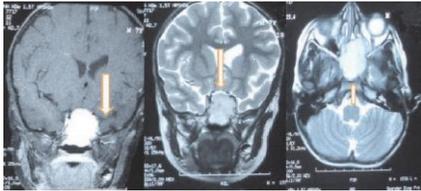


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*This Journal is dedicated to the Founder Chancellor
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I am happy to bring out this issue of the Sri Ramachandra Journal of Medicine. This issue has four original articles, one perspective articles and four case reports. There is steady increase in contribution from outside centres as well.

I thank the Reviewers, Editorial Board Members and Secretarial Assistants for improving the quality of the journal and also toiling hard to motivate the interest towards Publication. The information on Publication Oversight Committee in the organization will throw light on the Process of Publication.

Wishing you all happy reading.

P.V. VIJAYARAGHAVAN

EDITOR

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AN ANALYSIS ON UTILIZATION OF ANTIBIOTICS IN A TERTIARY CARE CENTRE

P. Elango^a, Darling Chellathai David^b, K. Thalavai^c, S. Manjunath^d, A. Ravi^e,

ABSTRACT

Background: Antibiotics are used to treat various infections. Use of irrelevant or irrational antibiotics over a period of time causes harmful effects in patients. Therefore it is necessary to monitor the indiscriminate use of antibiotics and save antibiotics in the future while saving patients.

Objective: The major objectives of the study is to study the outcome of safe medication policy, to calculate the consumption rate of antibiotics and to provide measures and suggestions to improve the safe antibiotic policy.

Methods: The various antibiotics used in the hospital are first identified and their amount of consumption is collected from the computer database for a period of two years from January 2010 to December 2011. The consumption rate of antibiotics is calculated. Based on the outcomes, the policies and appropriate directions are introduced in selection and usage of antibiotics.

Calculation:

* Antibiotic usage is calculated with reference to WHO guide lines and analysed

* Hospital antibiotic consumption rate are to be expressed as defined daily dosage (DDD) per 100 beds.

* Bench Mark : 82.59 DDD in our institute.

Results: The usage of antibiotics was 62.12 DDD in January, 2010 and it slowly increased to 100 +/- 5 DDD from May, 2010 and reached the peak of 138.99 DDD in may 2011 and it brought down to 56.02 DDD in December 2011.

Conclusions: The study elaborated the usage antibiotics in a tertiary care hospital over a period of two years. Restricted drug policy and restricted antibiotic policy and regular monitoring of medication process reduced the antibiotic usage to achieve the benchmark rate. Further, implementation of regulations will reduce the expenses spent on cost of antibiotics, reduce the resistance to antibiotics and provide a safe environment to future generation.

Key words: Antibiotic usage, defined daily dosage, medication processes, policies, quality indicators.

SRJM 2012;5:1-5

INTRODUCTION

The importance of proper use of Antibiotics:

Antibiotics are used to treat various infections and are very precious nowadays. Reason being precious is, there is no new molecule is invented recently. Use of irrelevant or irrational antibiotics over a period of time causes harmful effects in patients. It includes multidrug resistance and side effects like from simple rashes to anaphylactic reactions. It also causes super infections when broad spectrum antibiotics are used. It rarely creates kidney stones and difficulty in hearing. Therefore it is necessary to monitor the indiscriminate use of antibiotics and save antibiotics in the future while saving patients.

Sri Ramachandra Medical Centre (SRMC) is a tertiary care and a multispecialty hospital since 1985. It has been a pioneer in the field of providing a complete medical care facility to all carder of patients.

In the process of providing a quality care to their patients, Pharmacy and Therapeutic Committee (PATC) and Medication Safety Team (MST) with medication safety

nurses, clinical pharmacist under and guidance of clinical pharmacologist were formed. The medication safety team is mainly involved in monitoring the medication process and adverse medication effects in the hospital. In case of any deviations from the standards, the team reports to the PATC, thereby the errors can be rectified by appropriate measures.

Safe Medication Process:

More than 20 policies have been framed and implemented for ensuring a safe medication process to the patients in the tertiary care hospital. The process is closely monitored in the patient care areas by clinical pharmacologist, medication safety nurses and clinical pharmacists. The adverse drug reaction forms are used to collect the medication error which is reported to PATC at regular basis for corrective actions. The medication errors are analyzed based on five standard quality indicators such as Medication Errors (ME), Adverse Drug Reactions (ADR), Delay in Dispensing the drugs (DD), number of Stock Critical Medicine (SCM) and rate of Antibiotic Usage (AU).

OBJECTIVE OF THE STUDY

The major objectives of the study is

1. To study the standard antibiotic policy followed in tertiary care centre.
2. To study the various antibiotics used in the tertiary care centre in a period of 2 years
3. To calculate the consumption rate of antibiotics in the tertiary care centre and compare with the bench mark rate of the institution.

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- To provide measures and suggestions to improve the safe antibiotic policy in the tertiary care centre based on the calculation results.

MATERIALS AND METHODS

The various antibiotics used in the hospital is first identified, then the major indications for the usage of antibiotics and their amount of antibiotic consumption is collected from the computer database for a period of two years from January 2010 to December 2011.

The study is restricted only to the antibiotics consumption rate in inpatient department of the hospital and outpatients are excluded from the study. The consumption rate of antibiotics is calculated by clinical pharmacists and reviewed by the pharmacy and therapeutic committee every month. Based on the outcomes, the policies and appropriate directions are introduced in selection and usage of antibiotics.

The two important policies maintained in the tertiary care hospital. They are restricted drug policy and restricted antibiotic policy

Restricted drug policy:

This describes that some drugs are permitted for use in one division and not permitted for use in other divisions considering the pharmacological aspects of the drugs. Proper guidelines are given and are followed at the time of prescribing the drugs for various indications not only for infections and also for other ailments.

Antibiotics and Its Usage:

An antibiotic is a precious molecule in treating infections, but because of the irrelevant and irrational usage of antibiotics over a period of time causing harmful effects in patients ranging from simple rashes, multidrug resistance to anaphylactic reactions. Therefore it is necessary to monitor the indiscriminate use of antibiotics and save them for the future generation.

Since 2008 the MST was observing and restricting the use of various drugs including antibiotics but a fully functioning antibiotic restriction policy was introduced only in 2011.

Preventing irrational use of antibiotics and reducing antibiotic resistance is the novel approach in this era. Policy is essential to monitor the use of antibiotics to restrict high end antibiotics, to implement rational use of antibiotics and to prevent the resistance.^[1]

Restricted antibiotic policy:

This describes that the restricted antibiotics may be prescribed only by a consultant. Prescriptions by the assistant Physicians may be authenticated or endorsed by a consultant within 24 hours of the prescription. House Staff (postgraduates and CRRIs) will not be allowed to prescribe the following antibiotics.

- Carbapenems- imipenem, Meropenem, Ertapenem, Doripenem
- Glycopeptides- Vancomycin, Teicoplanin

- Linezolid
- Voriconazole, Caspofungin, Micafungin, Anidulafungin
- Polymyxin B, Colistin
- Tigecycline

Policy Education, Implementation and interventions undertaken:

The various education measures taken by the tertiary care hospital are as follows

- All physicians and other paramedical staff involved in the medication process are educated about the standard medication policy followed in the tertiary care hospital and are provided with regular training sessions on the updates of the policy.
- MST examined the prescriptions in the process of prescription audit, verified the relationship of the antibiotics in the list of prescription with culture sensitivity report and discussed with the treating team about the multiple antibiotics in the list and days of antibiotics usage.
- Medication safety programs and infection control programs are conducted periodically to all medical and paramedical.
- Errors and non-compliances are reported through standard adverse drug report form/incident report form.

CONSUMPTION RATE OF ANTIBIOTICS:

The consumption rate of antibiotics is calculated as follows,

DDD (Defined Daily Dosage): ^[2,3,4]

It is defined by the Anatomical Therapeutic Chemical (ATC) as the assumed average maintenance dose per day for a drug used for its main indication in adults and is assigned by the WHO Collaborating Centre. The number of DDDs for each antibiotic is determined by a group of experts from the WHO. The ATC code and DDD data of the antibiotics used in the tertiary care hospital are given in the table: 1

Calculation:

DDD of one antibiotic = Total grams of Antibiotic used in a month ÷ DDD of the antibiotic (as per ATC index) = DDD in grams.

- DDD for one Antibiotic = Number of DDD per month for the particular antibiotic used in the medical centre.
- Number of DDD per month of the antibiotic ÷ Number of patients warded during the month × 100 = Number of DDD for 100 patient days of occupied beds.
- The total sum up of all the DDDs is the antibiotic usage rate of the institute per month.
- Hospital antibiotic consumption rate are to be expressed as DDD per 100 beds.

Bench Mark in our institutions is 82.59 DDD

Table: 1 ATC code and DDD of the antibiotics

ATC Code	Name of Antibiotics	DDD
J01GB06	Amikacin	1
J01CA04	Amoxicillin	3
J01CR02	Amoxicillin+Clavulanate	3
J01CA01	Ampicillin	2
J01FA01	Azithromycin	0.5
J01DF01	Aztreonam	4
J01CE08	Benzathine Penicillin	3.6
J01CE01	Benzyl Penicillin – G	3.6
J01DF	Carbapenems	2
J02AX04	Caspofungin	14
J01DA15	Cefazolin	3
J01DA24	Cefepime	2
J01DE01	Cefepime+Tazobactam	2
J01DA32	Cefoperazone	4
J01DA32; J01CG01	Cefoperazone+Sulbactam	4
J01DA10	Cefotaxim	4
J01DD01; J01CG01	Cefotaxim+Sulbactam	4
J01DA37	Cefpirome Sulphate	4
J01DD02	Ceftazidine	4
J01DA22	Ceftizoxime	4
J01DD04	Ceftriaxone	2
J01DD04; J01CG01	Ceftriaxone+Sulbactam	2
J01DC02	Cefuroxime	3
J01BA01	Chloramphenicol	3
J01MA02	Ciprofloxacin	0.5
J01FF01	Clindamycin	1.8
J01CF02	Cloxacillin	2
J01XB01	Colistimethate	3
J01XX09	Daptomycin	0.28
J01DH04	Doripenem	2
J01DH03	Ertapenem Sodium	1
J01MA16	Gatifloxacin	0.4
J01GB03	Gentamicin	0.24
J01DH51	Imipenem –Cilastin	2
J01GB04	Kanamycin	1
J01MA12	Levofloxacin	0.5
J01XX08	Linezolid	1.2
J01DH02	Meropenam	2
J01XD01	Metronidazole	1.5
J01MA14	Moxifloxacin	0.4
J01GB07	Netilmicin	0.35
J01MA01	Ofloxacin	0.4
J01XD03	Ornidazole	1
J01CR05	Pipracillin+Tazobactam	14

J01XB01	Polymyxin B Sulphate	0.15
J01GA01	Streptomycin	1
J01XA02	Teicoplanin	0.4
J01AA12	Tigecycline	0.1
J01GB01	Tobramycin	0.24
J01CA13	Tricarillin+Clavulanic Acid	15
J01XA01	Vancomycin	2

Table: 2 The most frequently used antibiotics in kilograms from January 2010 to December 2011 with the percentage of decrease or increase.

S. No.	Antibiotics in Kilograms	2010	2011	% of Decrease or increase
1	Piperacillin + Tazobactam	90.381	89.436	-01.04
2	Ceftriaxone	51.282	32.848	-35.94
3	Cefoperazone	47.428	41.580	-12.33
4	Cefotaxime	34.573	25.889	-25.11
5	Metronidazole	29.010	21.992	-24.19
6	Cefazolin	27.428	20.632	-24.77
7	Amoxicillin	20.610	19.725	-04.29
8	Cefuroxime	10.243	15.670	+52.98
9	Amikacin	8.738	6.779	-22.41
10	Imipenem –Cilastin	7.986	9.205	+15.26
11	Cefepime	7.210	15.746	+118.39
12	Linezolid	6.252	4.511	-21.84
13	Benzyl Penicillin – G	4.906	0.372	-92.41
14	Levofloxacin	3.932	2.392	-39.16
15	Ciprofloxacin	3.093	2.461	-19.46
16	Meropenem	2.475	2.625	+06.06

RESULTS AND DISCUSSION:

The antibiotics are the lifesaving medications against infections, which has been used for many decades. But because of its in advent usage of antibiotics caused an additional burden to the medical society due to the development of new resistant microorganism, adverse drug reactions and increased morbidity and mortality rate in patients.

The antibiotic usage in the tertiary care centre was analyzed for a period of two years from January 2010 to December 2011. The bed occupancy during the study period is about 305771 (sample size).

There are about 51 antibiotics have been used in the hospital. The most commonly used antibiotics are listed in Table-2 and graph: 1

Piperacillin and tazobactam are recorded as the highest antibiotic which has been consumed in the hospital (90 Kg – 2010 and 89 Kg – 2011), followed by ceftriaxone (51 Kg in 2010) and cefoperazone (41 kg in 2011).

In 2011 there is reduction in the use of antibiotics like cefoperazone, cefotaxime, metronidazole, cefazolin, amoxicillin, amikacin, linezolid, benzyl penicillin - G, levofloxacin and ciprofloxacin and there is increase in cefuroxime, imipenem – cilastin, cefepime and meropenem when it is compared to the year 2010. The reduction in use is seen more in benzyl penicillin - G, ceftriaxone, cefotaxime, metronidazole and cefazolin and the increase is seen more in cefuroxime, cefepime and meropenem. Significant reduction is seen in benzyl penicillin - G (92.41%), levofloxacin (39.16%) and ceftriaxone (35.94%) and significant increase is seen in cefepime (118.39%) and cefuroxime (52.98%). Almost equal usage of antibiotics is seen in piperacillin + tazobactam in the year 2010 & 2011.(Table-2 and Graph:1)

The increase in use of certain antibiotics such as cefepime (118.39%) and cefuroxime (52.98%) is considered to be due compensatory increase in unrestricted antibiotics which have been available for choice of selection when restriction is imposed in certain antibiotics which showed significant decrease. But meropenem and imipenem + cilastin which have been restricted for use by Post graduate students and house staffs have increased by 0.6.06% and 15.26% respectively. (Table: 2 and Graph: 2)

The quality indicator of antibiotic use 2010 and 2011 is given in table: 3

The quality indicator of antibiotic use was about 62.12 DDD in January 2010 and slowly increased to 100 +/- 5 DDD from May 2010 and reached the peak of 138.99 DDD in May 2011 and later brought down to 56.02 DDD in December 2011.

In January, February and March, 2010 the AU is below the bench mark and from April, 2010 to July, 2011 it was above the bench mark and latter it was brought below the bench mark in October, November and December, 2011 (Table-3 and Graph: 3)

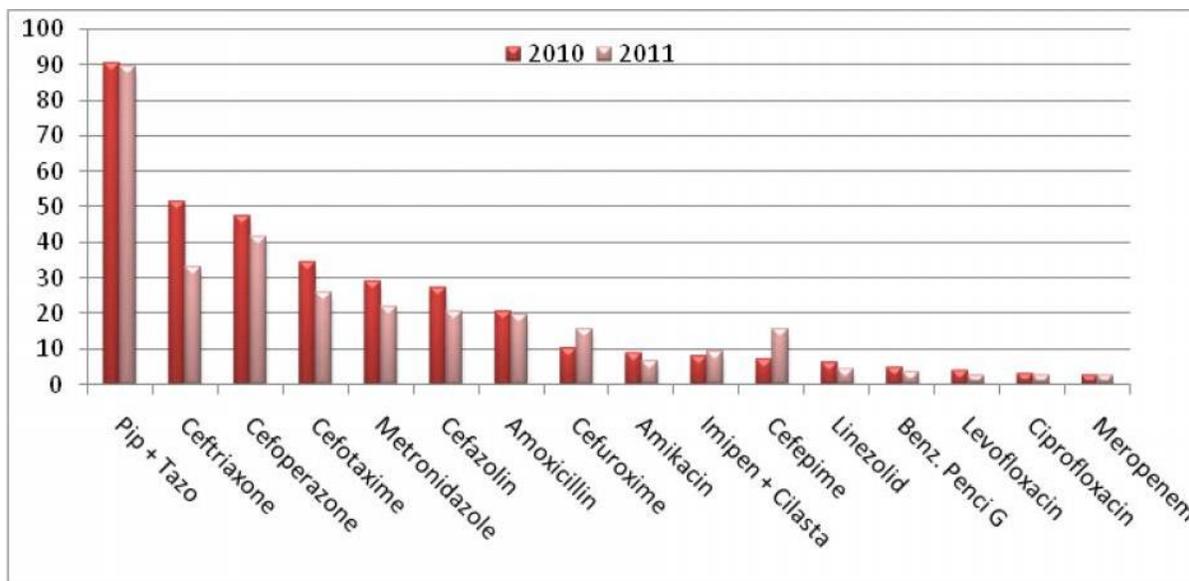
Table 3: Quality indicator of Antibiotics used in 2010 and 2011

Months	2010		2011	
	AU in DDD/ 100 BD	Bed Occupancy	AU in DDD/ 100 BD	Bed Occupancy
JAN	62.12	12719	124.26	12229
FEB	57.81	12536	97.34	12303
MAR	62.23	13821	109.61	13453
APR	87.40	13474	109.18	11366
MAY	94.78	13644	138.99	11235
JUN	100.60	13244	107.43	11449
JUL	102.58	13696	63.11	12417
AUG	97.94	13539	63.71	11778
SEP	98.66	14091	76.52	10525
OCT	96.93	15787	65.44	10770
NOV	103.00	13120	55.13	12296
DEC	106.87	13615	56.02	12663
Total	1081.8	163286	1066.74	142485

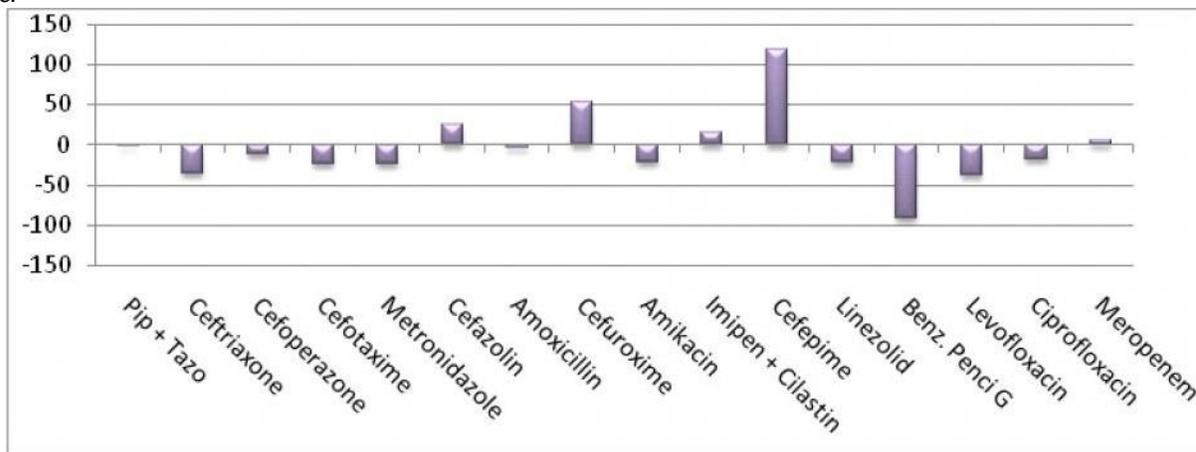
This increase in usage of antibiotics is due to the introduction of various evaluation and screening methods/policies in the system of using the antibiotics.

This reduction in the antibiotic usage may be due to taking precautions to prevent infections, implementation of restricted antibiotic usage, avoiding the usage of broad spectrum antibiotics, proper prescription of antibiotics to the patients based on their clinical conditions and reconsideration of drug is made based on the expert opinion and various culture and sensitivity reports. High antibiotic consumption which is known to produce multi resistant bacteria is restricted by this antibiotic policy.

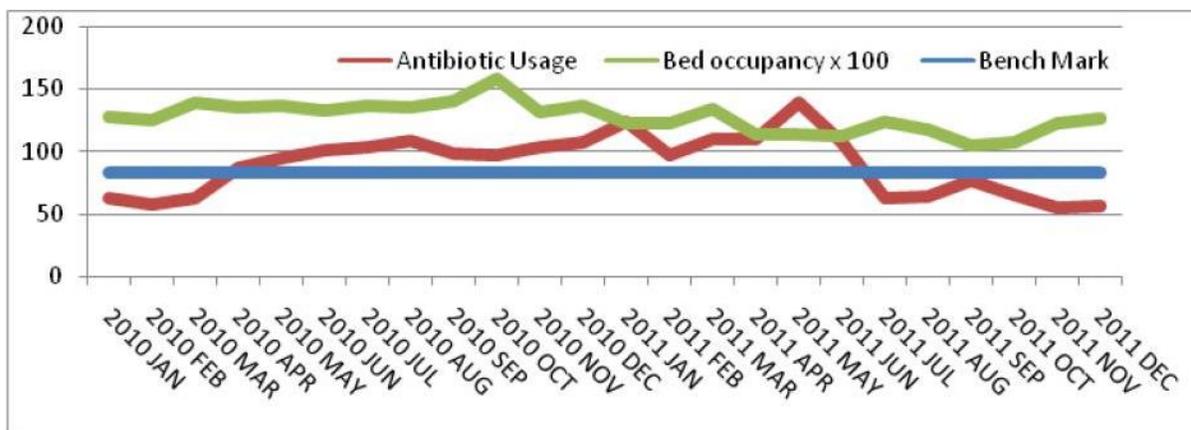
Graph: 1. The most frequently used antibiotics from January, 2010 to December, 2011



Graph 2: The most frequently used antibiotics from January 2010 to December 2011 expressed in percentage of decrease or increase.



Graph 3: Quality indicator of Antibiotics used in 2010 and 2011



THE IMPORTANCE OF ANTIBIOTIC RESTRICTION POLICY

Several strategies for regulating antimicrobial prescribing have been proposed regularly, such as health care provider educational programs, development of prescribing guidelines, monitoring resistance patterns, feedback activities, introduction of order forms, formulary replacement or institutional restrictions, mandatory approval from senior consultants before prescribing any antibiotics, regulated norms for dispensing restricted antimicrobials by pharmacist, computerbased restriction programs and limitation of contacts between physicians and pharmaceutical representatives. These measures produced a greater impact in usage of antibiotics and reduced the rate of antibiotic consumption significantly.

The major limitation of the policy is that the use of antibiotic is higher among unrestricted antibiotics than restricted ones, thus the increased usage of the unrestricted antibiotics should be strictly controlled by updating the safe antibiotic restriction policy.

CONCLUSION:

The study elaborated the usage antibiotics in a tertiary care hospital over a period of two years. A safe and efficient restricted antibiotic policy and regular monitoring teams reduced the antibiotic usage to achieve the benchmark rate. Thus, Regular monitoring and education on the antibiotic

usage helps to prevent the over usage and misuse of high end antibiotics which in return reduces the morbidity and mortality in patients due to the adverse drug reactions. The restricted antibiotic policy helps to reduce the exorbitant expenses spent for antibiotics and provide a safe environment to future generation reducing the development of resistance to antibiotics.

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AN EVALUATION OF EFFICACY OF CONTINUOUS FEMORAL NERVE BLOCK AS POST OPERATIVE ANALGESIA IN PATIENTS UNDERGOING TOTAL KNEE REPLACEMENT

P. Rani^a, T.R. Ramachandiran^a, Sagieva Koshy George^a

ABSTRACT

Background: The aim of the study was to evaluate the efficacy of continuous femoral nerve block as postoperative analgesia in patients undergoing total knee replacement.

Methods: Fifty patients who presented for elective total knee replacement were enrolled. All cases were performed under standard general anesthesia technique. Study group received ipsilateral continuous femoral nerve block with 6-10 ml of 0.0625% bupivacaine and fentanyl 2mcg/ml for postoperative analgesia. Control group received inj. Tramadol 50mg IM 8th hourly in the postoperative period. Breakthrough analgesic was given with inj. Fentanyl 25mcg IV. Pain assessment was done using Visual Analog Scale at 0, 4, 12, 24 and 48 hours in the postoperative period.

Results: The reduction in pain score in the study group were 50% at 0 hour, 33.3% at 4 hours, 33.3% at 12 hours, 66.7% at 24 hours, and 66.7% at 48 hours in the postoperative period when compared to control group. 32% of patients in first 24 hours and 64% of patients in 24 - 48 hours did not require breakthrough analgesics in the study group.

Conclusion: Continuous low dose infusion of local anesthetics into the femoral sheath provides better pain relief in the postoperative period following total knee replacement when compared to parenteral opioids. There was significant decrease in requirement of breakthrough analgesics in the study group.

Keywords: Femoral nerve block, pain relief, total knee replacement.

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INTRODUCTION

Pain control is the key to the early postoperative recovery of patients undergoing orthopedic surgery.^[1] Though there are many anatomical similarities between the innervations and bony landmarks of the lower and upper extremity, the enthusiasm for performing lower limb blocks is not as great. The majority of anesthesiologist prefers spinal or epidural technique over peripheral nerve blocks for lower extremity surgery, despite the potential disadvantages of neuraxial technique such as risks of postdural puncture headache, backache, postural hypotension, meningitis or epidural hematoma.^[2] Interest in epidural analgesia has had a recent reality check due to reports of spinal hematoma in patients undergoing epidural anesthesia and analgesia who receives enoxaparin. Tverskoy et al (1990) have suggested that peripheral nerve block reduces pain to a greater extent than epidural or intra-spinal local anesthetics in lower extremity surgeries.^[3]

Capedevila and Singelyn (1999) both reported improved range of motion as measured in degrees of knee flexion at ten days following total knee replacement in patients receiving regional anesthesia or continuous peripheral nerve block when compared to intravenous analgesia.^[4,5] This is believed to occur by prevention of central sensitization of low threshold mechanoreceptors and nociceptors at the level of spinal cord by blocking the transmission of impulses to the dorsal horn.^[6]

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MATERIALS AND METHODS

This is a randomized prospective clinical study done following institutional review board approval on 50 patients who presented for elective total knee replacement. Patients with pre-existing neuropathy or any contraindication to peripheral nerve blockade were excluded. Sample size was chosen by the nature of surgery is that, only limited cases were done over that period. Reviewing the reference articles also showed similar number of patients were taken in their study.^[5,13] Randomization was done by using slot technique. Study and Control were written in many slots and kept in a container and one slot was taken on the day of surgery and done according to the slot obtained. Patients belonging to ASA I-III were randomized into 2 groups. A written informed consent was obtained. Pre-operatively the procedure was explained to them in detail. They were educated as to how they would communicate their perception of pain according to visual analog scale (VAS) system of pain scoring after surgery. In VAS system, a scale with markings from 0 to 10 was used. 0 denotes no pain and 10 as most pain imaginable. The patient had to quantify a number at this scale indicating his intensity of pain at that moment. In the same pre-operative visit the hemodynamics and general physical conditions and their investigations were reviewed. Most of the patients had associated systemic illness like diabetes mellitus, hypertension, and hypothyroidism. Their conditions were optimized as per hospital protocol. Anti hypertensive drugs were continued till the day of surgery. Oral hypoglycemic agents were stopped and glycemic control was achieved with insulin with regular blood glucose monitoring. Other drugs, which were taken for concurrent illness, were continued. They were premeditated with tab. Lorazepam 1mg night before surgery. Intradermal xylocaine sensitivity test was done to rule out any allergic reactions.

PROCEDURE

In the operating room, after securing an intravenous line infusion of lactated ringers solution was started. The standard monitoring was established with continuous ECG monitoring, automated non-invasive blood pressure, pulse oximetry and end tidal CO_2 after intubation. Patients received IV midazolam 2mg and fentanyl 50mcg to achieve moderate sedation. In the study group with the patient in the supine position the location of the femoral artery was marked on the skin. The inguinal area was prepared with antiseptic solution and draped with sterile sheet. A femoral nerve block was performed by the inguinal paravascular approach (Winnies method) using contiplex D catheter (manufactured by B.Braun medicals). The femoral artery was palpated below the inguinal ligament and 5 cm teflon coated 22g short beveled insulated stimulator needle was inserted 1cm lateral to pulsation. With an initial output of 2 mA the needle was advanced at an angle of 30-45o to skin until quadriceps muscle contraction were elicited. The femoral nerve position was then optimized by eliciting quadriceps twitch with an output of <0.5 mA. After negative aspiration, 10 ml of 0.25% bupivacaine was injected through the needle. This was followed by placement of 22 gauge catheter introduced in a cephalad direction through the cannula and positioned to depth of 6 cm beyond the cannula tip. The catheter was taped into position with steri-strips, covered with an adhesive dressing and labeled. Continuous infusion of 0.0625% bupivacaine plus fentanyl 2mcg/ml was started at rate of 6 to 10 ml/hr because the weight of the patients ranged from 60kg to 110kg. Then these patients received general anesthesia using a standardized technique. In the postoperative care unit, hemodynamic (Heart rate, Blood pressure) and respiratory parameters were monitored continuously. Visual analog scale was assessed at 0, 4, 12, 24, 48hrs postoperatively. The nurses were instructed about the femoral nerve block infusion and supplementation of intravenous fentanyl 0.25mcg/kg as a breakthrough analgesic when required ($\text{VAS} \geq 4$). The number of break through analgesics required were also noted. The femoral nerve block infusion was continued for a period of 48 hrs post operatively and then the catheter was removed.

In the control group, the patients received standard general anesthesia technique as followed in the study group. 30 minutes before extubation these patients received inj. tramadol 50 mg intramuscularly and followed by 8th hourly injections of IM inj. tramadol 50mg. Monitoring and assessment were done alike the study group. Inj. Fentanyl 0.25mcg/kg IV was given as a breakthrough analgesic when required ($\text{VAS} \geq 4$). Numbers of breakthrough analgesics required were noted.

STATISTICAL METHODS

Statistical analysis was performed with Student's t-test and Mann-Whitney U test. Student's t-test for independent samples was used to compare the differences in age, weight, mean number of heart rate, systolic or diastolic blood pressure

between groups. The Mann-Whitney U test was used to assess the differences between control and study groups on the VAS pain scores and mean number of breakthrough analgesics requirement. Data were expressed as mean (SD) or median (interquartile range). In all the analyses a probability value of < 0.05 was considered significant. All analyses were carried out using SPSS software version 9.

RESULTS

Fifty patients were recruited to the study were equally distributed to either Control group or CFNB group. Patient characteristics are shown in Table-1. The mean values for age and weight of the patients do not differ significantly between control and study groups ($P > 0.05$).

Table 1: Patient's characteristics

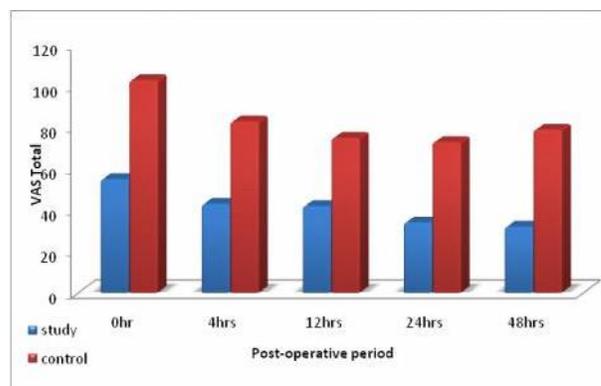
Characteristics *	Control group	Study group	P-value†
	(n=25)	(n=25)	
Age (Years)	63.2 ± 1.8	64.9 ± 1.2	0.44
Weight (Kg)	77.3 ± 2.9	83.4 ± 4.2	0.24

* Data are mean ± SD or number of persons

† Using Student's t-test for independent samples

On assessment of Visual analog scale (VAS) pain score during post-operative period there was reduction in pain scores in the study group which were 50% at 0 hour, 33.3% at 4 hours, 33.3 % at 12 hours, 66.7% at 24 hours and 66.7% during 48 hours in the post-operative period when compared to control group. The median pain scores steadily declined with increasing duration of post-operative analgesia in both control and study groups. However, the median values at different hours of post-analgesia were significantly lower in the study group than those in control group; $P < 0.05$ (Fig.1).

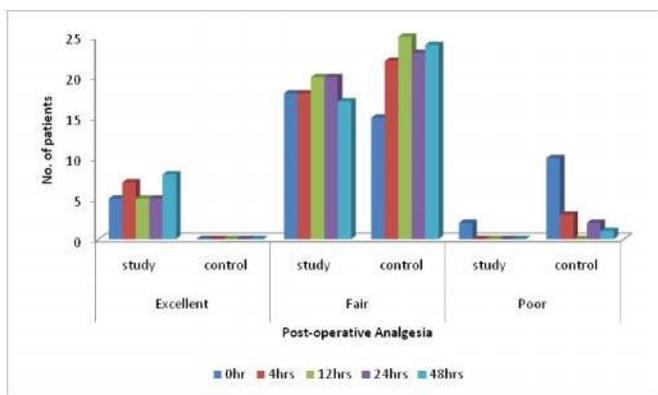
Fig.1: Comparison of sum of VAS score of Study group and Control group in various intervals in the postoperative period.



In the study group excellent pain relief was observed in 20% of the patients during 0 hour, in 28% of patients at 4 hours, in 20% of patients at 12 hours, in 20% at 24 hours and in 32% of patients at 48 hours of post-operative period. This includes two patients who had excellent relief throughout the post-operative period. In contrast in control group no

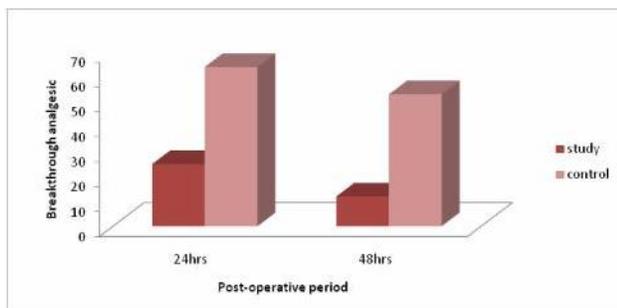
patient had excellent pain relief in the same period. A fair pain relief was experienced by 68-80% of the patients in the study group and 64-100% in the control group during the 48 hours post-operative period. Poor pain relief was observed in 8% of the patients in study group at 0 hour of post-operative period only, whereas it was 36% at 0 hour, 12% at 4 hours, 8% at 12 hours and 4% at 24 and 48 hours in the control group. When compared to control group, study group had significant statistical difference with $P < 0.05$ in patients who had excellent pain relief, whereas it was not significant in fair pain relief and poor pain relief patients. (Fig.2).

Fig.2: Distribution of patients according degree of pain relief (VAS score: 0=Excellent, 1-4=Fair, >5 poor) during different hours of post-operative analgesia in the control and study groups.



The dose requirement of breakthrough analgesics were between 2 to 3 for the patients in control group and it varied between 0 to 2 for those in the study group. When compared to control group, in the study group there was a reduction for the requirement of breakthrough analgesic of 60.9% in the first 24 hours and 77.4% during 24 to 48 hours. In the study group, 32% of patients in the first 24 hours and 64% of patients during 24 to 48 hours post-operative period did not require any breakthrough analgesics $P < 0.05$. (Fig.3)

Fig.3: Distribution of number breakthrough analgesia requirement of patients in control and study of group during 24 hrs and 48 hrs postoperative period.



In the study group the heart rate and systolic blood pressure during post-operative period were significantly lower than that in control group whereas both respiratory rates and diastolic pressure were not significantly different between the two groups (Table-2)

Table -2 : Heart rate, respiratory rate and blood pressure of patients in the control and study groups during hours of post-operative period

Haemodynamic and respiratory parameters	Control group Study group						P-value#
	n	Mean	SD	n	Mean	SD	
Heart rate	25	89.3	15.2	25	81.8	10.7	0.040
Respiratory rate	25	21.2	1.1	25	20.9	1.2	0.390
Systolic pressure	25	146.7	13.7	25	135.0	10.2	0.001
Diastolic pressure	25	85.4	4.2	25	86.2	7.3	0.600

Student's t-test for independent samples. P-values < 0.05 indicate that significant difference between groups. SD-standard deviation

DISCUSSION

Postoperative pain is the expected but nonetheless undesirable byproduct of all surgical procedures. IASP defines Hyperalgesia as an increased response to a stimulus which is normally painful.^[7] Poorly controlled acute postoperative pain may be an important predictive factor in the development of pathologic long-term chronic pain after surgery.^[8,9] Elderly patients may have an increased response to higher intensity noxious stimuli, decreased pain tolerance and decreased descending modulation (serotonin and non-adrenergic), which may contribute to the relatively high incidence of chronic pain in these patients.^[10, 11] The physiological and pharmacokinetic effects of aging on acute pain management are complex and the clinical implications include the slow titration of opioids that produces longer circulation times, smaller total doses because of increased sensitivity and expectation of a longer duration of action due to reduced clearance.

Patients scheduled for total knee replacement may receive prophylaxis against deep vein thrombosis and there is no definite conclusion regarding the absolute safety of neuraxial anesthesia and anticoagulation. The use of peripheral regional analgesic techniques as a single injection or continuous infusion can provide superior analgesia when compared with systemic opioids.^[12] Advantages of peripheral nerve blocks include reduced recovery room admissions (cost effective), less hemodynamic changes as compared with central neuraxial blockade, decreased vomiting, nausea and urinary retention and improved postoperative analgesia.^[2]

The knee is innervated by the lumbo sacral plexus. The femoral and obturator nerves innervate the anterior aspect of the knee, and the sciatic nerve innervates the posterior aspect. Blockade of both the sciatic and femoral nerves may be required to consistently provide postoperative analgesia after TKA. However equal analgesic efficacy has been demonstrated with either femoral or combined sciatic-femoral nerve blocks.

This observation suggests that sciatic innervation of the posterior knee is a relatively minor contribution to postoperative pain after TKA.

For assessing the adequacy of analgesia, visual analog scale (VAS) was used. Other clinical parameters like pulse rate, blood pressure, respiratory rate were also monitored. Post operatively, when patient had moderate pain or VAS \geq or = to 4, they were given breakthrough analgesics with inj. Fentanyl 0.25mcg/kg IV.

Both the groups received fentanyl intravenously as analgesia before induction. We wanted to make sure that catheter should not get blocked during intra-operative period and the technique could not be done at the end of procedure because under general anesthesia and neuromuscular blockade it is not possible to elicit the muscular response on nerve stimulation.

In our study, VAS pain score was done at 0, 4, 12, 24 and 48 hours in the postoperative period. We found a significant decrease in VAS pain score in the study group when compared to control group with P value <0.05 . The reductions in pain scores in the study group was 50% at 0 hour, 33.3% at 4 hours, 33.3% at 12 hours, 66.7% at 24 hours and 66.7% at 48 hours when compared to control group. Edwards ND et al^[13] found in his study that in patients with femoral nerve block had lower pain scores at 4 and 24 hours postoperatively (P value < 0.01) when compared with intramuscularly administered narcotics.

In the femoral nerve block group, most of the patients had the VAS were between 0-3 at 0 and 4 hour, hence did not receive breakthrough analgesic during that period. It was associated with 6 to 10 hours prolongation in the requirement of first analgesic dose. Allen JG et al^[12] compared the post operative requirement of parenteral opioids following subarachnoid block and combined femoral sciatic nerve blocks as postoperative analgesia in TKR patients. They found that nerve block group was associated with excellent analgesia and there was a delay of 2 to 8 hours in the requirement of first analgesic dose.

The median numbers of break through analgesic dose requirement was significantly less for the study group with 2.6 in control group and 1 in study group in first 24 hours. Median number of 2.1 doses was required in the control group and 0.5 in the study group in 24 to 48 hours.

In this study, both the group had high percentage of "fair" analgesia. 72-80% of the patients in the study group and 64-100% in the control group during the 48 hours post-operative period experienced a fair relief. We used minimal concentration of bupivacaine 0.0625% with fentanyl in our study, when reviewed with other similar studies bupivacaine concentration used were more than 0.1% for infusion. Sciatic nerve supply minimal area in posterior aspect of knee. We did only 3-in-1 block which cover maximum circumference of knee joint, but addition of sciatic

nerve block has been proved to give excellent analgesia which we didn't do in our study might be the reason for fair analgesia in high percentage of patients.

Excellent pain relief was observed in 20% at 0 hour, in 28% at 4 hours, in 20% at 12 hours and 20% of the patients in the study group during 24 hours and 20% at 48 hours of post-operative period. This includes two patients who had excellent relief throughout the post-operative period. In contrast, in control group no patient had excellent pain relief in the same period. Patient's pain tolerance might have contributed for excellent analgesia in small group of patients; if we had increased the concentration of the drug of the infusion we could have obtained better result.

Poor pain relief was observed in 8% of the patients in the study group at 0 hour of post-operative period, whereas it was 36% at 0 hour, 12% at 4 hours and 8% at 24 hours in the control group.

We believe that addition of fentanyl enhanced the analgesia with lower concentration of bupivacaine of 0.0625%. The cell bodies of sensory nerves in the dorsal root ganglion produce μ opioid receptor (MOR), δ opioid receptor (DOR), and κ opioid receptor (KOR) and the receptors are transported peripherally in the nerve axons^[14] When activated, opioid receptors in peripheral nerves modulate nerve activity by inhibition of high voltage calcium channels and suppression of tetrodotoxin-resistant selective sodium channel and nonselective cation currents stimulated by inflammatory PGF2.

The use of bupivacaine (0.1 to 0.25%) typically does not result in toxic blood levels when used for postoperative analgesia for 24 – 72 hours. S Ganapathy et al^[15] did a study on 62 patients with 0.2%, 0.1% bupivacaine at 10ml/hr for 48 hours after initial bolus of 30ml in femoral block catheter and venous plasma level of bupivacaine was measured. He found the levels were below the toxic range. In our study we used 0.0625% bupivacaine 6-10 ml/hour following a bolus dose of 10 ml and did not encounter any complications of bupivacaine toxicity.

In our study, 3 patients (12%) in the control group had nausea and vomiting and none of the patients in study group had nausea and vomiting. It is difficult to avoid certain side effects inherent to opioids like nausea, vomiting, pruritus, urinary retention and respiratory depression from their use. Nausea and vomiting may result from the indirect activation of visceral nuclei such as nucleus solitarius or the direct activation of chemoreceptor trigger zone in the floor of the fourth ventricle.

In this study all patients were monitored for respiratory rate hourly in the postoperative period. No patients had respiratory depression and this can be attributed to weak opioid activity of tramadol and the dependence of non-opioid mechanism for analgesia made tramadol a significantly less respiratory depressant at equi analgesic doses of other opioids. Fentanyl in analgesic dose did not found to produce respiratory

depression. Heart rate and blood pressure were monitored at hourly intervals in the postoperative period. In this study all patients had stable hemodynamics. The other complication on usage of continuous peripheral nerve blocks are the possibility of infection or catheter damage and the potential for shearing, leaving behind a portion that may act as an irritant or infective focus. In this study, no such problem was encountered.

We did not want to burden the patient with extra cost of contiplex needle when we are not giving analgesic infusion through the catheter.

We learnt that apart from central neuraxial blockade regional analgesia and anesthesia can be given for lower limb surgeries which is very useful both for patients and anesthesiologist.

CONCLUSION

Continuous low dose infusion of local anesthetics into femoral nerve sheath provides better pain relief in the postoperative period following total knee replacement when compared with parenteral opioids. There was a significant decrease in the requirement of breakthrough analgesics in the femoral nerve infusion group. The side effects were much lower than parenteral analgesics. The technique was easier to perform with minimal patient discomfort. Hence continuous femoral nerve catheter infusion is found to be an effective mode of postoperative analgesia in patients undergoing total knee replacement

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A COMPARISON OF LIPID PROFILE AND HOMOCYSTEINE LEVELS IN HEALTHY AND CHRONIC PERIODONTITIS SUBJECTS – A PILOT STUDY

Loganathan Dharmahla Devya, Ramamurti Anjanaa, Ranga Rao Suresha

ABSTRACT

Background and objective: Cardiovascular diseases (CVDs) have contributed to significant morbidity and mortality worldwide. It has been estimated that less than 50% of patients with atherosclerosis seem to lack currently identifiable risk factors. In recent times, periodontal infection has been proposed as a risk factor for the incidence of CVDs. The aim of our present study was to analyze for any alterations in lipid profile and homocysteine levels in chronic periodontitis patients compared to healthy individuals.

Methods: The study group comprised of a total of 20 patients (10 healthy and 10 chronic periodontitis subjects). Blood samples were drawn from these patients to estimate the levels of low density lipoproteins (LDL), high density lipoproteins (HDL), very low density lipoproteins (VLDL), total cholesterol,

total cholesterol/HDL ratio, triglycerides and homocysteine. Differences in the levels of the various lipid parameters and homocysteine between the two groups were analyzed using the students 't' test.

Results: In the present population study, a statistically significant difference was found in relation to triglycerides and VLDL (p value < 0.05) levels in patients with periodontitis. However, the difference in the other lipid parameters and homocysteine levels between both the groups was statistically insignificant (p value > 0.05).

Conclusion: The findings of our study indicate an increase in triglyceride and very low density lipoprotein levels in periodontitis subjects.

Keywords: Chronic periodontitis, cardiovascular disease, lipids, homocysteine.

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INTRODUCTION

The occurrence of cardiovascular diseases (CVDs) has been on the rising trend with genetic and environmental risk factors attributing to the complexity of the disease. In recent times, there has been an increasing incidence of CVDs in developing countries as a result of urbanization and life style changes which has contributed a greater share to the global burden of CVD.^[1] According to World Health Organization health statistics,^[2] CVD is the single leading cause of morbidity and mortality globally and less than 50% of the subjects with atherosclerosis seem to lack currently identified risk factors, indicating the possible involvement of novel risk factors.^[3]

The impact of chronic infections in particular, oral infections on CVD outcomes has been much speculated. Of the many oral diseases, periodontal disease is considered as one such risk factor for incidence of cardiovascular events^[4-7] and that it contributes to the global burden of chronic diseases.^[8,9] Periodontitis is a multifactorial disease characterized by loss of attachment of the tooth supporting structures, microarchitectural deterioration and loss of alveolar bone mass. It is generally regarded as an outcome of the host's exaggerated inflammatory immune response to the microbes present in the plaque biofilm. Over time, the destruction becomes irreversible and there is a significant loss of the supporting tissues of the teeth. These bacteria and

their toxins stimulate the local tissue response and cause the release of cytokines and other pro-inflammatory mediators such as interleukin -1 alpha (IL-1 α), interleukin -1 beta (IL-1 β), interleukin -6 (IL-6) tumor necrosis factor - alpha (TNF- α) along with acute phase reactants like C-reactive proteins, fibrinogen and homocysteine.^[10] Inflammation and chronic infections like periodontal disease are becoming the targets of interest as potential novel risk factors for CVD since a number of risk factors are common between them like high levels of serum lipids, inflammatory factors and hemostatic factors.^[4,5] Hyperlipidemia is a state of abnormal lipid profile. The association of altered lipid profile and periodontitis has been investigated in various studies, the results of which have been found to be inconsistent and inconclusive.^[11-13] Also elevated levels of homocysteine (Hcy) (which is a sulphur containing amino acid derived from methionine) seem to have an influence on lipid peroxidation. A positive relation exists between the concentration of Hcy and biohumoral parameters of inflammation.^[14]

Mixed view prevails on the concept of alterations in lipid profile and homocysteine level in chronic periodontitis patients compared to healthy controls. The aim of the present study was to investigate the association of the serum levels of low density lipoproteins (LDL), high density lipoproteins (HDL), very low density lipoproteins (VLDL), total cholesterol, total cholesterol/HDL ratio, triglycerides and homocysteine in healthy and periodontitis subjects.

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MATERIALS AND METHOD

A total of 20 subjects in the age group of 20-40yrs were enrolled for the present study. The control group comprised of 10 systemically healthy subjects without chronic periodontitis (n=10) and the case group comprised of

systemically healthy subjects with chronic periodontitis only (n=10). The study was carried out in the out patient department of Periodontology, Faculty of Dental Sciences, Sri Ramachandra University. The study was approved by the Institutional Ethics Committee for Students proposal of Sri Ramachandra University and a prior informed consent was obtained from all the subjects who were enrolled for the study.

The patients were selected based on specific inclusion and exclusion criteria. The inclusion criteria for the control group included systemically healthy subjects (without any previous history of any medical diseases like hypertension, diabetes mellitus, cardiovascular diseases, systemic medications etc) showing absence of periodontitis like absence of bleeding on probing, no attachment loss, no mobility or furcation involvement of teeth, no radiographic evidence of bone loss or a previous history of periodontal disease. While the inclusion criteria for the periodontitis group were systemically healthy patients with bleeding on probing, probing depth ≥ 5 mm having clinical attachment loss and radiographic evidence of bone loss in more than 10 teeth. Patients who smoked or consumed alcohol, taken antibiotics in the past 6 months, pregnant or lactating women, people who had undergone periodontal therapy in the past 6 months and who had a Body Mass Index(BMI) of more than 30 (obese), previous history of hypertension, stroke or CVDs were excluded from both the groups of the study.

After patient selection, gingival and periodontal findings were recorded for all the teeth. Periodontal parameters were assessed by measuring the pocket depth on the six surfaces (mesiobuccal, midbuccal, distobuccal, mesiolingual/ mesiapalatal, midlingual / midpalatal and distolingual/ distopalatal) of each tooth including the third molars, if present. A William's periodontal probe was used to measure the probing depth from the gingival margin to the base of the pocket. 5 ml of random blood was drawn from each patient in two separate vials and sent to the central laboratory to assess the serum levels of LDL, HDL, total cholesterol and triglycerides along with assessment of homocysteine.

The VLDL was measured by dividing the triglyceride value by 5 (source -Essential Laboratory mathematics by Catherine W.Johnson (MAed/Math).

The data were subjected to statistical analysis. Student's 't' test was performed to estimate the statistical difference between both the groups.

RESULTS

A total of 20 subjects participated in this study. The mean and standard deviation values of the lipid parameters, homocysteine and cholesterol/HDL ratio are shown in tables 1, 2 and 3 respectively.

A student 't' test was done to analyze the statistical difference. A statistically significant difference was found in relation to triglycerides (p value = 0.024) and VLDL (p value = 0.024) levels in both the groups. Though higher levels of other lipid

Table-1 : Mean of the various lipid parameters for both the groups

Lipid Parameters	Healthy	Chronic Periodontitis (mg/dl)
Total cholesterol	149.8±28.57	171.4±37.19
Triglycerides	114.9±53.06	198.6±112.90
HDL	34.35±9.18	34.6±10.85
LDL	95.8±17.86	112.8±26.59
VLDL	22.98±10.61	39.72±22.58

Table -2 : Mean of the homocysteine levels for both the groups

	Healthy	Chronic Periodontitis
Homocysteine (umol/l)	25.23±5.76	20.65±6.44

Table -3 : Mean of cholesterol / HDL ratio

	Healthy	Chronic Periodontitis
Total cholesterol/ HDL ratio	4.53±0.95	5.19±1.24

Fig.1 : Levels of various lipid parameters between the two groups

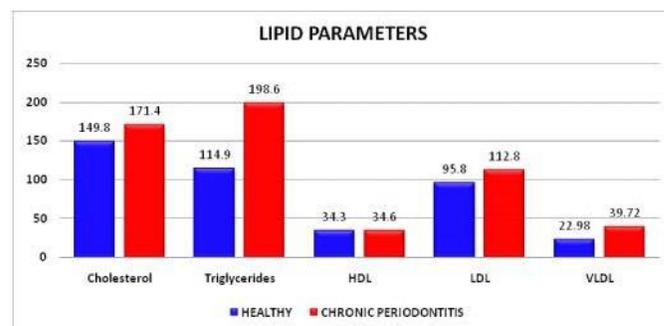
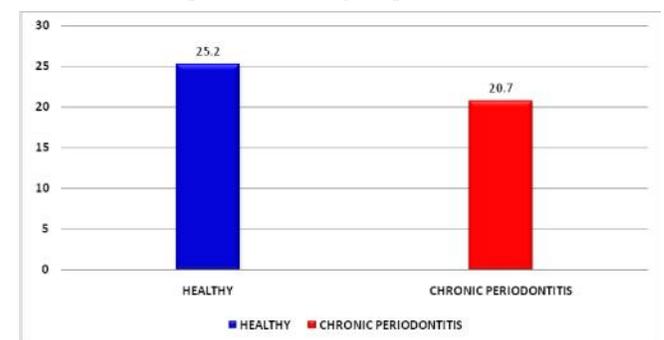


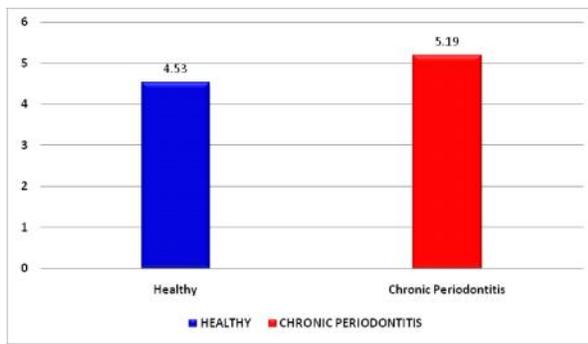
Fig. 2 : The differences in the levels of homocysteine between the control and periodontitis group



parameters were seen in the periodontitis group, the difference was statistically not significant (p value > 0.05). Fig. 1 depicts the differences in the lipid parameters between both the groups.

However homocysteine levels were found to be higher in the healthy group compared to the periodontitis group (Fig. 2). The cholesterol/HDL ratio was found to be greater in the periodontitis group (Fig.3).

Fig.3 : Represents the Cholesterol /HDL ratio between the two groups



DISCUSSION

In our present study, we investigated the risk factors that were associated with CVDs in periodontitis patients. The study was carried out after adjusting for confounders like age, BMI, smoking, diabetes mellitus, dyslipidemia or intake of non-steroidal anti-inflammatory drugs. Though we found higher levels of lipid parameters in the periodontitis group compared to the healthy group, the difference was statistically insignificant except for triglycerides and VLDL levels. There was a weak association of serum cholesterol, HDL, LDL and cholesterol/HDL ratio with the number of teeth with deep pockets (probing depth of 5mm or more) in the current study population.

Our results differ from the previous studies^[11,12,15] which have shown a reasonably strong association between periodontal infection and unfavourable lipid profile. This difference could probably be attributed to the sample size and potential confounders. This difference could also be related to the various types of bias that is commonly encountered with case control studies.^[16]

To increase the validity of this study, we eliminated the effect of potential confounders such as extremes of age, smoking, patients with diabetes and obesity with BMI of more than 30. We had strictly restricted the analysis of patients who were never smokers nor diabetics. The age of the study subjects were also between 20 and 40 years. Since obesity has been found to be associated with periodontal infection, we had enrolled only normal weight subjects (with BMI \leq 30).

Though we found a hyperlipidemic state in periodontitis patients compared to healthy controls, we could not detect any statistical association between the groups. Lipopolysaccharide (LPS) which forms an important component of gram negative bacteria are capable of exerting an effect on the plasma levels of triglycerides (eg) in a rabbit model, LPS administration has been shown to produce a decrease in the activity of adipose tissue lipoprotein lipase^[17] (a key enzyme in the catabolism of triglycerides) resulting in different degrees of hypertriglyceridemia.^[18]

Besides the conventional cardiovascular disease risk

factors like alterations in lipid profile, another risk factor that remains controversial till date is the level of homocysteine. The normal levels range from 5-15 μ mol/l. In contradiction to the earlier study^[19], plasma homocysteine levels were found to be elevated in healthy subjects compared to periodontitis subjects. This could be due to small sample size of our study. There could have been differences in the various mechanistic pathways (immunological, cytokines etc.) through which inflammatory process in periodontitis might have influenced the concentration of plasma homocysteine. Owing to the above reasons, the findings what were derived from our study might not be a true representation of the entire population.

Though the limitation of our study might be the small sample size, the findings of the study does not exclude the possibility of a hyperlipidemic state in periodontitis. An evidence based approach should be practiced that allows basic research to translate in to clinical practice. Thus prevention of periodontal diseases can be made an integral part of clinical practice that could modify the overall health behaviour.

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REFRACTIVE ERRORS VS TYPES OF CEREBRAL PALSY-AN OBSERVATIONAL STUDY IN VARIOUS SCHOOLS FOR CHILDREN WITH SPECIAL NEEDS

Jaya Rajini Vasanth^a, Namita Jacob^b, S.Viswanathan^c

ABSTRACT

Purpose: To report various types of refractive error based on its frequency of occurrence in different types of Cerebral Palsy (CP).

Background: This study has been conducted in the school for special children in and around Chennai, Tamilnadu, India.

The study aimed to document the occurrence of refractive error in various types of CP and the result of appropriate correction. This paper reports on the relationship between the types of CP and the different refractive errors present.

Methods: Three hundred and thirty two cerebral palsy children were recruited in this study. Their visual functions were assessed including Visual acuity, Refractive error, Squint, Accommodation and Visual field. Depending on the age, co-operation and cognitive ability of the child, visual acuity was measured using LEA Paddles and symbols. Visual fields assessment was done with the help of LEA flicker wand. To identify the squint of the children, Hirschberg test and cover test were performed. Routine static retinoscopy was performed both in dilated and undilated state. Children were dilated

with 1% Cyclopentolate Hcl and Tropicamide. Refractive error was corrected based on their dilated static Retinoscopy value as the undilated Retinoscopy value will be unreliable because of Accommodation. Ethics committee clearance was obtained as human subjects were involved in the study.

Results: According to our study, 6.48 years was the mean age of the children with CP. Irrespective of types of CP 57% of them were astigmats, 20% of them were hyperopes, 19% of them were Myopes and only 4% of them were Emmetropes. Among Astigmats 40% were Quadriplegic, 34% were Diplegic, 9% were Ataxic, 7% were Hemiplegic, 6% were Monoplegic, 3% were Athetosis, 1% was floppy type. CP was classified based on Gross Motor Function Classification system (GMFCS) and Biannual Fine Motor Function (BFMF).

Conclusion: This study shows that astigmatism was the most common refractive error among children with CP.

Key words: BFMF classification, cerebral palsy, cover test, GMFCS classification, refractive error, visual acuity.

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INTRODUCTION

Children with special needs, particularly those with cerebral palsy (CP), are at a higher risk of [visual and eye health problems](#) than their peers.^[1] These children may receive various interventions through their schools systems including occupational, physical, and/or speech therapy. However, in most cases, they do not receive a comprehensive eye and vision examination. Frequently, those with special needs who have vision or eye health problems may be asymptomatic or unable to express the presence of symptoms.^[2] Since children with special needs often cannot communicate symptoms adequately, it is important for the professionals who treat these children to be aware of the possible ocular and visual disorders that are frequently present. Often, those involved with a child's care may be the first to suspect a problem.^[3]

Cerebral palsy has different types. They are Spastic cerebral palsy, which is the commonest type of all occurs when the cerebral cortex gets damaged. Spastic Monoplegia is a deficiency of movement of one of the limbs of the body.

Spastic Diplegia affects both the legs of a patient. In Hemiplegia any one side of the body gets affected. All the four limbs are affected in Quadriplegia. It is characterized with more severe motor dysfunctions than other forms of CP. Athetoid type of CP is regarded as uninhibited, sluggish, winding movements.^[4] Ataxic is an unusual type that affects the stereopsis and equilibrium sensation. Patients having more than three forms of CP are considered to be mixed type.

As CP is a disorder of motor function, oculomotor functioning is often affected and accommodative function is reduced.^[5,6] Motor function may not be the cause for accommodative dysfunction in children with CP. However, accommodation can be reduced due to decreased vision, high refractive errors, and strabismus.

In general, assessment of visual acuity is done with high contrast test-charts; but, in real life, visual information is seldom at high contrast level, as we use intermediate and low contrast levels.^[7] For example, visual functioning at low contrast is very essential for communication as facial expressions require that we see thin faint lines at the edges of the mouth and eyes.

The proportion of prematurity related CP is lower and birth and infection related factors are higher than in Northern/developed country from where we have most research. Therefore we must study the children from our population. Efficient visual functioning is very important for learning and development of children.^[8,9] Therefore, this study would focus on assessing the visual functions in children with CP.

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METHODS

A prospective observational study was conducted in schools for children with special needs in and around Chennai, Tamilnadu, India. The study evaluated various aspects of vision, subjectively and objectively. Children in different centers of SPASTN (Spastic Society of Tamilnadu) were recruited for the study. Children from Vidyasudha (School for children with special needs) and KCDU in Sri Ramachandra University, Chennai, Tamilnadu were also included in the study. A detailed history about the child was noted and printed permission was acquired from the subject's parent. Children with CP based on physician's diagnosis, school records, and disability certificate information were included. Children ranging from birth to 18 years were included in the study. Those who were having motoric impairments that were not diagnosed as CP were excluded.

Depending upon the maturity, co-operation and cognitive ability, LEA Paddles and LEA Symbols were used to evaluate the visual acuity. Cycloplegic retinoscopy was then performed by instilling 1% Cyclopentolate Hcl and Tropicamide.^[10] Based on the cycloplegic values refractive error was ascertained and glasses were prescribed accordingly. One hundred and fifty three prescriptions were prescribed out of three hundred and twenty six subjects. Visual acuity was measured with the glasses in the following visits. There was a good compliance with the glasses. Visual acuity was improved compared to the previous visit.

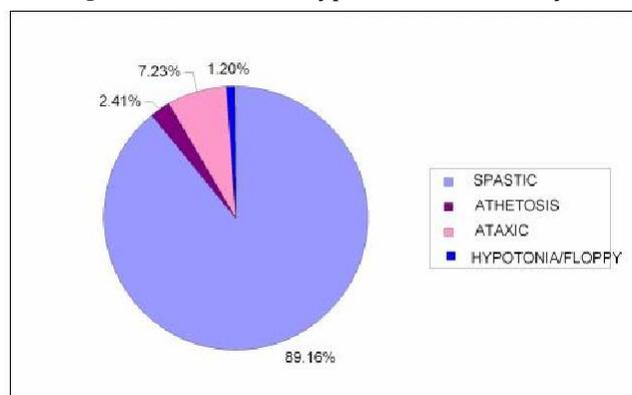
Table 1: Criteria for five levels of Gross Motor Function Classification system (GMFCS) and Biannual Fine Motor Function (BFMF), relevant for age's studied^[11]

GMFCS	BFMF
Level I Walks without restrictions, limitations in more advanced gross motor skills.	Level I One hand manipulates without restrictions. The other hand manipulates with restrictions or limitations in more advanced fine motor skills.
Level II Walks without restrictions, limitations walking outdoors and in the community	Level II a) One hand manipulates without restrictions. The other hand only ability to grasp or hold. b) Both hands: Limitations in more advanced fine motor skills.
Level III Walks with assistive mobility devices, limitations walking outdoors and in the community.	Level III a) One hand manipulates without restrictions. The other hand: no functional ability. b) One hand: Limitations in more advanced fine motor skills. The other hand: Only ability to grasp or worse.
Level IV Self-mobility with limitations, children are transported or use power mobility outdoors and in the community.	Level IV a) Both hands: Only ability to grasp. b) One hand; Only ability to hold. The other hand: Only ability to hold or worse.
Level V Self-mobility is severely limited, even with the use of assistive technology.	Level V Both hands: Only ability to hold or worse.

RESULTS

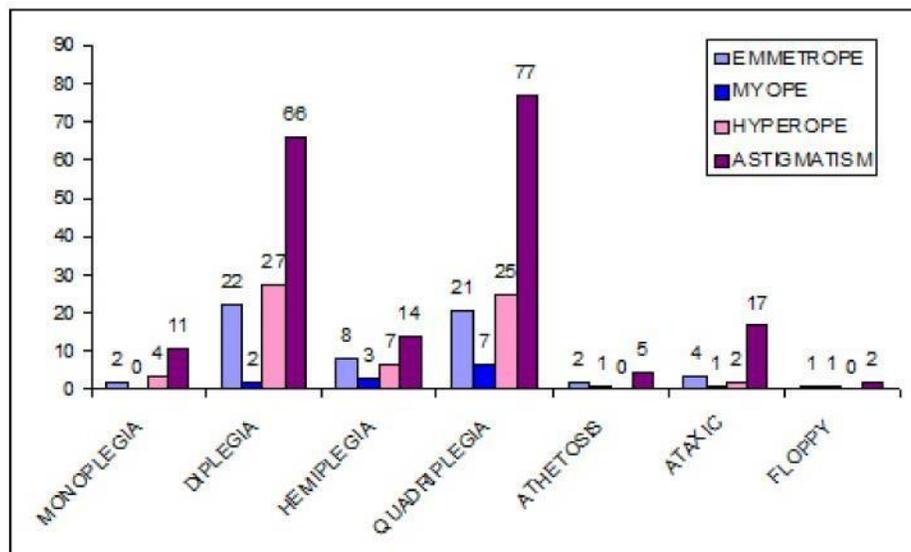
Among the 332 children 89.16% were spastic, 2.41% were athetoid, 7.23% were ataxic, 1.2% were floppy (Fig. 1). Findings reveal that the age of the children middles 6.48 years, irrespective of types of CP 58% of them were astigmats, 19.5% of them were hyperopes, 4.5% of them were Myopes

Fig. 1: Distribution of Types of Cerebral Palsy



and only 18% of them were Emmetropes.(Fig.2) Among emmetropes 35% were Quadriplegic, 36.67% were Diplegic, 6.67% were Ataxic, 13.33% were Hemiplegic, 3.33% were Monoplegic, 3.33% were Athetosis, and 1.67% was floppy type. Among Astigmats 40.10% were Quadriplegic, 34.38% were Diplegic, 8.85% were Ataxic, 7.29% were Hemiplegic, 5.73% were Monoplegic, 2.60% were Athetosis, 1.05% was floppy type. Among myopes 46.66% were Quadriplegic,

Fig.2: Refractive Error VS Types of Cerebral Palsy



13.33% were Diplegic, 6.67% were Ataxic, 20% were Hemiplegic, 6.67% were Athetosis, and 6.67% was floppy type. Among Hyperopes 38.46% were Quadriplegic, 41.54% were Diplegic, 3.08% were Ataxic, 10.77% were Hemiplegic, 6.15% were Monoplegic. CP was classified based on GMFCS and BFMF classification (Table 1).

DISCUSSION

A Cerebral Palsy child has an inability to control motor function which includes spasm or muscle tightness, disorder in mobility and gait. The major cause for this is brain damage which can occur prenatal or postnatal. Factors that can cause cerebral palsy are deficiency of oxygen, illness, poisoning, and head injury.

Also they may have impaired motor function, strange sensation and perception, breathlessness because of postural difficulties, ocular & auditory disorders, epilepsy, developmental delay and dyslexia.

Assessment of visual field in children with CP is often a difficult task, where it demands cognitive skills and eye-hand coordination. Diplegic or tetraplegic CP conditions often cause problems in measurement of visual fields, as they have postural and fixation difficulties. In general, subjectively experienced field is better than the field depicted by clinical tests. Clinical tests measure visual field at a very low luminance level, 5-15 cd/m², which is a luminance level border between photopic and mesopic vision. But we use our vision at day light luminance levels in most tasks. The interpretations of perimetry examinations may or may not depict the functional visual field. As a result, usual clinical measurements are quite often misleading. Lighting conditions and varying colors ensure that few things are ever similar to testing situations. Hence the test situation cannot be standardized; visual fields can be assessed approximately by confrontation technique in children with CP.

On the other hand, CP children had decreased visual

acuity, which was accompanied by impairment in visual perception, deprived control of extra-ocular muscles, greater prevalence of strabismus and nystagmus are all likely to be contributing factors.^[12]

Fant and Perlstein stated an increased incidence of myopia in spastic children and frequency of hyperopia was high in dyskinesia.^[13] Kozeis and Anogeianaki et al^[14] accounted 40.9% of astigmatism whereas 50% occurrence in study by Govinda and Lamba which is similar to the observation of our study (43.15%). Early predominance of refractive error implies hindered emmetropization. Findings of refractive error in Down syndrome correlates with our study.

This shows that further researches need to be carried out to identify the progress of ametropia in CP.

Ametropia was the most widespread abnormality acknowledged (79%) which shows disparity in Govinda et al^[15] study (N=70) where ocular deviation (35.7%) to be the most common defect. Various prevalence of abnormal refractive errors in patients with cerebral palsy, ranges between 28.5% to 54% in other studies.^[16,17,18] Moreover, only 25% of our children were using habitual correction when first examined. This emphasizes the need for suitable medical appointment and supervision of refractive problems, and guiding the parents for the need for vision care in CP children.^[19,20] Much of the literature quotes a higher prevalence of hyperopia in cerebral palsy. Our study agreed with the prior studies. We found the incidence of myopia and hyperopia to be considerably larger than that reported in normal children.

CONCLUSION:

Refractive error may change considerably within the first two years of age. Ocular abnormalities are very common in children with CP. Our findings shows 192 subjects have astigmatism which are similar to previous studies in the literature and confirm that children with CP are at more risk of developing ocular abnormalities. Parents and the health practitioners who are responsible for the health and overall development of children with CP should be aware of the ocular defects that may be present in these children. Early intervention will help for the child's physical, social, academic, and visual development. A full eye examination should be sought as soon as a diagnosis of CP is made and yearly thereafter

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ORTHOPAEDIC EDUCATION – CHALLENGES AND REFLECTIONS

P.V.Vijayaraghavan^a, Pankaj Shah^b

ABSTRACT

The concern is that surgeons of the future are taught by teachers of today using curricula of past. There are wide gaps between what is required, what is being taught and what is being assessed. There is need to change the existing

system of orthopaedic education on the basis of available evidence.

Key words: Assessment, competency, orthopaedic education, post-graduate, undergraduate.

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INTRODUCTION

The existing system of orthopaedic education, its lacunae, necessary areas that needs improvisation and the need for total change in the pattern of education requires reflection. The concern is that surgeons of the future are taught by teachers of today using curricula of past. This clearly reflects the pattern of orthopaedic education existing today. The Greatest challenge of Orthopaedic education is to create a Model Orthopaedic Surgeon who is competent in terms of Global standards.

The science of orthopaedics started as the art of straightening the deformed limbs of children. But today, the knowledge of orthopaedics has expanded to explore and manipulate the genetic expression to prevent the occurrence of deformities. Extensive research activities are attempted to regenerate normal bone tissues to replace amputated parts and in salvage procedures of tumor surgery. This phenomenal change dictates the need to reassess the efficacy of the present orthopaedic education system. The challenges and reforms are to be explored on the curriculum system, healthcare delivery skills and areas of research. The huge task that lies ahead for the teaching faculty is to provide a comprehensive system that imparts proper training to meet the challenges of modern orthopaedic science.

What is curriculum?

The confusion always exists between the curriculum and the syllabus. The curriculum is a formal plan of educational experiences and activities offered to a learner under the guidance of an educational institution and not a "Time Table". Curriculum is a pathway through which students travel during a course of study. On the contrary, syllabus is subject content in a course of study. The aim of the curriculum is to devise a education system that gives training, assess the knowledge and skills and attitude acquired and allow the trainee to apply the knowledge. The curriculum should be devised on the basis of the target group. As for as orthopaedic education is concerned we have to devise a curriculum for undergraduates and post graduates.

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How to achieve reforms on the existing curriculum?

- Assessment of existing system
- Defining Objectives and Goals, plan appropriate teaching learning activity and assessment and review on the effectiveness through stake holder feedback
- Develop Curriculum Development Initiative training
- Develop & Conduct Faculty Development Workshops
- Pilot Projects

Undergraduate orthopaedic education:

In a study by Dr. Jagdish Menon et al^[1], from JIPMER, in an analysis of MBBS students response to validated basic competency examinations in musculoskeletal medicine devised by Freidman and Bernskein,^[2] 95% of students failed to show basic musculoskeletal competency which is alarming. We also understand that 30-50% of practice for General practitioners revolves around musculoskeletal disorders.

As per the norms of Medical council of India, the medical undergraduate student is required to acquire the following knowledge and skills at the completion of the course.

Orthopaedics:

a. Knowledge:

The student should be able to:

- Explain the principles of recognition of bone injuries and dislocation.
- Apply suitable methods to detect and manage common infections of bones and joints.
- Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation.
- Recognize metabolic bone diseases as seen in this country.
- Explain aetiology, manifestations, diagnosis of neoplasm affecting bones.

b. Skills

At the end of the course, the student should be able to:

- Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colles's, forearm, phalanges etc.
- Techniques of splinting, plaster, immobilization etc.
- Management of common bone infections, learn indications for Sequestrectomy, amputations and corrective measures for bone deformities.
- Aspects of rehabilitation for polio, cerebral palsy and amputation.

c. Application:

- Be able to perform certain orthopedic skills, provide sound advise of skeletal and related conditions at primary health care level.

d. Integration:

Integration with anatomy, surgery, pathology, radiology and Forensic Medicine be done.

An Intern must have observed or preferably assisted at the following operations

- Drainage for acute osteomyelitis
- Sequestrectomy in chronic osteomyelitis
- Application and external fixation of fractures of long bones

The intern shall maintain a log book in which he shall record the skills acquired by him during his posting in the Orthopaedic surgery and at the end of the Ortho. Surgical ward posting, the log book shall be certified by the unit chief that the intern has successfully completed the training programme before issue of the completion certificate.

UG Education - MCI Regulation & The Dichotomy

- Increased hours of didactic lecturing in Orthopaedics
- Increased clinical training hours
- Assessment in Orthopaedics has been limited to theory and practicals has been left to the whims & fancies of General Surgeon and individual Universities.

POST GRADUATE ORTHOPAEDIC EDUCATION

- Do we have a well defined curriculum?
- Do we need one?
- Is it structured?
- Does present curriculum train or make an orthopaedic surgeon?

The evaluation of existing curriculum for graduates needs to be done on the basis of the questionnaire and the response of the postgraduates and the teaching faculty are acquired on following aspects.

1. What should be the ideal duration of orthopaedic training before you are eligible to sit for the master's
2. Is there a need for diploma in orthopaedics ? If so what should be duration of study ?
3. Should Orthopaedics be considered as a super speciality after getting a basic master's in general surgery ?
4. Is the training & academic schedule sufficient & uniform in the institutions recognized for Dip.N.B/ M.S.Orthopaedics ?
5. How useful are didactic lecture sessions ?
6. What amount of training per week should concentrate on clinical teaching & theoretical teaching?
7. What other areas of training are required for an orthopaedic P.G. programme ?
8. What in your opinion are the basic surgical procedures a post graduate should have done before his training is complete ?

9. How useful are the various CME programmes conducted during your course ?
10. What should be the ideal number of CME hours post graduate students should have attended during one year ?
11. How useful are hands on workshops / live demonstration workshops?
12. How do you rate the guidance and motivation towards basic research and Clinical research
13. Is dissertation necessary ? How does it benefit you ? Is there special time allotted for research / dissertation work?
14. Are you being trained as a teacher / resource person while doing your post graduation
15. When do you think a post graduate should get into sub specialty and how long do you think the training must be? Like in Pediatric orthopaedics, Adult reconstruction, Sports medicine, Arthroplasty, Orthopaedic oncology.
16. Do you know to browse the internet? How much of learning do you do through the internet?
17. Do you have journal review sessions? How much of your study is allotted to text book and how much on journals?
18. Do you have clinical oriented basic science sessions on
19. Exposures in anatomy museum, Bio-chemistry and Microbiology, Osteology, Orthopaedic pathology, Orthopaedic radiology
20. Are you happy with the present evaluation system in Theory, Practical, Viva voce?
21. Are you aware of objective structured clinical examination?

The fact evident from the responses to the questionnaire is that the postgraduate is not satisfied about the existing system and finds difficult to meet the global standards. The existing system fails to create global competency. It does not carry the beginner to varying levels of expertise. There exists disparity among students learning at different centers. There exists a difference between the rules of Medical council of India and National board examinations.

Medical council of India focus on

- * Theoretical knowledge
- * Practical and clinical skills
- * Thesis skills
- * Attitudes including communication skills
- * Training in research methodology
- * Subject based

National board examination focus on

- * Patient care ability
- * Teaching ability
- * Research ability
- * Team work
- * Competency based

What is Competency And Mastery?

“The habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions,

values, and reflection in daily practice for the benefit of the individual and the community being served".^[3]

Competency: The minimum level required to practice one's craft

Mastery: A pursuit of excellence above and beyond competence (Dreyfus Model) ^[4]

What is Expected from a postgraduate?

- Aware of the current concepts in quality care in Orthopaedics and musculo – skeletal trauma and also of diagnosis, therapeutic, medical or surgical management of orthopaedic problems.
- Able to offer initial primary management of acute orthopaedic and trauma emergencies.
- Aware of the limitations and refer readily to major centers for more qualified care of cases which warrant such referral
- Aware of research methodology and be able to conduct research and publish the work done
- Able to effectively communicate with patients, their family members, people and professional colleagues.
- Able to exercise empathy and a caring attitude and maintain high ethical standards.
- Continue to evince keen interest in continuing education irrespective of whether he / she is in teaching institution or in clinical practice.
- He should be able to be dynamic, available at all times and pro-active in the management of trauma victims and orthopaedic emergencies.

Based on various education systems and global training protocols the following skills and qualities are to be obtained by the post graduate to become competent to meet global standards and proceed his journey to become an expert in the chosen field. A post graduate resident should not only be competent in Medical Knowledge but in six other areas which is patient care, system based practice, practice based learning, professional attributes, interpersonal & communication skills, scholarly activity.

What is the role of the learner?

Teaching and learning activities should change from teacher centric methods to student centric methods. This can be achieved by adhering to the following criteria.

- * Organising teaching and learning so that learning is within the learners' control.
- * A goal towards which learners strive so that they become able to accept responsibility for their own learning.
- * The learner should be an active contributor to the educational process
- * Learning should closely relate to understanding and solving real life problems
- * Learners' current knowledge and experience are critical in new learning situations and need to be taken into account
- * Learners should be given the opportunity and support to

use self direction in their learning

- * Learners should be given opportunities and support for practice, accompanied by self assessment and constructive feedback from teachers and peers
- * Learners should be given opportunities to reflect on their practice; this involves analysing and assessing their own performance and developing new perspectives and options
- * Use of role models by medical educators has a major impact on learners.
- * Use of Bone Skills Lab and Cadaver Labs to facilitate learning in contrived situations.

The role of the teacher:

- Role Modeling or demonstration
- Setting a clear goal or image of the desired outcome
- Providing basic knowledge and skills needed as the foundation for the task
- Providing guided practice with corrective feedback
- Giving students the opportunity to reflect on their learning. Besides providing the technical and academic knowledge the teacher of this noble profession should not fail to teach the hidden values of the profession.
- Empathy
- Legal Medicine
- Ethics
- Professionalism
- Evidence Based Medicine
- Communication Skills

How to assess the quality of training?

"In all educational developments one of the most troublesome questions is that of **Assessment**".^[5]

The efficacy of training system and the knowledge of the learner could be assessed by the following methods.

- Written Examination
 - Essays and Structured Essays
 - Shot Answers
 - MCQS
 - Creative Writing
- Clinical Examination
 - Long Case
 - Short Case
 - Ward Rounds – Direct Observation
 - Clinical Skills Assessment
- Standardized patient
- High Technology Simulations
- Mini CEX (Clinical Examination)
- Objective Structured Clinical Examination (OSCE)
- Multi Source 360° - Assessment
- Oral Examination
- Portfolios
- Log Book

Need for research:

The scope for basic and advanced research in the field of Orthopaedics is enormous. Genetic engineering, Modulators of fractures healing, Tissue cultures, identifying the etiology of various idiopathic orthopaedic diseases, metallurgy are various avenues for research. The young generation should be directed to undergo research activities. They should be encouraged by devising financial supports, basic infrastructure. Education should also provide opportunities for clinical and translational research from bench to bedside.

At this juncture, we must remember that "Nothing in the world is permanent except CHANGE. To face the change is the challenge. Failure to meet is the sure sign of FAILURE. Managing changes can be accomplished by

- * Defining the Problem
- * Defining the Change Objective
- * Identifying the Driving Forces
- * Identifying the Restraining Forces
- * Developing the Comprehensive Change Strategy.

CONCLUSION:

This systematic evaluation of the existing educational system has explored various areas of lacunae. It becomes the responsibility of the teaching faculty to analyze and to bring effective reforms to train students to the global competency.

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CORTICAL BLINDNESS AND LANCE ADAM SYNDROME FOLLOWING ORGANO PHOSPHOROUS POISONING - A CASE REPORT

Sanjana Elfride^a, Ramkumar Akila V^a,

ABSTRACT

A twenty three year old male who allegedly attempted suicide by consuming an organo phosphorus compound commonly used as a rat killer poison complained of severe decrease in vision in both eyes. Neuro imaging and electrophysiological testing revealed a bilateral simultaneous involvement of the visual pathway. Anterior and posterior segments were unremarkable and a clinical diagnosis of cortical blindness was made. Two weeks later he developed post

anoxic intention myoclonus involving his limbs-Lance Adam syndrome. The present case highlights the importance of functional imaging with positron emission tomography in identifying the cause of visual as well as neurological dysfunction, especially when the initial insult is a consequence of brain anoxia.

Key-words: Cortical blindness, organo phosphorous poisoning, positron emission imaging.

SRJM 2012;5:23-25

INTRODUCTION

Organo phosphorous compounds are one of the most common causes of insecticide poisoning both accidental and intentional worldwide and the commonest cause of poisoning in India.^[1] WHO states a million people are accidentally exposed to these pesticides, and another two million attempt suicide with them.^[2] An Indian study has reported an incidence of 1.26 lakhs in a year.^[3] These agents exert their effects by acting on muscarinic and cholinergic receptors cumulating in respiratory arrest and death if not treated.

Cortical blindness is loss of vision from damage to the striate cortex, occurring bilaterally. Cerebral blindness is a more general term referring to a bilateral damage to the visual pathway posterior to the lateral geniculate body. A bilateral loss in vision, preservation of near reflex, normal ocular examination and extra ocular movements suggest its diagnosis. Cortical blindness can occur after ingestion or exposure to several toxins. Cardiac arrest, anoxia/hypoxia, ischemia in the posterior cerebral artery circulation, blood transfusions, bacterial endocarditis, cerebral angiography are some of the known etiologies.^[4]

CASE HISTORY

A twenty three year old male who survived cardiac arrest with acute organophosphorous poisoning presented to the ophthalmology out patient department with bilateral severe visual loss on regaining consciousness four days after exposure. Ocular examination revealed Best Corrected Snellens Visual Acuity of Right eye-3/60, Left eye - 6/60 not improving with pinhole (NIP). Rest of ophthalmic examination was unremarkable with normal pupillary light and near reflexes. Two weeks following the exposure he developed involuntary jerks of his limbs. A neurological diagnosis of post anoxic intention

myoclonus or Lance Adam syndrome was made. Computerized tomography brain revealed hypodense lesions involving right cerebellar hemisphere and bilateral occipital cortex suggestive of ischemia. Positron emission tomography (PET) scan showed severely reduced FDG (2 Deoxy-2-¹⁸F fluoro D Glucose) uptake in bilateral visual cortex and moderately reduced FDG uptake in bilateral cerebellar hemispheres and sensorimotor cortex suggestive of severe hypometabolism in the above mentioned areas(Fig1). This was consistent with a diagnosis of cortical blindness and post anoxic encephalopathy. Visually evoked potential showed a delayed P100 response in both eyes.

DISCUSSION

This patient presented with unusual simultaneous occurrence of cortical blindness and myoclonic jerks following recovery from cardiac arrest and anoxic brain injury due to ingestion of organo phosphorous compound. A retrospective study by Fitzgerald et al analysed the clinical patterns and functional outcomes of patients with anoxic brain injury over a period of fourteen years. Amongst the 93 patients they identified 10 had cortical blindness and six myoclonus.^[5] Organophosphorous compounds present with muscarinic and nicotinic signs by its action on these receptors. Respiratory distress is a common manifestation of acute poisoning and anoxic/hypoxic encephalopathy is not an uncommon sequel. The toxic effects of chronic exposure are different from acute ingestion of the same compound.

Visual loss following acute organophosphorous poisoning has been rarely reported.^[6] Hu et al have reported a case of carbamate poisoning presenting with cholinergic crises, cortical blindness and delayed peripheral neuropathy.^[7] Pradhan et al reported a case where a patient after ingestion of organophosphorous compound developed cortical blindness with myoclonic jerks.^[8] Serial imaging revealed reversible lesions in the occipital lobe and basal ganglia. This may result from a perfusion defect, acetylcholinesterase inhibition, alteration of cholinergic receptor density and inhibition of neurotoxic esterase.

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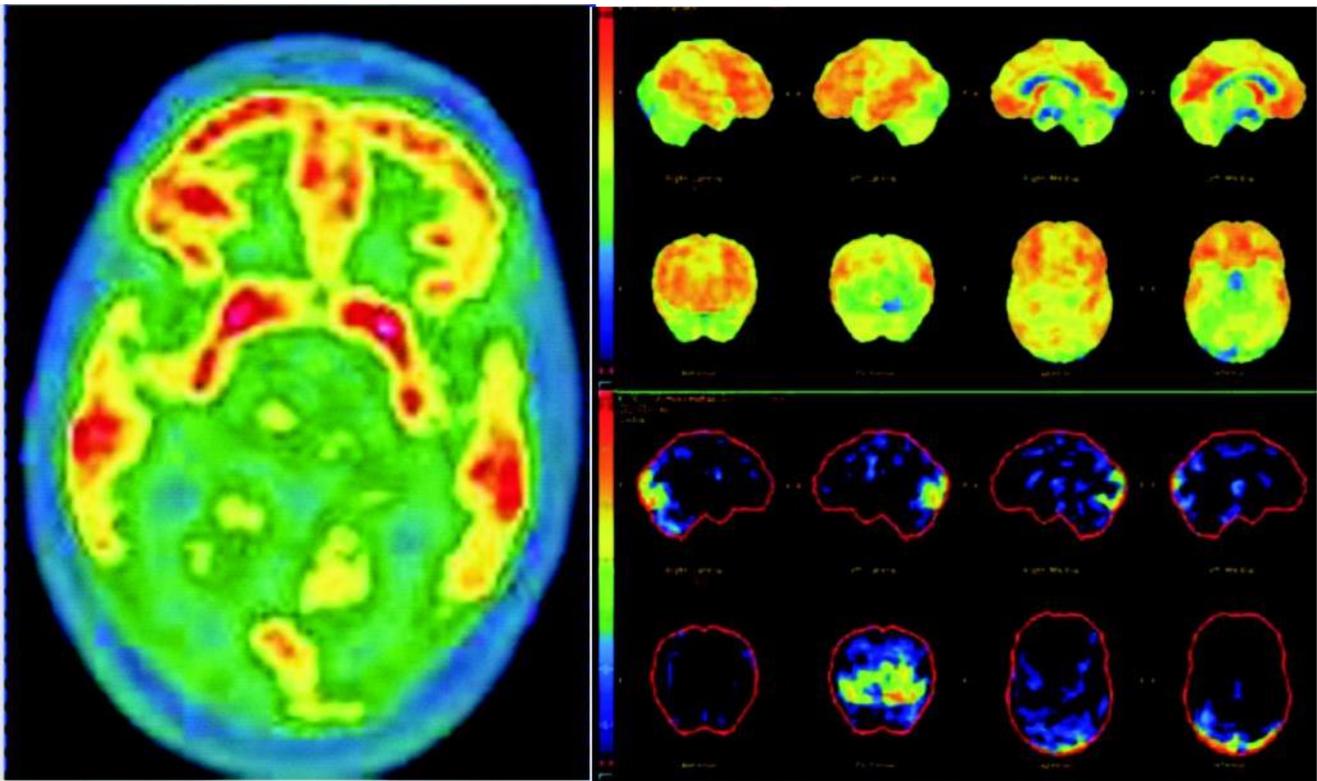


Fig. 1: PET image showing severely reduced FDG uptake in occipital cortex and cerebellar hemispheres.

A direct toxic effect of organo phosphate on the visual cortex or a more plausible anoxia could be the cause of loss of vision in our patient.

Positron emission tomography (PET) which measures brain physiology and function, helps in determining the cause of organic visual loss in patients with otherwise normal neuro imaging. It can demonstrate changes in cerebral perfusion, glucose metabolism, oxygen consumption, and neuroreceptor density. Anoxia due to direct toxicity or indirect effect of toxins, or a decreased perfusion causes decreased metabolic activity as visualised on PET scan. In addition to being a research tool, PET scans may also have prognostic implications with respect to evaluating recovery of vision in cortical blindness. Increased metabolic activity with visual hallucinations have been documented in some patients during recovery phase. Our patient showed no recovery until six months follow up.

In addition to blindness our patient demonstrated post anoxic intention myoclonus of the limbs and cerebellar ataxia.^[9,10] This is a rare complication of successful cardio pulmonary resuscitation caused by an abnormality in the neurotransmitter serotonin (5-hydroxytryptophan) within the inferior olive. By definition these patients have a good neurological outcome. They display involuntary movements when attempting to bring about movements of the limb. Imaging with PET scan in patients with LAS has demonstrated a decrease in the glucose FDG uptake and metabolism.^[9]

To best of our knowledge with literature review, there exists no specific treatment options for cortical blindness.

CONCLUSION

Unexplained visual loss in patients with cardiac arrest should raise a suspicion of cortical blindness. In the presence of a normal ophthalmic examination, PET scan may guide one towards an accurate diagnosis of cortical blindness.

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ESTHESIONEUROBLASTOMA - AN ATYPICAL PRESENTATION

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ABSTRACT

Esthesioneuroblastoma arising from the olfactory sensory epithelium is a rare tumour with most of the patients presenting with chronic and progressive symptoms related to the nose or sinuses such as nasal bleeding and persistent nasal discharge. These cells originate in the neural crest and differentiate into olfactory sensory elements. These are histologically similar to adrenal or sympathetic ganglionic neuroblastomas and retinoblastomas. We report a 7 year old boy who presented with bilateral sudden loss of vision

followed by progressive proptosis which is a very rare presentation of this neuro-ectodermal tumour. Computerized tomography (CT), Magnetic resonance imaging (MRI), followed by nasal endoscopic biopsy was done to confirm the diagnosis. This case report highlights a rare presentation of olfactory neuroblastoma with ophthalmic involvement.

Key-words: Esthesioneuroblastoma, olfactory neuroblastoma, proptosis

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INTRODUCTION

Esthesioneuroblastoma (ENB) also referred to as olfactory neuroblastoma is a rare neuro-ectodermal tumour that arises from the bipolar sensory receptor cells of the olfactory mucosa in the roof of the nasal fossa.^[1] These cells originating from the neural crest differentiate into olfactory sensory elements and histologically appear similar to adrenal or sympathetic ganglionic neuroblastoma and retinoblastoma. This has been recognized as a distinct pathological entity as a result of immunohistochemistry and electron microscopy findings. Major presenting symptoms are nasal obstruction, epistaxis, headache, anosmia and uncommonly ophthalmic features like proptosis and visual disturbances. Esthesioneuroblastoma has a bimodal age distribution between 11- 20 years and 51 - 60 years with equal sex predilection and accounts for 1-5 % of intra nasal malignancies.^[2]

CASE HISTORY

We present a case study of 7 year old boy who presented with bilateral sudden loss of vision followed by bilateral progressive prominence of the eyes for the past 2 months. There was no history of nasal obstruction or bleeding from



Fig. 1

the nose. Examination revealed visual acuity of no perception of light in both the eyes with mid-dilated non reacting pupils. He had bilateral axial proptosis (Fig. 1) and Hertel's Exophthalmometry was 23 mm in the right eye and 27 mm in the left eye (Baseline 95mm). Globes were fixed in all directions. Dilated fundus examination showed bilateral pale

disc. Visually Evoked Response (VER) showed non recordable wave forms. Computerized tomography (CT) showed a mass lesion involving the anterior cranial fossa extending into the ethmoid sinus, maxillary sinus and nasal cavity. Magnetic resonance imaging (MRI) showed a homogenous enhancing tumour of intermediate signal intensity involving the anterior cranial fossa compressing the optic nerves with extension into the sinuses, the nasal cavities and the orbits (Fig. 2). Nasal endoscopic biopsy showed malignant round cells with surrounding infiltration into the respiratory mucosa suggestive of esthesioneuroblastoma which was confirmed on immunohistochemistry. The child was referred to an Oto-Rhino-Laryngologist and Neurosurgeon for further management.



Fig. 2: MRI showing the homogenous tumour hypointense to grey matter on T1 weighted image and isointense – hyperintense on T2 weighted images.

DISCUSSION

Esthesioneuroblastoma was first described by Bergen et al in 1924 as esthesio neuro epithelioma olfactif.^[3] The main symptoms include nasal obstruction, epistaxis, headache and anosmia. Excessive lacrimation, proptosis and visual disturbance are associated ocular symptoms.^[4] The usual primary site of occurrence includes the superior nasal cavity, nasal septum, turbinates, ethmoid and cribriform plate. The tumour can spread submucosally involving the nasal sinuses, nasal cavity and surrounding structures including the orbits and skull base.^[5] It is rarely aggressive and can metastasize by lymphatic and hematogenous routes. Most common sites include the cervical lymph nodes, parotid glands, skin, lungs, bone, liver and orbit.

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The diagnosis and staging is best done using the CT which provides information regarding the bony invasion. The tumour presents as homogenous density mass, equal or greater than the surrounding soft tissue. It can extend to the ethmoid and maxillary sinus and rarely the sphenoid and both sides of the nasal cavity and paranasal sinuses. Intra-lesional calcification and presence of cysts along the intracranial margins in case of intracranial extension yields a definite diagnosis. On T1W MRI images, ENB presents as homogenous enhancing tumour with intermediate signal intensity. On T2W images, original intensity increases. Magnetic resonance imaging can help in delineating an intraorbital and intracerebral extension. It appears hypo to grey matter on T1WI and iso/hyper to grey matter on T2W I.^[6]

Histologically ENB is characterized by neuroepithelial cells arranged in the classic pseudo-rosette pattern with fibrillar intracellular background, marked microvasculature, round to fusiform cells approaching the size of lymphocytes with poorly defined scanty cytoplasm.^[7] One must be aware of the differential diagnosis which include lymphoma, plasmacytoma, malignant melanoma, rhabdomyosarcoma and primitive neuroectodermal tumour/Ewing sarcoma as ENB can be a “the great imposter”. A panel of antibodies are necessary to confirm the diagnosis. Tumour cells in ENB show immunopositivity for neuron-specific enolase, synaptophysin, chromogranin, neurofilament, catecholamines, and S100 in cells at the periphery of cell nests. Immunohistochemically tumour cells are negative for epithelial, muscle, lymphoid antigens and CD99. Negativity for these immunomarkers helps in further differentiating it from other undifferentiated nasal tumours at this site. Thus immunohistochemistry is a useful tool to confirm the diagnosis ENB and to rule out the possibility of other small round blue cell tumours. Electron microscopy proves useful in confirming the neuroendocrine origin of tumour cells in ENB with ultrastructure features such as presence of dense core neurosecretory granules, microtubules, neuritic processes and neurofilaments.

There are great variations in the treatment of ENB which include surgery with radiotherapy, combined surgery and preoperative radiotherapy or combined surgery and postoperative radiotherapy. The optimum management for ENB is probably surgery. The systemic chemotherapy in the management of ENB range from no response, palliation, partial or complete response. Chemotherapy is reserved for tumours spreading beyond the nasal cavity and paranasal sinuses or in cases of distant metastasis. Radiation is mostly recommended for palliative therapy. Goldsweig^[8] concluded that the degree of resectability of the tumour on primary surgery is the best predictor of long-term survival. Local recurrence of upto 57% and metastatic rate of 10- 30 % has been reported.^[9]

CONCLUSION

Esthesioneuroblastoma, usually presents with symptoms related to the nose but can rarely present with ophthalmic signs. Rare cases of ENB presenting with diplopia^[10] and bilateral proptosis with neck metastasis^[11] have been reported. Our patient presented primarily with visual disturbance followed by bilateral proptosis. Thus this case highlights the importance of considering ENB in the differential diagnosis of anterior cranial fossa tumours presenting with ocular symptoms.

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CO-EXISTENCE OF FUNGAL CONJUNCTIVITIS IN ORBITAL APEX SYNDROME DUE TO MUCORMYCOSIS

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ABSTRACT

This is a case report in a diabetic patient of a dual infection of fungal conjunctivitis caused by *Engyodontium album* and orbital apex syndrome caused by mucormycosis.

It is a first report of conjunctivitis caused by *Engyodontium album*. The patient responded well to the

decompression surgery for the orbital apex syndrome and to antifungal treatment for the conjunctivitis.

Key words : *Engyodontium album*, fungal conjunctivitis, orbital apex syndrome.

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INTRODUCTION

Fungal conjunctivitis by itself is rare and the causative organisms are known to be *Candida*, *Sporothrix* sp, *Allescheria* sp, *Aspergillus* species and *Mucor* sp.

Engyodontium album is known to cause Keratitis, Brain abscess, and Endocarditis^[2,3]. The fungus *E. album* is usually present in the damaged and moist wall in the buildings and has been isolated from paper, jute, linen and painted walls.^[1]

Its dispersal is by dry, hygrophobic conidia and hence it may be isolated from house air. The concurrent fungal conjunctivitis along with Orbital apex syndrome seen in this patient was probably due to the immunocompromised state that resulted from her longstanding diabetes mellitus.

CASE REPORT

A 56 year old female, a known diabetic for 15 years and a hypertensive for 4 years was admitted with fever, protrusion of left eye of 15 days duration. She also complained of loss of vision in the left eye for the same duration. On examination, patient was alert and well oriented with broadened bridge of nose and purulent discharge in the left nostril. Best corrected visual acuity (BCVA) was 6/60 in the right eye and no perception of light in the left eye. Cutaneous sensation over the distribution of the ophthalmic division of the left trigeminal nerve was impaired. Examination of her right eye showed non-reacting pupil to consensual light reflex and Grade 1 nuclear sclerosis and normal ocular motility. Examination of her left eye showed marked proptosis, matted eyelashes, chemotic conjunctiva with mucopurulent discharge (Fig.1). Slit lamp biomicroscopy showed descemet's folds in the cornea, non granulomatous keratic precipitates, grade 2 flare and cells. Examination of the vitreous showed grade 3 vitritis and vitreous haze. The pupil was dilated and fixed not



Fig. 1: Proptosis and total ophthalmoplegia with conjunctival discharge



Fig. 2: one month after treatment with systemic and topical antifungals

reacting to direct and consensual light reflexes. There was total ophthalmoplegia. Fundus examination of the right eye showed clear media, normal disc and macula, venous dilatation and a solitary cotton wool spot along the inferotemporal vascular arcade and that of the left eye showed hazy media, normal disc and patchy choroiditis in the macular and paramacular regions. A clinical diagnosis of Orbital Apex syndrome of probable fungal etiology with involvement of II, III, IV, VIth cranial nerves and first division of trigeminal with associated panuveitis was made.



Fig. 3: CT Para Nasal Sinuses (coronal view) showing evidence of sphenoidal sinusitis

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Fig. 4: CT of the orbital apex showing homogenous opacification of ethmoidal sinus

The computerized tomography (CT) scan of para nasal sinuses (PNS) and orbit that was done prior to her admission showed mucosal thickening in the left frontal sinus, ethmoidal sinus and sphenoid sinus (Fig.3). CT scan of the orbit showed a heterogenous mass in the region of the orbital apex and there was choroidal thickening (Fig.4).

Her blood investigations showed fasting blood sugar (FBS) of 197mg%, post-prandial blood sugar (PPBS) of 511mg% on the day of admission. Peripheral blood smear showed a normocytic normochromic anaemia and neutrophilic leucocytosis with toxic granules. Rest of the blood investigations were normal.

Conjunctival swab taken on the day of admission showed thin segmented fungal hyphae on 10% KOH mount. The KOH mount of the necrotic tissue from the ethmoid sinus showed narrow septate hyphae. The conjunctival swab also showed similar narrow septate hyphae.

The swab was inoculated each into Sabouraud's dextrose agar in duplicate and incubated one at 37°C and the other at 25°C. There was a growth observed in the tubes incubated at 25°C showing white, compact and floccose colonies in Sabouraud's dextrose agar after 5 days (Fig. 5a) The organism stained with lactophenol cotton blue with the pathognomonic zig-zag rachis (Fig 5b).

Based on the study of the morphology the fungus was identified as *E. album*. The identification of this fungus was further confirmed by Dr. Sybren de Hoog of Central Bureau of Schimmel cultures (CBS), Utrecht, the Netherlands. (culture deposit accession number CBS 121919). Vitreous tap was negative for any organism. The nasal swab was positive for *Staphylococcus aureus* and *Fusarium*. Nasal endoscopy showed an intact ethmoid with necrotic tissue in the area between middle turbinate and septum.

The patient was treated with IV Amphotericin B desoxycholate 50 mg in 1L of 5% dextrose over 10 – 12 hrs for 4 days and Inj Voriconazole 200 mg IV bd for two



Fig. 5a: White floccose growth of *E. album* on SDA medium

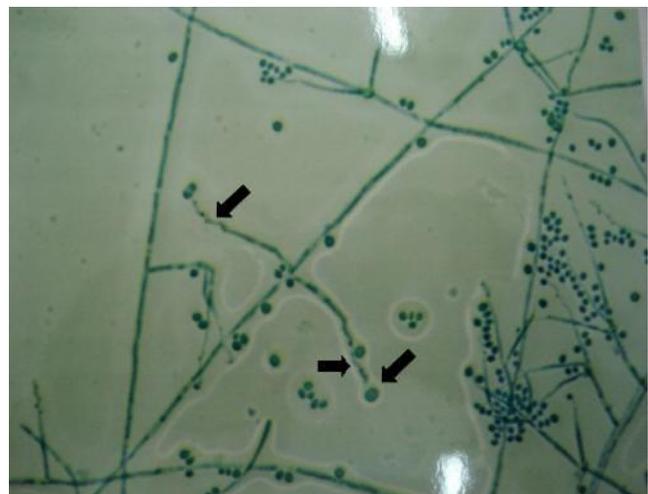


Fig. 5b: LPCB mount of the isolate Arrow showing zig-zag rachis (magnification) 400X

days and T.Voriconazole 100 mg bd for a month. Conjunctivitis was treated with topical Amphotericin B.0.15% (1.5mg/ml) eye drops qid for three weeks and Prednisolone acetate eye drops 1% tapered over a month.

One month later she underwent endoscopic left orbital decompression with removal of the medial wall and medial aspect of floor of the orbit. Perforation of the nasal septum was noticed at that time. Histopathological analysis of the tissue at the orbital apex showed features suggestive of zygomycosis. Special stains Periodic Acid Schiff (PAS) and Gomorii's Methanamine silver stain were positive. Conjunctival swab post antifungal therapy was negative for *Engyodontium album*.

Review after six months of medical and surgical therapy for orbital mucormycosis, there was no perception of light in the left eye and there was no recovery of total ophthalmoplegia. The conjunctival swab was negative for any organism and the muocopurulent discharge disappeared (Fig 2).

DISCUSSION

Orbital apex syndrome (OAS) has been described, as a syndrome involving the optic nerve (II), oculomotor nerve (III), trochlear nerve (IV), abducens nerve (VI) and ophthalmic branch of the trigeminal nerve (V1) due to infection or inflammation at the orbital apex. Orbital Apex Syndrome due to fungal infection is essentially from rhino-orbital spread. The causative fungi are commonly *Aspergillus*, *Mucor* and *Rhizopus*. The concurrent fungal conjunctivitis seen in this patient was probably due to the immunocompromised state that resulted from her longstanding diabetes. Fungal conjunctivitis by itself is rare and the causative organisms are known to be *Candida*, *Sporothrix sp*, *Allescheria sp*, *Aspergillus* species and *Mucor sp*.^[3,4] Literature search did not reveal any other instance where this rare fungus was isolated from conjunctiva before. This fungus has been proved to cause keratinolytic activity.^[5] The infections caused by this fungus *Engyodontium album* is known to have caused keratitis, brain abscess, and endocarditis. They were all treated with surgery and antifungal agents with good clinical outcome.

The taxonomic status of *E.album* has undergone through many changes. Originally *E. album* was included in the genus *Beauveria* described by Villenium.^[6] Limber^[7] then included it in a new genus *Tritirachium* but since 1972 a new genus *Engyodontium* has been created which includes two species *E. album* and *E. parvisporum*.^[8] *Beauveria* species are commonly found associated with insects or habitats supporting insects Even though conidia are produced in a similar manner (on a rachis) there were sufficient differences to warrant two separate genera.

Engyodontium album is known to have caused Keratitis, Brain abscess, and Endocarditis.^[2] Macedo et al had reported a case of fungaemia where *Engyodontium album* was isolated and cultured from blood of a patient with Acquired Immunodeficiency syndrome.^[9]

Polyenes act by binding to ergosterol present in the cell membranes. The conjunctival swab after one month of therapy with topical Amphotericin sent for fungal culture did not show any growth suggests that this fungus is

susceptible to polyenes.^[10] Amphotericin was chosen because of its greater penetration when compared to Natamycin. Whether *Engyodontium* could be isolated from the conjunctiva of patients with other immunocompromised diseases needs to be studied. To the best of our knowledge this is the first report of isolation of *Engyodontium* from a patient with conjunctivitis.

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PERFORATED APPENDICITIS - A RARE CAUSE OF PNEUMOPERITONEUM

V. Bhaskar^a, Saravanan Balachandran^a, T.Arulappan^a, T.R.Gopalan^a

ABSTRACT

Perforation of the appendix is a rare cause of pneumoperitoneum. Free air in the peritoneal cavity, is usually related to perforation of hollow viscus either due to peptic ulcer or a typhoid aetiology. We report a case of perforated appendix with Pneumoperitoneum and hyperbilirubinemia.

Patient underwent uneventful appendicectomy with appropriate antibiotic support

Key Words: Perforated appendix , pneumoperitoneum, subhepatic appendix

SRJM 2012;5:31-32

CASE HISTORY

A 38 year old gentleman was admitted for pain in the epigastric region for 3 days. He had history of pain around the umbilicus shifting towards the right iliac fossa associated with fever of non projectile, non bilious vomiting, prior to admission.

On examination the patient was afebrile, his pulse rate was 92/min, BP-120/70mmHg, with a respiratory rate of 18/min. Abdominal examination showed diffuse tenderness and rebound tenderness was present in the right lower quadrant. Bowel sounds were sluggish. Per rectal examination was normal.

Blood investigations were done showed a total white cell count-5750 cells/cmm (P-79.5, L-12.9, M-5.4, E-2.1,) ,with elevated bilirubin(Total bilirubin-3.0 mg/dl, direct bilirubin-1.78 mg/dl). USG Abdomen was non-contributory.

An X-ray film of the abdomen in the erect posture showed a doubtful pneumo peritoneum under the right cupola of the diaphragm (Fig 1). An X-ray chest was done, which was noncontributory. Computerized tomography of the abdomen showed an appendicolith and confirmed pneumo peritoneum(Fig. 2).

The diagnosis was of a hollow viscous perforation (either ileal or duodenal). A laparotomy was done which revealed 30 ml of pus with a perforated necrotic zone in the mid-portion of the appendix which was subhepatic in position with a dislodged faecolith. The caecal wall was intact. Rest of the abdomen was normal. Patient underwent appendectomy. The patient made an uneventful post operative recovery with antibiotic cover. Histopathological examination revealed inflammation, perforation and a partly necrosed mid-portion of the appendix. (Fig.3).

DISCUSSION

Acute appendicitis is related to swelling of lymphoid tissue in the submucosa in response to a bacterial or viral infection and is common in childhood and early adult life. If not treated early it leads to complications like gangrene, perforation, abscess, mass, and portal pyemia.

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Fig. 1: Imaging in Acute appendicitis



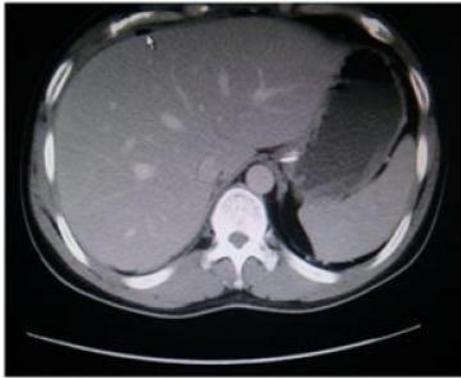
Plain X ray chest



Plain Xray Abdomen

Acute appendicitis presents with perforation in about 20-30% of cases, and pneumoperitoneum with perforated appendicitis is quite rare 0-7%.^[1] Greenberg found that in a ten-year period gas under the diaphragm were seen in two patients out of a total of 200 patients examined who had perforated appendix.^[2] Frimann-Dahl found no instance of pneumoperitoneum in over 2,000 cases of appendicitis with perforation.^[3] This rarity of associated pneumo-peritoneum is explained by the pathophysiology of acute appendicitis and the anatomical disposition of the appendix. The origin of the gas is uncertain. Gas-forming organisms from the bowel may be responsible or it may come from the lumen of the appendix, if patent although this is usually obliterated in acute appendicitis (Collins, 1955). An infection that evolves into suppurative gangrene of the appendicular wall may be hematogenous. In such cases perforation allows luminal air to escape from the caecum, resulting in a pneumoperitoneum.^[8] We did not find any such cause in our

Fig. 2: Computerized Tomography scan of abdomen



(a) showing pneumo peritoneum (marked)

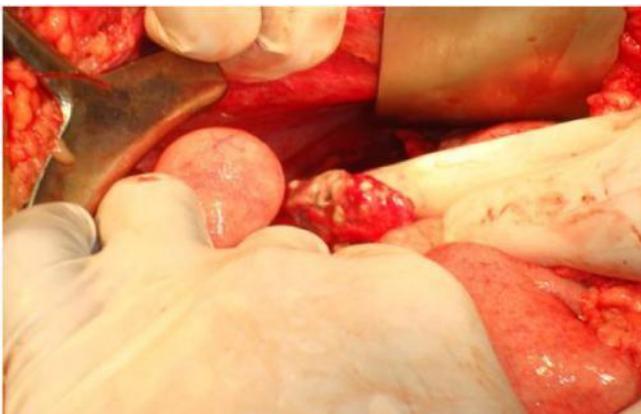


(b) showing fecolith (marked)

patient. The faecoliths, which are expelled from the perforation, are usually the cause of appendicular rupture. A study of 4950 patients recorded only 126 cases of faecolith (12.2%) among 1032 cases of perforation^[4] thus questioning the concept that the faecolith is responsible for the perforation

Appendiceal perforation in patients with acute appendicitis may cause a variety of potentially life-threatening complications. Endotoxins from bacteria like *Escherichia coli* have been shown to impact physiological bile flow in vivo causing hyperbilirubinemia. This in patients with appendicitis, may have a predictive potential for the preoperative diagnosis of appendiceal perforation.^[5] Our

Fig. 3: Operative picture showing sub hepatic perforated appendix (marked)



patient had hyperbilirubinemia and perforation. He grew *Pseudomonas* in the culture. Hyperbilirubinemia is seen in hepatic insults due to inflammation, sepsis and cardiogenic shock. Conjugated hyperbilirubinemia is the most common presentation, but often this also causes the unconjugated hyperbilirubinemia to increase. Quale JM et al^[7] state that the presence of hyperbilirubinemia may identify the patient at high risk of dying from septicemia.

In our part of the world typhoid ileal perforation is the differential diagnosis, but these patients are usually more toxic and febrile. Acute peptic ulcer perforations are common especially patients on NSAIDs. Moreover peptic ulcer or ileal perforation usually presents with distinct pneumoperitoneum^[6] and seen in regular skiagrams, unlike in our case. Other causes of bowel perforation are tuberculosis, Crohn's disease.

CONCLUSIONS

The occurrence of pneumoperitoneum is seen but rarely in appendicular perforation. Sepsis causing hyperbilirubinemia may occur along with a diagnosis of acute abdomen. When the regular skiagram is equivocal, a CT scan is a valuable imaging modality in diagnosis of appendical pathology. Emergency appendicectomy under antibiotic cover is still the gold standard in treatment.

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ERRATUM

***Trichophyton raubitschekii*: CHARACTERIZATION AND CLINICAL CORRELATES OF ISOLATES FROM DERMATOPHYTOSIS**

Elangovan Elavarashi^a, Anupma Jyoti Kindo^a, Jagannathan Kalyani^c, Rangarajan Sudha^b

The title was erroneously printed as “*Trichophyton raubitschekii* (A SYNONYM OF *Trichophyton rubrum*) ISOLATED FROM DERMATOPHYTOSIS - A CASE SERIES AND REVIEW” on the cover page of Vol.5, Issue 1, Jan-Jun 2012. The corrected title appears in the electronic version.

The error is regretted.

P.V. VIJAYARAGHAVAN

EDITOR

Sri Ramachandra Journal of Medicine

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***Trichophyton raubitschekii*: CHARACTERIZATION AND CLINICAL CORRELATES OF ISOLATES FROM DERMATOPHYTOSIS**

Elangovan Elavarashi^a, Anupma Jyoti Kindo^a, Jagannathan Kalyani^c, Rangarajan Sudha^b

The correction made in the Corresponding Author’s column is as follows:

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Editor, Sri Ramachandra Journal of Medicine, Jul-Dec 2012, Vol.5, Issue 2

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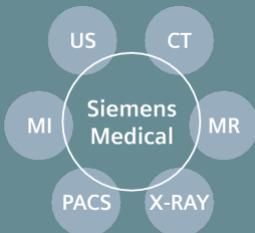
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