

MULLER JOURNAL OF MEDICAL SCIENCES and RESEARCH

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EDITORIAL

Severe cutaneous adverse drug reactions

Dr Nanda Kishore B.

A drug may be defined as a chemical substance or combination of substances, administered for the investigation, prevention or treatment of diseases or symptoms, real or imagined. An adverse drug reaction (ADR) may be defined as an undesirable clinical manifestation resulting from administration of a particular drug. Another definition is that of 'an appreciably harmful or unpleasant reaction resulting from an intervention related to the use of a medicinal product, which predicts hazard from future administration and warrants prevention of specific treatment, or alteration of the dose regimen or withdrawal of the product'¹.

Drug reactions may be solely limited to the skin, or they may be part of a systemic reaction, such as the drug hypersensitivity syndrome or toxic epidermal necrolysis (TEN)². Clinical diagnosis of adverse cutaneous drug reactions can often be challenging. This is further compounded by history of multiple drug intake, viral fever and cutaneous manifestations of internal diseases. Raujeau has defined certain criteria in an attempt to arrive at a diagnosis of ADR. These are (a) exclusion of other causes such as viral exanthema, (b) a temporal relationship between the drug intake and onset of rash, (c) improvement on cessation of drug, (d) aggravation on rechallenging, (e) cutaneous reaction known to be associated with the drug³.

Drug reactions may be immunologically mediated (IgE dependent, cytotoxic, immune complex dependent and delayed type – cell mediated), non – immunologically mediated (over dose, pharmacologic side effects, cumulative toxicity, delayed toxicity, interactions etc) or idiosyncratic⁴.

Severe Cutaneous Adverse Drug Reactions (SCADR/ SCAR) include, Stevens Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN) and Drug Hypersensitivity Syndrome (DHS)⁵. Acute Generalized Exanthematous Pustulosis (AGEP) is a relatively new addition to this list. This condition is

characterized clinically by flaccid pustules (<5mm) on an erythematous background, fever (>38°C), neutrophilia haematologically and typical histopathological changes⁶. The causative drugs implicated in SCADR / SCAR are sulfonamides, anticonvulsants, NSAIDs, anti retroviral agents and antibiotics⁷.

However a two stage diagnostic procedure with skin tests (to exclude IgE mediated allergy) followed by single blinded placebo controlled oral challenges carried out on the previously diagnosed NSAID hypersensitivity showed 55% of such patients tolerated NSAID on rechallenging⁸.

Stevens Johnson Syndrome & Toxic Epidermal Necrolysis TEN/SJS:

Pathogenesis : Genetic susceptibility plays major role in the pathogenesis of TEN/ SJS. A recent study has shown that HLA-B*1502 is strongly associated with carbamazepine induced SJS⁹. It has been shown by *in vitro* assay that HLA- B* 1502 is specific for carbamazepine binding to cutaneous T Cells which express a large amount of granulysin which is the key mediator responsible for the extensive epidermal necrolysis in SJS/ TEN. This may provide a basis for the therapeutic target for developing methods for the treatment of SJS / TEN. HLA A-29, B -12 and DR – 7 are the other HLAs implicated. The lymphocytic infiltrate consists mainly of CD8 + in the epidermis and CD4 + in the dermis. Macrophages and keratinocytes produce TNF- α . TNF- and FasL (Fas ligand) act synergistically to produce apoptosis of the epidermal cells. The binding of FasL with CD 95 death receptors and TNF with TNF – RI receptors is another cause for the apoptosis¹⁰. In vitro studies support the role of reactive drug metabolites (RDM). The impaired detoxification of RDM appears to be the initiating factor as shown by the lymphocyte

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toxicity assay (LTA) which is a measure of lymphocyte phenotypic detoxification where in patients lymphocytes are exposed to drug's metabolites *in vitro*. The markedly increased sensitivity to these RDM is taken as an evidence of impaired detoxification¹¹.

Clinical manifestations: Initial symptoms of SJS/TEN are nonspecific including fever, stinging eyes, discomfort on swallowing etc which precede cutaneous manifestations by few days. The early cutaneous lesions which develop mostly over the presternal region, face, palms and sole are erythematous and livid macules with a tendency to coalesce, gradually large areas of epidermal detachment takes place showing a positive Nikolsky sign¹². Slowly with the progression of the disease, sheets of full thickness epidermis detach revealing dark red moist dermis. SJS involves less than 10% of body surface area (BSA), SJS / TEN overlap involves between 10-30% BSA and > 30% BSA involvement is referred to as TEN⁵. Mucous membrane is involved in > 90% of SJS & TEN involving oral and ocular mucosa, including oropharynx, anorectal junction, vulvovaginal region and urethral meatus.

A scoring system to assure the severity and prognosis of TEN has been evolved in 2000 by Bastuji – Garin et al.¹³ Seven prognostic factors which include age, presence of malignancy, surface area of involvement, heart rate, serum urea, bicarbonate and glucose are considered, each scoring one. The scorten calculated within 24 hrs of admission accurately predicts the risk of mortality.⁹

Management : Most important point is to have a high level of suspicion regarding the possibility of a drug reaction. The offending drug has to be identified and discontinued immediately¹⁴. As both SJS & TEN are potentially life threatening conditions, immediate admission in an intensive skin care unit is necessary. Fluid replacement and correction of electrolyte imbalance is of utmost importance. Use of systemic corticosteroids remains a controversy. IV immunoglobulins have been found to be very beneficial as they block the binding of Fas L to Fas which prevents the apoptotic process⁹. Cyclosporine in the dosage of 3-5 mg/kg/day has been found to be beneficial.

Drug Hypersensitivity syndrome (DHS)

This is another form of severe cutaneous adverse drug reactions characterized by the clinical triad of fever, skin rash and internal organ involvement¹¹. Several other descriptive names have been given to these type of drug reactions such as drug induced delayed multiorgan hypersensitivity syndrome (DIDMOHS), drug reaction with eosinophilia and systemic symptoms (DRESS), dapsone syndrome (when dapsone is the cause) etc¹¹.

The common drugs causing this syndrome are dapsone, sulphonamides, carbamazepine, barbiturates, phenytoin, minocycline, azathioprine and abacavir¹¹. Some of the *in vitro* tests which may help in finding out the offending drug and to prove the connection between a drug and the reaction are RAST (radioallergosorbent test), mast cell degranulation test, lymphocyte transformation test, lymphocyte toxicity assay, macrophage migratory inhibition factor test and interferon – gamma release test¹⁵.

Clinically, the syndrome includes fever, severe skin eruption, lymphadenopathy, hepatitis, hematological abnormalities with eosinophilia and atypical lymphocytes. The syndrome typically develops between two and six weeks of drug intake, facial oedema with periorbital accentuation may be the diagnostic finding. The lymph node involvement may be either a benign lymphoid pattern or pseudolymphomatous in type.^{5,10,11} The diagnostic criteria for DHS established by a Japanese consensus group consists of maculopapular rash developing > 3 weeks of drug intake, prolonged clinical symptoms after cessation of the drug, fever (38°C), liver abnormalities, haematological changes, lymphadenopathy and Human Herpes Virus 6 reactivation.

Treatment consists of withdrawal of the causative drug, systemic corticosteroids and IFN – which reduces the level of mRNA¹⁰.

Acute Generalized Exanthematous Pustulosis (AGEP) : This condition is characterized by the appearance of multiple disseminated sterile pustules on an erythematous background associated with fever and massive neutrophilia. The skin lesions appear initially over the face or in the intertriginous

areas, moving to the trunk and the lower limbs in a few hours. Some patients may develop facial oedema and purpuric lesions. Mucosal involvement is uncommon. The causative drugs include antibiotics like cephalosporins, fluoroquinolones and macrolides⁶. The treatment is symptomatic and consists of withdrawal of the causative drug. Corticosteroids are indicated only in severe conditions.

Severe Cutaneous adverse drug reactions are rare but serious conditions with significant mortality rates. Scortten is an important prognostic indicator in TEN and SJS⁹. As most of the SJS and TEN are caused by antiepileptics and limited data is available on the association of HLA-B*1502 and carbamazepine in India, it is worthwhile to conduct a multicentric study across the country in this regard¹⁶.

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ORIGINAL ARTICLE

A study to assess the causes and effect of turnover of nursing staff in a selected hospital in Mangalore

Sweta D'Cunha*, Sucharita Suresh³, Fr. Lijo Bastian⁶

ABSTRACT**BACKGROUND AND OBJECTIVES**

Hospital administrators are concerned about the high turnover of nursing staff. This badly affects the patient care, rhythm of the hospital and the goodwill of the hospital. So the factors affecting and the causes of this phenomenon needs to be analyzed. For this purpose the topic was selected with the objectives to identify the causes for nurses turnover and to assess the effect of nursing turnover in a selected hospital in Mangalore

RESEARCH METHODOLOGY

The study is a descriptive study. Sample consists of all top managers, 20 doctors and 35 nursing staffs of the hospital. Sample was selected by using simple random method. A questionnaire was used to collect information about the causes for nurse's turnover and the effect of nursing turnover on the hospital.

RESULTS

The study revealed that the main cause for nurse's turnover is institutional reasons and career reason. The second cause is interpersonal reasons and finally social & personal reasons also contribute to turnover. The study of the effect of turnover revealed that it affects the functioning of the hospital, as well as other health personnel and also will have an effect on patient care.

CONCLUSION

Nursing service is essential in any hospital to provide quality medical care. But the increasing nurses' turnover is creating scarcity of experienced and efficient nurses, who can provide expert service. Therefore, hospital managers at all costs must minimize nurses' turnover. The study conducted will help the administrator to find ways to avoid the turnover of nurses.

Introduction

Excessive employee turnover is the major problem faced by many healthcare employers. Organizations invest a lot on their employees in terms of induction and training, developing, maintaining and retaining them in their organization. Therefore, managers at all costs must minimize employee's turnover.

Good nursing care is impossible without enough nurses and without good nurses. Staff shortages caused by nursing turnover are associated with significant decreases in the general quality of patient care, increases in the length of patient stays within hospitals, and greater numbers of hospital-acquired patient illnesses. It also implies a reduction in skill and efficiency on the part of the other

workers and reduced output for the hospital. Nurses turnover is also expensive from the view of the organization as it entails manifold costs to the organizations.

The hospital administrator has the responsibility to provide an environment so as to keep nurses satisfied and emotionally stable, which will in turn improve the quality of nursing, and satisfy the patients. If there is no personnel or if they are unable to work then the entire functioning of the organization can grind to a halt, which could cause a lot of damage to the organization by way of loss of productivity, loss of money and even loss of

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reputation. The success of patient care and the reputation of the hospital depend to a large extent on the efficiency of care extended by the nursing staff.

There is a need to develop a fuller understanding of the nurses turnover, more especially, the sources - what determines the turnover, effects and strategies that managers can put in place minimize turnover. Hence to study the above subject the following objectives were framed:

1. To identify the causes for nurses turnover in a selected hospital in Mangalore
2. To assess the effect of nursing turnover in a selected hospital in Mangalore

Methodology

The study is conducted according to the Descriptive Research Design. Sample consists of all top managers, 20 doctors and 35 nursing staffs of the hospital. Sample were selected by using simple random method. The tool and technique adopted for the data collection was questionnaire. Two separate sets of questionnaire were prepared to collect the causes of nurses' turnover and the effect of nurses' turnover on the hospital.

The collected data was analyzed by Frequency, percentage, mean and standard deviation. Assessment is done based on the following category. If mean percentage is the interval 0- 25 not at all an cause/ effect 26-50 cause/ effect at low extent 51- 75 cause/ effect at moderate extent 76- 100 cause/ effect at high extent.

Results

Demographic Characteristics

Demographic Characteristics of Nurses: Less than half of the samples (46%) were of the age group 20-25 years, 37% of the subjects were in the age group of 25-30 years and only (17%) were above 30 years. Majority of the samples, (83%) were females and only 17% were males.

49% of the subjects had 1-3 years of experience, 37% had 3-6 years of experience and only 14% had the experience of more than 6 years. More than half of the subject (60%) finished Bsc nursing and 40% finished their GNM course

Demographic Characteristics of Doctors: Majority of the subjects (75%) were in the age group of 30-40 years, 15% of the subjects were in the age group of 40-45 years and only 10% were in the age group of 50-60 years . Majority of the subjects (85%) were males and 15% were females

More than half of the subjects (60%) had 5-10 years of experience, 30% had 1-5 years of experience and only 10% had more than 10 years of experience

Demographic Characteristics of Top managers: 37.5% of the subjects were in the age group of 30-40 years, 12.5% of the subjects were in the age group of 40-45 years, 37.5% of them were in the age group of 50-60 years and 25% were above 60 years. Males and females were included equally among the subjects. More than half of the subjects (62.5%) had above 10 years of experience, 25% of the subjects had 1-5 years of experience and only 12.5% had 5-10 years of experience.

Causes of nurses' turnover

The causes of turnover was assessed through a questionnaire that consisted of 28 items based on 5 areas, which were evaluated using a '3'point rating scale.

Among the five causes of nurses turnover, Institutional reasons and career factors are almost equally high extent causes for turnover. Interpersonal reasons stands second; personal and social reasons together stands third as causes for nurses turnover.

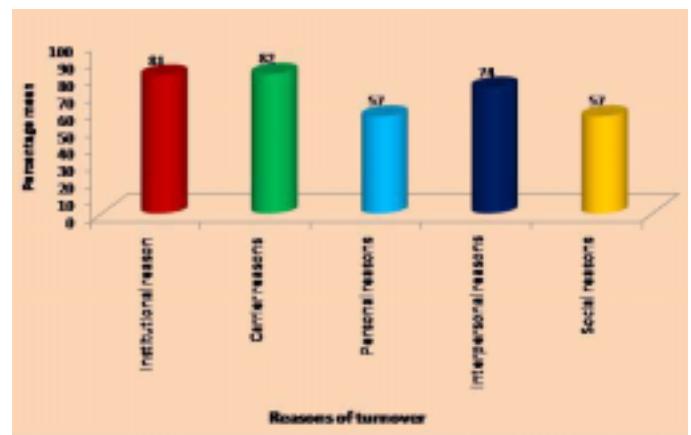


Fig 1: Comparison of the causes of nurse's turn over

Among the institutional reasons, factors such as workload, pay scale, lack of autonomy in work place, lack of incentives, discrimination by higher authorities, lack of advanced technology, working hours more than duty time were all causing nurses turnover with high extent.(All percentage mean > 75%). Other factors causes for nurses' turnover with moderate extent (all percentage mean is between 51 – 75%). Mrs. K.Lalitha S.Shankeraiah¹³, in their study realities and problems of nursing profession, states that the nurses in private sector pose problems like underestimation of their

profession, meager emoluments, unreasonably long working hours, deprivation of any growth, enhancing opportunity and pathetic working conditions with inadequate supplies of essential materials.

Among the career reasons for nurses turn over, the important factors considered as high extent are the lack opportunities for promotion and better opportunities in other places and, going for higher education. Other factors are such as lack of opportunities for professional growth and no exposure to different areas in the hospital are considered as the causes of moderate extent

Sl .No	Causes	Disagree	Partially agree	Agree	Mean	S D	Mean %
1	Work load	2(5.7)	8(22.9)	25(71.4)	2.66	0.59	88.57
2	Low pay scale	1(2.9)	9(25.7)	25(71.4)	2.69	0.53	89.52
3	Work schedule	5(14.3)	17(48.6)	13(37.1)	2.23	0.69	74.29
4	Lack of autonomy in workplace	2(5.7)	16(45.7)	17(48.6)	2.43	0.61	80.95
5	Lack of incentives	1(2.9)	11(31.4)	23(65.7)	2.63	0.55	87.62
6	Lack of equipment and supplies for doing nursing care.	9(25.7)	21(60.0)	5(14.3)	1.89	0.63	62.86
7	Discrimination by higher authorities	4(11.4)	18(51.4)	13(37.1)	2.26	0.66	75.24
8	Lack of advanced technology	4(11.4)	13(37.1)	18(51.4)	2.40	0.70	80.00
9	Working hours are more than duty time	3(8.6)	3(8.6)	29(82.9)	2.74	0.61	91.43
	Due to institutional reasons	-	-	-	2.43	0.37	81.16
1	Promotion in another hospital	1(2.9)	8(22.9)	26(74.3)	2.71	0.52	90.48
2	better opportunities in other places	0(0)	10(28.6)	25(71.4)	2.71	0.46	90.48
3	Lack of opportunities for professional growth	8(22.9)	13(37.1)	14(40.0)	2.17	0.79	72.38
4	Going for higher education	1(2.9)	15(42.9)	19(54.3)	2.51	0.56	83.81
5	No exposure to different areas in the hospital	3(8.6)	23(65.7)	9(25.7)	2.17	0.57	72.38
	Due to career reasons	-	-	-	2.46	0.29	81.90

Table 1: Causes of nurses' turnover due to institutional & career reasons

	Causes	Disagree	Partially agree	Agree	Mean	S D	Mean %
1	Heavy family burden	20(57.1)	8(22.9)	7(20.0)	1.63	0.81	54.29
2	Spouse working in some other places	27(77.1)	3(8.6)	5(14.3)	1.37	0.73	45.71
3	Children education	27(77.1)	3(8.6)	5(14.3)	1.31	0.76	43.81
4	Not feeling respected and valued for contributions and capabilities	6(17.1)	15(42.9)	14(40.0)	2.23	0.73	74.29
5	Leaving the job because of the sickness	26(74.3)	5(14.3)	4(11.4)	1.31	0.72	43.81
6	Lack of satisfaction with work	5(14.3)	11(31.4)	19(54.3)	2.40	0.74	80.00
	Due to personal reasons	-	-	-	1.71	0.38	56.98
1	Over bossism of other professionals	6(17.1)	14(40.0)	15(42.9)	2.26	0.74	75.24
2	Lack of co-ordination between other healthteam members.	8(22.9)	17(48.6)	10(28.6)	2.06	0.76	68.57
3	Lack of respect	5(14.3)	18(51.4)	12(34.3)	2.20	0.79	73.33
4	Lack of staff empowerment	1(2.9)	12(34.3)	22(62.9)	2.60	0.55	86.67
5	Inadequate staff communication	6(17.1)	24(68.6)	5(14.3)	1.97	0.57	65.71
	Due to inter personal reasons	-	-	-	2.22	0.44	73.90
1	Poor image of nursing	14(40.0)	10(28.6)	11(31.4)	1.91	0.85	63.81
2	Social discrimination	15(42.9)	14(40.0)	6(17.1)	1.74	0.74	58.10
3	Low social status in the community	22(62.9)	9(25.7)	4(11.4)	1.49	0.70	49.52
	Due to social reasons	-	-	-	1.71	0.61	57.14

Table 2: Causes of nurses’ turnover due to personal, interpersonal & social reasons

Among the personal reasons, lack of satisfaction with work causes at high extent, not feeling respected and valued for contributions and capabilities and heavy family burden are considered as the reason at moderate extent.

Among the causes due to interpersonal reasons, lack of staff empowerment is considered as the reason of high extent and the remaining causes are considered as the reason at moderate extent.

Among the social reasons, poor image of nursing and social discrimination are considered as causes at moderate extent. Low social status in the community is a cause low extent.

Many studies also indicate that important factors which result in employees quitting their jobs are [2] Low salary, better prospects in other hospitals, Poor working conditions, Transport problem, Housing problem, Marriage in case of female employees, Health grounds, Family circumstances, Further studies, Maltreatment by superiors, Unfriendly relations with colleagues, The attraction of going

back to one’s native place or going to a foreign country

Effect of Nurses’ Turnover According to Doctor

This section consists of the feedback of doctors about the effects of nurses’ turnover on the hospital. Majorly effect on institution, patient care & health personnel were considered. It was found that effect of turnover on institutional & effect on health personnel stands is high, and effect on patient care is moderate.

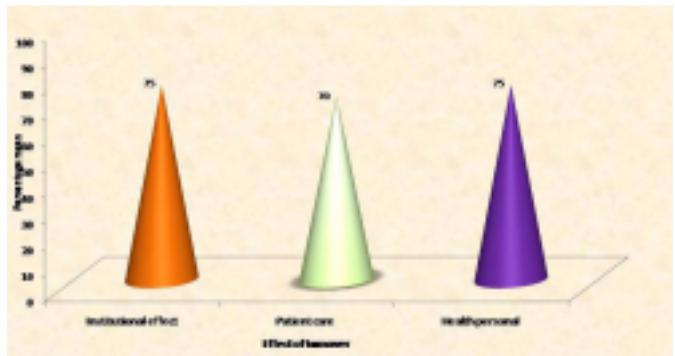


Fig 2: The effect of nurse’s turnover according to doctors

SI.No	Effect	Disagree	Partially agree	Agree	Mean	S D	Mean %
1	Difficulty in recruiting, training and orienting the new staff	2(10.0)	6(30.0)	12(60.0)	2.50	0.69	83.33
2	poor ward management	3(15.0)	9(45.0)	8(40.0)	2.25	0.72	75.00
3	confusion in emergency situation	2(10.0)	5(25.0)	13(65.0)	2.55	0.69	85.00
4	reduced speed of work	1(5.0)	7(35.0)	12(60.0)	2.55	0.61	85.00
5	Poor material management	5(25.0)	8(40.0)	7(35.0)	2.10	0.79	70.00
6	Difficulty in giving leaves	4(20.0)	8(40.0)	8(40.0)	2.20	0.77	73.33
7	Increased demand of the retained staff nurses	3(15.0)	3(15.0)	14(70.0)	2.55	0.77	85.00
8	Difficulty in maintaining the records of the staff	5(25.0)	12(60.0)	3(15.0)	1.90	0.64	63.33
9	Difficulty in assigning work to a new staff	5(25.0)	8(40.0)	7(35.0)	2.10	0.79	70.00
10	Risk of the remaining nurses quitting due to excess work load	6(30.0)	11(55.0)	3(15.0)	1.85	0.67	61.77
	Institutional effect	-	-	-	2.26	0.35	75.17
1	Nurses turnover affects the quality of patient care	3(15.0)	7(35.0)	10(50.0)	2.35	0.75	78.33
2	Difficulty in documentation of the patient data	8(40.0)	7(35.0)	5(25.0)	1.85	0.81	61.67
3	Lack of continuity in patient care	4(20.0)	7(35.0)	9(45.0)	2.25	0.77	75.00
4	Lack of inter departmental coordination for patient care	6(30.0)	8(40.0)	6(30.0)	2.00	0.80	66.67
	Patient care	-	-	-	2.11	0.55	70.42
1	Heavy work load for the remaining staff	4(20.0)	6(30.0)	10(50.0)	2.30	0.80	76.67
2	Nurses turnover affects the team work of medical personal	2(10.0)	9(45.0)	9(45.0)	2.35	0.67	78.33
3	Nurses turnover affects proper execution of doctor's orders	3(15.0)	6(30.0)	11(55.0)	2.40	0.75	80.00
4	Less resting hours for the remaining staff	4(20.0)	10(50.0)	6(30.0)	2.10	0.72	70.00
5	Difficulty in communication with other health team members	5(25.0)	7(35.0)	8(40.0)	2.15	0.81	71.67
	Health personal	-	-	-	2.26	0.57	75.33

Table 3- Effect of Nurses' Turnover According to Doctor

Among the effects on institution are difficulty in recruiting, training and orienting the new staff, nurses turnover leads to confusion in emergency situation nurses' turnover leads to reduced speed of work and increased demand of the retained staff nurses stands as the effect at high extent. The remaining effects (i.e, poor ward management, poor material management, difficulty in getting leave, difficulty in maintaining records, difficulty in assigning work to new staff, risk of remaining nurses quitting are considered as the effects at moderate extent. Robinson D.Chestle and wai chi Tai Teresa state that the additional burden put on the remaining staff during a turnover imposed transmission makes be a stressful climate fostering further turnover. Nearly three fourth of the hospital nurses said that in the past year they have witnessed a negative impact on the quality of the patient care as there are greater number of patients per nurse and increases in additional turnover among experienced nurses⁷.

Among the effect on patient care, nurse's turnover affects the quality of patient care stand at high extent. Other reasons like lack of continuity in patient care, lack of inter departmental coordination for patient care and difficulty in documentation of the patient data are considered at moderate extent

Among the effect on health personal, the effects which stands at high extent are, heavy work load for the remaining staff, nurses' turnover affects proper execution of doctor's orders and nurses' turnover affects the team work of medical personal. The causes which stand at moderate extent are, less resting hours for the remaining staff and difficulty in communication with other health team members. High levels of nurse turnover create a disruptive, unstable work environment that negatively impacts the retention of other medical service providers that work with the nurses. Anderson et al (2004)

Effect of Nurses' Turnover According To Top Managers

This section consists of the feedback of top managers about the effects of nurses' turnover on the hospital. Majorly effect on institution, patient care & health personnel were considered. Effect of turnover on institutional stands first, effect on health personal stands second and effect on patient care stands last.

Denvir, McMahon⁶ states that if employee turnover is not managed properly it would affect the organization adversely in terms of personnel costs and in the long run it would affect its liquidity position. However, voluntary turnover incurs significant cost, both in terms of direct costs (replacement, recruitment and selection, temporary staff, management time), and also (and perhaps more significantly) in terms of indirect costs (morale, pressure on remaining staff, costs of learning, product/service quality, organizational memory) and the loss of social capital. The staffing shortages caused by nurse turnover can lead to an increase in accident rates and absenteeism levels among the nurses who remain.

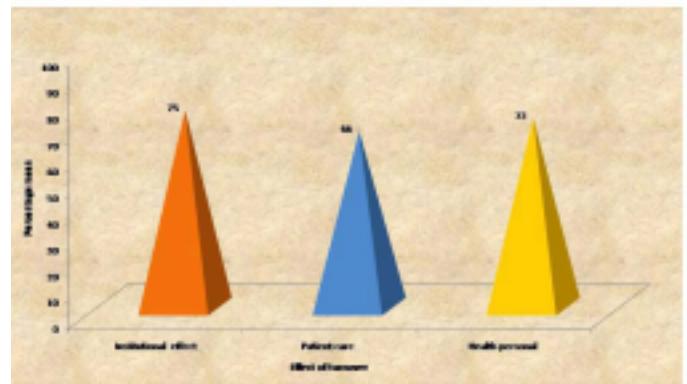


Fig 3: The effect nurse's turnover according to top managers

Among the effect on institution, the effects which is at high extent are, difficulty in maintaining the records of the staff, nurses turnover leads to poor ward management, nurses turnover leads to reduced speed of work, poor material management, difficulty in recruiting, training and orienting the new staff.

Among the effect on Patient Care, nurses' turnover affects the quality of patient care stand at high extent. Other reasons like, lack of continuity in patient care, lack of inter departmental coordination for patient care and difficulty in documentation of the patient data are considered at moderate extent

Among the effect on health personal, the effects which stands at high extent are, heavy work load for the remaining staff. The causes which stands at moderate extent are, nurses' turnover affects proper execution of doctor's orders and

nurses' turnover affects the team work of medical personal, less resting hours for the remaining staff

and difficulty in communication with other health team members.

SI.No	Effect	Disagree	Partially agree	Agree	Mean	S D	Mean %
1	Difficulty in recruiting, training and orienting new staff	0(.0)	3(37.5)	5(62.5)	2.63	0.52	87.50
2	Nurses turnover leads to poor ward management	1(12.5)	2(25.0)	5(62.5)	2.50	0.76	83.33
3	Nurses turnover leads to confusion in emergency situation	2(25.0)	3(37.5)	3(37.5)	2.13	0.84	70.83
4	Nurses turnover leads to reduced speed of work	0(.0)	4(50.0)	4(50.0)	2.50	0.54	83.33
5	Poor material management	0(.0)	5(62.5)	3(37.5)	2.38	0.52	79.17
6	Difficulty in giving leave	2(25.0)	5(62.5)	4(50.0)	2.25	0.89	75.00
7	Increased demand of the retained staff nurses	2(25.0)	1(12.5)	5(62.5)	2.38	0.92	79.17
8	Difficulty in maintaining the records of the staff	5(62.5)	1(12.5)	2(25.0)	1.63	0.92	54.17
9	Difficulty in assigning work to a new staff	3(37.5)	2(25.0)	3(37.5)	2.00	0.93	66.67
10	Risk of the remaining nurses quitting due to excess work load	2(25.0)	3(37.5)	3(37.5)	2.13	0.84	70.83
	Institutional effect	-	-	-	2.25	0.53	75.00
1	Nurses turnover affects the quality of patient care	1(12.5)	3(37.5)	4(50.0)	2.38	0.74	79.17
2	Difficulty in documentation of the patient data	4(50.0)	2(25.0)	2(25.0)	1.75	0.89	58.33
3	Lack of continuity in patient care	3(37.5)	3(37.5)	2(25.0)	1.88	0.84	62.50
4	Lack of inter departmental coordination for patient care	4(50.0)	1(12.5)	3(37.5)	1.88	0.99	62.50
	Patient care	-	-	-	1.97	0.81	65.63
1	Heavy work load for the remaining staff	0(.0)	4(50.0)	4(50.0)	2.50	0.54	83.33
2	Nurses turnover affects the team work of medical personnel	2(25.0)	3(37.5)	3(37.5)	2.13	0.84	70.83
3	Nurses turnover affects proper execution of doctor's orders	2(25.0)	3(37.5)	3(37.5)	2.13	0.84	70.83
4	Less resting hours for the remaining staff	4(50.0)	2(25.0)	2(25.0)	1.75	0.89	58.33
5	Difficulty in communication with other team members	2(25.00)	2(25.0)	4(50.0)	2.25	0.89	75.00
	Health personal	-	-	-	2.15	0.60	71.67

Table 4- Effect of Nurses' Turnover According to Top Managers

Conclusion

Nursing service is essential in any hospital to provide quality medical care. But the increasing nurses' turnover is creating scarcity of experienced and efficient nurses, who can provide expert service. The study conducted helps to identify the major causes of nurses' turnover as extended working hours, better future prospective, low pay scale, heavy work load, lack of job satisfaction etc which stimulate the nurses to leave the hospital. The study also revealed affect of this increased nurses' turnover on the hospital in terms of increased recruitment cost, increasing demand of retained nurses, reduced work speed, adverse effect on team work and poor ward management.

Hence the study helps hospital administrators by giving clear insight about various reasons of nurses' turnover and effect of these factors on hospital functioning in order to address this problem effectively.

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ORIGINAL ARTICLE

Antibiotic usage among doctors

Nishan Mathias⁶, Padmaja Udaykumar*, Oliver Clement Lobo⁷

ABSTRACT**OBJECTIVE**

This study was designed to evaluate the antibiotic usage pattern among doctors in a tertiary care hospital.

MATERIALS AND METHODS:

The study was a questionnaire based study conducted at Father Muller Medical college, Mangalore, Karnataka, India. 100 doctors from various specialties were randomly selected and were asked to fill a questionnaire to find out about their usage of antibiotics upon themselves.

RESULTS

The results showed that most of the doctors involved in the study, self prescribed. Most of the doctors also completed the course but only a few of them had obtained a culture sensitivity before using the medications. The percentage of doctors who experienced adverse effects was small.

CONCLUSION

The study showed the effective antibiotic usage among doctors.

KEY WORDS

Antibiotic, Doctors, Self-prescribed

Introduction

Doctors are generally considered to be bad patients. Unlike the rest of the population, when a doctor falls ill, he often self prescribes. With the easy accessibility to prescriptions for medicines, self prescription has become a convenient option. Previous studies suggest that self-prescription is common among practicing physicians¹.

Antibiotics have attained wide popularity since their introduction due to their great therapeutic value in eradicating pathogens. Unfortunately, the excessive and inappropriate use of antibiotics results in antibiotic resistance, which is a rapidly increasing global problem, with a strong impact on morbidity and mortality. This therefore, increases threat to public health². Despite this knowledge, unnecessary use of antibiotics remains common. The various factors contributing to the overuse of antibiotics include the lack of education, patient's expectations, past experience and economic incentives³. However, inappropriate use of drugs particularly antibiotics

among doctors themselves is not uncommon. Keeping this in mind, our study was designed to evaluate the antibiotic usage pattern among doctors in a tertiary care hospital.

Material and Methods

The study was approved by the institutional ethics committee. 100 doctors from various departments, with the designations ranging from assistant professors to professors were selected for the study on a random basis. The purpose of the study was explained to the participating doctors and an oral informed consent was obtained. A self assessment questionnaire was provided to them. The questionnaire consisted of 8 questions which checked the usage of antibiotics by the participants over the last two years, with indications, culture reports, type of drugs with dose and duration and

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also the outcome and adverse effects observed. After the completion of data collection, the data was analysed, reviewed and evaluated.

Results

A total of 100 doctors, of both sexes, and from different specialties agreed to participate in the study. Out of the 100 doctors who filled the proforma, 14 claimed that they had not used antibiotics for the past 6 months, as seen in figure 1. Out of the remaining 86 doctors, 69.7% of them took antibiotics for 5 or more days, leaving 30.3% of them taking antibiotics for less than 5 days, as seen in figure 2. Among the 86 doctors, only 4.65% confirmed their infection with a culture and sensitivity test before proceeding, as seen in figure 3. However, only 1 doctor was not happy with the outcome and 18.6% of them experienced adverse effects, as seen in figure 4.

Discussion

The current study examined the antibiotic usage pattern among doctors in a tertiary care hospital in Mangalore, Karnataka, India. All the doctors involved in the study were Indians and were residing in Mangalore. Studies on factors associated with antibiotic use are important to prevent the occurrence of antibiotic resistance^{4,5}.

A study done by DC Jason et al has shown self prescription to be prevalent among internal medicine residents in the U.K., pertaining to the use of antibiotics overuse or inappropriate use of antibiotics⁶. In a study on subjects from 9 countries, who were interviewed for antibiotic usage in the U.K, 72% of the 5379 subjects believed that antibiotics were needed for minor infections like sore throat⁷. However, there are limited studies done on doctors themselves as patients.

Figure 1: Doctors who used antibiotics in the last 6 months



Figure 2: Percentage of doctors who completed the course



Figure 3: Percentage of doctors who confirmed through culture sensitivity



Figure 4: Percentage of doctors who observed adverse effects



We found that 86% of the subjects took a course of antibiotics in the previous six months, and 60% completed the course. 31.3% of the subjects included in a study did not complete the course, which was better, as compared to 47% of subjects in Thailand. However, much lower than 10% in UK left the course incomplete⁷. In our study, culture was opted for only in 4.65% of the cases, with a majority of these (70.9%) being done for respiratory infections. Since we know that most of the upper respiratory tract infections are of viral etiology and are self limiting, antibiotic usage in these conditions could be irrational. Inadequate duration of antibiotic usage has been shown to be one of the major causes of antibiotic resistance⁸.

The remission or cure of infections among doctors in our study was good, which could be because of either effective antibiotic usage or due to unnecessary usage i.e. when there was no actual bacterial infection at all. However, further large scale studies are required to know the percentage of these minor infections which actually need antibiotics.

Conclusion

It is a known fact that most of the practicing physicians and other doctors self prescribe for minor ailments and most of them completed the course most of the times.

The increasing incidence of drug resistance towards antibiotics is of great concern. Despite this knowledge, an irrational use of antibiotics still exists. In conclusion, the use of antibiotics for minor infections like upper respiratory tract infections

particularly viral infections should be avoided wherever possible and antibiotics usage should be based on the culture sensitivity report.

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ORIGINAL ARTICLE

Assessment of risk factors and effectiveness of learning package on prevention of risk factors during pregnancy among antenatal women attending the selected health care centres at Mangalore

Shiji P.J*

ABSTRACT

BACKGROUND

Pregnancy is a period of excitement, expectancy, some anxiety and even fear. It is a tragic fact of life that in the very act of giving births, of achieving motherhood, nearly half a million women die every year in the world.

AIM & OBJECTIVES

The main aim of this study was to find out the various risk factors among antenatal women during pregnancy as well as to educate the antenatal women regarding prevention of risk factors during pregnancy.

METHODS

A descriptive evaluative approach with one group pre-test post-test design was used for this study to conduct in two community health centres (CHC) at Mangalore. The sample comprised of 50 antenatal women who were primipara or multipara in first, second and third trimester, attending antenatal clinic. Sample was selected by using convenient sampling technique. to data collection process. Data was collected by using antenatal assessment checklist to identify the risk factors and interviewed by a structured interview schedule before and after the administration of learning package.

RESULTS

Overall the antenatal assessment showed that majority (96%) of samples was abnormal with presence of one or other risk factors indicating high risk pregnancy. Only 2% of them were normal without any presence of risk factors indicating healthy pregnancy state.

A paired' test was computed to see the effectiveness of learning package showed that Mean post-test knowledge score (28.22) was significantly higher than their mean pre-test knowledge score (13.12). The calculated 't' value ($t_{49}=39.474, P<0.05$ and $P<0.01$ level of significance). This strongly indicates learning package was effective in increasing knowledge of antenatal women on prevention of risk factors during pregnancy.

CONCLUSION

The findings of this study support the need for conducting educational programme to increase the knowledge of antenatal women on prevention of risk factors during pregnancy. Educating the antenatal women helps to bring down the maternal and neonatal mortality and morbidity rate.

KEY WORDS

Assessment; Effectiveness; Learning Package; Prevention of risk factors; Antenatal women; Descriptive ;Evaluatory approach.

Introduction

Pregnancy is a stress that may unmask a variety of medical conditions including hypertension, pre-eclampsia, metabolic syndrome, gestational diabetes and ischemic heart disease, etc¹. It is estimated that 5,85,000 women die each year

because of high risk factors during pregnancy and childbirth; of these 99% deaths are in developing countries (WHO)².

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Every minute of every day, somewhere in the world and most often in a developing country, a woman dies from complications related to pregnancy. It is stressed that 70% of all maternal deaths are caused by the factors like haemorrhage (24%), infection (15%), unsafe abortion (13%), high blood pressure (12%) and obstructed labour (8%). Nevertheless poverty, social exclusion, low levels of education and violence against women are powerful underlying causes of maternal death and disability³.

The worldwide maternal mortality ratio reflects a women's risk of dying each time she becomes pregnant. The maternal mortality rate (MMR) in India is 405 per lakh live births⁴, where as in Karnataka it is 195 per lakh live births⁵, and in Dakshina Kannada it is 90 per lakh live births in 2007,⁶ even today MMR in India is 204 per lakh live birth..

The purpose of the study was to find out the various risk factors among antenatal women during pregnancy as well as to educate the antenatal women regarding prevention of risk factors during pregnancy. This would enable them to take care of themselves at home to maintain stringent vigilance for early signs of complications and seek medical aid immediately. Thus the antenatal women will be free from the complications related to pregnancy. However, there is lack of knowledge and practice regarding the preventive measures of risk factors during pregnancy.

Objectives of the study

1. To assess the risk factors among antenatal women as measured by antenatal assessment check list.
2. To determine the level of knowledge of antenatal women on prevention of risk factors during pregnancy as measured by structured interview schedule.
3. To determine the effectiveness of learning package on prevention of risk factors for antenatal women in terms of gain in knowledge score as measured by structured interview schedule.
4. To find the association of risk factors with selected demographic variables.

Methods

A descriptive evaluatory approach with one group pre-test post-test design was used for this study. The study was carried out in two community health centres (CHC) at Mangalore, Dakshina Kannada District. The sample comprised of 50 antenatal women who were primipara or multipara in first, second and third trimester, attending antenatal clinic. Sample was selected by using convenient sampling technique. Data collection was done from 1st August to 23rd August, 2008. Formal written permission from DHO as well as concerned Medical officers and informed consent from the antenatal women were obtained prior to data collection process. Data was collected by using antenatal assessment checklist to identify the risk factors.



Checking Blood Pressure



Checking Hemoglobin



Checking blood sugar using glucometer

Later, antenatal women were interviewed by using a structured interview schedule before and after the administration of learning package on prevention of risk factors during pregnancy.



Checking foetal heart sounds using foetoscope



Educating and discussing with antenatal women through learning package

Results

The results of this study depicted in the figure showed that majority (56%) of samples had Hb level below 12-14 gm %, about 8% of them had presence of pallor, 10% of them had bleeding gums indicating risk for anaemia in pregnancy. About 44% of samples had increased level of blood sugar and (2%) had abnormal weight indicating risk for gestational diabetes and maximum (34%) of samples had head ache, pitting oedema (2%), ankle oedema (2%), facial oedema (2%), puffiness of eyes (2%), increased Blood Pressure (2%) and presence of albumin in urine (6%) indicating risk for pre-eclampsia. None of the samples had any factors indicating risk for early bleeding in pregnancy.

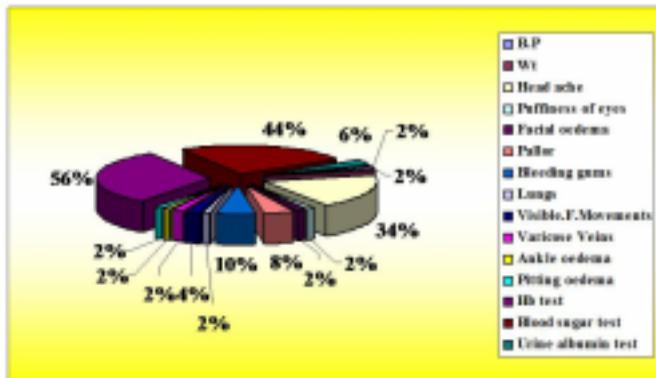


Figure: Pie diagram showing distribution of samples according to the identified risk factors among antenatal women

Overall the antenatal assessment showed that majority (96%) of samples were abnormal with presence of one or other risk factors indicating high risk pregnancy. Only 2% of them were normal without any presence of risk factors indicating healthy pregnancy state as presented in the table.

Table: Frequency Percentage Distribution of Samples According to Antenatal Assessment N=50

Antenatal women	Frequency (f)	Percentage (%)
NORMAL	2	04
ABNORMAL	48	96
TOTAL	50	100

The study results also revealed that antenatal women in general lacked knowledge regarding prevention of risk factors during pregnancy before administration of learning package. The data presented in Figure show that majority (50%) of the antenatal women had an average (10-20 scores) level of knowledge and about 38% of them had poor (<10 scores) level of knowledge. Only 12% of the antenatal women had good (21-30 scores) level of knowledge on prevention of risk factors during pregnancy in pre-test where as in the post-test, majority (64%) of the antenatal women had good (21-30 scores) level of knowledge and about 36% of the antenatal women had excellent (31-40 scores) level of knowledge on prevention of risk factors during pregnancy.

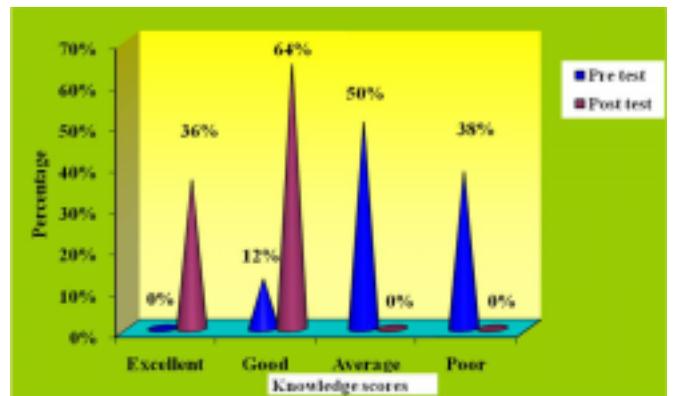


Figure: Cone diagram showing distribution of samples according to the level of Pre-test and post-test knowledge scores

Mean post-test knowledge score (28.22) was significantly higher than their mean pre-test knowledge score (13.12). This indicates that there was considerable gain in knowledge scores, suggesting that learning package was adequately effective in increasing the knowledge of antenatal women regarding prevention of risk factors during pregnancy.

Area-wise mean percentage pre-test and post-test knowledge score of antenatal women shows highest gain (41.11%) in the area of concept of high risk pregnancy and least (28.86%) in the area of prevention of diabetes in pregnancy in pre-test where as in the post-test highest gain (76.18%) in the area of prevention of pre-eclampsia and least (63.43%) in the area of prevention of diabetes in pregnancy.

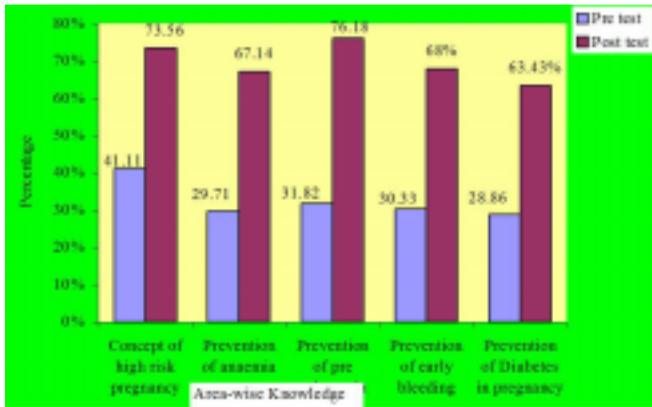


Figure ; Bar diagram showing area-wise distribution of mean percentage pre-test and post-test knowledge scores on prevention of risk factors during pregnancy

A paired ‘t’ test was computed to see the effectiveness of learning package showed that post-test knowledge scores were significantly higher than the pre-test knowledge scores ($t_{49}=39.474, P<0.05$ and $P<0.01$ level of significance). This strongly indicates learning package was effective in increasing knowledge of antenatal women on prevention of risk factors during pregnancy.

Table: Mean, Mean Difference, Standard Deviation and ‘t’ value between Pre- test and Post- test Knowledge Scores N=50

Group	Knowledge scores	Mean	Mean difference	Standard deviation	SD (d)	df	t’ value	Level of significance
Antenatal women	Pre-test	13.12		5.382				
	Post-test	28.22	15.100	4.473	2.705	49	39.474	Significant

$t_{(49)}=2.021 p<0.05$ $t_{(49)}=2.704 p<0.01$

Chi-square was computed to test the association between risk factors and selected variables. There was an association between dietary pattern and varicose vein, urine albumin test, trimester of pregnancy and haemoglobin test, family history of any disease and coated tongue, history of previous labour and haemoglobin test at 0.05 level of significance. There was no association between risk factors and rest of the variables at 0.05 level of significance.

Discussion

The findings of this study support the need for conducting educational programme to increase

the knowledge of antenatal women on prevention of risk factors during pregnancy^{7,8,9}. Educating the antenatal women helps to bring down the maternal and neonatal mortality and morbidity rate. This study finding are consistent and significant with the findings of other researchers study conducted in various places such as Manipal, Mangalore, Udupi, Chennai etc^{10,11,12,13}.

Limitations

1. The study was conducted on a small sample, which limits the generalization of the findings.
2. Randomization of sample was not possible due to limited number of antenatal women at a time.
3. The study did not use any control group. The investigator had no control over the events that took place between pre-test and post-test.
4. No follow up was conducted to measure the retention of knowledge of antenatal women after the post-test.
5. Structural knowledge interview schedule was used to collect information, which restricts the response of the respondents.

Suggestions

1. Child birth preparation classes can be planned and organized for couples attending the antenatal clinic.
2. The health professionals could arrange continuing educational programmes on prevention of risk factors during pregnancy in the hospital OPD, community area and PHC.
3. There should be a hospital policy for antenatal women to undergo child birth preparation classes.
4. Nursing college teachers should motivate the students to give mass health education programmes on the prevention of risk factors during pregnancy for community people.

Recommendations

1. A similar study may be replicated on a large sample with different settings with different demographic characteristics.
2. An experimental study can be undertaken with control group.
3. A study may be carried out to evaluate the effects of educational intervention on mothers who

are at high risk and mothers who are at low risk during pregnancy.

4. A study may be conducted using other teaching strategies like video, film, skits, role play, etc.

5. A comparative study to test the effectiveness of teaching through an information booklet on prevention of high risk pregnancy between rural and urban antenatal women may be conducted.

6. A study may be conducted to assess the knowledge of practicing midwives (ANM, GNM) regarding prevention of risk factors during pregnancy.

7. A follow up study may be conducted to determine the effectiveness of SIM in terms of change in behaviour towards self care among those subjects to whom the SIM was administered.

8. An extensive teaching strategy/ protocol may be developed in all aspects of high risk pregnancy separately.

9. A comparative study may be carried out to assess the level of knowledge on prevention of risk factors during pregnancy between primigravida and multi gravida women.

Interpretation and Conclusion

The present study proved that the learning package is an effective teaching strategy to improve the knowledge of antenatal women on prevention of risk factors during pregnancy. The result of the study showed that there is a great need for health professionals to educate the antenatal women regarding prevention of risk factors and promotion of health during pregnancy. This will bring down greatly the maternal mortality rate among antenatal women.

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ORIGINAL ARTICLE

“Tharmac gynoprep Thin Layer Cytology”- Simple, inexpensive method of Liquid Based Cytology

Hilda Fernandes*, Sujaya V Rao¹, Nagaratna¹, Mukta R Pai¹, Leena JB³, Kirana Pailoor³, Nisha J Marla²

ABSTRACT**BACKGROUND**

Liquid based cytology (LBC) is a technique that enables cells to be suspended in a monolayer and thus better morphological assessment is possible. The more widely used technologies for LBC require expensive equipment. We report a study of a simple, inexpensive cytocentrifugation method LBC for cervical cytology.

AIM

The purpose of this study is to evaluate cytocentrifugation method of LBC of “Tharmac gynoprep Thin Layer Cytology” marketed in India by Wheecon Instruments and compare it to the conventional Pap Smear (CS).

MATERIALS AND METHODS

Conventional smears were prepared using Ayer’s spatula and endocervical brush and fixed immediately. Samples for LBC were collected using Cervex Brush ® Combi, head of which was detached and dropped in gynoprep preservative vial and processed in cytocentrifuge. Both the CS and LBC slides were stained with Papanicolaou stain.

STATISTICAL ANALYSIS

Statistical evaluation was carried out testing equality of proportions by Z-test. The result was considered significant when $P < 0.05$.

RESULTS

A total of 115 women were part of this study. LBC smears allowed better morphological assessment as the cells were suspended in a monolayer with reduction in cell overlapping, inflammatory cells, blood, mucus and artifacts. In LBC, 6 were (5.4%) unsatisfactory, in CS, 14 (12.7%) were unsatisfactory. Five cases were unsatisfactory in both methods. In CS, 94 (85.4%) cases of NILM, 1 each of ASCUS and SCC were reported. In LBC, 98 (89%) cases of NILM, 5 cases of ASCUS and 1 SCC were detected. Two samples were subjected for HPV testing. Histopathological correlation was available in 12 cases. **Conclusion:** This method of LBC is diagnostically reliable, with an overall improvement in sample preservation, specimen adequacy and visualization of cell morphology. It offers the possibility of additional molecular testing and is more cost effective than the expensive automated systems.

KEY WORDS

gynoprep, monolayer, LBC, conventional

Introduction

The pap smear has been utilized for cervical cancer screening for more than 50 years. Despite being credited with a 70% reduction in mortality for cervical cancer, the false negative rate is still a cause for concern. It is widely acknowledged that two third of the overall false negative rate can be attributed to sampling errors. Liquid Based Cytology (LBC) was introduced to overcome these limitations.

The two technologies – Thin Prep (Cytoc Corp) and Surepath (Tripath Imaging Inc) are widely used¹. These require expensive equipment leading to a significant increase in the price of LBC. The Liquid Based Cytology performed by cytocentrifugation exists since 1970’s. Studies have shown that this

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method of LBC significantly reduces the cost^{2,3,4}. Any cytology laboratory equipped with a cytocentrifuge can use this technique. No additional device is required. Information on the efficacy and effectiveness of systems based on cytocentrifugation is not readily available.

The purpose of this study is to evaluate cytocentrifugation method of LBC of "Tharmac gynoprep Thin Layer Cytology" marketed in India by Wheecon Instruments and compare it to the conventional Pap Smear (CS)

Materials and Methods

The present study was conducted on 115 women attending gynaecology department of our hospital. These included women who came for general gynaecologic checkup and women with gynaecologic complaints like bleeding per vaginum, irregular menses, pain in the lower abdomen, post coital bleeding or any abnormal findings on per speculum examination. After a detailed history and thorough clinical examination, conventional smears (2 smears) were taken from the cervix with an Ayer's spatula and endocervical brush. Slides were prepared and fixed immediately in Methanol. Cellular material for LBC was collected using Cervex Brush® Combi. According to the manufacturer's instructions the brush was inserted into the cervix, rotated clockwise twice, the head was detached, dropped into 'Tharmac gynoprep cell preservative' vial and sent to the laboratory. In the cytology laboratory LBC samples were processed according to the manufactures instruction manual Viz. After the assembly of the Ecofunnel system, the fixation solution for dilution is pipetted into the Ecofunnel. Cell preservation fluid with cells is taken after shaking thoroughly, avoiding the mucus. Cytotechnologist determined the volume of diluent fixation fluid depending on the turbidity of the cell rich preservative fluid. The volume of cell rich preservative varied from 0.5ml to 2ml. The samples were spun in Tharmac Cytospin for 10minutes at 1200 RPM to get an uniform rectangular smear of 22mm x 15mm on the slide. Slides from both (conventional smear) CS & LBC were stained with Papanicolaou stain, were reported using Bethesda 2001 reporting system. The results were compared. Histopathological correlation was done wherever possible. Statistical evaluation was carried out

testing equality of proportions by Z-test. The result was considered significant when $P < 0.05$.

Results

Conventional smears and LBC samples from 115 women were compared in this study. The minimum age of the woman screened was 22 years and maximum was 74 years. Fifty eight (50%) women belonged to the 5th decade of life followed by 25 (21%) women in their 4th decade. Most common presenting complaint was irregular menses followed by lower abdominal pain. The conventional and LBC slides differed markedly in their appearance

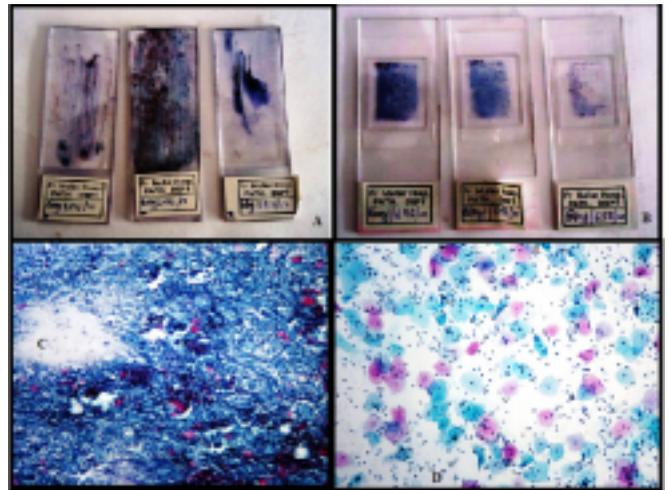


Fig 1 . Macroscopic appearance of smears. A-CS, B- LBC: C- clumping of cells in CS(10X, Papanicolaou), D-monolayered spread of cells in LBC(10X, Papanicolaou)

(Fig 1). LBC slides displayed uniform layer of cells across 22 x 15 mm area, whereas conventional smears were distributed in streaks of variable density over a variable area of the slide. The density in LBC also varied according to the cellularity. Mucus and blood was significantly reduced in LBC compared with CS, and leukocytes were randomly distributed throughout (Fig 2) . Out of 115 cases, 5 cases were unsatisfactory for evaluation in both the methods and these were excluded from the comparison. Fourteen(14) cases were unsatisfactory in conventional smear method and 11 in LBC method initially. Repeat preparation of LBC with more cell sample, yielded satisfactory cellularity in 5 cases reducing the number of unsatisfactory samples to 6. (5.45%). Distribution of lesions is as

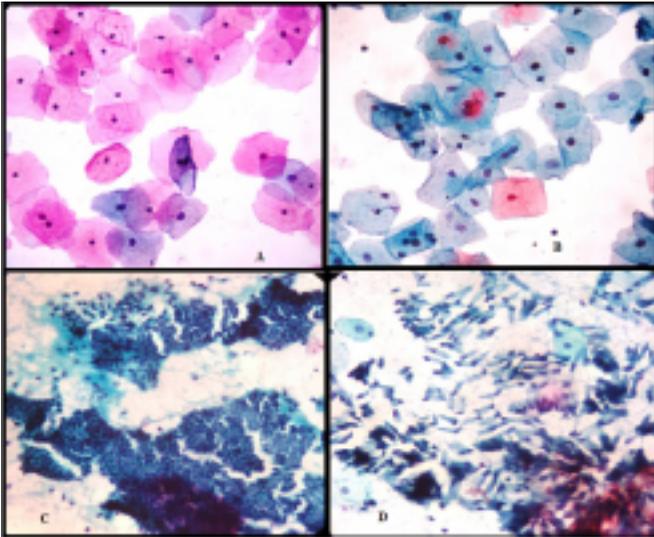


Fig 2. Morphology of cells in LBC(40X, Papanicolaou). A-superficial cells, B-intermediate cells, C & D- endocervical cells

shown in the table1. Two samples were sent for Human Papilloma Virus (HPV) testing and were found to be negative. In 12 cases, histopathological correlation was available. These patients underwent hysterectomy for unrelated reasons. Eleven (11) cases which were NILM on cytology showed features of chronic cervicitis. One case which was reported as ASCUS only on LBC showed CIN I on histology. Corresponding CS was unsatisfactory. The most common cause of unsatisfactory smear on LBC was dense fluid in the background (4 cases). These samples were grossly bloody. Repeat preparations did not improve the quality. Corresponding CS revealed partially obscuring blood. In CS, unsatisfactory smears were due to scant cellularity (8 cases), obscuring inflammation (3cases), blood (2cases) and Mucus(1case). Transformation zone component was seen 97 cases (88%) of CS and 70 cases (63%) of LBC. Cell yield of endocervical component was better in CS.

Discussion

Liquid based cytology offers better cell morphology. The specimen is collected in a preservative solution rather than being directly spread on the slide. Cellular structure is better preserved because the cells are immediately fixed. The process prevents drying artifacts, removes most contaminating blood, mucus and inflammatory cells. Many authors have reported that Papsin or

cytocentrifugation method offers equally good qualitative results^{2,3,4,5,6,7}. Cytomorphology in LBC was better when compared to CS in our study. One of the advantages of the liquid based preparations is the low unsatisfactory rate due to optimal cell fixation and easy monitoring of preparation quality. Park et al have reported a threefold reduction of unsatisfactory rate with Thin Prep LBC⁸. Studies have shown reduction of unsatisfactory rate with manual and cytocentrifugation methods of LBC^{9,10,11,12}. Additionally this method of LBC allows reprocessing of unsatisfactory samples³. Satisfactory results were obtained after reprocessing of 5 out of 11 LBC samples in the present study. HPV DNA testing and cell block preparation can also be performed from the residual fluid^{13,14,15}. Microscopic evaluation of thinner cell preparation is less time consuming than the conventional smears thus giving more job satisfaction to cytotechnologists and cytopathologists^{3,4,16,17}.

The problem of obscuring inflammation or blood was not seen in LBC smears. However background fluid obscuring cell morphology in grossly bloody samples was the drawback of the gynoprep preservative fluid. Additional solution to lyse the blood before cytocentrifugation may help. Jhonson et al have used Cyto Rich Red fluid before processing in Cyto Rich yellow fluid¹⁸. Transformation zone component was better in conventional smears. Khalbuss et al, Garbon et al and many others have reported a similar finding. ^{2,3,5,8,19}. Khalbus et al have opined that conventional dual smear sampling from both sites is more sensitive than the single sampling of fluid based cytobrush specimens. Two separate samples from ecto and endocervix may be preferable to a single one, provided they are collected in cytorich Red¹⁸. Depuydt et al have reported that use Cervex Brush ® Combi yields increased number of endocervical cells²⁰. Differential sampling/ sampling error may be the cause for lack of endocervical cells in our study.

Liquid Based Cytology tends to be more sensitive and specific than conventional smears in detecting cervical intraepithelial neoplasia and invasive carcinoma^{7,18}. Diagnostic accuracy of both methods was comparable in our study. The sensitivity and the specificity were not calculated as there were no CIN 2+ histology. More number of ASC-US were detected in LBC. Data from the

college of American pathologists PAP program survey indicate a wide range (0-9-11%) of ASC-US reporting with Thin Prep and Surepath Methods²¹.

Conclusion

Liquid Based Cytology performed by cytocentrifugation is inexpensive, reduces inadequate smears and allows HPV detection by molecular biology. If two separate samples from ecto and endocervix are taken and manufacturers provide a lytic solution for grossly bloody samples, it would be worthwhile to further study this method. This method can be performed by small laboratories which can not invest in automated equipments.

Lesion	CS	LBC	Z value	P value
NILM	94(85%)	98(88%)	0.81	0.209
ASCUS	1(0.9%)	5(4.5%)	1.66	0.048
SCC	1(0.9%)	1(0.9%)	0	1.00
Unsatisfactory	14(12.9%)	6(5.4%)	1.87	0.030
Total	110			

Table 1. Distribution of lesions in CS and LBC.(NILM-Negative for Intraepithelial Malignancy, ASCUS- Atypical Squamous Cells of Undetermined Significance, SCC- Squamous Cell Carcinoma). P value <0.05 not significant.

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ORIGINAL ARTICLE

Universal precautions: Knowledge, Attitudes and Compliance of doctors and nurses in a tertiary care hospital in South India.

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ABSTRACT

BACKGROUND

Human immunodeficiency virus/Acquired immunodeficiency syndrome (HIV/AIDS) has been recognized as one of the biggest challenges to improving HIV/AIDS care around the world. Apart from HIV/AIDS the concept of universal precautions (UP's) in the light of increasing blood borne infections comes into vogue.

OBJECTIVES

To determine the knowledge, attitudes and compliance of health service providers with respect to universal precautions and also to assess the need for adequate training of health care providers with regard to all current and changing health care protocols.

METHODS

A cross-sectional survey was carried out among 40 doctors and 40 nurses working at a tertiary care centre following ethical committee approval and informed consents from subjects. A questionnaire was prepared based on the World Health Organisation (WHO) and Centre for Disease Control (CDC) guidelines on UP's and was pre-tested before finalization.

RESULTS

The responses were clubbed in major domains as per the objectives of the study. Despite a high level of awareness regarding UP's among both doctors and nurses, statistically significant differences between doctors and nurses regarding hassles of implementing UP's were noticed.

CONCLUSIONS

It's of paramount importance to ensure a safe working environment for all health care workers (HCW's) and to educate and constantly update their knowledge, attitudes and compliance of various UP's which will go a long way in providing safety and greater patient care in an ever changing medical scenario.

KEY WORDS

Universal precautions, Health care workers, Blood borne infections, HIV/AIDS, WHO/CDC guidelines.

Introduction

The HIV/AIDS epidemic is firmly rooted especially in developing countries all over the world. For a health professional, in addition to contact with infected blood and blood products, other blood borne diseases can also be acquired by exposure to other contaminated body fluids such as cerebrospinal fluid, pericardial, pleural and amniotic fluids. The risk of human immunodeficiency virus (HIV) infection may appear relatively low, but this calls for worry as those infected get it through the care of their

patients¹. In developing nations, excessive handling of contaminated needles, high patient demand for injections and the lack of safe needles and sharp containers for disposal enhance the risk of occupational transmission of blood borne pathogens². Clearly, health care workers in developing countries are at serious risk of infection from blood borne pathogens particularly Hepatitis B virus (HBV), Hepatitis C virus (HCV),

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and HIV because of the high prevalence of such pathogens in many poorer regions of the world². Universal precautions recommends taking protective and preventive measures whenever there is contact between health care workers and the mucous membranes, blood, and body fluids of patients³. The essence of UP's according to Gerberding et al⁴ is "the routine use of appropriate barriers and techniques to reduce the likelihood of exposure to blood, body fluids and other tissues that may contain blood borne pathogens". It assumes that anybody in a hospital, especially patients are potential carriers of blood borne pathogens and therefore, all patients are treated in the same way as though they were infected.

Materials and Methods

This was a prospective cross sectional study done using a questionnaire administered to doctors and nurses which was prepared based on the WHO and CDC guidelines on UP's and was pre-tested before finalization. The study was conducted to develop and evaluate a culturally appropriate academic detailing intervention on the universal precautions knowledge, attitudes and compliance of doctors and nurses in a tertiary care hospital in South India. The analysis of the findings pertaining to their knowledge, aptitude and compliance of UP's were carried out and the statistical importance of various parameters were assessed. Eighty health care workers (40 nurses & 40 doctors) participated in the study. They were visited individually to discuss the purpose of the study and were handed over the structured questionnaire covering all the above mentioned aspects.

Results

All 80 (100%) respondents claimed knowledge about Universal precautions and its various constituents. About 32 (80%) doctors and 21 (56.8%) of nurses were able to state a difference between UP and standard precautions. Majority of the respondents believe that UP are applicable to all categories of patients and also highly effective in preventing exposure to blood borne pathogens like HIV, HBV and HCV. Hand washing technique was

positively considered as the first step towards infection control among doctors and nurses (97.5%, 92.3% respectively). Toilet soap was not enough in ensuring removal of potentially harmful infections according to the respondents. 35(90%) of the nurses concluded that UP's also applies to feces, sputum, sweat and vomitus as opposed to doctors 27 (67.5%) (Table 1). Needles should not be recapped after

SPECIMENS	DOCTORS	NURSES
BLOOD	40 (100%)	40 (100%)
BODY FLUIDS	40 (100%)	40 (100%)
FECES, SPUTUM, SWEAT & VOMITUS	27 (67.5%)	35 (90%)

Table 1: Specimens found applicable in the study of UP's

use according to the nurses 35 (87.5%) when compared to the 22 (55%) doctors. 23 (60.5%) nurses admitted the need to discard used needle sharps in puncture proof containers as opposed to doctors 20 (47.6%). 36 (94.68%) doctors are more cautious and aware of the greater chances of risk of infection with hollow needles. Hospital waste management must follow universal policy of segregation using color coded bags as was unanimously agreed upon by both doctors and nurses. Sodium hypochlorite dealt well with accidental spillage of blood according to almost 37 (97.4%) of the nurses and 27 (69.2%) doctors, although 10 (25.6%) felt that alcohol could be effective to a certain extent. Almost all the respondents were of the opinion that gloves, gowns, masks

PARAMETER	DOCTORS		NURSES	
	YES	NO	YES	NO
HOUSE KEEPING DEPT. AWARENESS OF UP'S	23(57.5%)	17(44.7%)	30(75.0%)	10(26.3%)

Table 2: UP's among House Keepers

and goggles are essential part of the personal protection equipment (PPE). Apart from a knowledge of universal precautions, a true understanding of their attitudes and compliance towards various practical day to day applications

of UP's also had been evaluated. Differences among doctors and nurses do exist on the extent of knowledge and practise of UP's among house keeping staff of the hospital. (**Table 2**). All the respondents agreed that a right attitude and total compliance to UP's can go a long way in assuring safety at work. The doctors, nurses and all other HCW's working in the hospital under survey declared that a policy existed to support the routine practise of UP's and that they all should coordinate well and continue to strictly adhere to it. 35(92%) nurses required the infection status of the patient before they examined, performed or assisted any procedure on a patient in contrast to doctors of whom only 23(63.9%) really required it. For some, hassles of UP's did affect their efficiency in carrying out any medical or laboratory procedures effectively. This was however not the case among 33

PARAMETERS	DOCTORS	NURSES
TIME CONSTRAINT	09 (22.5%)	11 (27.5%)
NON AVAILABILITY OF PROTECTIVE GEAR	21 (52.5%)	17 (42.5%)
CANNOT PERFORM A SPECIFIC TASK WITH EASE	03 (07.5%)	02 (05.0%)
ADMINISTRATIVE REASONS	07 (17.5%)	10 (25.0%)

Table 3: Hindrances to fully adhere to follow UP's in defined situations among the respondents

(82.5%) doctors, but the nurses were divided on this aspect with 19 (54.3%) of them finding UP's a hassle as opposed to 16 (45.7%) and 5 (12.5%) quite undecided. The major hindrances affecting doctors in fully adhering to UP's were at times, non availability of protective gear at the site in 21 (44.7%) coupled with occasional administrative reasons for 7 (17.5%) doctors and 10 (25%) nurses. (**Table 3**). However the respondents were quick to educate other HCW's working with them ensuring availability of appropriate safety materials in case of various emergency situations and comply fully to UP's more so among doctors 30 (79%) and 23 (62%) nurses. Strict compliance to UP's by both doctors and nurses were a routine feature in this hospital set up. Every respondent had also been vaccinated against Hepatitis B and

their protective antibody levels were >10 IU/ml. There was no hesitancy among them when dealing with HIV patients. However the respondents were of the opinion that isolation wards & separate qualified staff to take care of HIV cases was the need of the hour. Respondents opined that full compliance to UP's can only be achieved with timely educational update lectures, major role of the hospital infection control committee and also an extension of the knowledge, attitude and compliance levels to nurses of all streams and house keeping staff. They unanimously agreed that public awareness by audio visual sign boards in the hospital and other public places will also play a huge role in achieving the goal of a near trouble free health care environment.

Discussion

Studies have shown that strict compliance with UP's has substantially reduced the risk of exposure and contraction of the disease.⁵ Beckmann et al reported that implementation of UP's contributed to decreased parenteral injuries, which represent the most common source of significant occupational exposure to blood borne pathogens⁶. Yet it is unfortunate to note that UP's are not strictly practised fully well, especially in developing countries like India, where according to studies, 40% of health service providers in North India admitted to recapping needles⁷. In a rural area of Anhui in China, the rate of self reported non compliance with glove utilization and hand hygiene among obstetricians and gynaecologists was only 68%⁸. In Changsha, China, only 11% of student nurses used gloves during high risk procedures⁹. Thus developing nations report the higher incidence of needle stick injury among health service providers¹⁰. UP's assumes that anybody in a hospital, especially patients, are potential carriers of blood borne pathogens and need to be treated as potential risk group. In practical terms it involves the use of gloves, aprons, goggles, suitable care of needles, sharps and other contaminated instruments, house keeping with appropriate cleaning policies and ensuring strict adherence to standard practises. This requires the sustained provision of protective materials, proper training of health care providers

and adherence to sterilization and disinfection protocols. Infection can occur as a result of exposure to blood-borne pathogens such as HBV and HIV following 'sharps' injuries. McCormick et al's (1991) fourteen year study revealed that needle stick is the most common type of injury with an increasing incidence every year¹¹. A lack of preventive measures, the incidence of injury could be higher in developing countries. Emotional and psychological impact of the accidental injuries may also be severe. Furthermore, HCW's needed to wait at least 3 months to determine their HIV status according to Treloar et al.¹¹ The severe physical, financial, emotional and psychological consequences of accidental exposure warrants development of an effective program to minimize their incidence. This should include an effective training programme where appropriate guidelines are laid down that will develop a positive attitude and set a high standard of compliance among HCW's.

"Universal precautions," as defined by CDC Atlanta, are a set of precautions designed to prevent transmission of HIV, HBV, and other blood borne pathogens when providing first aid or health care¹². Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other blood borne pathogens. Their guidelines recommend wearing gloves when collecting or handling blood and body fluids contaminated with blood, wearing face shields when there is danger of blood splashing on mucous membranes and disposing of all needles and sharp objects in puncture-resistant containers. Universal precautions are designed for doctors, nurses, patients, and health care support workers who come in contact with patients or body fluids. A thorough knowledge, good attitude and strict compliance with all UP's is the crux of any health care institution. The doctors and nurses in our study were fully aware of the term UP's and believed that it's an essential ingredient of their routine health care practise. They were more of a routine feature in the present hospital set up as far as nurses were concerned when compared to doctors which was similar to a study by Gershon et al. on

compliance to universal precautions among HCWs showing different levels of compliance. His study showed that the compliance was maximum among nurses, intermediate for technicians and the least for doctors¹².

The standard precautions synthesize the major features of universal precautions designed to reduce the risk of transmission of blood borne pathogens and body substance isolation (designed to reduce the risk of pathogens from moist body substances) and apply them to all patients receiving care in hospitals regardless of their diagnosis or presumed infection status. Standard precautions apply to (1) blood; (2) all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain blood; (3) non intact skin; and (4) mucous membranes. The precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals. Our questionnaire study on hand disinfection practises revealed that soap had no major role in disinfection and so nurses preferred to use alcohol instead of chlorhexidine, but at times a lack of effective training in the institution, high work load, understaffing and lack of a role model among senior staff can play an important role in non compliance. Pittet et al were the first to document that a high workload is associated with poor compliance to hand washing. Low compliance during the care of patients in intensive care units may also be a reason for the spread of multi-drug resistant organisms¹³. Larson et al. reported that top level management involved in increasing organizational culture of hand hygiene had a significant response from the staff by compliance to hand hygiene, eventually reducing the incidence of methicillin resistant staphylococcus aureus (MRSA) and vancomycin resistant enterococci (VRE)¹⁴. Knowledge aspect alone is not sufficient to maintain the quality of health care. The median of total compliance with the universal precautions followed here was comparable to the compliance with the universal precautions in developed countries. Doctors and nurses were equally compliant in almost all aspects of UP's except hand washing, as shown by other studies too¹⁵.

Needle recapping has attracted attention as a major contribution to needle stick injuries as per Colebunders and Verstraeten study, 1990; Jagger, 1988. In this study differences in avoiding recapping needles were not found. In this set up needle incineration and its disposal into puncture proof containers was found ideal and followed over the years thus avoiding the necessity to recap needles in a safer manner. In the pilot study conducted above many nurses still preferred to recap the needles. The risk of a hollow needle carrying more risk was obvious to our respondents. The small sample size used in our study might lead to the limitation of power to detect a significant difference and to minimize the biases as all fulltime healthcare workers in our hospital were recruited in the study. Personal protection equipment (PPE) like gloves, gowns masks and goggles were available in the hospital but its use was limited at times citing administrative and time constraints of hindrance to adhering to UP's. Concrete administrative policies to ensure a smooth flow of material in the hospital and timely academic detailing approach of education will significantly improve knowledge, attitudes and compliance scores of health providers in this setup. Another study indicates that most of the HCWs in an urban tertiary health care facility in India possessed incomplete knowledge, as shown by other studies in developed¹⁶ as well as developing countries, including India^{17,18}. This lack of appropriate knowledge was not a factor leading to any level of anxiety among our HCW's regarding exposure to blood borne pathogens.¹⁹

It seems probable that an incomplete understanding of the principles underlying UP's among urban tertiary HCWs affected their practises and led to reduced compliance than expected in this group. Perceived barriers to compliance with UP's clearly influence HCW's ability and willingness to comply with them in practise as was seen in our survey. Inability to use PPE during emergencies, overwork and busy schedules have also been shown in similar settings^{18,20}, as was seen in our study. All HCW's by policy had also been vaccinated against HBV having taken the full course resulting in protective antibody levels of > 10

IU/ml. Hospital administrators should simultaneously strive to create an organizational atmosphere in which adherence to recommended hand hygiene practises is considered an integral part of providing high-quality health care. For such an approach to be successful, hospitals must provide visible support and sufficient resources in the form of continuous education programs which should be innovative, educational and motivational, tailored to specific health care personnel²¹. The role of the hospitals infection control committee in studies by Angelillo et al. recommends that attending continuing education courses about hospital infection had a positive effect on infection control procedures and compliance with barrier techniques²². Limitations of our study are that the sampled population is small making it difficult to generalise the finding and limited literature available of previous studies involving doctors and nurses. Although this study has limitations, it is also a good starting point for more extensive future research.

Conclusions

To conclude an academic detailing approach of the aspects used in this study will significantly improve awareness of the knowledge, attitudes and compliance scores of all health care personnel. Dissemination of the results to policy makers and other relevant bodies in the institution is highly recommended. Educational intervention should be implemented with appropriate strategies to meet the growing need of applying the basics of universal precautions to ensure a safe working environment particularly in local institutions and make way to open newer avenues of better health care covering not only local needs but also the needs of the health institutions world over. The knowledge and practice of UP's has had an attitudinal influence with a general positive attitude towards professional duty to care for patients with blood and body fluid infections. However knowledge is not enough to prevent infection, but adequate skills during practise is very pertinent. The overall knowledge, attitude and compliance levels of both doctors and nurses were found to be positive towards UP's. A regular training programme on UP's and

updating the HCW's knowledge on the same and also setting up of billboards both in hospitals and public places can also bring the masses into the purview of maintaining a clean and safe healthy hospital environment making way for greater scope for the emerging concepts of medical tourism.

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REVIEW ARTICLE**Management of infected nonunion of tibia – review article****B. Jagannath Kamath***, **Saraswati Viswanathan⁶**, **Ankush Bansal⁶**, **Sandeep Kini⁶****ABSTRACT**

Infective nonunion is a common complication of open tibial fractures. High level of morbidity is associated with this condition. However, there are significant variations in the treatment protocols in previous literature. This paper is a literature study and attempts to provide insights into the classification, diagnostic modalities and various treatment options. We have also identified shortcomings of the existing literature and scope for further research in this field.

KEYWORDS

Nonunion, Tibial fractures, Literature Review

Introduction

Orthopedic advisory panel of United States Food and Drug Administration defines nonunion of the fracture of tibia as a fracture that is a minimum of nine months post occurrence and is not healed and has not shown radiographic progression for at least three months¹. It is often considered inappropriate to wait for a period of nine months or more for diagnosing nonunion. Early recognition of a potential nonunion followed by early intervention reduces the overall time to union and reduces the patient's prolonged pain and disability². Although definitions of infected nonunion vary, it has been commonly defined as a state of failure of union and persistence of infection at the fracture site for 6 to 8 months³. There is a considerable morbidity associated with infected nonunion which includes social, financial, physical, and mental aspects^{2,14}.

Open tibial fractures have high incidence of chronic infection which is a contributing factor for nonunion^{4-6,10}. In general, rates of infection have been reported to be 0% to 2% for type I, 2% to 5% for type II, 5% to 10% for type IIIA, 10% to 50% for type IIIB, and 25% to 50% for type IIIC open fractures of tibia according to the Gustilo and Anderson classification⁶⁻⁹. Operative treatment of even closed fractures with prolonged operating time and opening of fracture site during surgery is associated with chronic infection and nonunion¹⁰. Pathological fractures in acute and chronic osteomyelitis can also persist as infective nonunion.

Classification

A number of authors have attempted to classify nonunions, chronic osteomyelitis and infected non unions. Classification based on severity and related treatment protocol is usually preferred. Bone gap and active infection are the crucial factors relating to treatment and prognosis in infected nonunions. Jain and Sinha¹¹ categorized patients with nonunion into two groups. Type A is infected nonunion of long bones with non draining (quiescent) infection, with or without implant in situ; Type B is infected nonunion of long bones with draining (active) infection. Both are further classified into two subtypes: 1) nonunion with a bone gap smaller than 4 cm or 2) nonunion with a bone gap larger than 4 cm. Treatment suggested for type A1 infected nonunion includes single-stage debridement and bone grafting with fracture stabilization. Adequate debridement, fracture stabilization, and second-stage bone grafting is advocated in Type B1 infected nonunion. Treatment suggested for bone loss more than 4 cm (Type A2 and B2) is distraction histiogenesis. Another classification based on integrity of fibula by Gordon and Chiu classifies fractures into Type A with tibial defect and nonunion without substantial bone loss, Type B where tibial bone loss >3 cm and intact fibula, and Type C with tibial bone loss >3 cm associated with nonunion of fibula¹².

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Challenges and basic approach

Typical problems in an infected nonunion include soft tissue loss with multiple sinuses and scarring, osteomyelitis, bone loss, osteopenia, adjacent joint stiffness, complex deformities with limb-length inequalities and poly bacterial multidrug-resistant infection^{3,11}. Bone gap and active infection are the critical factors determining the treatment and prognosis. Detailed evaluation of the patient, the examination of involved bone and soft tissues, and identification of infective organism forms the initial steps of management. Radical debridement, skeletal stabilization, and microbe-specific antibiotics are essential to control the infection. Local antibiotic delivery is a useful supplement to systemic administration. Soft-tissue loss may require local or free muscle flap coverage. Small bone defects can be managed by acute docking or bone grafts. However, large defects require complex reconstructive procedures, such as distraction osteogenesis and vascularized bone grafting¹³.

Clinical examination, diagnosis and investigations

Infected nonunions are often diagnosed clinically. Examination may reveal chronic discharging sinuses with bony tenderness, bony irregularities, bone thickening, palpable defects in the bone, visible underlying implants, deformity and painful abnormal mobility (in case of implant failure or no implant). Although high ESR and CRP are indicative of active infection, a significant drop in their values during the follow-up indicates a good prognosis. Early radiographs may not be helpful in diagnosing infection although nonunion can be easily established with no cortical continuity. Late stages may reveal nonunion with sequestrum, osteopenia periosteal reaction with thickening of bone, bony deformities and loosening of implants.

It has been shown that the combination of technetium-99m methylene diphosphonate bone scans and indium-111-labelled white cell scans have a high sensitivity and specificity for diagnosing infection in the presence of nonunion with sensitivities of 60% to 86% and specificities of 84% to 97%. However, there are situations that may result in a false-positive test. These can include fractures at metaphysis adjacent to an arthritic joint, delayed union or nonunion with instability at fracture

site, recent surgery, and conditions such as heterotopic ossification or myositis ossificans. Combination of WBC-labelled imaging and bone marrow imaging may increase test accuracy up to 90%^{15,16}. This is due to the fact that fractures, hardware, recent surgery, or neuropathic joints may lead to alterations in the bone marrow. These tests are not necessary in every case of infected tibial nonunion but may be valuable diagnostic aid when the clinical or radiographic signs are not clear.

CT provides excellent definition of cortical bone and a fair evaluation of the surrounding soft tissues and is especially useful in identifying sequestra. MRI is more useful for soft-tissue evaluation than CT. MRI may reveal a well-defined rim of high signal intensity surrounding the focus of active disease (rim sign). On T2-weighted imaging, sinus tracks and cellulitis show increased signal intensity. Drawbacks of MRI are cost, difficulty in imaging around metal implants, and poor delineation of cortical bone. Angiography of the limb enables to identify the vascularity pattern at the fracture site and distal to the site. This knowledge is essential before planning for local flaps to cover the soft tissue defects. Flap provides a significant amount of tissue for coverage. It also brings in a good blood supply and results in a good cosmesis at the recipient site with minimal donor site morbidity.

In nonunions with active discharging sinuses, the culture of material obtained by superficial swabbing of the wound and even the sinus tract cultures have a low sensitivity, specificity and predictability in identifying the offending organism^{17,18}. Intraoperative bone culture is considered gold standard and has higher sensitivity in identifying aerobic, anaerobic and even fungal growth in cases of chronic osteomyelitis.

Management of infective nonunion

Considerable judgment is required to treat a patient with an infective nonunion. There are various methods of treatment that have been suggested for this complex problem. The conventional or classic method involves the 'infection-elimination first' strategy¹⁴. The objectives of the conventional method are to convert an infected and draining nonunion into non infective nonunion. The second stage is to promote healing of the nonunion by bone grafting. Prolonged duration of treatment and adjacent joint

stiffness are the major complications of this method. The next method is the active or modern method by Weber and Cech et al¹⁹. The objective of the active method is to obtain bony union early and shorten the period of convalescence and preserve motion in the adjacent joints. Restoration of bony continuity is the first step and takes absolute priority over treatment of the infection. Recent research suggest promising results in simultaneous management of infection and nonunion by radical debridement and immediate coverage of the bone and soft tissue loss by composite flaps. One or the other of the above methods can be done wholly or in part, depending on the circumstances in a given patient, and the judgment of the surgeon. The Ilizarov method is a combination method of treating infected nonunion that has similarities to both the conventional and the active methods²⁰. Pulsed electromagnetic therapy as suggested by Bassett et al can be used in low grade infective nonunion without bone loss²¹.

INFECTION CONTROL

Infection persists mainly due to two reasons: presence of dead tissue and presence of dead space. Therefore the management of infection includes removal of dead tissue followed by obliteration of dead space.

Debridement

Chronic osteomyelitis requires surgical treatment. Antibiotics alone rarely can eradicate the infection for various reasons. Bacteria are able to adhere to orthopaedic implants and bone matrix through various receptors. They form a slimy coat or the bio film that protects them from phagocytic cells and antibiotics²². The goal is to convert a necrotic, hypoxic, infected wound to a viable wound. Bacterial load can be reduced by thorough debridement that includes removal of exudates (hematoma and pus), abscess membranes, sinus tracts, granulation tissues, unhealthy wound margins, and sequestra. Thorough debridement is recommended under tourniquet. At the end of the debridement, tourniquet is released to ensure that viable tissues are left behind. Punctate bleeding in the bone ends (Paprika sign)²³ indicates viability. Continuous suction irrigation also reduces the bacterial load further²⁴. High frequency ultrasound using piezoelectric crystals converts the electrical

signals to mechanical vibrations which can be used for thorough debridement.

Antibiotics

There are not many studies regarding the use and duration of antibiotics for established infective nonunion. Traditionally, osteomyelitis is treated with 4-6 weeks of parenteral antibiotics after definitive debridement surgery²⁵. Ideally, antibiotics should be nontoxic, convenient to administer, affordable, and based on the in vitro susceptibilities of the microorganisms. There is no evidence that antibiotic therapy for >4–6 weeks improves outcomes compared with shorter regimens²⁶. The oral antibiotic therapy, preceded by a short parenteral therapy, can get high rates of clinical and bacteriological cure in chronic osteomyelitis with or without implant in situ²⁷.

Local Antibiotic Bead Chains

This mode of delivering antibiotics has the advantage of obtaining very high local antibiotic concentrations, while maintaining low serum levels and low systemic toxicity. The rationale for this treatment is to deliver 200 times higher levels of antibiotics locally in concentrations that exceed the minimal inhibitory concentrations. Heat stable antibiotics are used because during the cement-hardening process, the exothermic reaction can render heat-labile antibiotics ineffective. The commonly used antibiotics are gentamicin, tobramycin and vancomycin²⁸⁻³¹.

Thorough debridement followed by wound closure with beads inside provides high concentration of antibiotic. If the wound cannot be closed, these beads can be covered with water impervious dressing (bead pouch technique). Suction drains should not be used as the concentration level of the antibiotic is diminished when they are used. Duration of implantation of antibiotic beads can be short-term or long-term. In short-term implantation, the beads are removed within 10 days, and in long-term implantation, they may be left up to 80 days. A study by Henry et al showed that long term bead chain implants exhibit higher remission rates without increasing the risk of complications²⁸.

Biodegradable antibiotic delivery systems offer a significant advantage over PMMA in that a second procedure is not required to remove the implant. In 2002, McKee et al. had successful outcomes in 23

of 25 patients with chronic osteomyelitis of the tibia, who were treated with tobramycin-impregnated calcium sulfate pellets³². Other example includes gentamicin-impregnated polylactide-polyglycolide co-polymer implants which are biodegradable and may not need removal once they have been implanted.

To retain vs. removal of implant

Fracture fixation devices impair host resistance to infection. If they provide absolute stability, this benefit may overcome their detrimental effects. In carefully selected cases (low-virulent organisms and healthy tissues) if the stability is adequate even after extensive debridement, internal fixation may be retained. If there is instability or the infection fails to resolve promptly, plates or intramedullary nails should be removed and replaced with external fixation³³.

DEAD SPACE MANAGEMENT

Acute shortening

Bone and soft tissue defects after debridement can be managed by acute shortening. Literature suggests acute shortening if the bone gap is up to 6cms followed by gradual lengthening through metaphyseal osteotomy. Larger gaps >6cm are managed by segmental bone transport technique. Magadum et al published a study in 2006 advocating acute compression and lengthening for large defects. They incorporated 5 Ilizarov rings, used transverse incision and performed large fibular resections. Good functional results were obtained after acute compression with primary shortening up to 17cms (Mean -10cms) and subsequent lengthening³⁴.

Soft tissue replacement

Dead space created after radical debridement may range from localized muscle flap on a vascular pedicle to micro vascular free tissue transfer. Very rarely, small defects in soft tissue undergo spontaneous healing or are managed with vacuum assisted closure or split skin graft coverage. Local-regional muscle flaps used for soft tissue coverage in tibial nonunions include gastrocnemius muscle flaps in defects around the proximal third of the tibia and the soleus muscle flaps in defects around the middle third. Defects around the distal third of the tibia usually require a microvascular free flap. The transfer of vascularized muscle tissue improves

the local biological environment by increasing local blood supply³⁵. It enhances the host's defence mechanisms and promotes bone and soft-tissue healing. Success rates of 66% to 100% are reported in cases of vascularized muscle flaps.

Adjuvants

Cancellous bone grafts, corticocancellous bone and bone graft substitutes can be used for managing dead space. They have osteoinductive and osteoconductive potential. Many authors advocate bone grafting as a second stage procedure after 6-8 weeks following a thorough debridement in first stage³⁶. Open bone grafting technique for the treatment of chronic osteomyelitis was described by Papineau et al³⁷ based on the principles that granulation tissue markedly resists infection and autogenous cancellous bone grafts are rapidly revascularized and are also resistant to infection³⁸. Panda et al have reported a success rate of 80-90% with this technique³⁹. However, prolonged hospitalization and immobilization, and long term antibiotic usage are some reported drawbacks of this technique.

Implications of antibiotic impregnated cancellous bone grafts for infective nonunion with small gaps was studied by Chan et al⁴⁰ in 1998. They concluded that the use of impregnating antibiotics had no adverse effects on incorporation of autogenic cancellous bone graft and helped to eliminate infection. They found it to be a safe and an effective method with rapid recovery. In the year 2000, they published another study⁴¹ comparing bone graft alone with antibiotic-impregnated bone grafts for infective nonunion. Though the union rates were comparable, the antibiotic-impregnated bone grafting group had significantly superior results (95.6%) in infection elimination than the pure cancellous bone grafting group (82%). Recent studies with recombinant Bone Morphogenic Protein-2 (rhBMP-2) have also yielded positive results⁴².

Larger gaps > 2cms with loss of stability requires cortical support along with osteogenic potential. Microvascularised fibular grafts^{43,44} and double rib with serratus anterior muscle composite grafts⁴⁵ are successfully used by some authors with good results. Vascularized iliac crest graft with covering soft tissue based on deep circumflex iliac vessels are also used for larger bone and soft tissue defects.

MECHANICAL STABILITY

Mechanical stability is mainly provided by external fixators⁴⁶ that include rail fixators, ring fixators and the combined hybrid fixators. Ring fixator systems include Ilizarov, Volvok-Oganesian and Kalnberg system. Hybrid system includes Fischer system, Taylor spatial system, Tenxor system and Orthofix Hybrid system. Ilizarov ring fixator system is extensively used in stabilization of infective non unions⁴⁷. The Ilizarov principle is based on increasing the vascularity in order to eliminate infection and obtain union. However, the concept of 'Osteomyelitis burns in the fire of regeneration' is no longer completely acceptable. Studies have shown recurrence of infection with the Ilizarov fixator alone. Most authors perform thorough open debridement with or without local antibiotic beads followed by application of ring fixator. The Ilizarov frame allows multiple modes of treatment, including compression, distraction, lengthening, and bone transport.

Three basic modes of application exist for the Ilizarov frame: (1) monofocal, (2) bifocal, and (3) trifocal. Monofocal technique is performed when there is no shortening and the procedure does not require corticotomy. Either compression (for hypertrophic nonunion) or compression distraction (accordion technique for normotrophic nonunion) is performed at the nonunion site. Bifocal and trifocal techniques are performed for larger bone defects. Bifocal technique involves one corticotomy followed by distraction. They are either proximal to distal or distal to proximal depending on the corticotomy site and transport direction. Trifocal involves 2 corticotomies and distraction is performed either in ipsilateral (both fragments in same direction) or contralateral manner (both fragments in opposite direction towards center-centripetal).

Depending on the type of pin placement in transported segment of the Ilizarov system, the transport methods are classified into external, internal and combined bone transport (fig.1 A,B & C). External bone transport uses only outer rings in the transported segment which is held with olives/wires. This can achieve 5-7cm lengthening at osteotomy site and allows correction of rotations and angulations using hinges. Internal transport incorporates crossed wires across the transported segment. This segment has no rings attached to it.

It is used when 7-10 cm lengthening at corticotomy site is required. Further, it also prevents deviation of transported segments at the docking site. Combined transport uses both techniques and is advocated when there is >10cms bone loss with severe deformities and associated deep soft tissue scars.

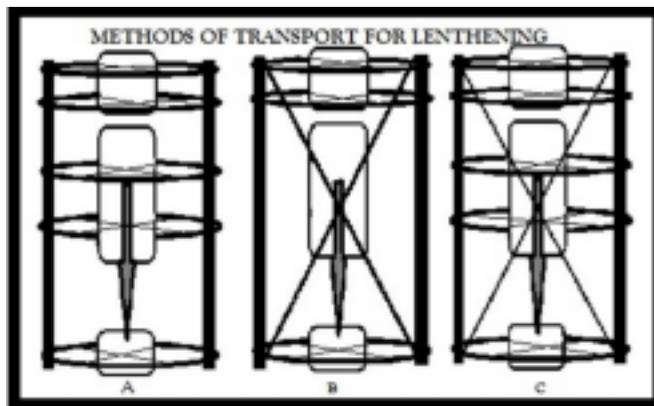


Fig. 1

Antibiotic impregnated nails

Recent studies with antibiotic impregnated intramedullary nails⁴⁸ have been used successfully with good outcomes in infective nonunion with less than 6cm of bone loss. Further studies are required to prove its consistency and repeatability.

Outcome Measures

Association for the study and application of the methods of Ilizarov (ASAMI) scoring system is widely accepted for measuring outcomes after Ilizarov fixator.

Bone results (Table 1) and functional results (Table 2) are quantified separately indicating that these results may not always correlate.

Functional outcome measures cannot be easily incorporated in Indian scenario as activity modification is usually seen and amputation is preferred to multiple surgeries in financially poor patients.

Biophysical methods

Ultrasonography and capacitive coupling electrical stimulation have been used for aseptic nonunions with promising results⁴⁹. Such methods are also used on infective nonunions. However, their indication and repeatability in infective nonunions requires further evaluation.

Bone results	Grade	Criteria
Excellent		Union, no infection, Deformity < 7 deg, Limb length discrepancy < 2.5 cm
Good		Union + any two of the following; absence of infection, < 7 deg deformity and limb length discrepancy of, 2.5 cm
Fair		Union + one of the following; Absence of infection, < 7 deg deformity and limb length discrepancy of, 2.5 cm
Poor		Non union/refracture/union + infection + deformity . 7 deg + limb length discrepancy . 2.5 cm

Table 1.

Functional results	Grade	Criteria
Excellent		Active, no limp, minimum stiffness [Loss < 15 deg knee extension/, 15 degrees dorsiflexion of ankle], No reflex sympathetic dystrophy [RSD], insignificant pain
Good		Active with one or two of the following:limp, stiffness, RSD, significant pain
Fair		Active with three or all of the Following; limp, stiffness, RSD, significant pain
Poor		Inactive [Unemployment or inability to return to daily activities due to injury]
Failures		Amputation

Table 2.

Amputation

Indications for amputation in cases of infective nonunion⁵¹ can be patient related. Elderly age group with associated co morbid conditions like diabetes, peripheral vascular disease and those who are mentally or financially unfit for reconstructive protocol, are some examples of cases who undergo amputation. Limb related indications include damage to posterior tibial nerve, injury to ipsilateral foot, severe joint stiffness and contractures, and malignant transformation.

Prevention

Prevention of infection is imperative and must always be the primary goal in treating fractures. Open fractures can be prevented from this complication by early and thorough debridement, early administration of appropriate antibiotics, skeletal stabilization and early coverage of wound^{4-7,10}. For closed fractures intraoperative asepsis, shorter surgical duration and adequate hemostasis should aid in prevention of infective nonunion^{5,10}.

Conclusion

Management of infective nonunion is individualized. It requires patience from the treating surgeon and the patient as most of the methods require long duration of treatment. Debridement and infection control form the first line of management following which the union, deformity correction and limb length equalization are considered. Soft tissue procedures are equally important to provide adequate coverage and blood supply at the nonunion site. Newer methods like acute compression followed by lengthening in large gaps have shown good results. Newer methods like bio degradable antibiotic delivery systems, antibiotic impregnated bone grafts, bone morphogenic proteins and use of biophysical methods can be used as adjuncts. Proper management of open fractures and asepsis during surgical management of closed fractures should be the aim to reduce the incidence of this debilitating condition.

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REVIEW ARTICLE

Neonatal anemia: a review

Seema Gonsalves[#], K. Shreedhara Avabratha^{*}, K. Bhagyalakshmi²**ABSTRACT**

Neonatal anemia is a common problem among our neonates specially the preterms. Anemia is defined as Hb or hematocrit >2 SD below the mean for age. Physiological anemia is common and manifests around 6-12 weeks of age. Anemia of prematurity which is an exaggerated physiological anemia can sometimes lead to increased morbidity and mortality among neonates. The important causes of anemia are blood loss, decreased erythrocyte production and increased RBC destruction. A stepwise approach is the key to diagnosis. There are various modalities of treatment available like packed RBC transfusion, iron therapy and erythropoietin. It can be prevented by delayed cord clamping, decreasing iatrogenic blood loss and nutritional supplementation.

KEYWORDS

Neonate, Anemia, Physiological, Prematurity, Stepwise approach

Normal hematological values and definition

The normal hemoglobin concentration for a term newborn is 19.3 \pm 2.2 g/dl with a hematocrit of 61% \pm 7.4%¹. Shortly after birth the Hb concentration increases and by the end of the first

Weeks	Hb level
0	17.0
1	18.8
3	15.9
6	12.7
10	11.4
20	12.0
50	12.0

Table 1: Hemoglobin changes in term infants during first year of life [2].

week, values are identical to birth values. The values decrease thereafter (table 1²). In case of preterm neonates the Hb levels start decreasing earlier, in the first week of life.

Anemia is defined as Hb or hematocrit >2 SD below the mean for age. Anemia during the first week of life may

thus be defined as a Hb value less than 14g/dl. Anemia can be of two types³:

- (i) Physiological anemia and (ii) Anemia of prematurity.

i. Physiological Anemia of Infancy

All neonates experience a decline in circulating RBCs during the first week of life. This postnatal drop in hemoglobin level in term infants is well tolerated and requires no therapy; hence it is commonly referred to as 'physiological anemia of infancy'. This is characterized by dropping Hb levels, low reticulocyte count. This is a direct consequence of down regulation of erythropoietin synthesis, occurring as a result of improved O₂ saturation (due to gradual shift to adult Hb). The Hb concentration decreases until the O₂ requirement increases beyond the O₂ delivery. This nadir is reached around 6-12 weeks and the Hb levels are between 9.5-11g/dl. This stimulates renal erythropoietin production and thus RBC production increases⁴.

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ii. Anemia of Prematurity

In prematurely born babies this decline is more rapid, approximately 8g / dl in infants with birth weight of 1 - 1.5 kg and approximately 7g / dl in <1kg neonates. The pronounced decline in hemoglobin concentration that occurs in extremely

1. Decreased RBC survival in preterms.
2. Rapid growth of preterm babies
3. Reduced iron stores and RBC mass due to phlebotomy
4. Vitamin E deficiency in premature infants

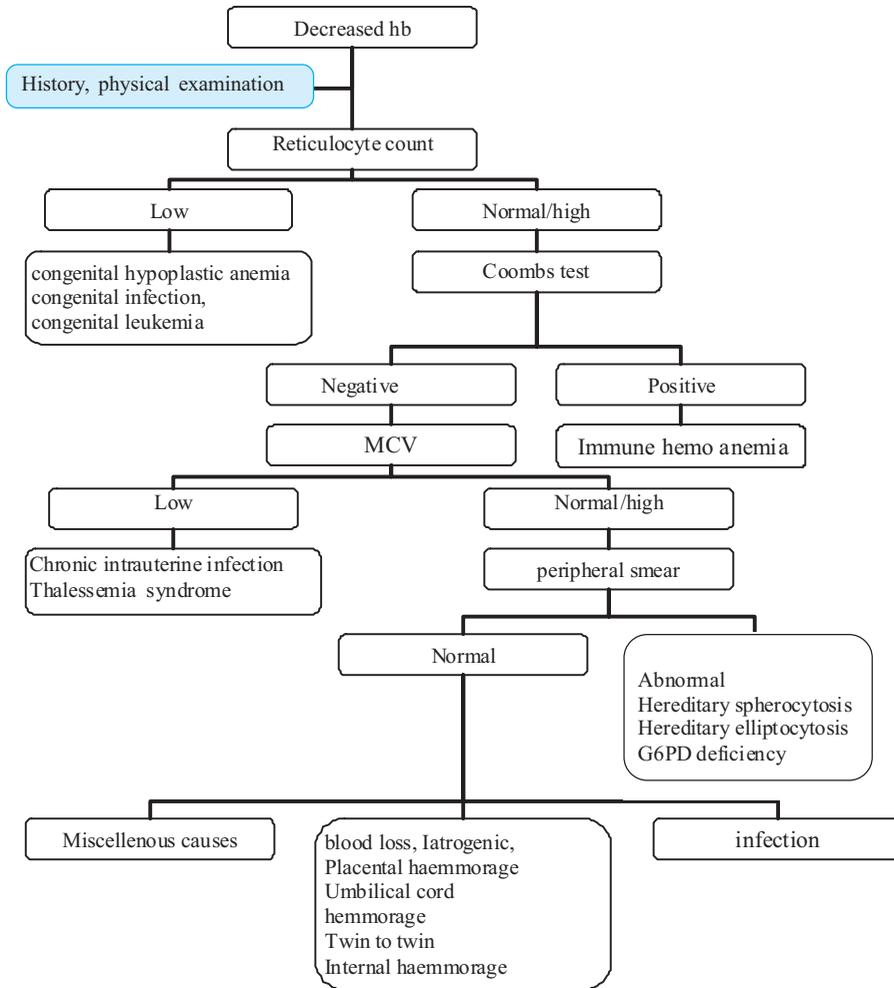


Fig 1: A stepwise diagnostic approach to anemia

low birth weight babies, is associated with abnormal clinical signs, hence is considered as pathological. This 'anemia of prematurity' is an exaggeration of normal physiological anemia. The main cause is inadequate erythropoietin synthesis in response to hypoxia, in preterm babies. The switch over from hepatic synthesis of erythropoietin to renal synthesis occurs at 40 weeks of gestational age. This is further aggravated by:

Etiology of Anemia in Newborn

The numerous causes of anemia are classified under 3 broad groups: Blood loss, Increased RBC destruction and Decreased RBC production (Table 2)⁵.

DIAGNOSTIC APPROACH

To detect the cause of anemia a detailed history and physical examination cannot be overemphasized. A stepwise approach is depicted in Fig.1⁶.

i. History

Maternal obstetric history: vaginal bleeding, maternal blood group, multiple gestations, evidence of fetal distress. Family history: It is important because certain conditions are autosomal recessive (eg: Fanconi's anemia), autosomal dominant (e.g. Hereditary spherocytosis) and x-linked inheritance (e.g. G6PD deficiency). A history of relatives with anemia, jaundice or splenectomy will indirectly give a clue. Finally a history of the newborn itself is essential, particularly gestational age, and day of life at presentation, the ethnicity / race and sex (e.g. G6PD deficiency) of the infant.

ii. Physical Examination:

Physical examination of an anemic newborn can provide helpful insight into the cause of the condition like: acute blood loss leads to shock, cyanosis, poor perfusion and acidosis and chronic blood loss produces pallor and the infant may exhibit only mild symptoms. Chronic hemolysis is

associated with pallor, jaundice and hepatosplenomegaly. Also, there is importance for knowledge of specific conditions (e.g. Fanconi's anemia, Diamond Blackfan anemia) and their associated congenital anomalies.

iii. Laboratory Investigations:

Laboratory investigations need to be done in stepwise manner. Simple bedside tests like Apt test

Blood loss
Fetal hemorrhage
Placental hemorrhage
Umbilical cord bleeding
Postpartum hemorrhage
Iatrogenic
Increased erythrocyte destruction
Immune hemolysis
Acquired hemolysis
Hereditary RBC disorders
Vitamin E deficiency
Decreased erythrocyte production
Congenital
Diamond Blackfan syndrome
Acquired
Infections e.g.: rubella, parvovirus

Table 2: Important causes of neonatal anemia

and Kleihauer-Betke test when done may sometimes directly detect the cause. If not, the workup needs to start with Hb / hematocrit to prove anemia as shown in table 2. Once anemia has been proven, one needs to do the reticulocyte count. The reticulocyte count tells about the state of the bone marrow. Hence if it is low bone marrow suppressed states

Anaemia in the first 24 h	Hb 12 g/dl(Hct 0.36)
A Cumulative blood loss in 1 week, In a neonate requiring intensive care	10% blood volume
Neonate receiving intensive care	Hb 12 g/dl
Acute blood loss of	10%
Chronic oxygen dependency	Hb 11 g/dl
Late anaemia, stable patient	Hb 7 g/dl

Table 3: Suggested transfusion threshold for infants below 4 months of age [8]:

like congenital hypoplastic anemia, leukemia or congenital infections are to be considered. If the reticulocyte count turns out to be normal, the next step would be doing the coomb's test. Based on the coomb's test, a positive result suggests immune mediated hemolysis to be the likely cause, if negative the mean corpuscular volume has to be measured. A low MCV signifies low RBC volume which may be due to chronic infection, blood loss or thalassemic syndromes. In case of normal / high MCV a peripheral smear would be the most important investigation to be done. Based on the cell type whether normal or abnormal the diagnostic conclusions can be made.

TREATMENT

Treatment depends on the underlying cause. There are several etiology-specific therapeutic interventions available to treat neonatal anemia. The disorder of erythrocyte production for example may need steroid therapy or bone marrow transplantation, whereas direct or exchange transfusions may be the necessary therapy for blood loss and the hemolytic disorders. The common therapeutic modalities are as below:

i. Red Blood Cell Transfusion

Clinical evidence has shown that there is no improvement in infants treated empirically for low hemoglobin levels versus those transfused for clinical reasons⁷. Most of the neonatal transfusions are small volume (10-20 ml/kg) transfusions given to replace phlebotomy losses. Packed RBCs given in small aliquots (10-20 ml/kg) at the rate of 2-3ml/kg/hr and 2ml/kg rises the Hb level by 0.5-1g/dl. In anemia of prematurity aim is to restore or maintain adequate tissue oxygen delivery without a marked increase in oxygen consumption.

Dedicating aliquots from a single donation of red cells to allow sequential transfusions from the same donor for neonates who are likely to be repeatedly transfused is considered good practice. These must be transfused within the normal shelf-life (currently 35 d for red cells in additive solution).

Collection of autologous cord blood for storage and reinfusion has been studied. The unusual success in collection and transfusion was ascribed to patient selection, meticulous preparation and short storage time.

ii. Erythropoietin

Recombinant human erythropoietin (rHuEPO) may reduce blood transfusion requirements in neonates⁸. However its effect appears to be relatively modest and does not reduce transfusion requirements within the first 2 weeks of life when sick neonates are almost transfusion dependent because of frequent blood sampling.

Articles and randomized controlled trials have been published where the potential benefits, safety and cost effectiveness of human erythropoietin administration have been examined. Several studies have demonstrated beneficial effects, but in association with conservative transfusion criteria, the minimization of phlebotomy losses and early iron administration. When considering the administration of erythropoietin, one needs to be aware that the preparation contains human albumin⁹.

When used, a dose of 250 units/kg subcutaneous three times a week, preferably starting within 3 days of birth, and continued for 6 weeks, is the regimen of choice. A major adverse effect of recombinant erythropoietin is noted to be retinopathy of prematurity (ROP). Whether the development of ROP is due to rHuEPO and its known angiogenic properties, or to the use of iron, has yet to be clarified - both theories have been postulated¹⁰.

iii. Iron Therapy

Iron deficiency in the neonatal period occurs as the result of chronic blood loss or rapid depletion of limited iron stores. As a result, iron supplementation is often necessary to support effective erythropoiesis⁶. Treatment involves first correcting the underlying cause of the iron depletion (i.e. acute or chronic blood loss) and initially starting on 3-6mg/kg/day of elemental iron. It is important to remember that iron therapy is not beneficial in most cases of erythrocyte destruction or impaired production but may be beneficial therapy in neonates who have experienced blood loss.

Prevention of neonatal anemia

Some of the following methods can be adopted to minimize neonatal anemia.

i. Autologous Transfusion⁷

Cord clamping: True autologous transfusions in an infant can occur by delaying cord clamping or by collecting, storing and re infusing cord blood as a blood product. The potential advantages and disadvantages of clamping have been debated and are different for term versus preterm neonates.

ii. In-line Devices

If non invasive methods are insufficient to guide transfusions, combining these methods to decrease iatrogenic loss and improve erythropoiesis might prove to be advantageous to the infant. Since blood gas analyses are a primary source of iatrogenic loss, in-line devices that permit continuous pH, pO₂, and pCO₂ measurements should theoretically decrease venous blood loss.

iii. Nutritional Supplementation:

Providing RBC substrates and preventing additional destruction are: mother's milk or formulas similar to mother's milk in that they are low in linoleic acid are used to maintain a low content of polyunsaturated fatty acids in the RBCs. Vitamin E 15-25 IU is given daily until the baby is 38 to 40 weeks post conceptional age. Substantial evidence indicates that inadequate protein intake is an important contributor to anemia in preterm infants⁵. Good evidence documents that the "normal" postnatal decrease in Hb can be attenuated by 1.0 to 1.5 g/dL (10 to 16 g/L) in preterm VLBW infants provided with daily protein intake 3.5 to 3.6 g/kg compared with those who receive intakes of only 1.8 to 1.9 g/kg.

Iron supplementation around 3-4 weeks is also an important intervention to prevent anemia of prematurity. Food fortification is a cost effective, long term measure for improving the iron status of the entire population.

SUMMARY

Anemia in newborn can have varied etiology. It is an important cause of morbidity in neonates. Detailed history and a stepwise approach will clinch the diagnosis. Treatment depends on the etiology and many options are available for the same.

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CME ARTICLE

Clinical skills training

Smitha Bhat*

ABSTRACT

Training and assessment in clinical skills is a crucial part of the undergraduate medical curriculum, in spite of which it is often the part most neglected in undergraduate training. This article is a review of the current methods of teaching, learning and assessing clinical skills. The teaching of clinical skills began at the bedside with the apprenticeship model. Now advanced technology in the form of skills labs and sophisticated simulators is harnessed to improve clinical skill training. In spite of evidence showing that teaching- learning of clinical skills occurs best at the bedside, it seems to be on the decline, due to certain barriers. However there are strategies to overcome these barriers. Many innovations like the Five Step Method and the One Minute Preceptor have been devised to improve clinical skills training. Skills labs are safe environments where the learner can be trained in the basic clinical skills. These skills can be further refined in the actual clinical environment. However skills labs are expensive to establish and maintain. Better methods in clinical skills training must be paralleled by more relevant and objective methods of assessment. Assessment can be made more relevant by taking it to the workplace. Methods of workplace based assessments include Mini CEX, 360 Degree Assessment, Case Based Discussion and Direct Observation of Procedural Skills.

I fervently hope that current teachers of medicine can somehow recapture the Oslerian spirit and strive diligently to restore the very core of doctoring—humanism. Reaching that goal will require teachers with commitment, compassion, candour, and common sense. Teachers who understand and believe that medicine is a calling, not a business. Teachers who can look at, listen to, and talk with patients. Teachers who will work as hard and as long as it takes to ensure patients' welfare. And teachers who always put patients first."

- Dr Herbert L Fred

Introduction

A Clinical skills training program that is well planned and delivered is the cornerstone of undergraduate medical education. However, paradoxically, hands on training in basic clinical skills is the weakest link in many medical school curricula. The last two decades have seen many innovations in training and assessment in clinical skills; however it is a fact that doctors in training master many skills during post graduate residency rather than during the undergraduate medical course. Thus, graduate doctors often are found inadequately trained in clinical skills^{1,2}. Skill training must be an integral part of the undergraduate medical curriculum to produce clinically competent doctors.

Background and History

A skill is the ability acquired through sustained effort and practice to perform job functions and activities. Skills may be cognitive, interpersonal and

technical. The word clinical is derived from the Greek word *klinikos* which means pertaining to 'at or around the sick bed'. 'Clinical skills' refers to examination and procedural skills that occur in the clinical environment.

Clinical skills were first practised by the ancient Ayurvedic and Egyptian physicians. Later Galen and Hippocrates developed the idea of a detailed history taken from a patient followed by a focused physical examination². Till recently, by and large, instruction in clinical skills was by the apprenticeship model where the student learned the art of examination by observation of a senior physician at the bedside³.

The first documentation of a mannequin to practise skills was the medieval Quintain, which knights on horses used for lance practice. The first medical mannequin simulator was Resusci Anne,

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built to resuscitation skills such as mouth to mouth respiration. It was an extremely basic model, and was followed by the amazingly lifelike Sim one which breathed, blinked, moved its jaw and could be used for practice of endotracheal intubation. However it was not accepted for widespread use because it was extremely expensive. Sim one was followed by Harvey developed by the American heart association. Harvey could be used for skills training – various palpatory and auscultatory findings could be demonstrated and learnt with Harvey. Newer mannequins for instruction in diagnostic and procedural skills include SLEEPER, BODY CASE 1.2 and GAS⁴.

Skill training in medical college

The aim of the undergraduate medical curriculum is to produce a doctor who possesses the 'requisite knowledge, skills, attitudes, values and responsiveness, so that he or she may function appropriately and effectively as a physician of

first contact of the community while being globally relevant⁵. If this is the goal, then the following list would be a sample of the skills that a graduate doctor must possess at the end of the course⁶.

- History-taking skills, adult medical and surgical, Paediatric, ObG and psychiatric.
- Physical examination skills.
- Clinical reasoning skills.
- Practical procedures and techniques.
- Patient management and prescribing skills.
- Administrative skills, e.g. paperwork, sickness certification, death certification, referral procedures, admissions, etc.
- Attitudinal awareness and professionalism, e.g. codes of conduct, professional behaviour, responsibilities of a doctor.
- Communication skills, e.g. verbal/non-verbal communication, breaking bad news, dealing with the 'difficult' Patient, written communications.
- Critical appraisal skills including Evidence Based Medicine.
- Documentation skills.

- Economic skills.
- Ethical/legal considerations, e.g. obtaining valid informed consent, confidentiality, statutory notifications, etc.
- Health and safety and manual handling, including hand hygiene and universal precautions.
- Information and communication technology including information retrieval, handling, generic IT skills.
- Internet use.
- Investigative skills including selection of tests and interpretation of results data.
- Learning skills.
- Organizational skills, e.g. time management.
- Presentational skills including small and large audience presentations, bedside presentations, written materials.
- Resuscitation skills, both adult and paediatric basic life support, and adult advanced life support.
- Teaching skills including basic educational principles and practical teaching sessions.
- Team working and leadership skills.

Ideally these skills would be taught in a real world clinical situation i.e. in hospital or in the community. The decision regarding when specific skills would be taught can be made after setting goals of expected levels of proficiency a particular points of the undergraduate course⁶.

Barriers to teaching learning of clinical skills⁷

Institutional value system

- Non-existent rules of conduct for Faculty
- Insufficient teaching staff motivation
- Non-existent mentorship

Structure and organization of training

- Poor structuring of curriculum
- Fixed schedule of the hands-on practice
- Inappropriate training dynamics

Missing tools

- Catalogue of clinical skills – each medical school depending on the community it is based in, would list a set of clinical skills that a young graduate should possess.
- Practicum of clinical skills – a list of essential and more complex skills, with the rationale of why the procedure is important, with a detailed sequence of how exactly the skills should be performed.
- Portfolio (logbook) of acquired clinical skills
- Patients' participation and cooperation

Stages in teaching clinical skills

Skill learning is an active process where the teacher does not teach the skill per se but rather facilitates its acquisition. This facilitation occurs in three steps

1. Explanation of the skill – the underlying principles, its steps and its uses
2. Demonstration of the skill – where the learner observes the steps of the procedure
3. Practice with feedback – on simulated models and on real patients⁷.

The acquisition of psychomotor skills is based on seven fundamental principles⁸.

- Conceptualization — where the trainee is introduced to the cognitive elements of the skill.
- Visualization – the trainee observes the skill being performed, from beginning to end.
- Verbalization— the trainee observes the skill a second time, while listening to an explanation of the steps.
- Practice— the trainee now practices the skill
- Correction and reinforcement
- Skill mastery— the trainee can demonstrate the skill without error.
- Skill autonomy— the trainee can perform the skill in real life situations without error.

Methods of teaching clinical skills

Bedside teaching

The patient is the pivot upon which clinical medicine rotates, and to be effective, clinical teaching

must involve and be centred upon the patient. William Osler one of the best known clinician educators strongly advocated bedside teaching and said “no teaching without the patient for a text, and the best teaching is often that taught by the patient himself ”⁹.

Bedside teaching usually occurs on the ward, and is a small group teaching learning experience. Depending on time and staff available and number of students, bedside teaching can be planned in different ways¹⁰.

1. Business rounds – The student accompanies the clinical unit on rounds and observes them at work.
2. Patient centred rounds – The student is assigned one or more patients who he or she follows from admission to discharge
3. Teaching rounds – patients are selected and seen by the student in advance and presented to the teacher and discussed. Clinical skills are demonstrated and learnt at the bedside.
4. Shadowing – the student accompanies a junior member of the staff and assists in their work.

Teaching in the ward places the students' clinical learning in context. however, there are a number of barriers to effective bedside teaching. These include¹¹.

Barriers:

- Possibility of patient discomfort and non co operation
- Lack of privacy
- Patients are often hard to locate
- Learners do not want to go to bedside
- Takes more time
- Teachers feel uncomfortable (if not familiar with topic of discussion)

In spite of these barriers, teaching at the bedside is considered the best way to enhance trainee skills, and the WHO advisory committee on medical training has recommended that medical schools increase the amount of bedside teaching time in their curricula.

The following strategies would help to overcome the barriers to bedside teaching, and improve learner outcomes^{12,13}.

1. Preparation – a. Know curriculum
- B. Be aware of knowledge and skill levels of student
- C. Be updated on latest methods of history taking and examination
- D. Undergo development programs and updation about best practice teaching methods
- E. Provide incentives for teaching faculty.
2. Plan what you hope to achieve at each bedside encounter – in other words, which system is to be taught, what aspect is to be focused on, how much time to spend with each patient.
3. Plan goals for each session along with learners.
4. Introduce yourself and your students to the patient, emphasize that the purpose is teaching, and not that everything discussed at the bedside is necessarily related to their condition.
5. Be a role model to the learners in terms of professionalism and bedside manner
6. Observe and evaluate the learner
7. Challenge the learners, do not humiliate them. Don't ask junior learners a question when a senior learner has failed to answer. Keep all students engaged.
8. Conclude the bedside teaching session by summarising what has been taught.
9. Leave time for doubts, clarifications and assignments.
10. Get feedback
11. Evaluate yourself; reflect on the teaching and how to improve it.
12. Start your preparation for the next phase with the reflection of the concluded class.

Innovations and improvisations in bedside teaching

1. Five step method – this technique was first used in the American college of surgeons trauma life support course and can be used for any type of skill teaching regardless of the level of difficulty⁸.
 - Overview
 - Preceptor silently demonstrates skill
 - Preceptor demonstrates skill with explanation

- Learner explains skill
- Learner demonstrates skill

2. One minute preceptor

The one minute preceptor has been devised to help the busy clinician to teach effectively in short periods of time – it can be used in the ambulatory setting i.e. the clinic or outpatient department. It is based on the following learning sequence – having an experience (a patient encounter), reflecting on the experience, making generalizations based on what is learnt from that experience, and testing these generalizations on new situations. It begins with the student presenting a case or patient encounter to the trainer. The trainer then uses five microskills to teach the learner. These 5 microskills are¹⁴.

- Get a commitment. – for example – “what do you think the diagnosis is?”
- Probe for supporting evidence. – “why are you considering this condition”
- Teach general rules. – “If a patient has fever, productive cough and chest pain, consider a pneumonia.
- Reinforce what was done. “you did an excellent job of eliciting the family history of tuberculosis.”
- Correct mistakes – “You could be right that the patient has an uncomplicated pneumonia, but without percussing the lung, we have a good chance of missing a parapneumonic effusion.”

The one minute preceptor works best in the ambulatory setting where the teacher interacts with student, rather than lecturing to him/her. Positive reinforcement of what is done correctly is an important part of OMP.

3. Clinical clerkships

In clinical clerkships the student, under supervision, interacts with and follows up a patient just as a physician would do. clerkships occur after the basic science curriculum, and are supervised by medical faculty at a medical college hospital.

The purpose of the clerkship is to teach the medical student clinical examination, clinical reasoning, and patient management. During the clinical clerkship, the medical student interacts with

patients much as a physician does, however their management decisions are implemented only after evaluation and approval by senior faculty. Clerkships do not offer comprehensive coverage and training in all the required basic clinical skills. However, the clerkship experience, does prepare students to be effective clinicians if it follows skills lab training and assessment of in the preclinical years¹⁵.

Skills lab and other alternatives to traditional bedside teaching



The clinical skills laboratory is a room dedicated to training in examination and procedural skills, both by self study and by training. It has numerous simulators and interactive models. It gives students an insight in to the way a professional functions. There are several advantages of a skills lab

Firstly, it is a relatively safe environment where a student can acquire and hone skills before using them in actual clinical situations. However, more importantly, the teaching, learning and feedback can be more structured and therefore more effective. The main disadvantage of a skills lab is that it is an artificial environment, and to be effective, skills learned here must be refined and practised in the ward.

Skills centres are planned and budgeted for by the medical college administrations, students, faculty and trustees. An effective skills lab would be

- Relevant to the educational and training requirements.
- Integral to the curriculum
- Flexible in its design¹⁶.

Maintaining the skills lab

1. Protection and maintenance of equipment
2. Support material and guidelines so that equipment can be used carefully and safely
3. Clinical skills teachers to train both the other students and other teachers on how to use the skills centre.

Standardized patients

A “standardized patient” (SP) is a healthy person taught to give certain responses to trainees during examination. A SP can be used to teach communication skills, history taking and physical examination skills. The advantage of using a SP is that the student can learn skills in a safe environment, without the fear of the consequences of making mistakes. Additionally, repeated practice till the skill is mastered is possible, and the SP gives the student useful feedback¹⁷.

Cadavers

Cadavers can be used as a low cost alternative to skills labs. The following procedures can be learnt and practised on a cadaver.

- Central venous access by the internal jugular, subclavian, and femoral approach.
- Cricothyrotomy.
- Pericardiocentesis.
- Cranial burr holes.
- Intraosseous catheter placement.
- Thoracotomy.
- Intra-articular access.
- Tube thoracotomy

Assessment of clinical skills by observation of trainee performance in the workplace.

Traditionally, clinical and practical skills have been assessed by the long case, the short case and more objectively by the OSCE and OSLER. However, now evaluation is made more relevant by taking it to the work place where the student would be expected to function effectively in the future in real life. Assessment methods of trainees in the workplace include

1. Mini-Clinical Evaluation Exercise (mini-CEX)
2. Clinical Encounter Cards (CEC)
3. Clinical Work Sampling (CWS)
4. Blinded Patient Encounters (BPE)
5. Direct Observation of Procedural Skills (DOPS)
6. Case-based Discussion (CbD)
7. Multi Source Feedback (MSF)

1. Mini (mini-CEX)

The mini CEX is a modification of the CEX (clinical evaluation exercise). Here, the faculty observes and grades the student during a patient encounter that lasts for 15 – 20 minutes. The assessment is recorded on a standardized rating form. This mini CEX is repeated 3-4 times in a year and covers a broad range of patient situations, and situations such as ambulatory ward and emergency. The mini c ex is found to be a reliable assessment tool, compatible with high stakes assessments¹⁸.

2. Clinical encounter cards

The CEC system was developed at McMaster University in Canada and it grades student performance based on direct observation of a patient encounter. The encounter card system is based on the following parameters: history-taking, physical examination, professional behaviour, technical skill, case presentation, diagnosis and treatment. Each dimension is scored using a 6-point rating scale. This system has high reliability and validity, and students satisfaction with this method is high¹⁹.

3. Clinical work sampling

This assessment method, developed in Canada, is based on direct observation of clinical performance in the workplace. In this method faculty members directly observe the trainees and grade them on communication skills, physical examination skills, diagnostic acumen, consultation skills, management skills, interpersonal behaviour, continued learning skills and health advocacy skills. Trainees can also be assessed by nurses and patients.

The rating forms use a 5-point rating scale ranging from unsatisfactory to excellent performance. This assessment is valid and reliable if a minimum of 7 patient encounters are observed.

4. Blinded patient encounters

In this method the patient is initially unknown to the trainee. Five students participate in a bedside tutorial and one student from the group is observed while he elicits a history or performs a directed physical examination. After this there is a discussion on the investigations and management to be done. The student who presented the case is then given feedback (in private) about his performance. Feedback is provided using a 9-point rating scale.

5. Case based discussion

This method begins with a discussion of a particular clinical case with a focus on clinical findings, and lab investigations. After this discussion the students are allowed some time to read and analyse to get to a final diagnosis or create a differential diagnosis

In Session 2, the students present their own differential diagnosis and answer questions that the staff asks. The staff and students finally come to a diagnosis.

Feedback is given to each student in how they performed..

6. Multi source feedback

Multi source feedback is also known as 360 degree assessment. It involves getting opinion about a trainee from a variety of people. Persons who assess the trainee include the patients, co workers, faculty and nurses. Performance may be affected by the relation between rater and ratee and sociodemographic features. However, it has been questioned whether MSF and patient feedback can actually identify poor performance as various confounding factors in this method have been identified²⁰.

7. DOPS – Direct Observation of Procedural Skills

Trainees are given a list of procedures which they demonstrate under observation. DOPS grades not only the quantity of procedures done but also the quality of work done²¹.

Conclusion

Training in clinical skills is essential to produce a competent physician. Clinical skills are best learnt at the bedside in small groups with a structured lesson plan, and with feedback and

practise. However, skills labs are also useful as an adjunct to bedside teaching. Innovations in teaching like the 5 step method can be used to improve training. Training in clinical skills can only be effective when it is followed by an objective, reliable, valid work place based assessment. Multi source feedback, clinical work sampling, clinical encounter cards and Direct Observation of procedural skills are methods of workplace based assessment.

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SHORT COMMUNICATION

Epidermodysplasia verruciformis (EV) : a case report

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ABSTRACT

EV is rare disorder ,which is characterized by persistent human papilloma virus infection with autosomal recessive inheritance.EV was first reported in 1922 by Lewandowsky and Lutz.We describe a case of who had all the classical skin manifestations along with the unusual findings of V shaped nick over the free nail edge.

KEY WORDS

Epidermodysplasia verruciformis,autosomal recessive trait

Introduction

Epidermodysplasia verruciformis is also called as Lewandowsky-Lutz Dysplasia or Lutz-Lewandowsky epidermodysplasia verruciformis¹. It is an extremely rare autosomal recessive hereditary skin disorder with equal sex distribution. In the west, the peak incidence is in spring and winter with lower incidence in summer. It is characterized by abnormal susceptibility to human papilloma virus. It is typically associated with HPV types 5 and 8², which are found in 80 % of the normal population as asymptomatic infections³, although other type may also contribute. Clinical diagnostic features are life long appearance of pityriasis versicolor like macules, flat verruca plana associated with risk of malignant transformation^{2,4}.

Case report

• A 29 year old male came with complaints of mild itchy raised lesion over the face and trunk for the last 4 years which first appeared over the face and slowly progressed to involve the trunk. He was treated with some medications previously without any favourable result. It was not associated with any constitutional symptom. There was history of photoaggravation of the lesion. On clinical examination numerous papules and plaques, most



*V' shaped nicks over the distal free edge of the nail



Multiple flat topped papules & plaques with mild verrucous surface distributed over the face

of them being flat topped with mild verrucous surface, distributed over the face (more over the mandibular region), neck, middle of the chest and extremities were seen. Lesions over the extremities were micropapules with rough surface. Multiple verrucous plaques were present over the dorsum and pulp of the fingers and over the lower legs and the dorsum of the feet. Symmetrically distributed, guttate, hypopigmented macules were present over the trunk. There were V shaped nicks over the free edge of the nails with subungual hyperkeratosis.

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Oral mucosa was found to be normal. Epidermodysplasia verruciformis and Darier's disease were considered for differential diagnosis. Histopathological examination of the skin showed hyperkeratosis and acanthosis with extensive vacuolation in keratinocytes with central pyknotic nuclei. Keratinocytes were swollen and irregularly shaped. Diagnosis of epidermodysplasia verruciformis was established. The subungual and other verrucae were treated with local formic acid application.

Discussion

EV is an autosomal recessive disease characterized by life long eruption of verrucae-like lesion. It is associated with disseminated HPV infection and immunological abnormalities. The cause of this condition is an inactivating mutation in either the EVER 1 or EVER 2 genes, which are located adjacent to one another on chromosome 17¹. The precise function of these genes is not yet fully understood, but they play a role in regulating the distribution of zinc in the cell nucleus. It has been shown that zinc is a necessary cofactor for many viral proteins, and that the activity of EVER1/EVER2 complex appears to restrict the access of viral proteins to cellular zinc stores, limiting their growth⁵. Numerous treatment modalities have been tried without benefit. Drug like cimetidine is also tried⁶. Therapeutic alternatives for treatment of viral

wart such as electrodesiccation, cryotherapy, topical retinoic acid preparations, contact sensitization and surgical methods are generally unsatisfactory⁷. However, a case of successful treatment with acitretin and interferon alfa-2a is reported⁸. Our case had all the classical features of EV along with V shaped nick of the free edge of the nail which is a feature more typical of Darier's disease

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SHORT COMMUNICATION

Chronic idiopathic hematocele of scrotum – a mimicker of malignancy!

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ABSTRACT

We report a case of a 64 year old male, with a history of non traumatic painless enlargement of a scrotum. Physical examination showed a non tender mass measuring 25x10cms. Ultrasonography showed suspicion of neoplasm. Orchidectomy performed following surgical exploration revealed chronic hematocele which was confirmed histologically. Hematocele can clinically and radiologically mimic a neoplasm and this should be kept in mind before any radical treatment is initiated.

KEY WORDS

Hematocoele, Testicular mass, ultrasonography

Introduction

During fetal development, the **processus vaginalis** testis forms as an extension of the peritoneum, descending into the scrotum and surrounding the testis. The normal scrotum contains a few milliliters of serous fluid in between the layers of the tunica vaginalis. A hydrocele is a collection of fluid in either the tunica vaginalis or a persistent **processus vaginalis**. Hematoceles are typically a result of direct trauma to the scrotum, although idiopathic cases have been reported. Patients usually present following trauma with pain and an acute scrotal swelling similar to a hydrocele, although not transilluminating well¹. Hydrocele is the most common cause of painless scrotal swelling. However, hematocele and pyocele are rare. Other causes of a scrotal mass are inflammatory conditions, malignant neoplasms and trauma. Clinically and sonographically, a hematocele may simulate a testicular neoplasm. Thus, preoperative diagnosis is difficult². Hematocele presents as a testicular tumor, and the main clinical significance lies in the difficulty encountered in excluding malignant lesions preoperatively³.

Case report

A 64-year-old male came with history of gradually increasing painless scrotal swelling of one-year duration. He gave no history of trauma, fever or pain. Scrotal examination revealed a large non-tender mass measuring 25 x 10cm. Ultrasonography showed features suspicious of



Fig 1: Cavity with thick capsule filled with clotted blood and adherent testis.

Fig 2: Fibrocollagenous capsule with hemosiderin-laden macrophages and chronic inflammatory cell infiltrate. H & E 20X.

testicular neoplasm. Surgical exploration done showed a hematoma, which was closely related to compressed testis and spermatic cord. Due to severe adhesion, testis could not be saved and low inguinal orchidectomy was performed. Grossly, the resected mass measured 20.5 x 10.0 x 8.0 cm and consisted of a cavity having a thick capsule filled with old brownish-black clotted blood. The cavity was separated from the testicular tissue, which was compressed to one side, but was looking normal. [Fig1] Microscopy showed a thick fibrocollagenous capsule with many hemosiderin-laden macrophages, dystrophic calcification, cholesterol clefts and chronic inflammatory cell infiltrate [Fig 2] consistent with

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long standing hematocele. Adjacent normal testicular tissue showed features of atrophy.

Discussion

Scrotal masses can occur from infancy to old age, with various causes distributed widely across the age spectrum. Common causes of scrotal mass are inflammatory lesions, malignant neoplasms and traumatic lesions including hematomas^[4]

A hematocele is the accumulation of blood in between the layers of the tunicavaginalis or sac. It can be either recent (acute) or chronic. A recent hematocele is usually the result of injury of a small blood vessel during aspiration of a hydrocele. In such cases, there is prompt refilling of the sac with considerable pain and tenderness. This recent or acute hematocele in a previously normal tunica vaginalis is commonly associated with direct testicular trauma⁵. Chronic hematocele occurs due to long standing spontaneous bleeding into the tunica vaginalis. Idiopathic or spontaneous bleeding seems to be more common in elderly patients³.

According to etiology, hematoceles can be classified into idiopathic and secondary ones. Secondary hematoceles are usually associated with trauma, surgery or neoplasm, but sometimes can be caused by hematological alterations or vasculitis⁴. Clinical and physical examination findings closely mimic neoplasm of testis in case of hematocele⁶. In our case testicular malignancy could not be ruled out both clinically and radiologically and was subsequently idiopathic hematocele. At ultrasonography hematoceles appear as complex cystic lesions with internal septations and loculations. Whenever sonographic studies of a scrotal swelling reveal a multicystic mass, even if the history and physical findings are more compatible with testicular neoplasm, a hematocele should be considered in differential diagnosis. Surgical exploration may be needed whenever the diagnosis is in question. However MRI has a higher sensitivity and allows

clear demonstration of blood. In our case with the long standing history of painless enlargement of scrotal mass and with radiological and clinical findings suspicious of malignancy, surgical exploration was mandatory for definitive diagnosis. However during the exploration, testis could not be seen separately from the hematoma and orchidectomy was performed.

In conclusion differential diagnosis of chronic hematocele should be considered even in case of clinical and radiological suspicion of testicular malignancy. Early diagnosis and complete evaluation can help to preserve the testis avoiding complications such as testicular **compression, epididymo** - orchitis and abscess due to the infection of **persisting** hematocele.

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SHORT COMMUNICATION

Pseudomyxoma peritonei secondary to appendiceal mucinous cystadenoma: An interesting case report and review of the literature

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ABSTRACT

Pseudomyxoma peritonei (PMP) is a rare condition in which diffuse collections of gelatinous fluid are associated with mucinous implants on peritoneal surfaces and omentum. The disease almost always originates from a perforated appendiceal mucinous neoplasm. We report an interesting case presenting with abdominal pain and distension of abdomen to our hospital.

KEY WORDS

Pseudomyxoma peritonei, Appendiceal mucinous cystadenoma.

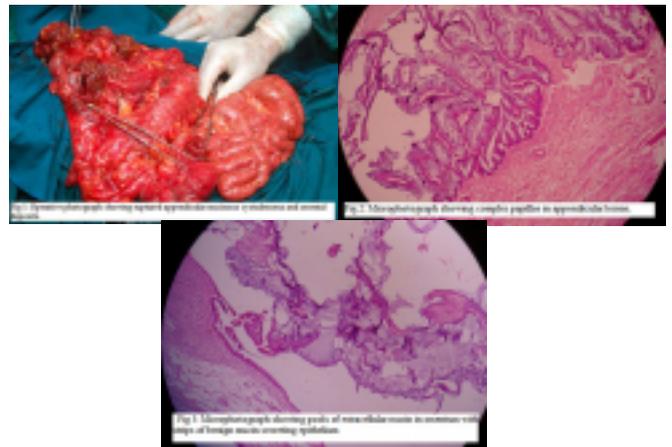
Introduction

Pseudomyxoma peritonei (PMP) characterized by abundant extracellular mucin in the peritoneum. The “myxomatous” appearance is attributed to the associated fibroblastic and vascular proliferation that is probably incited by the mucin. This results in multifocal peritoneal, serosal and omental implants admixed with copious amounts of mucin accumulation within the abdomen and pelvis. PMP arises as the result of neoplastic mucin-secreting cells with low-grade cytologic features disseminating within the peritoneal cavity. It is traditionally believed that most cases of PMP originate from ovarian tumors. This belief is challenged recently by increased usage of immunohistochemical stains and molecular genetic studies, which showed a large proportion of these tumors to be secondary to appendiceal tumors in both men and women^{1,2,3}. It has an indolent course but may recur over months to years.

Thorough surgical debulking is the mainstay of treatment. All gross disease should be removed. Appendectomy is routinely performed. Additionally, perioperative chemotherapy is used to kill any remaining cancer cells.

Case report

A 65 yrs old lady presented to with decreased appetite, vomiting and abdominal distension of 6 month duration. She gave history of having



undergone hysterectomy for dysfunctional uterine bleeding 10 yrs back. On examination, patient was haemodynamically stable. Abdomen was uniformly distended with free fluid. Routine blood investigations and chest x-ray, ECG was normal. Serum tumor

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markers CA-125 (151.4 u/ml) and CEA (305.8) were raised. Mantoux test was negative. USG and CT scan abdomen showed gross multiseptated ascites with solid and cystic areas within and nodular omental thickening, possibility of TB peritonitis / Pseudomyxoma peritonei (PMP). USG guided FNAC showed mucinous material and adipose tissue fragments. There were no epithelial components and a possibility of PMP was suggested.

Patient underwent laparotomy and found to have abdomen filled up with gelatinous material with mucinous implants over greater omentum, lesser omentum, mesentery and the pelvis. There was a ruptured mucinous cyst present in the distal portion of appendix. Both ovaries were normal (atrophic). Frozen section of ruptured appendicular mucinous cyst wall was reported as benign. Patient underwent total omentectomy, resection of mucinous deposits and appendectomy. Patient recovered well and sutures removed on 14th postoperative day and discharged from the hospital. Histopathology report was primary mucinous cystadenoma of appendix with mucinous deposits in the omentum-PMP.

Discussion

Pseudomyxoma peritonei (PMP) preferentially affects women with an average age of 53 years [4]. It has an indolent course but may recur over months to years. Most acknowledge that PMP predominantly originates in the appendix in men and increasing evidence suggests a similar site of origin in females^{3,5}. In women synchronous ovarian and appendiceal disease is common, and PMP appears more prevalent. However immunohistochemistry and molecular genetic techniques support the hypothesis that in the majority of women, the ovarian tumor is metastatic from a perforated appendiceal mucinous tumor^{2,6-8}. Recently MUC 2 over-expression has been suggested as a molecular marker for PMP of intestinal rather than ovarian origin⁹.

Mucinous neoplasms of the appendix are uncommon entities associated with a variety of underlying pathological processes ranging from simple appendiceal mucoceles to mucinous hyperplasia, serrated adenoma, mucinous adenoma/cystadenoma, mucinous neoplasm of uncertain

malignant potential, mucinous neoplasm of low malignant potential and mucinous cystadenocarcinoma¹⁰.

The current mainstay of the treatment is through surgical debulking. Repeated cytoreductive surgical debulking procedures including resections of the tumor implants, omentum and obstructive bowel are common due to recurrence of the disease. Intra-peritoneal chemotherapy (5FU, Mitomycin C) has minimal benefit with reduction in the number of foci of atypical epithelium and or atrophy and degeneration of the atypical neoplastic epithelium.

When a patient presents with increasing abdominal girth as a result of presumed malignant ascites, the diagnosis is usually established with paracentesis, or laparoscopy and biopsy. If possible, paracentesis, or laparoscopy, should be performed through the midline as these sites can be excised by a midline abdominal incision. Ideally no lateral puncture or port sites should be used as this may result in abdominal wall tumor seedling, reducing the probability of disease eradication¹¹. Laparoscopic access and visualization may be compromised by disease extent, in particular a large omental "cake", rendering accurate laparoscopic assessment impossible. Appendiceal mucocele is not contraindication for laparoscopic surgery, but appropriate precautionary measures should be taken to avoid rupture in the peritoneal cavity. Therefore, some authors recommend open surgical approach¹². Extensive cytoreductive surgery is also not possible through laparoscopic approach.

The Washington Hospital Center has pursued a "cytoreductive approach" for these patients^{13,14,15}. This treatment approach involves an initial series of well-defined peritonectomy procedures that strip all disease from the parietal peritoneal surfaces and resect all visceral peritoneal involvement, leaving the abdomen virtually free of disease. Additionally, perioperative chemotherapy is used to kill any remaining cancer cells.

In the Mayo series, 67% of patients ultimately developed recurrence and 50% of recurrence occurred within 2.5 years¹⁶. If managed appropriately, these tumors have an excellent 5-year survival rate exceeding 80%.

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SHORT COMMUNICATION

Verrucous linear nodules over the forearm and foot

Jacintha Martis*, Rochelle Monteiro⁴, Nanda Kishore B¹, Ganesh Kamath², Nisha J Marla²

ABSTRACT

Warts or verrucae are rough, scaly, spiny, painless papules or nodules that can be found anywhere over the skin surface. They are caused by infection by Human Papilloma Virus (HPV) which belong to the family Papovaviridae. Diagnosis is usually based on clinical examination. They appear as solitary or multiple, hard papules with a rough surface over exposed parts of the body. Though verruca is a common dermatological entity, our case demonstrates the spectrum of variation in morphology that it can present with.

KEY WORDS

Verruca, linear nodules

Introduction

Warts are a benign proliferation of the skin resulting from infection with human papilloma virus. Depending upon their regional predilection, histopathology and biology, HPV types are separated into three categories: cutaneous (non genital) types (HPV types 1-4), genital mucosal types (HPV types 6, 11, 16, and 18) and isolates from epidermodysplasia verruciformis (HPV types 5 and 8).

Case report



Figure 1: Verrucous papules and nodules seen in a linear arrangement over the left forearm.

A 63 year old female presented to us with painful lesions over the left hand and foot since 3 years. It was gradual in onset, started over the left leg initially, increased in size and number and gradually spread to the hand. There

was no history of previous trauma over the affected area.

On examination, verrucous papules and nodules of varying sizes, ranging from 1cm to 5cms, were seen in a linear arrangement over the left forearm (Figure 1). Tenderness was present



Figure 2: Verrucous plaques on the dorsum of left foot

over the lesions. Similar lesions were seen over the dorsum of left foot (Figure 2). A solitary medial lymph node was palpable over left axilla. Routine blood investigations was normal and HIV spot was negative.

Skin biopsy taken from the nodule under hematoxyllin and eosin stain showed epidermal hyperkeratosis, parakeratosis, acanthosis, with broadening and elongation of rete ridges and papillomatosis (Figure 3). Group of large vacuolated cells (Koilocytes) were present in the stratum malpighii (Figure 4). Dermoepidermal junction showed dense plasmacytic infiltrate, with few focal areas showing disruption of basal ridges and papillomatosis. (H & E, x 40)

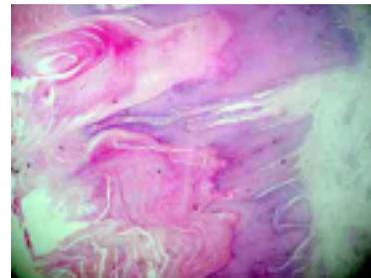


Figure 3: Epidermal hyperkeratosis, parakeratosis, acanthosis, with broadening and elongation of rete ridges and papillomatosis. (H & E, x 40)

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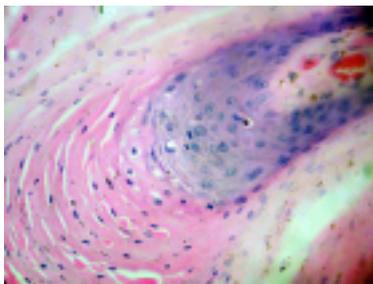


Figure 4: Group of large vacuolated cells (Koilocytes) were present in the stratum malpighii (H & E, x 100)

layer. Features were consistent with Verruca Vulgaris. Fungal culture was negative. Patient was advised to undergo cryotherapy.

Discussion

Warts or verrucae are rough, scaly, spiny, painless papules or nodules that can be found anywhere over the skin surface. They are caused by infection by Human Papilloma Virus (HPV) which belong to the family Papovaviridae. Various morphological forms may occur viz. verruca vulgaris (common warts), verruca plana (plane warts/ flat warts), plantar warts, filiform warts, digitate warts and anogenital warts (condyloma acuminata)^{1,2}. They predominantly occur in children and adolescents³.

Diagnosis is usually based on clinical examination¹. They appear as solitary or multiple, hard papules with a rough surface over exposed parts of the body, ranging from few mm to 2 cms in diameter. Formation of new warts at sites of trauma (Koebnerization) maybe seen⁴. Histopathologically, marked hyperkeratosis, parakeratosis, acanthosis, inward turning and elongation of rete ridge and papillomatosis are seen. Koilocytes are usually present which are large vacuolated cells with small pyknotic nucleus and clear cytoplasm. Immunohistochemical diagnosis may be done by detection of Papillomavirus antigen by immunoperoxidase methods⁵.

Verrucae have to be differentiated from Chromomycosis and TBVC.

Numerous therapeutic options are available of which the commonly practiced ones are electrosurgery and cryotherapy. Intralesional Bleomycin and topical Trichloroacetic acid are few of the other treatment options that have been tried^{1,2,6}.

Though verruca is a common dermatological entity, our case demonstrates the spectrum of variation in morphology that it can present with. The thick, verrucous nodules can easily mislead the clinician to suspect a deep fungal or tubercular etiology. And in a scenario where no treatment option is 100% effective, management of these kinds of massive lesions poses a clinical challenge.

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MEDICAL HISTORY PAGE

Evolution of laughing gas

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KEY WORDS

Laughing gas, Nitrous oxide, Dr. Horace Wells, History

Show me a Hero and I will write you a tragedy....

Show me a discovery and I will write you a controversy....

Discovery of Inhalation Anaesthesia is regarded as one of the most wonderful gift of science, and the people who pioneered that great blessing, are among the first benefactors of humanity. Ether and Nitrous oxide, which were to become the two important anaesthetic agents, were first viewed as merely recreational in nature. The breakthrough that heralded the modern era of anaesthesiology involved the controversy surrounding four men, each of whom, claimed to have been the pioneer in surgical anaesthesia. Dr. Crawford Long, a physician, who declared to have used ether on his patients but did not publish his findings until late; Dr. Horace Wells, a dentist, who was the first to publicly advocate the use of nitrous oxide as an anaesthetic, but failed to convince the medical fraternity; Dr. Charles Jackson, a Chemistry Professor, who alleged to have given the idea to both Wells and Morton and finally Dr. W.T.G Morton, a dentist and pupil of Wells, who conducted a successful public demonstration of ether as an effective surgical anaesthetic on October 16, 1846.

In science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs. Though Morton is credited by most historians as the discoverer of Anaesthesia, the intuition and contribution of Horace Wells that led to the discovery of nitrous oxide as an anaesthetic agent initiated the era of constant progress in anaesthesiology. Many anaesthetics have been tried and discarded, including ether and chloroform, but nitrous oxide prevailed. This article is an attempt to

trace the historical journey of nitrous oxide commonly known as *laughing gas*.

Nitrous oxide, a veteran of the anaesthetic array, began its long, eventful and often controversial "life" in 1772 when medicine, surgery and dentistry were very primitive and a good surgeon was one who could operate the quickest. Despite its obvious advantages, pain-free surgery, and pain-free childbirth were opposed by conservatives who believed: "*Pain is a natural and intended curse of the primal sin. Any attempt to do away with it must be wrong*". After a promising childhood nitrous oxide experienced a rebellious adolescence where it was used for nitrous frolics and was nicknamed as "*the laughing gas*".

In 1845, after a failed public demonstration of its anaesthetic powers, nitrous oxide was overshadowed by its contemporaries, ether and chloroform. It reappeared again in 1863 and by 1867 it was an established anaesthetic agent for dental surgeries and subsequently became incorporated into obstetric practice, for labour analgesia. As predicted by Wells, it finally found a valuable

role in the operating room.

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In its adult life, we have witnessed it being lauded as an essential component of almost every general anaesthetic and also seen it being associated with a wave of scandals; especially now as new more glamorous pretenders to the throne try to unseat it.

Nitrous oxide was the first gas recognized to have anaesthetic powers. The men who played a pivotal role in keeping the spirit of nitrous oxide alive were...

JOSEPH PRIESTLEY

Inert, colourless, odourless and tasteless, Nitrous oxide was first isolated and identified in 1772 by the English chemist, Joseph Priestley (1733-1804). He called it *phlogisticated nitrous air*¹. Priestley was a clergyman, natural philosopher and educator. He developed an interest in science after his association with Benjamin Franklin. Priestley was famous for being the first to isolate important gases such as oxygen, carbon monoxide, carbon dioxide, ammonia, and sulfur dioxide. He published his discovery in his book, where he described the preparation of *nitrous air diminished* (nitrous oxide), by heating iron filings dampened with *nitrous air* (nitric acid). Writing of his research on gases, he observed, "I cannot help flattering myself that in time very great medicinal use will be made of the application of these different kinds of airs..." [Priestley J., *Experiments and Observations on Different Kinds of Airs*. 6 vols. 1:228, 1774]².

Many scientists feel that Priestley was not a real scientist; he was more of a dabbler in science. He frequently did not see the importance of his discoveries. Yet, one cannot deny that his discoveries and research methodology provided the foundation for nearly all scientists that came after him. The preparation of Nitrous oxide was actually the *Dawn of Anaesthesia*.³ And to think that he did it all without a scientific education; maybe that was his advantage.

SIR HUMPHREY DAVY

The synthesis of the atmospheric gases gave birth to the ill-conceived discipline of "*pneumatic medicine*". Its most famous champion was Thomas Beddoes (1760-1808), founder of the Pneumatic Medical Institution in Bristol. Beddoes hired the teenage Humphrey Davy (1778 – 1829)⁴ as its

Research Director. Doctors and patients tried inhaling the newly discovered gases to see if their inhalation cured any diseases. Humphrey Davy was a chemist, poet and inventor. The exhilarating effects of inhaling nitrous oxide were noted by him and he wrote, "*Whenever I have breathed the gas, the delight has been often intense and sublime.*" Davy found that inhaling the compound made him want to giggle uncontrollably until he passed out. So the illustrious scientist dubbed it "*laughing gas*". Regrettably, such a frivolous nickname probably discouraged the idea that the gas might serve a serious medical purpose. Seeing no harm in the use of the gas, he introduced nitrous oxide to the British upper class as a recreational drug in 1799 at gatherings that were quickly coined "laughing parties." While the "nitrous oxide capers" are things of the past, the term "*it's a gas*" continues to imply that an event or activity is sure to amuse and bring gales of laughter. Despite the popularity of the gas among Davy's friends and his experience about the ability of the gas to entirely take away the pain of his tooth during one of his inhalations, Davy seemed never to have considered the use of nitrous oxide as an anaesthetic, missing a huge opportunity. Most tantalizingly of all, Davy in 1800, explicitly suggested in his book, the use of nitrous oxide as an analgesic during surgery, "*... since it appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place*"⁵. Unfortunately, this was an idea ahead of its time and more than forty years of continuing surgical mayhem were to pass before the worldwide anaesthetic revolution.

DR HORACE WELLS

Horace Wells (1815-1848) was a compassionate and successful dentist of deep religious convictions. He set up his dental office in Hartford, Connecticut. Wells hated to see his patients suffer and had always sought ways to minimize their distress as best he could. In 1844, Wells and his wife attended a public demonstration of *the laughing gas* by Mr. Gardner Q. Colton⁶. One of the volunteers was Samuel Cooley, who was known to Wells. Under the effect of the gas Cooley stumbled and injured his leg. Later he sat next to Wells, who asked him if he had pain; Cooley said he had not felt a thing and was surprised to find blood all over his leg. This impressed Wells and as chance



Fig. 2 Death of Horace Wells

proverbially favours the prepared mind, he immediately thought of the possible use of nitrous oxide in general and dental surgery. After the show, Wells contacted Colton and asked him to bring the nitrous

oxide to his office. The next day Wells submitted to the extraction of one of his own molars by fellow dentist Dr John Riggs. Colton administered the nitrous oxide. Almost insensible, Wells soon recovered his senses and exclaimed: "A new era in tooth pulling!"

Hugely encouraged at his success, Wells, together with his colleague Riggs, went on to extract teeth from their patients with the aid of nitrous oxide. Wells experimented energetically with ether and other agents too; but he preferred nitrous oxide because it was safer. Horace Wells attempted a public demonstration of surgical anaesthesia in January 1845. For arranging it in Boston, he contacted his former partner and student Morton who was in Massachusetts; they consulted initially with Charles Jackson, Professor of Chemistry but he did not seem convinced. He then approached Dr John Collins Warren, founder of the *New England Journal of Medicine* and Massachusetts General Hospital, bearing an account of his marvelous innovation. Warren with some reluctance agreed to cooperate. If fate had been kinder, the name of Horace Wells might have echoed down the ages as one of the greatest benefactors of humankind. Unfortunately, during the public demonstration at Massachusetts General Hospital the patient stirred and cried out. He had been under anaesthetized as the gasbag was withdrawn too soon. The reaction of the audience, a class of irreverent medical students, was scornful. There was laughter and cries of "humbug". Wells was mortified. In the rest of his short life, it seems he never really recovered from the humiliation.⁷ Wells attempted to resume his normal practice back in Hartford. At no time did Horace Wells attempt to obtain an economic benefit from his discovery having always the good of humanity in mind. Twenty one months after Wells' unfortunate episode, John Collins Warren allowed William Morton to demonstrate the use of ether as

an anaesthetic. Morton decided to use Ether as suggested by Jackson whom he had consulted again. On October 16, 1846, Morton performed a successful demonstration in which Warren removed, painlessly, a tumor from the neck of a patient.⁷

A bitter controversy was unleashed soon afterwards among Wells, Morton and Jackson⁴ over priority in the discovery of general anaesthesia by inhalation. Dr. Crawford Long added his name to the conflict by claiming he had used ether for surgical procedures in 1842. Long, however, never communicated his experiences, until the controversy between Wells, Morton and Jackson became public.

Late in 1846, Wells traveled to Europe, trying to start a business buying and selling art pieces, but found that his fame as the discoverer of anesthesia had preceded him. He then gave successful demonstrations in Paris. Back in the United States, Wells published a booklet entitled "*History of the Discovery of the Application of Nitrous Oxide, Ether and Other Vapors in Surgical Operations*", in which he asserted his priority⁸. When friends urged Wells to patent his discovery, he replied: "No! Let it be as free as the air we breathe..."

In January of 1848, Horace Wells moved to New York where he started to experiment with chloroform. Apparently he became addicted to this drug and one evening, while under the influence of chloroform, he sprayed sulfuric acid on two prostitutes, burning the neck of one of them. Once he realized what he had done, Wells became embittered and insane. After he was arrested, the judge seeing that he was an educated and polished person, allowed him to go to his living quarters on his request, accompanied by a policeman, to retrieve some personal things. These included a bottle of chloroform and a knife which led to his demise in Tombs prison later. That night, in his cell, under the influence of chloroform, Wells committed suicide by severing his femoral artery. This is how the discoverer of anaesthesia died, on January 24, 1848. He was 33 years old. Wells left few letters in his prison. One to the editor of the *Journal of Commerce* in which, in an obvious state of desperation, he explained that his attack on the women was caused by the delirium brought about by the chloroform. The reason he gave for the crime which he was about to commit on him was that he felt his character had irrecoverably gone. The other letter was to his wife,

asking for forgiveness and saying that he was rapidly losing his mind.

Excerpts from the letters:

"I lost all consciousness before I removed the inhaler from my mouth...but on coming out of the stupor I was exhilarated beyond measure... and seeing the phial of acid, I seized it and rushed into the street and threw it at two females...The excitement did not leave me for some time after my arrest."

"To the Editors.-My last request is that...while commenting on this unhappy affair, think of my poor wife and child, also my mother, brother and sister, all of whom are amongst the most respectable members of society."



Fig. 3 Ether Monument

"To my dear Wife.- I feel that I am fast becoming a deranged man, or I would desist from this act. I can't live and keep my reason, and on this account God will forgive the deed...I can say no more."

After his death, the news arrived that the Medical Society of Paris had honored him as the discoverer of anaesthesia and had made him an honorary member. In 1864, the American Dental Association and, in 1872, the American Medical Association posthumously recognized Wells as the discoverer of anaesthesia.

Following the death of Wells, the dispute between Morton and Jackson continued, since both wanted to be the recipients of the 100,000 dollars award promised by the U.S. Congress to the discoverer of anaesthesia. Both Morton and Jackson mobilized legions of lawyers, lobbyists, newspapermen and politicians to defend their respective causes. The expenses and aggravation caused by this bitter dispute cost Morton all his fortune and his physical and mental health. He died in 1868, as a consequence of a heart attack. Jackson continued his incessant but fruitless pursuit of the award, even after Morton's death. Finally, he

lost his mind, and was confined for several years to an insane asylum where he died in 1880.

GARDNER QUINCY COLTON

"Professor" Colton (1814 - 1898) was a flamboyant showman and lecturer on natural philosophy, chemistry and the telegraph. He enjoyed the rudiments of a formal medical education, but never graduated. Colton quit medical school in New York after discovering that staging public entertainments was more lucrative and more fun than medical training. He earned \$535 from his first public demonstration of the effects of nitrous oxide. Colton was so enthusiastic about the new gas he even thought nitrous oxide might replace ethyl alcohol as the world's leading social intoxicant. The gas used in these lectures by Dr. Colton was contained in a rubber bag, and was administered through a horrible wooden faucet. He was the first person to administer nitrous oxide as a general anaesthetic in surgical medicine. It was for the extraction of a molar tooth from dentist Horace Wells who requested him to deliver the gas as an anaesthetic.

Colton headed to California during the gold rush. Unsuccessful in finding gold, Colton returned in 1863 and set up a company with two dentists, adapting his earlier techniques of anaesthesia. The company was successful. In the 1860s, Colton successfully established The Colton Dental Association in New York. Between 1864 and 1897, Colton and his colleagues successfully extracted teeth from tens of thousands of dental patients under nitrous oxide anaesthesia without any fatalities. Colton's advice on how to use nitrous oxide was simple: *"Instruct the patient to take full, deep and slow inspirations of the gas and hold the lips and nose so as to allow no particle of common air to enter and dilute the gas. By this means, anaesthesia will be reached in from forty-five to sixty seconds."*⁹

After 1868, Chicago surgeon Edmund Andrews (1824-1904) began combining nitrous oxide with 20% oxygen. This prevented asphyxia and permitted prolonged anaesthesia. The popularity and reputation of nitrous oxide was finally recovered in hospital surgery as well as dentistry.

Today, in Boston, a statue stands, erected to the Father of Anaesthesiology. By not mentioning any of the claimants, the Ether Monument in the Boston Public Garden remains neutral in regard to the controversy. This is perhaps the paramount reason why it is generally considered the most important, visible, and recognizable memorial to the introduction of surgical inhalation anaesthesia.

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FMCI ARCHIVES

EXCERPTS FROM THE ARTICLE BY MR EDWARD GONSALVES PUBLISHED IN THE FMCI CENTENARY SOUVENIR

Rev Fr. Denis D'Sa*

A SHORT HISTORY OF THE INSTITUTIONS

Nestling on the sea-board of Karnataka State is the city of Mangalore, the headquarters of South Kanara, one of the two maritime districts of Karnataka. It has been described by the Indian Nightingale, Mrs Sarojini Naidu, as a "a garden city hidden under coconut groves". An outstanding limb of this green city is the Kankanady Hospital, its comprehensiveness summed up in its official title Fr Muller's Charitable Institutions.

While still at St Aloysius College, Fr Augustus Muller SJ, encouraged by the patronage his little dispensary received from sick students and others in town, had been dreaming dreams of a larger service to the suffering and an extended campus. He had set his sights on Kankanady, one of the seven hills of Mangalore. Why he chose Kankanady is an open question. But the site described by one of his biographers as 'nothing more than a howling wilderness' appears to have caught his fancy, as Edyah did that of the first Jesuit team with whom he came to India, and another hill, Balmatta, the fancy of the founders of the Basel Evangelical Mission.

Although the exact date of the founding of Father Muller's Charitable Institutions is not on record, all evidence, internal and external, points to 1880. That was the year Fr Muller set up the Homoeopathic Poor Dispensary at Kankanady, a very modest little structure but a veritable mine of efficacious drugs intended for the use of all who sought them. To the poor they were dispensed gratis, to others at reasonable prices, the profits being turned over to the maintenance of the dispensary, and later to the maintenance of the rest of the Hospital too.

From documents extant, the land for the Hospital was purchased from several parties - 3 ¾ acres of Kankanady village from Mr Lazarus Domingo, a small extent from Mr T.S.Bhatt, and smaller extents from others including ½ acre and attached house from Mrs Juliana Lobo, mother of Frs Jerome and Charles Lobo, under a sale-deed dated 29.01.1896.

While according to records, Fr Muller started his work of dispensing medicines at Kankanady as far back as 1880 when he also ran a dispensary at St Aloysius College, the building of the Hospital began only in 1890 when he moved out bag and baggage to Kankanady. The lepers had been housed until then at St Joseph's Asylum, Jeppoo in uncongenial surroundings on the roadside between the two Jeppoo graveyards. Fr Muller, purchasing ten acres of land on Kankanady Hill, had the ground leveled and erected a new leprosy hospital building with 11 rooms, 6 for men and 5 for women. The cost of the construction was Rs.5,000/-. The Hospital was occupied in 1892. As the number of patients rose to 32, two more rooms were added in 1906. Two contributions of Rs.797/- and 25 were received from St Francis Guild of London. The patients numbered 50 in 1909 and the total annual cost of their maintenance was Rs.5000/-. The District Board and Municipality helped with grants of Rs.300/- and Rs.200/- respectively.

The Leprosy Hospital, later known as the Leper Asylum, was under the direct supervision of Fr Muller and his assistant. A warder administered the medicines and maintained order. With the building of the General Allopathic Hospital in 1895, the diet for the lepers came from the Female

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Hospital, the main dish consisting of mutton on 4 days and fish on the other days of the week.

About the same time as the Leper Asylum, Fr Muller built a large Homoeopathic Dispensary abutting the road in front of the Cloistered Carmel.

New wings were added later, the Western wing in 1905 and the Eastern in 1906, and the total cost of the construction came to Rs.10,000/-.

..... (to be continued)

MEDICAL IMAGE

Charles excision and skin grafting for filarial lymphoedema, a forgotten procedure revisited

Rupa M. Mascrenhas*, Praveen Kumar², Erel A.I. Diaz¹

A 59 year old man presented with filarial lymphoedema of left lower limb since 12 years. Patient had difficulty in walking and lifting his left leg due to heavy weight of the limb. On examination



Figure 1 - Pre-operative photograph of filarial limb

there was non pitting oedema of left lower limb extending from ankle to knee. Patient underwent Charles excision and skin grafting. 12 kilograms of skin and subcutaneous was removed. Graft uptake was 95%.

The Charles procedure is an ablative procedure whereby the affected subcutaneous tissue is resected down to deep fascia and the area covered with skin grafts.



Figure 2 – post operative photograph of the limb

The Charles procedure involves the excision of all skin and subcutaneous tissue from the affected extremity down to the deep fascia, with coverage using split skin graft. [1] This technique is reserved for only the most severe cases. Complications include ulceration, hyperkeratosis, keloid formation, hyperpigmentation, weeping dermatitis, and severe cosmetic deformity.

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MEDICAL IMAGE

Onychomycosis caused by *scytalidium dimidiatum*

Chaitra P*, Nanda Kishore B¹, Rekha B¹, Pratibha Bhat⁶

55 year old immunocompetent lady presented with asymptomatic black lines along the finger nails of 10 years duration. On examination there was melanonychia with longitudinal ridging of nail plate and brown-black distal subungual hyperkeratosis. Distal nail clipping was subjected to fungal culture using Sabouraud dextrose agar (SDA) with and without cycloheximide at room temperature.

Olive-grey colony of size 1 cm sensitive to cycloheximide was grown on SDA after 18 days of inoculation. On colonial microscopy, a melanin producing dematiaceous fungus with thick septate hyphae and barrel-shaped arthroconidia arranged in chains was identified as *Scytalidium dimidiatum*.¹



Figure 1 - Melanonychia with longitudinal ridging of nail plate.



Figure 2 - Brown-black distal subungual hyperkeratosis.

Onychomycosis due to *S. dimidiatum*, a plant pathogen, is a rare chronic fungal nail infection that may cause melanonychia. It has a low prevalence of 0.87% particularly reported in toe nails of

adult females.² The infection being resistant to routine antifungal therapy, voriconazole has been tried successfully in some cases.³ It can cause deep subcutaneous and disseminated infections in immunocompromised patients.



Figure 3 - Colonial micromorphology of *S. dimidi* (Lactophenol cotton blue 400x).

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CAMEO

Mnemonics in medicine

Raghavendra Bhat*

Schools teach a lot of unnecessary facts expecting the students to memorise and remember them. When I was struggling to remember the names and sequence of planets, my elder sister said “ Mary very early made John shake up Nelly’s pillow “ (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto.) This was my first exposure to the world of mnemonics. Oh boy,! I was so impressed!!

The process of learning was not much different in the medical school- only more complicated. The transition from PUC to MBBS was not only shocking but totally devastating. Anatomy, probably the most difficult subject has many words which are really Greek and Latin. Concepts were complicated, prints smaller but bottomline remained the same- remember and recollect- or else...! Thus it became a necessity to find a way to remember which was a passport to passing the examination- (pass percent then was about 35%). Naturally I went in search of mnemonics!

What are mnemonics? The process or technique of improving or developing memory, Quick gimmicks that make some information more memorable-

ACRONYMS- quick to learn, difficult to retain, easy to forget. Eg- ARP

ACOUSTICS- creating sentences from the letters of words to be remembered. Eg- to Zanzibar by motor car, Road transport department carries bags

Rhymes- eg-c3, C4, C5 keeps your diaphragm alive.

Lady between two majors was a popular one! Before you get any funny ideas, let me tell you- this refers to the fact that Lattisimus dorsi muscle lies between the Teres Major and the Pectoralis Major in the Bicipital groove! A Groovy one! The way to remember the carpal bones was- She Looks Too Pretty, Try To Catch Her. I remember this mnemonic

better, but was never successful in remembering the 3 T's in proper sequence. Arrangement of structures in relation to costal groove of a rib was VAN (vein, artery, nerve). There was even a NAVEL in the thigh!- Arrangement of structures in the Femoral triangle from lateral to medial side- Nerve, artery, vein, empty space, Lymphatics. Some mnemonics were appropriate and highly successful- SCALP is one such;- Skin, Connective tissue, Aponeurosis, Loose areolar tissue and Pericranial aponeurosis. This is even taught in surgery and is mentioned in teh Mc'gregor's surgical textbook. Road Transport Department Carries Bags- refers to the formation of the Brachial plexus- roots, trunk, division, cords and branches.

There are some mnemonics related to numbers- 1,3,5,7,9 and 11 for the dimensions of Spleen;

Size-1"x 3"x 5 "

Weight- 7 oz.

Underlying ribs- 9 through 11.

Very interestingly , numbers play an important role in remembering the levels at which three major structures pass through the diaphragmatic hiatus-

AORTIC HIATUS : 12 LETTERS: T 12

OESOPHAGUS: 10 LETTERS: T 10

VENACAVA: 8 LETTERS : T 8

Probably it is easier to remember the actual facts.!!!

Mnemonics follow us into the clinical side also! Argyll Robertson Pupil as a case in point- ARP is the pneumatic- Read forwards, it indicates Accomodation reflex present. Read backwards, it points that papillary reflex is absent. One frustrated student used to have another way of remembering this fact- “Prostitute’s eye”- which accommodates but does not react (like a prostitute who is a source of this malady anyway!!) . Bell’s palsy (Facial palsy) – related to the Facial nerve VII seen is remembered as - `To Zansibar By Motor Car`- which gives the main branches of the facial nerve. % F’s of patient with gallstones- Fat, Female, Fertile, Forty, Family history- Some added flatulent too!. Also common

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was 6F's of abdominal distension- Fat, fluid, flatus, faeces, foetus and full bladder.

Treatment of ventricular fibrillation had an interesting one- Shock, shock, shock, everybody shock, little shock, big shock, momma shock, poppa shock!

Shock- defibrillation

Everybody- Epinephrine

Little- lidocaine

Big- Bretyllium

Momma- Magnesium sulphate

Poppa- procainamide.

Death is a very saddening experience particularly when it is of a friend or close relative. The sequence of events after which the family finally accepts the reality are- Denial, Anger, Bargaining, Grieving and Acceptance. The mnemonic for the same is: Death always brings great acceptance. The root value of the nerve supply of the diaphragm will make a difference between life and death and therefore must be remembered. This is a fitting mnemonic- C3, C4 and C5 keep your diaphragm alive! Some related to poisonous snakes- Red on black, poison lack; red on yellow, dirty fellow!!

Mnemonics are used in clinical practice also- the treatment of angina pectoris can be summarized as 2 A's and BALI- Aspirin+ Clopidogrel; Analgesia+ admission, Betablockers, Angiography, Low molecular weight heparin, Infusion of nitrates.

ABC of cardiac resuscitation- Airway, Breathing and Circulation is one of the most used mnemonics. The newer recommendations making it ACB is another matter.

ABCD summarizes the drugs used in treatment of hypertension: ACE inhibitors- ARB's, Betablockers, Calcium channel blockers and diuretics.

ADDISON is a mnemonic for causes for Addison's disease- Autoimmune, Degeneration (amyloid), Drugs (Ketoconazole), Infections (TB, HIV), Secondary; hypopituitarism, Other (Adrenal bleeding), Neoplasia: Secondary carcinoma.

CAGE questionnaire in psychiatry is universally used for assessment of alcoholism.

CREST syndrome of scleroderma- Calcinosis, raynaud's phenomenon, Esophageal hypomotility, Sclerodactyly, Telangiectasia- is also famous.

The need for mnemonics is less for a treating physician. Now I am told there are some hindi mnemonics too. I find it easier to learn the medical subjects than the hindi mnemonics. I give up !

WHAT IS NEW

Newer antibiotics – are there any?

Padmaja Udaykumar* Dr Ravichandra V¹

Antimicrobial agents are the most dramatic examples of the advances of modern medicine. Many infectious diseases once considered incurable and lethal can now be treated with just a few tablets. The most vulnerable molecular targets of antimicrobial drugs have been identified and antibiotics to tackle most of them have been developed. In the bargain, we have exhausted most of the sites that could be targeted. Unless new targets are identified, at least in the next decade we have to rely on the existing families of antibiotics.

It is well known that micro organisms can adapt to the environmental pressures including antibiotic pressures in a variety of effective ways. The 'super bug' for example, is resistant to all available antibiotics. Overuse and inappropriate use of antibiotics have fueled an increase in the prevalence of multidrug-resistant pathogens and some even speculate that we are nearing the end of the 'antibiotic era'.

Despite the well published concern over the issue, only two novel antibiotic classes - oxazolidinones (linezolid) and lipopeptides (daptomycin) have been introduced in the past 20 years, apart from a few new agents of existing classes. As the arsenal of antibiotics is not being restocked, considerable effort will be required on the part of the medical community to maintain the efficacy of existing antibiotics.

The two novel antibiotic classes introduced are –

1. Daptomycin obtained from *Streptomyces roseosporus*, was discovered 2 decades ago but clinical development resumed when the need was felt for drugs effective against vancomycin resistant gram positive bacteria. Daptomycin is bactericidal against methicillin resistant and vancomycin resistant staphylococci, streptococci, enterococci and *Clostridium perfringens*.

Though the exact mechanism of action is not known, daptomycin appears to have a unique mechanism of action. It binds to the cell membrane

and depolarizes it. This leads to outward movement of potassium ions resulting in rapid cell death. Daptomycin is thus bactericidal. It is synergistic with gentamicin.

Daptomycin is administered intravenously as oral absorption is poor. It should not be given intramuscularly because it causes direct toxicity to the muscle. Dose: 4- 6 mg/kg /day IV.

Adverse effects include peripheral neuropathy, myopathy, gastrointestinal disturbances, head ache, insomnia, dizziness, fever, abnormal liver function tests and jaundice.

Daptomycin should not be used to treat pneumonia because surfactant in the lungs antagonizes the effects of daptomycin.

Daptomycin is used in complicated skin and soft tissue infections, bacteremia and endocarditis.

2. Linezolid an oxazolidinone is a synthetic antibacterial effective against gram positive bacteria including MDR strains like MRSA and VRSA and anaerobes. It is bactericidal against streptococci but bacteriostatic against staphylococci and enterococci.

Linezolid acts by inhibiting protein synthesis. It binds to 50 S ribosomal subunit and inhibits the initiation of protein synthesis.

An advantage with linezolid is its good oral bioavailability - completely absorbed and hence oral and intravenous dose are the same (400 - 600mg BD).

In patients undergoing hemodialysis linezolid should be given after dialysis because it can be excreted through dialysis.

Adverse effects include gastrointestinal disturbances and on prolonged use of > 2 weeks can cause reversible myelosuppression, rhabdomyolysis, peripheral neuropathy and lactic

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acidosis. Linezolid is a MAO inhibitor and can cause **serotonin syndrome** with other drugs that increase serotonin levels or with tyramine-rich food (**Cheese reaction**).

Linezolid is indicated in nosocomial pneumonia, skin and skin structure infections, respiratory tract infections but reserved for the treatment of multi drug resistant strains.

Some newer antimicrobials are in the process of development in different stages of clinical trials, though the budget for research on antibiotics is alarmingly reduced all over the world. The antibiotics in the pipeline include –

1. Cephalosporins – ceftobiprole, ceftaroline

2. Beta lactamase inhibitor – NXL 104 (to be combined with ceftazidime)
3. Quinolones – Finafloxacin (For *H.pylori* and UTI), delafloxacin, nemonoxacin
4. Glycopeptides – Oritavancin
5. Oxazolidinones – Torezolid, Rodezolid
6. Ketolide – Cethromycin,
7. Streptogramin – NXL 103
8. Miscellaneous – Iclaprim, fidanoxacin

To conclude, antibiotics are to be used judiciously. Newer antibiotics are very few and are all expensive. They should to be reserved for resistant micro organisms and therefore used only as a last resort.

Drug	Dose & Route	Indications	ADRs
Doripenem	500 mg, i. v., 8-12 hrly	Pneumonia, UTI, Intra abdominal infections, Pyelonephritis	occasional seizures
Faropenem	200-300 mg, oral, thrice daily	CAP, LRTI, SSSI	Diarrhea, abdominal pain, nausea
Aztreonam	1-2g, i.m., i.v., 6-8 hrly	Gram negative pneumonia, meningitis, sepsis due to gram negative microbes	Well tolerated
Telavancin	10 mg/Kg, i. v., daily	Gram positive infections	Nausea, taste disturbances, insomnia
Dalbavancin	1 g, i. v., once a week	Gram positive infections including streptococcal, staphylococcal infections	Nausea, diarrhea, constipation
Streptogramins (quinupristine+dalfopristin)	7.5 mg/ Kg, i. v., 8-12 hrly	VREF, SSSI, MRSA, Nosocomial pneumonia	Phlebitis, Arthralgia, Myalgia
Tigecycline	100 mg loading dose followed by 50 mg oral, daily	CAP, SSSI, intrabdominal infections	GI irritation, hepato toxicity, photosensitivity, hypersensitivity
Telithromycin	400-800 mg, oral, daily	CAP, Acute bronchitis/sinusitis	Hepatotoxicity
Dirithromycin	500 mg, oral, daily	RTI, SSSI	G.I. disturbances

CAP – Community acquired pneumonia;
 SSSI – Skin and skin structure infections;
 MRSA – Methicillin resistant *Staph. aureus*;

LRTI - Lower respiratory tract infections
 VREF – Vancomycin resistant *E. faecium*
 RTI – Respiratory tract infections

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ACKNOWLEDGEMENTS

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