VOLUME 19
NUMBER 1/2
JANUARY / JULY 2006

Journal of the Bangladesh Society of Anaesthesiologists

JOURNAL OF THE BANGLADESH SOCIETY OF ANAESTHESIOLOGISTS

VOLUME - 18 **NUMBER - 1 & 2** **2005**

CONTENTS

Journal of BSA, Vol. 18, No. 1 & 2, 2005

Editorial

PREEMPTIVE ANALGESIA

To every doctor, pain relief is not just a request or demand but is a basic human right of any patient who has pain. Pain is the commonest of all complaints made to doctors and its incidence far outscores all other complaints taken together. Belonging to the genre of medical practitioners which claims to expertise in pain and its relief, an anaesthetist must be equal to this challenge and actually relieve pain efficiently. But the hard reality is that we are not coping with this job well enough. This is evident from the fact that about 50% patients are not getting adequate relief from acute pain[1]. It is admissible that it is not only the anaesthetists who are to blame alone because in our community everybody tries to treat pain in his or her own way and there may be a lack of organization and application as well as understanding of the knowledge necessary for effective pain relief. There has been almost a total lack of efforts at practicing systematic analgesia by our anaesthetic colleagues.

Chronic pain has got its own set of aetiology and specific characteristics. It is difficult or sometimes impossible to fully control some of the cases of chronic pain syndromes. A systematic multidisciplinary approach in these cases can give better results and some comfort to the patient. Unfortunately, this humanitarian aspect of service is almost non-existent in our country. There is no denying the fact that organized multidisciplinary pain-clinic approach of systematic chronic pain relief *is* important. However, the importance of acquisition of a deeper insight and application of the state of the art of acute pain relief cannot be underestimated.

An evolving concept of control of long term ill effects of *acute pain* that is the focus of this discussion. Applying analgesic drugs indiscriminately is by no means the proper way to conquer the menace of acute pain. The answer lies in the approach, the strategy and application if a consistently effective acute pain relief service. The database gives us an idea of how older ideas in this context are being shunned or revamped and new ideas are being infused. A great deal of research and activities are going on round the world that we can enrich ourselves by. One such thing is the concept of *preemptive analgesia*[2]. This is not so new because two decades have past since the effect of prior anaesthesia was described on rats3. It was pointed out later that the mechanism involved was central sensitization to pain and preemptive analgesics can prevent it[4].

The whole idea of preemptive analgesia arises from the fact that 'It is better to block pain before it arises'. This is not easy. Neither it is always pragmatic. In majority of cases, patients come with the complaint of already having the pain. But there are situations where pain has not yet started, but inevitably going to start sometime. Post surgical pain, labor pain, change of dressings etc are the instances of the predictable painful situations. It has already been mentioned that post surgical pain is the most appropriate arena for the application of preemptive analgesia because the onset of pain is precisely known. Although degree of pain may vary with type and extent of surgery, pain is, nevertheless, inevitable to follow. Potential for this acute pain becoming prolong with or without concomitant change in pain perception and pain behavior increases if pain is allowed to be felt by the patient for a reasonably long time after amputation of an extremity, the so-called *phantom pain*[5], thoracotomy[6], laparotomy[7], herniorrhaphy[8] and mastectomy[9]. Moreover, even low levels of residual pain are associated with decreased physical and social function as well as a diminished perception of overall health may be followed by long-term painful sequelae of surgery in both adults and children.

Research works conducted by different workers confirm the fact that preemptive analgesia works best when it is applied before the onset of phase 1 pain and when it is applied throughout the perioperative period[2]. This reiterates what is already known, patients must be protected from pain in the perioperative period. We now know why.

One questiong' remains to be answered. What are the drugs and techniques available to deploy preemptive analgesia? Before answering this, we must confess that we really do not know for sure. Certain observations tend to reveal that ability to block both central and peripheral sensitization phenomenon may not be equal in all analgesics. Morphine is a beneficial drug in this respect because it has been shown that if used before applying painful stimuli and reversed with naloxone before the expected onset of phase 2 pain, sensitization is either prevented or reduced. Whereas intraoperative administration of

isoflurane does not do so[10]. This also tells us that the so called process of central pain sensitization can occur even in unconscious state where there is no apparent response to ongoing painful surgical stimuli. Other analgesic like fentanyl and ketamine[ll], anti-inflammatory agents[12] and neural blockade[13] may likewise vary in their ability to block sensitization and when the complete picture comes out in future, we can evaluate them according to their preemptive value which we cannot do today.

Not only the drugs but also different techniques are being reevaluated according to their preemptive efficacy. For example, epidural anaesthesia covering the whole of postoperative period is one of the best techniques 14 probably because it fulfils all the requirements of preemptive analgesia i.e. early application, applied throughout postoperative period and conduction block. If this is true then epidural catheters may be recommended to be introduced in all relevant cases even if the primary general anaesthesia is being employed. There is already a growing awareness of the fact that Infiltration with local analgesic solution *before* incision gives better result in long term pain prevention as compared to it applied at the end of suturing[14].

It should be clear that there may be something valuable in the offing for us to go on with increased enthusiasm as farkcute pain relief is concerned. Although there are a number of articles published on a pessimistic note about the efficacy of preemptive analgesia, reasons for apparent failure to show efficacy in those works have also been put forward. Let us believe, for the sake of our poor patients reeling helplessly with postoperative or other types of acute pain, that we have found a tool to combat it decisively. Optimistic research works ought to be undertaken by our anaesthetic colleagues and join forces with those who are out to show that it does work. Acute pain can indeed be conquered with the new tool called preemptive analgesia.

REFERENCES

1. Siwek J. Twelve pitfalls of adequate pain control [Editorial]. Am Fam Physician 1997;56:726-32.
2. Gottschalk A, Smith DS. New concepts in acute pain therapy: preemptive analgesia. Am Fam Physician 2001;63:1979-84,1985-6.
3. Gonzalez-Darder JM, Barbera J, Abellan MJ. Effects of prior anaesthesia on autotomy following sciatic transection in rats. Pain 1986;24:87-91.
4. Woolf CJ, Chong MS. Preemptive analgesia - treating postoperative pain by preventing the establishment of central sensitization. Anesth Analg 1993;77:362-79.
5. Sherman RA, Devor M, Heermann-Do K. Phantom pain. New York: Plenum, 1997.
6. Dajczman E, Gordon A, Kreisman H, Wolkove N. Long-term postthoracotomy pain. Chest 1991;99: 270-4.
7. Gottschalk A, Smith DS, Jobes DR, Kennedy SK, Lally SE, Noble VE, et al. Preemptive epidural analgesia and recovery from radical prostatectomy: a randomized controlled trial. JAMA 1998;279:1076-82.
8. Callesen T, Kehlet H. Postherniorrhaphy pain. Anesthesiology 1997;87:1219-30.
9. De Vries JE, Timmer PR, Erftemeier EJ, van der Weele LT. Breast pain after breast conserving therapy. Breast 1994;3:151-4.
10. Tverskoy M, Oz Y, Isakson A, Finger J, Bradley EL, Kissin I. Preemptive effect of fentanyl and ketamine on postoperative pain and wound hyperalgesia. Anesth Analg 1994;78:205-9.
11. Souter AJ, Fredman B, White PF. Controversies in the perioperative use of nonsteroidal antiinflammatory drugs. Anesth Analg 1994;79:1178-90.
12. Cousins MJ, Veering BT. Epidural neural blockade. In: Cousins MJ, Bridenbaugh PO, eds. Neural blockade in clinical anesthesia and management of pain. 3d ed. Philadelphia: Lippincott-Raven, 1998:243-321.
13. Bach S, Noreng MF, Tjellden NU. Phantom limb pain in amputees during the first 12 months following limb amputation after preoperative lumbar epidural blockage. Pain 1988;33:297-301.
14. Tverskoy M, Cozacov C, Ayache M, Bradley EL, Kissin I. Postoperative pain after inguinal herniorrhaphy with different types of anesthesia. Anesth Analg 1990;70:29-3

A.Y.F. Elahi Chowdhury

Professor, Department of Anaesthesiology, National Institute of Cardiovascular Diseases, Sher-e-Bangla Nagar, Dhaka.

Original Article

EVALUATION OF TIP HOLED SPINAL NEEDLE - A COMPARATIVE STUDY

Iqbal Hossain Chowdhury[1], Hasina Begum[2], Asia Begum[3], AKM Akhtaruzzaman[4], KM Iqbal[5]

Background: The performance and post dural puncture headache were assessed in this randomised clinical study.

Methods. Total 100 patients of ASA physical status I and II undergoing elective caesarean section were enrolled for the study. Patients in the controlled group Group-A. Patients in the trial group (Group-B).

ABSTRACT:

Regional block has its own unique place in modem anesthetic practice increasing popularity over 30-40 years has followed better understanding of the technique and acceptance than the incidence of side effects is tow. These depend not only on the correctly performed procedures but the correct design of the needle is also important. The purpose of this clinical study is to evaluate the performance of tip hole spinal needle (25G) in comparison with widely used Quincke spinal needle (25G). Clinical effects, performers satisfaction, side effects and complications were assessed over 100 pts who were decided into group A (Qiuncke gr) & Group B (tip hole gr) undergoing emergency & elective C.S. under spinal anaesthesia. Ease of insertion of the needle, number of attempts for successful insertion, appearance of CSF flow through needle, bending of needle, quality of analgesia, clinical effects & PDPH were assessed.

No significant changes in pulce, BP. & SPO_2 in 1 minute & 5 minuets were found in pre-operative & per-operative period in Group A & also in Group B.

In terms of ease of insertion there was no significant change in Group A (100%) & Group B (90%). It was found that in less than 1 second no CSF fluid appeard in Group A but in Group B, CSF appeard in 30%, in less than 2 seconds, the values among Gr A & Gr B were 4% & 52%, in less than 3 seconds. 50% & 18% respectively. In less than 4 seconds & 5 seconds in Group A 38% & 8% respectively and no CSF fluid appeard in Group B in that period.

In Group A 52% cases required 1 attempt, 28% cases 2 attempts, 16% of cases 3 attempts & 4% cases 4 attempts were required. In Group B it was 86%, 14% & no 3rd & 4th attempts required. In terms of bending of needles during insertion, the performance of Group B was better (7% in Group A and no in Group B). The incidence of PDPH was found absolutely nil among the gr B & negligible (2%) in gr A subjects.

INTRODUCTION:

First planned spinal anaesthesia for surgery in human performed by August Bier in 1899 with cocaine. In the beginning of the 20th century, intradural injection was carried out for many procedures. But the popularity waned in the late 1940s following reports of neurological damage[22] as well as other complications like sever hypotension, nausea, vomiting, PDPH etc.

Again increasing popularity over the last 30-40 years has followed better understanding of the technique & acceptance that the incidence of side effects is low. Theses depend not only on the correctly performed procedures but the correct design of the needle is also important'. Spinal needles are manufactured with no surface irregularities and with a tight fitting removable stylet which completely occlude the needle lumen. Equally diverse are the shapes of the bevel and the tips of the needles. The needles are either end or side injection and either sharp or rounded bevel edges.

The most widely used spinal needle is Quincke needle which has a bevel length, with sharp cutting edges, a sharp point and end injection port. Sprotte, Greene and Whitacre are pencil point needles, have a rounded bevel, no cutting edges and side hole proximal to the bevel, which causes less damage to the tissues during puncture with less chance of PDPH. But clinical studies suggest that, it gives

1. Assistant Prof. Anaesthesia, Analgesia & ICU, BSMMU.
2. Junior Consultant Anaesthesia, Analgesia & ICU, DMCH.
3. Assistant Prof. Anaesthesia, Analgesia & ICU, BSMMU.
4. Associate Prof. Anaesthesia, Analgesia & ICU, BSMMU
5. Prof. (Retd.) Anaesthesia, Analgesia & ICU, BSMMU.

rise to the newer problems with lateral bending of the tip[2], the side hole being obstructed by the tissues , and delayed appearance of CSF.

That causes damage to the dural tissue with more chance of PDPH, but early appearance of CSF fluid.

Analyzing the performance of the existing needles, the conclusion was drawn that the criteria of an ideal spinal needle may be as follows. The external diameter of the needle should be as thin as possible and the tip should be of a dural fiber-spreading variety. The tip and the shaft should be capable of with standing forces during needle placement. It should also have a drug delivery hole that does not weaken the needle nor become obstructed by tissue.

Easy and quick flashback of CSF is another important desired feature.

Considering these aspects, a new tip holed spinal needle has been designed and produced by Doctor Japan co. Ltd. Japan and Willy Rusch AG, Germany. The tip of the needle proper is actually the blunt end of the needle shaft and the hole for end injection. The stylet that projects beyond the tip of the needle finally form the penetrating part of the tip of the complete needle[4].

There is report of the performance of new tip holed needle[4] but there is no comparison of its clinical performance and side effects with other types of spinal needles commonly sued (Quincke, Whitacre, Sprotte). In these clinical study evaluation the tip holed spinal needle in comparison with widely used Quincke spinal needle.

METHODS AND MATERIALS:

100 ASA physical status I and II patients having elective caesarean section, aged between 20 to 35 years and weighted between 45 to 60 kg, were randomised by card sampling for this study in Bangabandhu Sheikh Mujib Medical University (BSMMU). A total of hundred cards, fifty for each group were prepared by another person who was not aware of the study. Every patient included in the study was allowed a card preoperatively. According to the card number, patients were grouped. Group A and Group B (experimental group)

Preoperative

All patients preoperative base line data like pulse rate, blood pressure, respiratory rate and oxygen saturation were measured and recorded. Informed consent was taken from all patients.

PEROPERATIVE

Intravenous channel for routine infusion was started and monitor attached for measuring pulse, blood pressure and arterial oxygen saturation.

Data processing

All statistical analyses were carried out using SPSS statistical package (SPSS 11.0 for Windows Version). All results are expressed as mean ± standard deviation (SD) or in frequencies as applicable. The results were compiled and analysed using Unpaired 't' or Chi square (x^2) as appropriate. Results were considered statistically significant if $p<0.05$ (Confidence Interval; CI-95%).

RESULTS

Observation of the present study was analyzed in the light of comparison among the subject groups, each group having n = 50. All results are expressed as mean ± standard deviation (SD) or in frequencies as applicable. The studied groups became statistically matched for age (p = 0.705), weight (p = 0.599) and height (p=0.642).

Table-I

Demographic characteristics of the study

Characteristics / Groups	Group-A	Group-B	P value
Age in years	27.5±0.65	28.15 ±0.66	0.705
Weight in kg	62.38±1.02	64.09±1.32	0.599
Height in cm	152.5±6.0	151±7.1	0.642

Values are expressed as mean ± SD, analysis were done by unpaired student's 't' test. Values are regarded as significant if $p<0.05$ (CL-95%).

The demographic characteristics are summarized in Table-1. The mean age was found 27.5±0.65 in group-A and 28.15 ±0.66 in group-B. The mean weight was 62.38±1.02 in group-A and 64.09±1.32 in group-B. The mean height was 152.5±6.0 in group-A and 151±7.1 in group-B.

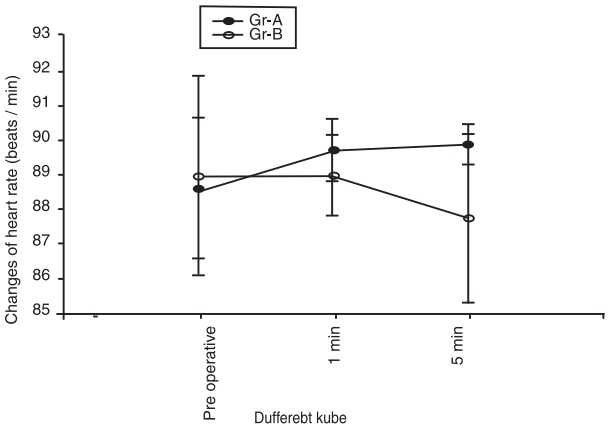

Fig: 1: *Changes of heart rate*

Changes of heart rate are displayed in Fig-l. The heart rate has significantly ($p<0.001$) and $p< 0.70$ changed in 1 and 5 min after block.

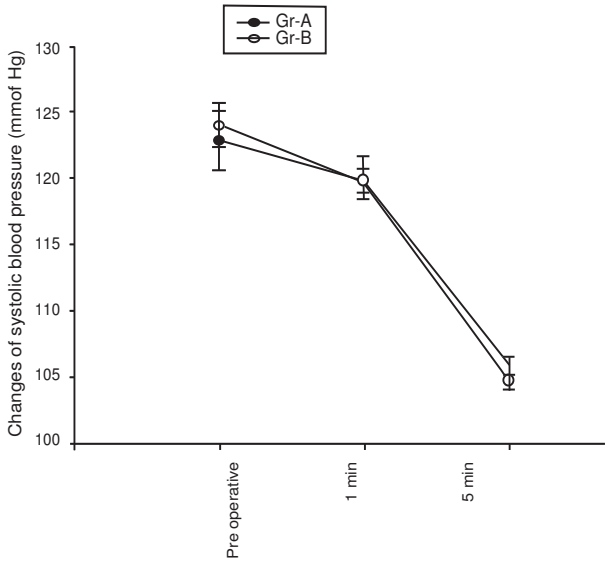

Fig.-2: *Changes of systolic blood pressure in different time*

Table-II

Performance of the needle

Characteristics	Group-A	Group-B	P value
Insertion			
Smooth	50	47(94%)	
Difficulty	0	3(6%)	
Appearance of CSF in seconds	3.54±0.10	1.84±0.13	0.000
No of attempt			
One	26(52%)	43(86%)	
Two	14(28%)	7(14%)	0.002
Three	8(16%)	0	
Four	2(4%)	0	
Bending of needle	7(14%)	0	0.050

Values are expressed as mean ±SEM or in frequencies. Within parenthesis are percentages over column total. Values are expressed as significant if $p<0.05$

Table-III

No of patient complaints of post dural puncture headache and back pain

Characteristics	Group-A	Group-B	P value
PDPH	0	2(4%)	0.000

Values are expressed in frequencies. Within parenthesis are percentages over column total. Values are expressed as significant if $p<0.05$

DISCUSSION:

In caesarean section operation spinal anaesthesia is popular for various reason. During the spinal anaesthesia various type of spinal needles are used. In our country due to cheap and availability 25 gauge and 26 gauge Quincke needles are mostly used. This cutting bevel have some disadvantages like bending of the needle, delay appearance of CSF and PDPH. To overcome this disadvantages a newly designed tip-holed spinal needle was made. The present work was designed to made a comparison between 25 gauge Quincke spinal needle with the 25 gauge newly designed tip holed spinal needle in obstetrical patient during spinal anaesthesia.

There are few studies[5,6] which examine the technical difficulties involved in the use of different spinal needles. In our study formed the impression that distinctive click (better sensation with the loss of resistence upon dural puncture) is very much apparent with newly designed tip holed needle than

Quincke needle. Whereas a few recorded distinctive click with 25 gauge whitacre needle which less than Quincke needle[7].

Regarding the number of attempts of needle insertion it was found that 86% of group B subjects required only one attempt, while group A subjects required more than two or more attempts for imsertion. Similar type of study reported 64% incidence of successful dural puncture at first attempt using 25 gauge whitacre needle[7]. The present study demonstrate that the difference of attempts of insertion among two procedures were statistically significant (Table 2, Fig. 3). We had no failure to puncture the dura in both type of needle whereas, Levy JH et al. Found failure to confirm dural puncture with 25 gauge needle.

Recently bending of the needle has been reported with certain fine gauge needles[2,8]. This bending may occur both at the level of the shaft and at the tip. Shaft bending typically occurs in Quincke needles with unilateral tip bevel. When the bevel encounters tissue resistance, it may change its trsjectory and become bent; however this is usually not persistant. This altered needle track, may fail to reach the dural sac, of may enter far laterally[9].

It was hypothesized that a needle of spreading bevel (cone-shaped) with the drug delivery port at the tip would overcome most of these problems. The mechanical weakness imposed by some needle tip designs caused by the presence of a delivery orifice on or near the tip of the spinal needles-has been removed. As such, it is expected that the needle will not bend under usual placement circumstances To create these modified tip holed spinal needles, 26 gauge Quincke bevel needles (B.Braun) were modified[4].

In our opinion number of attempts of insertion and bending of the needle was very likely due to unilateral tip bevel of the quincke spinal needle.

Quick appearance of the CSF at the hub contribute to easy identification of the sub-arachnoid space with a reduction in failure rate[10]. However similar gauze needles do not always ensure the same CSF flow rate[5,11]. A major contributing factor to CSF flow rate is internal diameter, which for any given needle size varies between manufacturers[10].

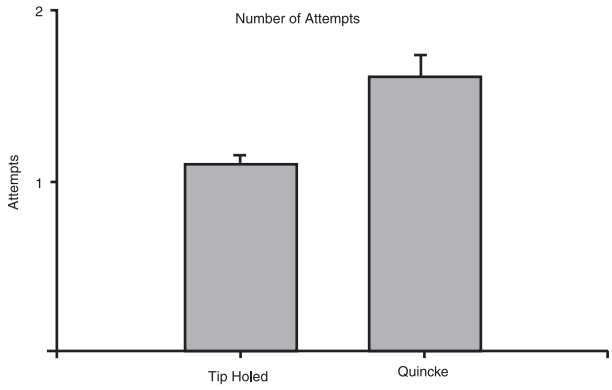

Fig.-3

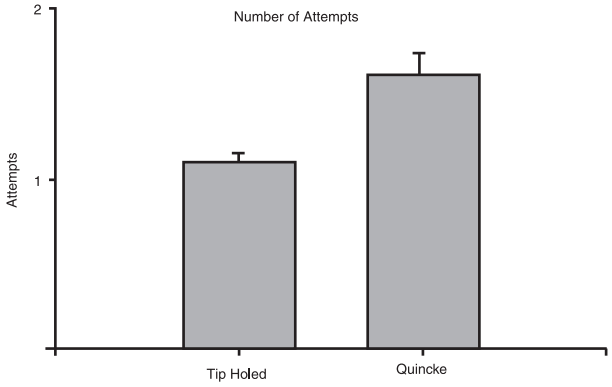

Fig.-4

In this study about the appearance of CSF, it was found that there was highly significant difference among group A and group B subjects. The appearance of CSF was comparatively late in group A subjects (Table 2, Fig. 4). Our work supports the previous study of two seconds of CSF flash back to appear has been suggested as ideal time[11].

In another study of 29 gauge needles, cerebrospinal fluid (CSF) was not detected, and therefore anaesthesia was not possible in 8% patients[11]. Because of CSF at the hub is expected with side holed needles compared with open tipped needles (like Quinckes).These modifying factors have been eliminated altogether in the new design and thus, laminar flow of CSF is maintained throughout.

PDPH has always been present following spinal anaesthesia [12,13] and incidence is greatest in obstetric patient[14,15] The frequency of PDPH seems affected by needle size and tip configuration.

Recent report suggest that the pencil-tip configuration seems to be the single most important factor in reducing the incidence of PDPH and related symptoms[16,17,18]. PDPH remains frequent complication in obstetric population in spinal anaesthesia, it occurs most commonly in young, female patients (particularly parturients[15],[19] and correlates with the size of the spinal needle used[20,21,22]. Mayer et al[23,24] reported to similar incidence of PDPH with 27 gayge Quincke needle and 24 gauge Sprotte needle[15].

The incidence of post dural puncture headache (PDPH) was found absolutely nil among the group B subjects, however negligible (2%) PDPH was observed among group A subjects (Table 3) in our study. Similar findings was also observed with 24 gauge Sprottee needle in a similarly controlled study in obstetric patient[25] and with 25 gauge Whitacre needle[7]. The Sprotte needle was compared to 25 gauge cutting bevel needle, the use of which was associated with 14.5% incidence (eight patients) of PDPH[25]. Other controlled studies in obstetric patients have appeared and reported headache frequencies of 4% (one patient) with 22 gauge whitcre needle against 25% (six patients) with 26 gauge Quincke needle [26] and 3.6% (two patients) with 24-gauge sprotte needle compared with 1.75% (one patient) with a 22 gauge sprotte need1e[27].

Our finding is near the study of sprotte 24 gauge and whitacre needle 25 gauge. Incidence of PDPH in both the study and our study is <2%[7] 25 gauge cutting bevel needle was associated with 14.5%[25] incidence of PDPH while comparing with Sprotte needle 24 gauge. Looking at the finding of low PDPH in our study we agree with other pencil point needle study observers and the spreading of dural fibre seems to be the main reason.

CONCLUSION

The study shows a difference in performance between 25 gauge Quincke needle with the 25 gauge newly designed tip holed spinal needle. Both the needles are quite acceptable regarding ease of insertion. But regarding number of attempts at insertion, about the appearance of CSF, in terms of bending, the newly designed tip holed spinal needle is better that Quincke spinal needle.

The incidence of PDPH was found also absolutely nil with the tip holed group.

REFERENCES :

1. Spinal Anaesthesia. St. Ven M Yentis et al. Anaesthesia and Intesive Care A-Z, an encyclopaedia of principles and practice, Butterworth Heinemann, 2nd ed, 2000;502.
2. Urrie LE. Modification to the sprotte spinal needle. Anaesthesia 1993;48:92 (Letter).
3. Come LAL, Vogal W. Failed spinal anaesthesia with sprotte needles. Anaethesiology 1991;75:717-718.
4. Selim M Jahangir Reg. Anaesthesia and Pain Medicine 2000;25:403-407.
5. Serpell MG, Gray WM, Flow dynamics through spinal needles, Anaesthesia 1997;52:229-236.
6. Spoelder EM, Wagemans MFM, Zurmond WWA, Lange JJ de, Flow through spinal needles. Ned Tijdschr Anaes 1996;9:123-127.
7. Shutt LE; Valentine SJ. Wee MYK, Page RJ, Presser A, Thomas TA. Spinal anaesthesia for caesarian section: comparison of 22-gauge and 25-gauge whitacre needles with 26-gauge Quincke needles Br J anaesth 1992;69:589-94.
8. Lambret DH, Hurley RJ, Hertwig L. Datta S. Role of needle gauge and tip configuration in the production of lumbar puncture headache. Reg Anesth 1997;22:66-72.
9. Baumgarten RK. Importance of the needle level during spinal and epidural anesthesia. Reg Anesth 1995;20:234-238.
10. Krommendijk EK, Verheijen R Van DB. Spoelder EM, Gielen MJM de Lange J. The pencan 25G needle. A new pencil point needle for spinal anaesthesia tested in 1193 patients Reg. Anaesth. 1999;24:43-50.
11. Abouleish E, Mitchell M, Taylor G. Miller H, Warters D, Rashad MN. Comparative flow rates of saline in commonly used spinal needles including pencil-tip needles, Reg. Anesth 1994;20:34-42.
12. Campbell DC. Douglas MJ, Pavy TIG, Merrick P. Flanagan MI, MeMorland GH. Comparison

of the 25-gauge Whitacre with 24-gauge Sprotte spinal needle for elective caesarian section: Cost implications Can J Anaesth 1993;40:1131-1135.

13. Sharma SK, Gambling DR, Joshi GP, Sidawi JF. Herera ER. Comparison of 26-gauge Atraucan registred and 25-gauge Whitacre needles: Insertion characteristics and complications. Can J Anaesth 1995; 42: 706-710.
14. Krueger JE, stoelting VK, Graf JP, Etiology and treatment of post spinal headaches. Anaesthesialogy 1951; 12: 477-485.
15. Vandam LD, Dripps RD. Long term follow-up of patients who received 10, 098 spinal anaesthetics Syndrome of decreased intracranial pressure (headache and ocular and audotory difficulties) Journal of American medical association 1956; 161: 585-591.
16. Bertil J Lofstrom, Mats Bengtsson. Spinal and extradural analgesia. In: JF Nunn, JE Utting BR Brown Eds. General anaesthesia, S^{t}" ed. London, Butterworths,1989;1086.
17. Lynch J. Krings-Ernst I, Strick K,. Topalidis K. Schaaf H. Flebig M. Use of a 25-gauge Whitacre needle to reduce the incidence of postdural puncture headache.Br. J Anaesth 1991; 67: 690-693.
18. Lybecker H, Djemes M, Schmidt JE Postdural puncture headache (PDPH): Onest, duration, severity and associated symptoms. An analysis of 75 consecutive patients with PDPH, acta Anaesthesiol Scand 1995; 39: 605-612.
19. Brownridge P spinal anaesthesia revisited: an evaluation of subarachnold block in obstetrics. Anaesth Intensive care 1984;12:33-42.
20. Frumin MJ spinal anaesthesia using 32 gauge needle. Anaesthesiology 1969;30:599-603.
21. Tourtelotte WW. Handerson WG, Tucker RP, Gilland 0, Walker JE, Kokman E. A randomized double blind clinical trial comporing the 22 versus 26 gauge needle in the production of post lumber puncture syndrome in normal individuals. Headache 1972;12:73-78.
22. Moore DC. Factors influencing spinal anaesthesia Reg. anaesthesia 1982;7:20-24. 23. Mayer DC, Quance D, weeks SK, Headache after spinal anaesthesia for coesarian section: a comparison of 27-gauge Quincke and 24-gauge sprette needles. Anaesth Anale 1992;75:377-86.
24. Zucker-pinchoff B, Ruttenberg M. A Comparison of spinal needle flow rates. Reg Anaest (supplement) 1993;18:46.
25. Cesarini M, Torrielli R, Lahaye F, Mene JM, Cabiro C. Sprotte needle for intrathecal anaesthesia for Caesarean section: incidence of postdural puncture headache. Anaesthesia 1990; 45: 656-658.
26. Snyder GE, Person DL, Flor CE, Wilden RT. Headache in obstetrical patients; comparison of Whitacre needle versus Quincke needle. Anaesthesiology 1989; 71: A860.
27. Leeman MI, Sears DH, O'Donnell LA, Reisner LS, Jassy LJ, Harmon TW et al. The incidence of PDPH in obstetrical patients comparing the 24-gauge and 22-gauge Sprotte needle Anaesthesiology 1991; 75: A853.

Original Article

PRE-EMPTIVE ANALGESIA FOR POSTOPERATIVE PAIN RELIEF IN CHILDREN – ROLE OF PARACETAMOL

Rubina Yasmin[1], AKM Akhtaruzzaman[2], Paresh Chandra Sarker[3], Neaz Ahmed[4] Ranadhir Kumar Kundu[5], KM Iqbal[6]

SUMMARY:

This prospective clinical study was carried out in the Dept. of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU, Dhaka, during the period of May 2003 to July 2003. The study was done to emphasize the importance of giving analgesics pre-emptively instead of waiting for the child to complain of pain and to produce smooth recovery after surgery by decreasing immediate post-operative pain in children by a simple, safe acceptable drug. The children scheduled for tonsillectomy under general anaesthesia were recruited in this study. The analgesic efficiency of rectal paracetamol in two doses, 25 mg/kg bodywt.(Gr-P_{25}) and 50 mg/kg. bodywt. (Gr-P_{50}) were compared with Diclofenac Sodium suppository 1mg/ kg body weight (Gr-D) given half an hour before induction of anaesthesia. Pain scoring was done by TPPPS (Toddler Pre-schooler postoperative pain scale). Heart rate and blood pressure were stable in Gr-P_{50} and Gr-D. Time of first demand of analgesic was delayed in Gr-P_{50} and Gr-D. Total paracetamol consumption in 24 hours was less in Gr-P_{50}(181±14.25) and Gr-D (212±25) than Gr-P_{25}(318± 26.39). Total duration of analgesia in Gr- P_{50} (657±9.94) mins. and in Gr-D(502±10.63) mins. and in Gr-P_{25}(288±23.17) mins. Pre-emptive high dose rectal paracetamol appears to be more effective than diclofenac sodium suppository for postoperative analgesia in children undergoing tonsillectomy.

INTRODUCTION:

Pain is not just a sensory modality but also an experience. The IASP defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Pre-emptive analgesia, an evolving clinical concept, involves the introduction of an analgesic regimen before the onset of noxious stimuli, to prevent sensitization of the nervous system to subsequent stimuli that could amplify pain.[2] Pre-emptive analgesia would be directed at central neurons by using NSAIDs, paracetamol, ketamine, local anaesthetics and opioids either alone or in combination.[3] In this study, pre-empt rectal paracetamol and diclofenac sodium has been included.

As post operative pain in children is intense and short lasting, children with mild and moderate pain need analgesia only for 24 hrs. and can be managed by simple medication[4]. Paracetamol is commonly used in children for mild to moderate pain. It is well tolerated and relatively free of side-effects in clinical doses[5]. On the other hand diclofenac sodium is an excellent analgesic, but it has the side effects like gastro-intestinal bleeding, depression of platelet function, increased bleeding time, decreased renal and splanchnic perfusion[6,7]. Diclofenac sodium therefore have greater risks in tonsillectonmy where bleeding from tonsil bed is likely to be large[8]. Thus, in the present study, role of pre-emptive paracetamol in controlling pain in children has been studied. Different doses of paracetamol are used to see the range of analgesia in terms of quality and compared with diclofenac sodium, a commonly used NSAID.

MATERIALS AND METHODS:

This prospective study was carried out in the department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandu Sheikh Mujib Medical University, Dhaka during the period of May 2003 to July 2003. The children aged between 6-12 years with ASA grade I & II and scheduled for tonsillectomy under general

1. Assistant Professor, Department of Anaesthosiology, DMCH, Dhaka-1000
2. Associate Professor, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU, Dhaka
3. Assistant Professor, Department of Anaesthesia, SSMC & Mitford Hospital, Dhaka
4. Junior Consaultant, Department of Anaesthesiology, Ibrahim Cardiac Hospital and Research Institute, Dhaka
5. Associate Consultant, Square Hospital, Dhaka
6. Professor & Ex-Chairman, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU, Dhaka

anaesthesia were recruited in this study. Children with known allergy to study drugs, hypovolaemia, hepatic and renal diseases, hemorrhagic diathesis and bronchial asthma were excluded form this study.

After recruitment children were randomly divided into three groups by card sampling, twenty in each group. The group P_{25} received paracetamol 25mg kg body weight per rectum, Group P_{50} received paracetamol 50mg/kg body weight per rectum and Group D received diclofenac sodium 1 mg/kg body weight per rectum –half an hour before induction of anaesthesia. The administered dose was maintained close to the calculated dose. Patients data were collected in prescribed forms containing patients particulars, preoperative baseline (Pulse, blood pressure, temperature) parameters, per and postoperative parameters.

After pre-oxygenation for 3 mins with 100%oxygen, induction of anaesthesia was done with thiopentone sodium 4-5 mg/kg IV and tracheal intubation was done after giving Inj. Suxamethonium 1.5 mg/kg IV. Maintenance of anaesthesia with N_2O 70%, O_2 30% and halothane – 0.5% with long acting muscle relaxant atracurium besylate 0.5 mg/kg body weight. Residual effect of neuromuscular blocking drug was reversed by Inj. neostigmine 40 ìg/kg with atropine 20 ìg/kg and tracheal extubation performed. Peroperative analgesia maintained by Inj. Fentanyl 1µg/kg at the time of induction and $D_5$0.225 NS fluid was used by IV drip at a rate of 6 ml/kg/hr.

Children were assessed both preoperatively and at 15mins, 1 hour, 4 hours, 8 hours in the post-operative ward. Study parameters included TPPPS (Toddler Pre-schooler post operative pain scale) for measuring pain intensity at 15 minutes afterward, 1 hour afterward, 4 hours afterward and 8 hours afterward, Variables of TPPPS were verbal complaint/cry/groan/moan/grunt, facial expression motor behavior, rub/touch painful area.

If TPPPS >3/10 then injection pethidine 0.5mg/kg IV, was administered, Time of first demand of analgesia, heart hate, blood pressure, temperature, complications like nausea, vomiting, sedation, bleeding, recovery were observed.

Statistical Analysis:

All results were expressed as mean ± SEM calculated for each of the variable at all observation time of all children in each group. The data were compiled and analyzed with the help of chi-square and one-way ANOVA test. Values were expressed as significant if $p<0.05$ (Confidence limit-95%)

RESULTS

Observation of the present study was analyzed in the light of comparison among each subject groups. Each group having n=20. All results were expressed as mean ± SEM or in frequencies as applicable. The studied groups became statistically matched for age (P=0.51), weight (P=0.49), baseline pulse rate (P=0.55) as well as baseline mean blood pressure (P=0.91).

Heart rate (beats/min) of the studied groups are displayed in Table-II, Figure-1. Baseline heart rate were not different significantly (P=0.55) in all three groups but varied significantly at induction (P=0.05), at 5 mins after induction (P=0.01), at 15 mins after induction (P=0.00), at extubation (P=0.01), 15 mins, after extubation (P=0.05), 4 hrs after extubation (P=0.01), 8 hrs, after extubation (P=0.01). Heart rate was not significant (P=0.59) at 1 hr. after extubation. There are significant interaction between groups time (0.00, 0.00 and 0.00) in three groups.

Table-I

Demography

Groups / parameters	Gr-P_{25}	Gr-P_{50}	Gr-D	F value	P value
Age in years (ranged)	8.7±0.37(7-12)	8.9±0.36(7-12)	8.6±o.41(6-12)	0.81	0.51
SexMaleFemale	11(55%)9 (45%)	13 (65%)7 (35%)	9 (45%)11 (55%)		
Body weight in kg	28.8±1.44	27.05±1.15	26.10±1.56	0.43	0.49

Values are expressed as mean±SEM or in frequencies. Within parenthesis are ranged of age distribution or percentage over column total. Between group analyses were done by one way ANOVA. Values are expressed as significant if $p<0.05$ (CI-95%).

Table-II

Changes of mean heart rate (beats/min) at different time period of the studied groups.

Group S/ time	Base line	At induction	5 min after induction	15 min after induction	At extubation	15 min after extubation	1 hr after extubation	4 hr after extubation	8 hr after extubation	F value	P value
Group	94±1.4	113±1.5	110±1.5	103±1.49	112±0.9	107±1.6	100±1.8	105±1.8	102±1.63	5.46	0.00
-P_{25}	5	8	2		0	6	9	3			
Group	92±0.8	110±0.4	105±0.6	105±0.63	109±0.5	105±0.8	98±1.11	94±1.14	97.50±1.	3.48	0.00
-P50	1	8	4	8	0	6		3	39		
Group	92±0.9	114±0.9	111±1.0	107±0.99	115±0.8	110±1.0	101±1.7	94±1.39	101±1.46	2.99	0.00
-D	8	8	2		1	1	5				
F	0.63	1.79	2.98	3.55	2.53	0.97	0.53	1.33	2.49		
P	0.55	0.05	0.01	0.00	0.01	0.05	0.59	0.01	0.01		

Values are expressed as mean±SEM. Between group analyses were done by one way ANOVA. Values are expressed as significant if p<0.05 (CI-95%). - (0.00, 0.00 and 0.00) in three groups.

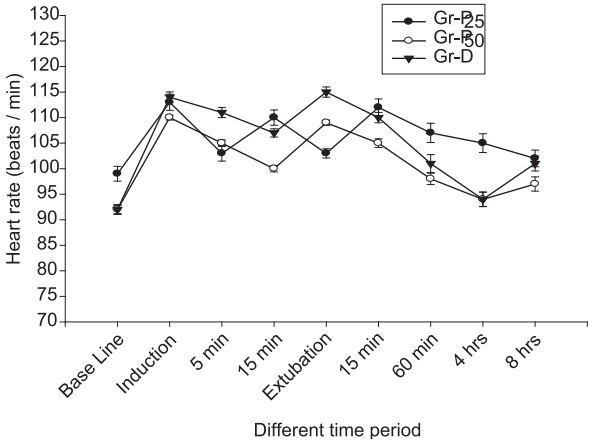

Fig:-1: *Changes of heart rate in different time period*

Mean blood pressure (mm of Hg) three studied groups are displayed in Table-III, Figure-2. Baseline mean blood pressure were not significantly different (P=0.91) in all three groups but varied significantly 15 mins after induction (P=0.00), at extubation (P=0.00) 15 mins, after extubation (P=0.02), 1 hr. after extubation (P=0.00), 4 hr after extubation (P=0.00), 8 hr. after extubation (P=0.00). There are significant interaction between groups x time (P=0.00, P=0.00 and P=0.01).

Changes of temperature (^{o}F) at different time period of three studied groups are displayed in Table-IV, Figure-3. Baseline changes of temperature were not significantly different (P=0.631) in all three groups but varied significantly 5 mins after induction (P=0.05), at 15 mins after induction (P=0.00), at

Table-III

Changes of mean blood pressure (mm of Hg) at different time period of the studied groups.

Group s/ time	Base line	At induction	5 min after induction	15 min after induction	At extubation	15 min after extubation	1 hr after extubation	4 hr after extubation	8 hr after extubation	F value	P value
Group	7611.8	8411.9	8411.5	88±L2	85±1.25	82±1.55	80±1.24	82±1.29	80f1.21	6.5	0.0
-P_{25}	35	22	64	26	8	2	3	5	5	8	0
Group	75±1.2	83±1.3	80±1.2	78±1.2	82±0.82	78±0.68	76±0.78	75±0.95	75f0.79	5.7	0.0
-P50	63	32	12	05	0	0	9	0	9	8	0
Group	76±0.9	84	8311.3	80±1.0	85±1.36	82±1.14	79±0.95	75±0.87	79±1.03	2.9	0.0
-D	57	±2.045	78	75	5	5	7	2	8	6	1
F	0.01	0.07	0.12	2.53	4.33	3.99	5.64	3.44	4.11		
P	0.91	0.10	0.34	0.00	0.00	0.02	0.00	0.00	0.00		

Values are expressed as mean±SEM. Between group analysis were done by one way ANOVA. Values are expressed as significant if p<0.05 (CI-95%).

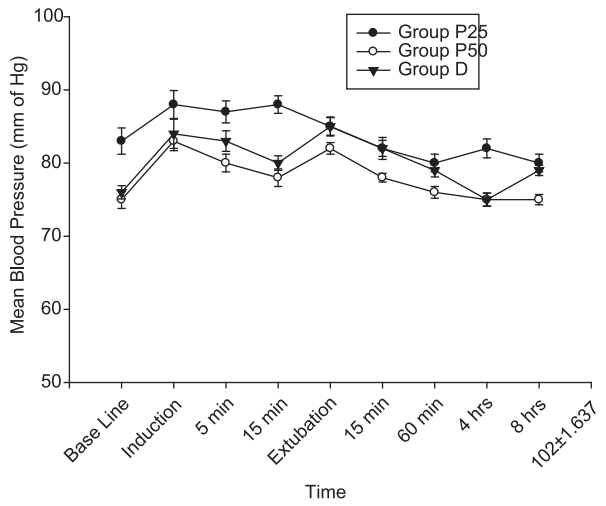

Fig.-2: Chages in blood pressure (mmHg) at different time period of the studied group)

Table-IV

Changes of temperature (0^c) at different time period of the studied groups.

Groups / time	Base line	At induction	5 min after induction	15 min after induction	At extubation	15 min after extubation	1 hr after extubation	4 hr after extubation	8 hr after extubation	F value	P value
Group P25	98.39±0 .089	98.43±0 .077	98..35f0. 086	98.08±0 .103	97.78±0 .100	97.63±0 .120	97.13±0 .121	98.22±0 .086	99.01±0 .062	1.1 1	0.0 5
Group Pso	98.38±0 .073	98.36±0 .076	97.89±0. 082*	97.51±0 .063	97.15±0 .075	96.92±0 .078	96.96±0 .691	97.88±0 .111	98.74±0 .096	3.4	0.0 0
Group D	98.34±0 .045	98.24± 0.046*	98.10±0. 051	97.90±0 .034	97.76f0 .08	97.84±0 .07	97.81t0 .685	98.51±0 .060	98.88±0 .033	2.9 9	0.0 0
F	0.31	0.09	1.1	2.1	1.30	2.40	3.49	4.10	2.19		
P	0.631	0.10	0.05	0.00	0.05	0.00	0.00	0.00	0.01		

Values are expressed as mean±SEM. Between group analysis were done by one way ANOVA. Values are expressed as significant if p<0.05 (CI-95%).

extubation (P=0.05), 15 mins after extubation (P=0.00), 1 hr. after extubation (P=0.00), 4 hrs after extubation (P=0.00), 8 hrs after extubation (P=0.01). There were significant interaction between groups in time (P=0.05, P=0.00 and P=0.00).

Pain intensity of three studied groups was assessed by TPPPS. TPPPS of three studied groups are displayed in Table-V, Figure-4. TPPS varied significantly 15 minuets after extubation (0.00), at 1 hr after extubation (P=0.00), at 4 hrs. after extubation (P=0.00), at 8 hrs. after extubation (P=0.00). There are significant interaction between groups X time (P=0.01, P=0.00 and P=0.01).

Total analgesic requirements of three studied groups are displayed in Table-VI, Figure-5 and 6. Time of first demand of analgesic in all three groups were significant (P=0.001). Total paracetamol consumed in all three groups were also significant (P=0.00)

RECOVERY STATUS

The recovery status of the patients in this study was assessed. The rates of recovery were evaluated by using "Modified Steward Coma Scale" at 5 and 10 minutes after extubation. In Gr-P_{25} out of 20 patients 2 obtained score 7 after 5 minutes and 18 obtained score 7 or more after 10 minutes. In Group-P_{50} out of 20 patient's 14 obtained score 7 or more after 5 minutes and 6 obtained score 7 or more after 10 minutes of extubation. In Group-D out of 20 patient's 14 obtained score 7 or more after 5 minutes and 6 obtained score 7 or more after 10 minutes of extubation (Table-VII).

Values are expressed in frequency, within parenthesis percentage over column total. Between group analysis were done by c2 test. Values are expressed as significant if p<0.05 (CI-95%)

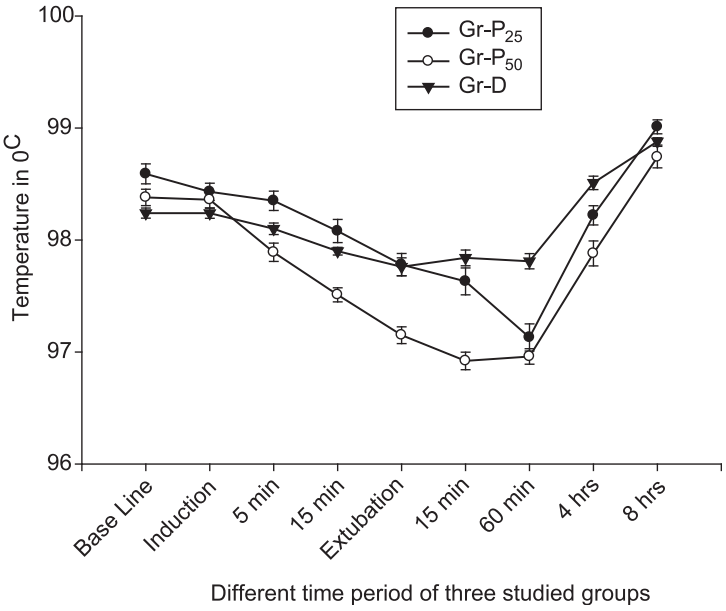

Fig.-3: *Changes of temperature in the studied groups*

Table-V

TPPPS score of three studied groups

Groups/ score	15 min after extubation	1 hr after extubation	4 hr after extubation	8 hr after extubation	F value	P value
Gr-P_{25}	0.70±0.27	0.25±0.12	2.00±0.19	1.75±0.19	2.10	0.01
Gr-P_{50}	0.10±0.10	0.05±0.01	0.04±0.01	0.05±0.01	4.20	0.00
Gr-D	0.95±0.11	0.05±0.05	0.025±0.013	2.0±0.22	1.89	0.01
F	4.32	3.44	9.33	8.93		
P	0.00	0.00	0.00	0.00		

Values are expressed as mean±SEM. Between group analysis were done by one way ANOVA. Values are expressed as significant if $p<0.05$ (CI-95%).

Table-VI

Total Analgesics requirement in mg.

Groups / parameters	Gr-P25	Gr-P50	Gr-D	F value	P value
Time of first analgesic demand in minutes	288±23.17	657±9.94	502±10.63	9.34	0.00
Total Paracetamol consumed in mg	318±26.39	181±14.25	212±25	7.32	0.00

Values are expressed as mean±SEM. Between group analysis were done by one way ANOVA. Values are expressed as significant if $p<0.05$ (CI-95%).

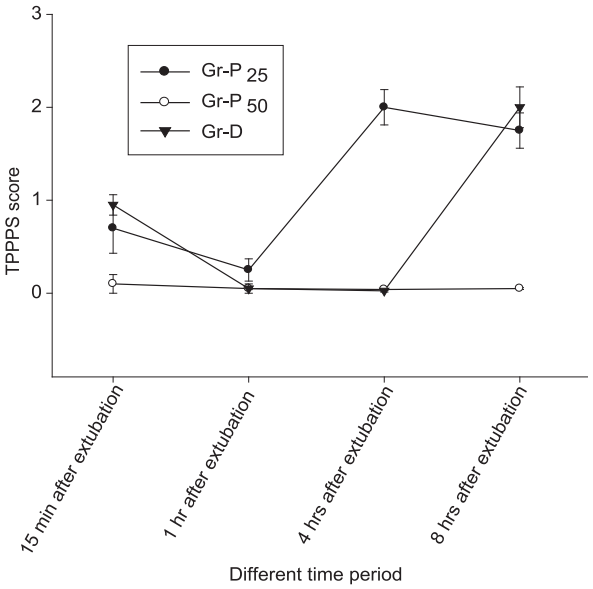

Fig-4: *TPPPS of three studied groups*

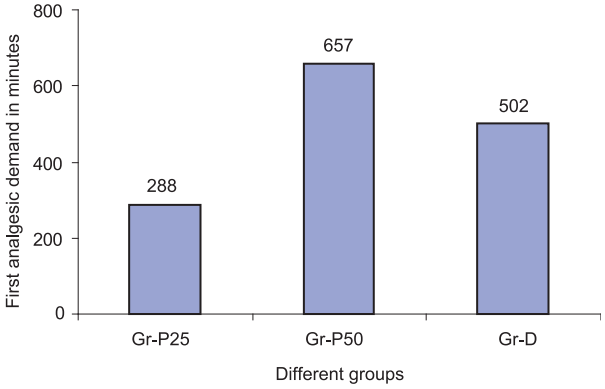

Fig-5: *Time of first analgesic demand in minute*

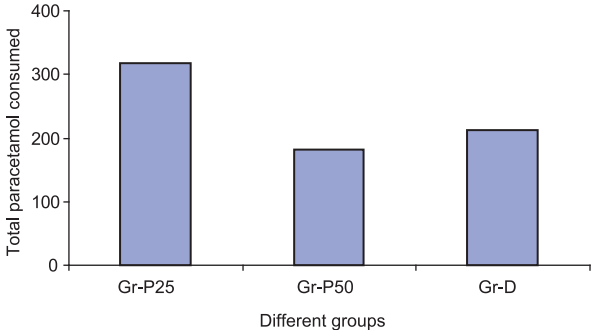

Fig-6: *Total paracetamol in 24 hours*

Table-VII

Recovery status

Group/Time	*Group-P 25*	*Group-P 50*	*Group-D*	*P value*
5 minutes after extubatione"7	2 (10)	14 (70)	14 (70)	0.0001
10 minutes after extubatione"7	18 (90)	6 (30)	6 (30)	0.0001

Values are expressed in frequency, with in paranthesis percentage over colum total. Between groups analysis were done by X^2 test. values are e xpressed as significant if :M<0.05 (CI-95%)

DISCUSSION:

Pre-emptive analgesia is an antinociceptive treatment that prevent establishment of altered central processing of afferent input from sites of injury.[9] The most important condition for establishment of effective pre-emptive analgesia are the establishment of an effective level of antinociception before injury and the continuation of this effective analgesia level into the post injury period to prevent central sensitization during the inflammatory phase. The concept of pre-emptive analgesia was formulated by Crile at the beginning of previous century on the basis of clinical observation [10].

The recommended daily dose for paracetamol in children in 90mg/kg given 4 to 6 hourly [11 12]. Although the optimum paediatric dose for antipyresis is 20mg/kg[12 13 14]: this dose should only be used as a loading dose if repeated administration is envisaged with range of 10-15

mg/kg[13]. Concern about hepatoxicity has result in cautious preoperative dosing regimes, but both pharmacokinetic and pharmacodynamic data have shown these to be inadequate[9] . While there is increasing evidence that a single rectal loading dose of 35-45 mg/kg results in more desirable plasma paracetamol concentrations[15] .In our present study, we have used 25mg/kg and 50mg/kg body weight of paracetamol per rectum which were within the recommended dose suggested by Brian Anderson, Frank & Coulthard, Temple and Wilcon et al[11,12,13,15].

In the present study, we have also used Diclofenac sodium, a dose of 1 mg/kg body weight per rectum. Though diclofenac sodium is an excellent analgesic but it has the side effects like gastro-intestinal bleeding, depression of platelet function, increase in bleeding time, hepatotoxicity, decreased renal and splanchnic perfusion [6,7]. Diclofenac sodium therefore have greater risks in tonsillectomy where bleeding from tonsil bed is likely to be large[8] .

In our study, we have used paracetamol in two doses Gr. P_{25}-25mg/kg body weight per rectum Gr.P_{50}-50mg/kg body weight per rectum and Diclofenac sodium 1mg.kg body weight per rectum It was found that, Gr.P_{50} patients has duration of analgesia(657±9.94) minutes on the other hand GrP_{25} patients had duration of analgesia (288±23.17) minutes and Gr.D patients had duration of analgesia(502±10.63)minutes.

Again, in our study, we have managed postoperative pain by Inj. Pethidine o.5mg/kg IV. as rescue analgesic. Only 2 children of group P_{25} received Inj. Pethidine 0.5mg/kg IV. as rescue analgesic. Twenty four hrs. paracetamol consumption was significantly lower in Group P_{50} (181± 14.25) than Group P_{25}(318±26.39) and Gr.D (212±25).

Post operative pain scoring was done by TPPPS. (Toddler preschooler postoperative pain scale). It is an observation scale for measuring postoperative pain in children. In adults, pain assessment can be done by the visual analogue scale(VAS). But this is not applicable on children. So in TPPPS multiple variables like verbal complaint, cry, groan, moan, grunt, facial expression, restless motor behavior, rub/ touch painful area are used and scored accordingly. TPPPS varied significantly in 15 mins after extubation (P=0.00), at 1hr after extubation (P=0.0), at 4 hr after extubation(P=0.00) and at 8 hr after extubation(P=0.00) in Group.P50.

Paracetamol is an effective antipyretic at plasma concentration of 0.066-0.130mmol/L[15,16,17]. In our study, body temperature of children also had decreased significantly in Gr. P_{50} & Gr.D. This may be due to paracetamol or diclofenac used, general anaesthesia [18], cold ambient temp. in the operating room, use of large amount of unwarned intravenous fluid [19]Although the patients body temperature had been reduced but not to the extent of hypothermia, even of mild variety.

Acute pain results in sympathetic over activity which is manifested by increase in heart rate, blood pressure, peripheral resistance and cardiac output[20]. In this present study, heart rate and blood pressure remained stable throughout the study period in Gr. P_{50} and Gr.D.

CONCLUSION

In the present study, we found that time of first demand of analgesic was delayed in Gr- P50 than Gr-D and Gr-P25. Total duration of analgesic was also greater in Gr-P50 than Gr-D and Gr-P25. So, it can be concluded that, pre-emptive high dose rectal paracetamol (50mg/kg body weight) appears to be more effective than diclofenac sodium suppository for controlling post operative pain in children undergoing tonsillectomy.

REFERENCES:

1. Marskey H, Able Fessard DG, Bonica JJ et al; Pain terms; A list with definitions and notes on usage. Pain 6:249,1979.
2. Allan Gottschalk, John Hopkins, David S.Smith, New Concepts in Acute Pain Therapy; Pre-emptive anatomy; American Family Physician , 2001; May;(63); 1979-83, Number-10.
3. Clifford J Woolf, Mum Seng Chang, Pre-emptive analgesia treating post-operative pain by preventing the establishment of central sensitization, Anaesthesia, analgesia, 1993; P-362-379.
4. Dilip Power, Peri-operative pain management in children , in proceedings of 5th SACA and 1st SARPS Congress, Dhaka, 2003, P –171-173.

5. Stephan A Schug, David A, Sidebotham, Micheal MC. Guinnety, Jane Thomas and Larna fox; Acetaminophen as an adjunct in the management of acute postoperative pain, Anaesthesia and Analgesia, 1998, 87, page-368-372.

6. Joel B Gutner, Anna M Varughese, Jean F Harrington; Recovery and complications after tonsillectomy in children; A comparison of Ketotolac and morphine.

7. Lynn M Rusy, Constance S.Houck Lorna J Sullivan,Laurie A Ohlms; Adouble blind evaluation of ketorolac tromethamine versus acetaminophen in paediatric tonsillectomy; analgesia and bleeding Anaesthesia and Analgesia, 1995,Vol-80, page-226-29.

8. S.J. Mather, J.I Alexander, Pharmacology, in Stephen J. Mather and David G. Hughes, Ahandbook of Paediatric Anaesthesia, 1996, page-16-38

9. Kelly, Dermot J, Ahmad, Mahmood, Brull, Sorin J, Pre-emptive Analgesia; recent advances & current trends. Canadian Journal of Anaestheisa, D&C. 2001, 48; 1091-1101.

10. Crile GW; The Kinetic theory of Shock and its presentation through anoci-association; Lancet 1913; 185, page-7-16.

11. Frank O.R & Cowthard K.P 1988; Paracetamol for fever on children Aust. Form, Phys,17,771.

12. Temple A.R(1983); Paediatric dosing of acetaminophen Ped. Pharmacy,3,321-327

13. Wilson J.T Brown, R.D Bocchini, J.A & Kearns G.L(1982),efficacy, disposition and pharmaco dynamic of aspirin, acetaminophen and choline salicylate in young febrile children,. Ther. Drug. Ther,4,147-180.

14. Peterson R.G(1985), Antipyreties and analgesics in children, Dev. Pharmac, Ther,8,68-84.

15. Brian Anderson; Paracetamol-The paediatric analgesic Aus. Anaesth.1996. Paper-2

16. Anderson-B, Kanagasundarum-S, Woodlard-G; Analgeisc effecacy of paracetamol in children using tonsillectomy as a pain model; Anaesth. Intensive care. 1996,Dec;24(6),669-73.

17. Anderson B-J; Woodlard – G.A; Holford N-H; Pharmacokinetics of rectal paracetamol after major surgery in children; paed. Anaes.1995;5(4);237-242.

18. Morgan G, Edward, Mikhail S Marged, Clinical Anaesthesiology (Appletion and large) 3rd edition p-117.

19. Morgan G, Edward, Mikhail S Marged, Clinical Anaesthesiology (Appletion and large) 3rd edition p-941.

20. Michael Cousins, Acute and postoperative pain. Patricj D. Wall, Ronald melzaek, A text book of pain, 3rd edition, chapter-19, page-370.

UPDATE OF NEUROANAESTHESIA IN BANGLADESH

Hasina Begum[1], Iqbal Hossain Chaudhury[2], AKM Azizul Hoque[3], UH Shahera Khatun[4]

ABSTRACT :

In the last 20 years , new drugs and new methods of cerebral monitoring have been introduced, that have affected our choice & conduct of anaesthesia . Which affects significantly the outcome of neurosurgery. To consider the outcome from neurosurgical anaesthesia , both drugs & monitors have to be considered.

This is a retrospective study of 2000 patients those who attended in BSMMU from 1985 to 2002 for craniotomy under general anaesthesia . Perioperative mortality (overall) of that period was 5.5% . Perioperative mortality significantly reduced from 1985 to 2002 .

In first 6 years (1985 – 1990) mortality was 14% ; in 2nd 6 years (1991 –1996) mortality was 6%; in 3rd 6 years (1997 –2002) mortality was only 2.48% . At the same time number of patients undergoing surgery greatly increased : In first 6 years (1985-1990) it was 225 ; in 2nd 6 years (1991 – 1996) : 557 , in 3rd 6 years (1997 – 2002) : 1169 .

All the above data shows markedly reduced mortality and increased number of surgery indicates tremendous improvement in the field of neuroanaesthesia both in drugs and monitors as well as skillness of neurosurgeons .

To assess changes in outcome , outcome measures need to be defined for neuroanaesthesia . Because the effects of surgery markedly affect neurological or neurophysiological outcome, it can be difficult to distinguish the effects of surgery & anaesthesia and the effects of new agents.

INTRODUCTION:

The goal of neuroanaesthesia is to provide a safe anaesthetic for the patient while improving surgical condition in keeping with patient safety.

In the last 20 years new drugs and new methods of cerebral monitoring have been introduced that have affected our choice and conduct of anaesthesia. To consider the outcome from neurosurgical anaesthesia , both drugs & monitors as well as skilled manpower have to be considered.

As the effects of surgery markedly affect neurological or neuropsychological outcome, it can be very difficult to distinguish the effects of surgery & anaesthesia. But gradual increase in availability of sophisticated monitoring techniques & improved operating condition under anaesthesia have allowed increasingly difficult procedures to be performed on patients previously deemed inoperable.

In 1980's IPGMR and DMCH (Dhaka Medical College Hospital) were the only two established centers for neurosurgical operative procedures, where most of the cases were emergency one. But now a days all medical college hospitals & some private clinics & hospitals are doing the job very efficiently.

This paper examines the effects of agents, techniques & monitoring facility for neurosurgical outcome in Bangladesh.

METHODS & MATERIALS:

It was a retrospective study of 2000 patients who attended in BSMMU from 1985 to 2002 for craniotomy under general anaesthesia. The patients were divided in three groups: Group A: patients were admitted & operated in year 1985 – 1990 (1st 6 years); Group B: patients were admitted & operated in year 1991 – 1996 (2nd 6 years); Group C: patients were admitted & operated in year 1997 – 2002 (3rd 6 years). In both groups total number of mortality were assessed , in addition to that the mortality also assessed in post. fossa operations & operations other than post. fossa.

The data were compiled and analyzed for statistical significance by ANOVA test or unpaired t test as appropriate. P value <0.05 was considered significant.

1. Junior Consultant, Anaesthesia, Analgesia & ICU, DMCH
2. Assistant Professor, Anaesthesia, Analgesia & ICU, BSMMU
3. Associate Proessor, Anaesthesia, Analgesia & ICU, DMCH
4. Professor, Anaesthesia, Analgesia & ICU, DMCH

RESULTS:

Table : 1

Overall mortality (1985 –2002)

Total cases	:	2000
Total operations	:	1941(97.05%)
Un-operated cases	:	59(2.95%)
Peri-operative mortality	:	111(5.71%)

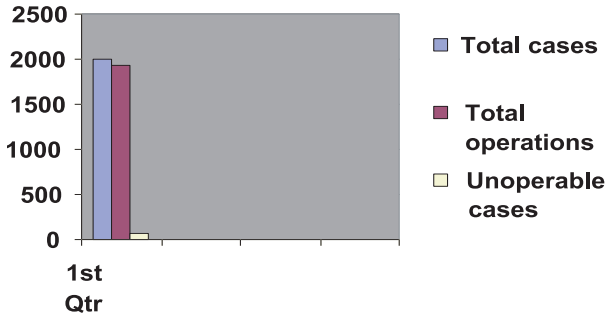

Table-II

Peri-operative mortality (1985-2002) in IPGMR

Sl. no	Diagnosis	Total oper.	Total death	Percentage
1.	Astrocytomas	754	22	3.05%
2.	Meningiomas	407	15	3.93%
3.	Pituitary tumors	235	19	8.51%
4.	Craniopharyngiomas	172	15	9.00%
5.	Acoustic Neuromas	158	16	12.03%
6.	Medulloblastoma	119	12	11.76%
7.	Brain abscess	114	3	3.51%
8.	Meningeal Sarcomas	19	3	15.79%
9.	Arachnoid Cyst	13	1	8.00%
10.	Colloid Cyst	11	4	36.36%
11.	Fibrosarcoma	1	1	10.00%
	Total	2000	111	5.71%

Table - III

Operative mortality in GroupA, GroupB & GroupC (1985-2002)

Sl.no.		Group A 1985-1990	GroupB 1991-1996	Gruop C 1997-2002
1.	Total operations	225	577	1169
2.	Total operative deaths	33(14.66%)	36(6.0%)	29(2.48%)
3.	Post. fossa mortality	15	8	6
4.	Mortality other than post. fossa	18	28	23
5.	% of post. fossa operative mortality	39.47%	10.5%	3.0%
6.	% of mortality other than post. fossa	9.63%	5.8%	2.33%

Table-IV

Total operations in Group A, Group B & Group C

Groups	Total operations	ANOVA
Group A (1985-1990)	225	P<0.01
Group B (1991-1996)	577	
Group C (1997-2002)	1169	

S = Significant.
NS = Not significant.
HS = Highly significant.

Table-V

Total operative deaths in Group A, Group B & Group C

Groups	Total operative deaths	ANOVA
Group A (1985-1990)	33	P>0.05NS
Group B (1991-1996)	36	
Group C (1997-2002)	29	

Table-VI

Total Post. fossa operative deaths in Group A, Group B & Group C

Groups	Total post. fossa operative deaths	ANOVA
Group A (1985-1990)	15	P>0.05
Group B (1991-1996)	08	NS
Group C (1997-2002)	06	

Table-VII

Percentage of mortality in Group A, Group B & Group C

Groups	Percentage of mortality	ANOVA
Group A (1985-1990)	14.66%	P<0.05S
Group B (1991-1996)	6.0%	
Group C (1997-2002)	2.48%	

S = Significant.
NS = Not significant.
HS = Highly significant.

DISCUSSION:

Apart from a conventional anaesthetic technique which plays meticulous attention to detail the essential factors in neuroanaesthesia are the maintenance of cerebral perfusion pressure and the facilitation of surgical access by minimizing blood loss and preventing increases in central nervous tissue volume and oedema[1] .

The data shows tremendous improvement of outcome of neurosurgical patients from1985 to 2002. Though the data is taken from IPGMR, it might be the overall reflection of neurosurgical outcome of Bangladesh.

Introduction of new sophisticated drugs gives remarkable improvement in the field of neuroanaesthesia. The effects of anaesthetic agents on cerebral metabolism, blood flow, cerebro-spinal fluid(CSF) dyanamics and intracranial volume & pressure are often profound.[2] Peroperative cerebral ischaemia markedly affects postoperative outcome. In 1985 most of the patients were anaesthetised with Barbiturates, halothane, tubocurarine / gallamine & suxamethonium. All these drugs markedly affects cerebral perfusion & metabolism.

Introduction of new drugs are :

1. Intravenous: Propofol.
2. Volatile anaesthetic agents: Isoflurane.
3. Fentanyl , Remifentanyl.
4. New NMB agents like: Vecuronium, pipecuronium etc.

In vitro, propofol directly dilates cerebral vessels,[3] whereas in vivo it causes cerebral vesoconstriction, presumably by reducing cerebral metabolic rate & thus cerebral blood flow[4]. However cerebral blood flow decreases more markedly than cerebral metabolism & some suggests that propofol causes direct cerebral vasoconstriction. During propofol anaesthesia , cerebral vessels remain reactive to changes in PaCO2 & changes in cerebral perfusion pressure, but the responses are less.[5]

In general , volatile anaesthetic agents dilate the cerebral vessels.[6] Their overall effect on cerebral blood flow depends on the balance between this direct vasodilatation & the indirect effect of decreased metabolism & flow-metabolism coupling leading to vasoconstriction.

Although the effects of anaesthetics are related to the effects on cerebral blood flow, in fact cerebral blood volume is a critical factor affecting intracranial pressure & brain volume. In summary, Isoflurane is as suitable as propofol for neuroanaesthesia in a concentration below 1.5 MAC. However, the indication for some small direct vasodilatation in comparison to the direct vasoconstriction of propofol may offer savoflurane some potential advantages.[7]

Semi-synthetic opiates have in general, only minor or transitory effects on ICP & on cerebral hemodynamics. However, in patients with lesions such as head trauma or cerebral tumors, opiates can increase ICP during induction of anaesthesia or sedation in the intensive care unit [8], related to an increase in CBF. In a study Remifentanil was compared with fentanyl in a randomized, double-blinded, prospective trial, for elective supratentorial craniotomy for space occupying lesions [9]. Remifentanil was a reasonable alternative to fentanyl, with similar adverse events, hemodynamic profiles & median recovery times [10].

For years, controlled or induced hypotension has been the cornerstone of the anaesthetic management during cerebrovascular surgery. However, more and more data indicated that arterial hypotension could cause cerebral ischemia. Although the safe limits of arterial hypotension have never been determined, it seems advisable to maintain normotension during neurosurgical procedures to avoid controlled or induced hypotension, which could be detrimental. Reducing arterial CO_2-tension is one of the most efficient ways to decrease cerebral blood flow, and hence intracranial pressure. However,the cerebral vasoconstriction caused by hyperventilation may be so intense that the limits of cerebral ischemia can be reached. This was shown in severe head injury where prolonged hyperventilation increased the incidence of cerebral ischemia, the same may be true for neurosurgical anaesthesia. Therefore, end-tidal CO_2-tension should be monitored, as well as arterial CO_2-tension, to maintain normocapnia during neurosurgical procedures.

Improvement of OT environment, patient position & close monitoring of the patient both clinical & instrumental like :

- Continuous monitoring of ECG.
- BP monitoring every 5 mins or earlier.
- Monitoring of SPo_2.
- Monitoring of $ETCO_2$.
- Central Venous pressure (CVP) monitoring.[selected cases].
- IBP measurement [selected cases].
- Temperature monitoring.
- Availability of post-operative controlled ventilation.

In 1980 there was no monitors except clinical. In 1985 only pulse oximeter was introduced. After that all monitors were introduced day by day and presence of qualified anaesthesia personnel gives very good outcome.

But specialized monitoring device of CNS for measurement of adequacy of CBF, ICP, cerebral metabolism are even now not available in Bangladesh.

If we give a look to skilled manpower: In 1980 there was no Fellow (FCPS) in anaesthesia. The 1st FCPS in anaesthesia in Bangladesh passed in 1983, where as in 2004 the number of Fellows are 65. Other postgraduates like MD, Diploma (DA), member of BCPS (MCPS) all increased in the same ratio[statistics from BCPS].

CONCLUSION:

Meticulous use of all drugs, monitors as well as techniques of anaesthesia like hyperventilation, patients position, post-operative controlled ventilation and last of all skilled personnel are responsible for present position in case of neuroanaesthesia.

Introduction of monitoring device for measuring ICP, CBF, ABG & other neurological parameter. Specialized neuro ICU & neuro-postoperative care will give more effective & fruitful results.

REFERENCES:

1. A.R.Aitkenhead; Textbook of Anaesthesia; 3rd ed; Neurosurgical anaesthesia; page 603.

2. Morgan,Mikhali,Murray; clinical Anaesthesiology; 3rd ed; Neurophysiology and anaesthesia; page 552.

3. Gelb AW, Zhang C, Hamilton JT. Anaesth Analg 1996; 83: 472-6

4. Nakamura K, Hatano Y, Hirakata H et al . Br J Anaesth 1992; 68: 193-7

5. Fox J, Gelb AW, Enns J et al. Anaesthesiology; 1992; 77:453-6

6. Ornstein E, Young WL, Fleischer LH et al. Anaesthesiology; 1993; 79: 498-502

7. Cathy S. DE DEYNE ; Do new anaesthetic techniques make a difference to outcome? ; ESA Refresher Courses ; [file://C:\ Documents% 20and%20Settings\ Sakib\ My%20Documents \New% 20Folder\7rc.h...]

8. Albanese J, Durbec O, Viviand X et al. Anaesthesiology; 1993; 79: 493-7

9. Guy J, Hindman BJ, Baker KZ et al. Anaesthesiology; 1997; 86: 514-524

10. Balakrishnan G, Raudzens P, Samra S et al. Anaesth Analg 2000; 91: 163-9..

Journal of BSA, Vol. 18, No. 1 & 2, 2005

Original Article

USE OF ORAL BROMAZEPAM AS PREMEDICANT AND IT'S EFFECTS IN PERI-OPERATIVE PERIOD –A COMPARATIVE STUDY WITH ORAL DIAZEPAM

Md. Sirajul Islam[1], Debabrata Banik[2], AKM Akhtaruzzaman[3], Paresh Chandra Sarker[4], Kazi Mesbahuddin Igbal[5]

ABSTRACT :

Anaesthetic management begins with the pre operative psychological preparation of the patient and administration of a drug or drugs selected to produce specific pharmacological responses prior to the induction of anaesthesia. Preoperative medication should increase the likelihoods that patient will enter the preoperative period free from apprehension, sedated but easily arousable and fully co-operative[1]. A prospective randomized controlled trial was performed in adult patient of different surgical approach to see the effectiveness of bromazeparn as a premedicant and the haemodynarnic changes in patients at perioperative period. Ninety patients of ASA grade I and II, aged 20 to 50 years of both sexes undergoing different type of surgery under general anaesthesia of 30 to 150 minutes duration and were divided randomly into three groups. Control group (Group-C) has no medication preoperatively. Group-D were given oral diazepam 5 mg at night before the operation and 5 mg at morning on the day of operation and Group-B were given bromazeparn 3 mg at night before and 3 mg at morning on the day of operation. Observations were carried in during preoperative assessment on the day before surgery, in the anaesthetic room at morning, before induction and in postoperative ward (after extubation). Anxiety level was measured by Visual Analogue Scale (VAS), which was reduced significantly at morning on the day of operation, before induction and 24 hrs after operation in Group-B (p< 0.001). Pulse rate, blood pressure (systolic and diastolic) at different time in perioperative period (in Group-D and group Group-B) was stable in comparison to Group-C (p<0.001). Sedation score that was measured at morning on the day of operation before induction in different groups was seen and found that in Group-D, (36.66%) patients were drowsy but responds to verbal commands in comparison to Group-B (6.66%) (p<0.001). Recovery statuses were measured by Aldrete Recovery Score and have seen recovery scores was better in bromazepam taken group (73.33%) in comparison to diazepam taken group (56.66%). Postoperatively nausea was more in diazepam taken group (20.00%) than bromazepam taken group (16.16%). It was concluded that oral bromazepam at divided dose as a premedicant relief anxiety, and patients are haemodynamically stable in perioperative period with a well recovery.

INTRODUCTION:

Surgical patients have high incidence of anxiety and there is an inverse relationship between anxiety and smoothness of anaesthesia [2.] level of anxiety is associated with increased central and autonomic nervous system activity, psychological and physical symptoms[3]. There are many reason for preoperative anxiety; fear of the unknown or of postoperative nausea or pain; fear of the loss of control during anaesthesia; and fear based on previous experience or the experience of others of not being asleep during surgery[4]. There are many possible reasons for administering premedication, but the main one is to relieve fear and anxiety[6].

One major benefit of a preoperative assessment clinic may be to reduce patient anxiety. When we see a patient for the first time in the preoperative holding area, we may sense that the patient is anxious. The patient may have felt anxious from the time he learned that surgery was necessary and this feeling of anxiety may last up to several days after surgery[f]. Relief from anxiety is accomplished most effectively by non-pharmacological mean, which may be termed psychotherapy. In some patients, reassurance and explanation may be insufficient to allay anxiety.

1. Junior Consultant, Department of Anaesthesiology, Ibrahim Cardiac Hospital & Research Institute. Shahbag, Dhaka.
2. Associate Professor, Department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU, Shahbag, Dhaka
3. Associate Professor, Department of Anaesthesia, Analgesia and Intensive Care Medicine. BSMMU. Shahbag, Dhaka
4. Assistant Professor, Department of Anaesthesia, Analgesia and Intensive Care Medicine. SSMCH, Dhaka
5. Chairman, Department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU, Shahbag, Dhaka

In these patients, it is appropriate to offer anxiolytic medication[2].

Benzodiazepines are the most popular premedicants for pharmacological sedation and anxiolysis because of their minimal side effects. When medication is the treatment of choice to reduce anxiety, the benzodiazepine namely midazolam, diazepam, lorazepam, triazolam and temazepam are the drugs routinely used. Nevertheless, there is no single drug without any side effects. Most benzodiazepine has a sedating and as well as an anxiolytic action. Amnesia is another action of benzodiazepine thought to be advantageous. But some studies show that only a minority of patients would choose amnesic premedication[7]. Benzodiazepine produces anxiolysis in doses that do not produce excessive sedation, and this is advantageous if respiratory function is compromised[2].

Diazepam, which is available in tablet form and is a popular drug for reduction of pre operative anxiety, specially when patients can be treated earlier than one day before surgery. The distribution half-life of diazepam is 1 hour and excretion half-life is 32.9 ± 8.8 hours[8].

Bromazepam is a benzodiazepine used clinically for its anxiolytic effects and comparative studies on psychiatric patients have shown that it is superior in this respect to diazepam and lorazepam[9]. Its pharmacokinetic properties are consistent with rapid complete absorption from the gastrointestinal tract, peak level being attained in between 1- 4 hours. It is metabolically degraded and has a mean half-life of 11.9 hours. The metabolites are secreted as conjugated glucoronides and after 72 hours only 2.3% is detectable unchanged in the urine [10]. There is some evidence from studies that the degree of sedation produced by bromazepam is less than that produced by diazepam while the anxiolytic effect is greater[11]. The drug is completely absorbed after oral administration and is eliminated form the blood with a mean half-life of 12 to 20 hour as opposed to 20 to 100 hours for diazepam[11,12]. Bromazepam is a powerful psychotropic agent; in lower doses it selectively reduces tension and anxiety. In high doses, it has sedative and muscle relaxing properties.

Though bromazepam has been used for a long time as a psychotropic agent, to investigate the further relative potency we carried out a double blind, placebo-controlled study comparing it with diazepam as a premedicant to relieve anxiety in anaesthetic practice.

MATERIALS AND METHODS:

90(ninety) patients of ASA physical status I & II, age between 20 & 50 of both sexes undergoing different type of surgery under general anaesthesia were included in a double blind randomized study at the department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU, Dhaka. The approval of hospital ethical committee was duly taken before carrying out the study. The purpose of the study was clearly explained & informed written consent was taken from each patient. The patient's refusal to participate in the study, history of hypersensitivity to any benzodiazepine group of drugs, major psychological disturbances and low intelligence, patient with any renal or and hepatic impairment, debilitated patients, pregnancy, breast-feeding, uncontrolled hypertension, myasthenia gravis and chronic use of hypnotics or sedatives were excluded from the study. The patients were allocated randomly into three groups, thirty in each. Group-C (control group), patients in this group was not given any medication but the placebo, Group-B patients were given oral bromazepam 3mg at 10.00 PM before the day of operation and 3mg at 6.00 AM on the day of operation and Group-D subjects were given oral diazepam 5mg at 10.00 PM before the day of operation and diazepam 5mg at 6.00 AM on the day of operation.

Counseling was done about operation and the general anaesthesia. After demonstrating to all patients, we assessed anxiety level by visual analogue scale (VAS) (A 10 cm scale, left end of which denoted 'no anxiety' designated by '0' and the other end maximum anxiety designated by '10'). Pulse rate and arterial blood pressure was recorded as a base line parameter. Before going to operating theater at morning the patient was assessed for anxiety level and asked whether they had experienced nausea, vomiting or any others symptoms. Before venepuncture, pulse rate and arterial blood pressure (Systolic and Diastolic) were recorded.

The sedation levels were also evaluated by the anaesthetist just before the induction of anaesthesia and in the recovery room 30 and 60 minute after operation. Sedation was evaluated

on a score of 1- 4; 1= alert /active, 2= awake/calm, 3= drowsy but respond readily to verbal commands, 4= asleep. Anaesthesia was induced with fentanyl L 5-µgm/kg body weight and thiopental sodium 5 mg/kg and endotracheal intubations was done with suxamethonium I mg/kg. Anaesthesia was maintained with 70% $_{N20}$ in oxygen, fentanyl 0.05 µgm /kg every 30 minutes interval. All these were supplemental with halothane at the lowest possible concentration. Muscle relaxation was achieved with vecuronium (Norcuron) 0.05 mg/kg initially and 0.01 mg/kg subsequently if needed. Before and 10 minutes after intubations and throughout the operative period at 10 minute interval pulse and blood pressure were recorded. At the end of operation muscle relaxation was reversed with a mixture of neostiglnine 0.05 mg/kg and atropine 0.02 mg/kg and tracheal extubation were done. Total duration of surgery was noted. After extubation and finally in the postoperative ward in addition to the above parameter recovery status were measured by Aldrete recovery score [13]. Approximately 24 hours after the anaesthesia the last assessment was carried out in the ward. The patient was also asked whether he or she could recollect any events immediately to induction and whether had any awareness or dreams (pleasant or unpleasant) during the operation.

All statistical analysis was carried out using SPSS statistical analysis software. All results are expressed as mean ± SD or in frequencies as applicable. The results were compiled and analyzed statistically using two way and One-Way ANOVA and Chi-square test as appropriate. Results are considered significant if $p<0.05$. (Confidence interval; Cl- 95%)

RESULTS:

The groups were similar in age, weight, ASA grading & duration of surgery (Table -I). There were no significant differences between groups in anxiety level by VAS during preoperative assessment. VAS was significantly different in Group-C (p=0.002) and Group-B (p=0.000) with Group-D (p=0.29) at morning on the day of operation, before induction of anaesthesia and 24 hours after operation (Table-II).

Pulse rate during pre operative assessment at different groups were similar (Fig-1). Pulse rate rises before induction in Group-C & in Group-D but it reduces in Group-13 (Fig-1). There is significant change in pulse rate in between groups & within groups at different times after induction & after recovery.

During pre operative assessment the mean systolic & diastolic blood pressures at different groups were similar (Fig-2 & Fig-3)_ Systolic & diastolic blood pressures vary at different time. Before induction significant changes were observed in between the groups (Group-C, Group-D & Group-B). However within the groups at different after induction there was no [significant] changes in Group-B.

Sedation score that were measured on arrival in Operation Theater at morning (just before the induction of anaesthasia) in three different groups (Table-III). There was a significant change in sedation score in between the groups. Recovery score that were measured after extubation by Aldrete recovery score (minimwn score '0'& maximum score '10') (Appendix -1& Table-IV). It was seen that patient in Group-C & Group-B recovered well in comparison of group-D. Post operatively nausea, vomiting & increased secretion was observed (Table-V). Nausea was more in group-C (26.66%). Less vomiting was seen in group-B & group-D (6.66%).

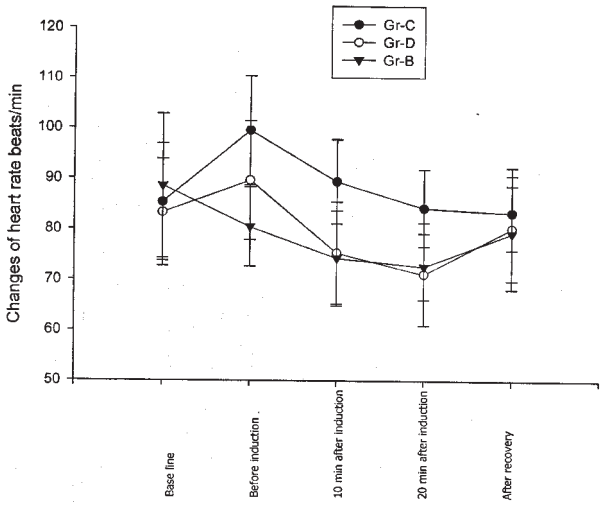

Fig.-1 : *Changes of heart rate (beat / min) in three studied groups*

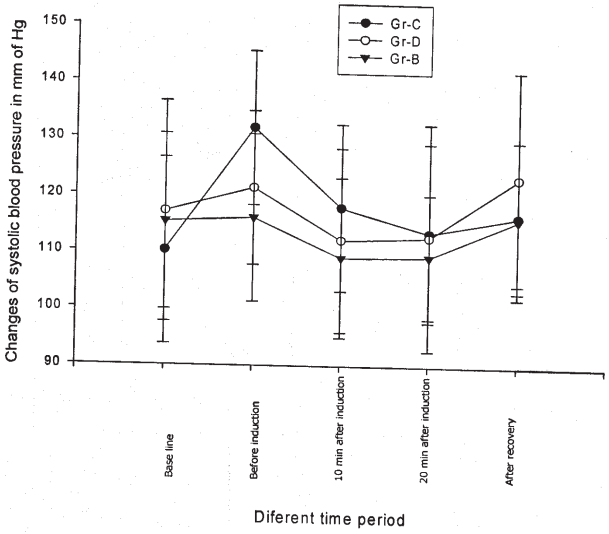

Fig.-2 : *Changes of systolic blood pressure in different time of three studied groups.*

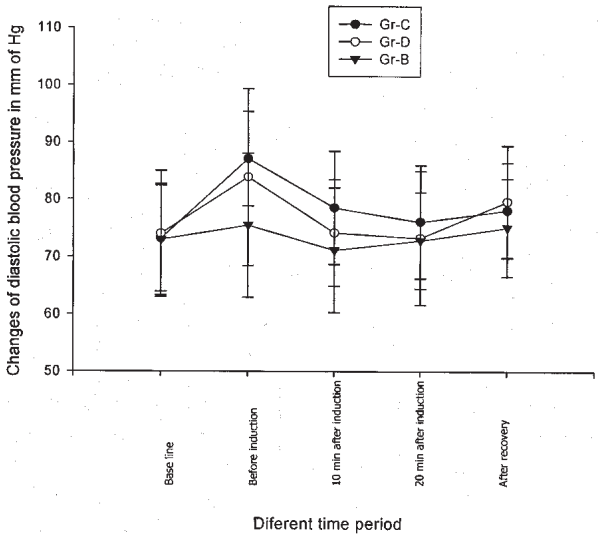

Fig.-3 : *Changes of diastolic blood pressure in different time of three studied groups.*

Table I

Characteristics of Subject

Group/variable	Group-C	Group-D	Group-B	pValue
	n	30	30	30
Age in years	42.43 + 9.14	41.93 ± 9.99	40.33 ± 13.22	0.740
Weight in kg	55.30 + 11.74	55.53 t 9.84	53.70 ± 10.47	0.770
Sex: Male	06(20%)	04(13.33%)	05 (16.70%)	0.560
Female	24(80%)	26(86.66%)	25 (83.30%)	
ASA: I	19(63.3%)	21(70%)	22(73.3%)	
ASA: II	11 (36.7%)	09(30%)	08(26.7%)	0.703
Operation Timein min	65.17 ± 11.17	66.50±15.48	67.00 f 14.47	0.869

Values are expressed as mean ± SD or as frequency. Within parenthesis are percentages over column total. Between groups analysis were done by ANOVA. Values are expressed as significant if $p<0.05$ (CL-95%).

Table-II

Anxiety Level by VAS in three different groups

Time	Group-C	Group-D	Group-B	p value
	n	30	30	30
During Pre-operativeassessment	7.93±1.34	7.83±1.72	8.00± 1.31	0.907
Morning on day of operation	8.67±1.52	6.77±2.11	5.43± 1.54	0.001
Before Induction	8.47±1.43	6.73±1.95	5.17± 1.05	0.001
24 hours afteroperation	7.30±1.49	6.43 ± 1.79	5.10 ± 1.15	0.001
P value	0.002	0.29	0.001	

Table III

Sedation Score in three different groups

Score	Group-C	Group-D	Group-B	x^2	pValue
	n	30	30	30	
1-2	30(100.00%)	19(63.33%)	28 (93.33%)		
3	0 (00.00%)	11(36.66%)	2 (6.66%)	25.06	0.001
4	0 (00.00%)	0(00.00%)	0 (00.00%)		

Values are expressed as frequency. Within parenthesis are percentages over column total. Between groups analysis were done by Chi-square test. Values are expressed as significant if $p<0.05$ (CL-95%).

Table IV

Recovery Score in three different groups

Score	Group-C	Group-D	Group-B	x^2	p
9-10	27(90.00%)	17(56.66%)	22(73.33%)	12.18	0.16
7-8	3 (9.99%)	12(40,00%)	8(26.66%)		
5-6	0(00.00%)	1(3,33%)	0(00.00%)		

Values are expressed as frequency. Within parenthesis are percentages over column total. Between groups analysis were done by Chi-square test. Values are expressed as significant if $p<0.05$ (CL-95%).

Table V

Side effects observed in three different groups

SideEffects	Group- C	Group- D	Group- B	x^2	Pvalue
	n	30	30	30	
Nausea	08(26.66%)	06(20.00%)	05(16.66%)	0.934	0.627
Vomiting	04(13.33%)	02(06.66%)	02(06.66%)	0.098	0.578
Increasedsecretion	20(66.66%)	16(53.33%)	13(43.33%)	3.315	0.191
Others	0(00.00%)	0(00.00%)	01(03.33%)	2.022	0.364

Values are expressed as frequency. Within parenthesis are percentages over column total.

APPENDIX I

Post anaesthetic Aldrete recover score

Original Criteria	Modified criteria	Point value
Color:	Oxygenation:	
Pink	$SP0_2$ > 92% on room air	2
Pale or dusky	$SP0_2$ > 90% on oxygen	1
Cyanotic	$SP0_2$ < 90% on oxygen	0
Respiration:		2
Can breath deeply & cough	Breath deeply & coughs freely	1
Shallow but adequate exchange	Dyspneic, shallow or limited breathing	0
Apnea or Obstruction	Apnea	
Circulation:		
Blood pressure within 20% of normal	BP±20 mm Hg of normal	2
Blood pressure within 20-50% of normal	BP± 20 -50 mm Hg of normal	1
Blood pressure deviating > 50% from normal.	BP more than ± 50mg Hg of normal	0
Consciousness:		
Awake, alert & oriented	Fully awake	2
Arousable but readily drift back to sleep	Arousable on calling	1
No response	Not responsive.	0
Activity:		
Moves all extremities	Same	2
Moves two extremities	Same	1
No movement	Same	0

DISCUSSION:

Anaesthetists have the opportunity to influence the course of their patient's anaesthetic with a preoperative visit and preoperative medications. Most common reason for administering premedication is to make the experience of anaesthesia and surgery more pleasant and less traumatic. Based on ones own clinical experience and favorite routine, an anaesthetist may order a sedative-hypnotic, narcotic analgesic, major tranquilizer or anticholinergic drug. Frequently a combination two or more compounds from different drug groups is prescribed. It is generally accepted that patient apprehension (or anxiety) is a major factor that should be controlled in the preoperative period.

There is limited study on Bromazepam as a premedicant in comparison with diazepam. Chalmers et al. 1984 studied on gynaecological operation giving diazepam 10 mg in one group and Bromazepam 9 mg in other group between 1.5 and 3 hours preoperatively[11]. No difference was demonstrated between the effectiveness of the two drugs. Our study differs from that regarding the doses and the timing of giving the drugs. We have used bromazepam 3 mg at night before and 3mg at morning on the day of operation and diazepam 5mg at night and 5 mg at morning on the day of operation.

Our study is based on the patient under going different type of surgery and to see the effectiveness of bromazepam as an anxiolytic when

used as premedicant. We used VAS to measure the anxiety status at different period. VAS was significantly changed in different group [in Group-D ($p=0.29$) and in Group-B ($p<0.001$) with Group-C(0.002)] at morning on the day of operation, before induction of anaesthesia and after 24 hours of operation.

These changes are similar to the study of Fontain et al 1983 though the measuring method was different[14] . Fontain et al studied on anxious patient with a primary diagnosis of generalized anxiety disorder with Bromazepam (18 mg/day), diazepam (15mg/day) or placebo. Bromazepam and diazepam was found to be significantly ($p<0.05$) superior to placebo with respect to somatic anxiety factor and total score of Hamilton Anxiety Rating Scale and the fear/ anxiety factor of patients' self-rating symptom scale[14].

In Hallett & Dean 1984 study on general practice to asses the benefit-risk ratio of the bromazepam, in a dose range of 3mg to 9mg daily in divided dose, was effective as and anxiolytic in 79% of the patients and that the acute benefit risk ratio is acceptable with respect to the class of drug and indication for which bromazepam is prescribed[15]. In study of Kerry et al. 1972, a comparison of bromazepam, diazepam and chlor diazepoxide, was found bromazepam was better than diazepam but difference failed to reach statistical significance[16]. Our study also shows a significant difference of effect as anxiolytic between the Bromazepam and diazepam.

Both systolic & diastolic blood pressures were not significantly changed in group-B. In Chalmers et al. 1984 study patients of the diazepam group and Bromazepam group, no significant cardiovascular effects have seen except in one patient who had Bromazepam, suffered from severe hypertension[11]. Our study results are similar to Chalmers et al. regarding no haemodynamic alteration.

In Chalmers et al. 1984 study patient were markedly sedated in diazepam group, whereas no patient of the bromazepam group was markedly sedated. They also showed that 55% of the diazepam group was slightly to moderately sedated and 80% of patient in bromazepam group were so. They concluded that there was no significant change in between the group regarding the sedative effect. In our study, we found 36.66% of patient in diazepam group were drowsy in comparison to bromazepam, which was 6.66%, and no patient in either group were markedly sedated[11]. This differs from Chalmers et al. Study because the dose administered in their study was 10 mg diazepam and 9 mg bromazepam between 1.5- 3 hour preoperatively. Where as in our study bromazepam 3mg and diazepam 5 mg given in divided dose one in night before surgery and another at morning preoperatively.

In the study of Fontain et al. 1983 at generalized anxiety disorder with bromazepam 18 mg/day and diazepam, 15mg/day was seen that 62.5% of the patient drowsy in comparison of the diazepam taken group (50%)[14] which differs from our study as we used bromazepam 3mg and diazepam 5 mg given in divided dose one in night before surgery and another at morning preoperatively. Comparative study done by Ponnudurai & Hardly 1986 between bromazepam and lorazepam as a premedicant, no significant difference in sedation score was found ($p>0.1$)[17]. However, in our Study bromazepam in comparison to diazepam was seen a highly significant change ($p<0.001$).

Recovery from general anaesthesia is a time of great physiological stress. It seeins reasonable to expect that the physical and mental state of the patient will be compromised maximally at which they have just regained consciousness after general anaesthetic. Measures that have been used to assess the patients' state during this immediate recovery period have tented to focus predominantly on physiological or vestibular motor functioning[18].

In general term many of the ways of assessing immediate recovery from anaesthesia appear to show that patient generally make a speedy return to normal functioning depends upon the type of anaesthetic agent used, the duration of surgery, the other intraoperative procedure and variation in premedication[18].

In our study recovery status of patients were measured by Aldrete & Kroulik recovery score". We found in Group- C, twenty-seven (90.00%) patient has a recovery score from 9-10 in comparison to Group-D where it was seventeen (56.66%). In Group-B recovery score of 9-10 was twenty two (73.33%). From this study, it was seen that patient in Group-C and Group-B recovered well in comparison of Group-D. It means that diazepam affect the recovery probably due to it is prolonging half-life.

Postoperatively nausea, vomiting, and increased secretion are observed in some of the patients. Nausea was more in the Group-C, which were eight (26.66%) in comparison to Group-D which was six (20.00%) and Group-B that was five (16.16%). Four patients in the Group-C were vomited after recovery in postoperative room. Less vomiting was seen in Group-B and Group-D, which were two (6.66%). In a comparative study of bromazepam and lorazepam done by Ponnudurai and Hardly it was seen that there were no difference in incidence of nausea, and amnesia although there was less vomiting in the bromazepam group[17]. In Chalmers et al. study one patient (5%) complained of nausea in each group. They studied on forty patient, twenty of each group by giving diazepam 10 mg and bromazepam 9 mg preoperatively at morning on the day of operation[11]. But in our study we found 16.16% of bromazepam group complained about nausea and two (0.66%) patient vomited in post operative room in comparison to control group which was four (13.33%).

These types of side effect are commonly seen in patients undergoing surgery under general anaesthesia. These may be due to the drugs used preoperatively or due to the patient's factor. There were no adverse cardio respiratory reaction nor did we observe any untoward behavioral effects.

CONCLUSION:

From the present study, it is concluded that oral bromazepam at divided doses as a premedicant relief anxiety, and patients are haemodynamically stable in perioperative period than the oral diazepam. Patients those have taken bromazepam recovered well and were less drowsy.

REFERENCES:

1. Stoelting RK., Miller R.D. Psychological preparation & preoperative medication. In: Basics of anaesthesia,: Churchill Living Stone, New York, 1984; 381-397.
2. Baxendale B., Smith G. Preoperative assessment and premeditation. In: Aikenhead AR., Robotham DJ., Smith G., eds. A textbook of anaesthesia .Churchill Livingstone. 2001; 417-428.
3. Hargrove R.L. Awareness: a medico legal problem. In: Rossen M., Lunn JN., eds. Conscious awareness & pain in general anaesthesia. London.] 978; 149-154.
4. McCleane G J., Cooper R., Forum. The nature of pre operative anxiety .Anaesthesia 1990; 45: 153-5.
5. Penttila HJ., Nuutinen L S., Kiviluoma K T., Partanen AM. Sublingual triazolam versus peroral diazepam as a premeditation for general anaesthesia. Canadian journal of anaesthesiology 1995; 42: 862-8.
6. Johnston M. Anxiety in surgical patients. Psychol Med 1980; 10: 145.
7. Kortilla K., Aromaa U., Tammisto T. Patient's expectation and acceptance of the effects of the drugs given before anaesthesia: comparison of light and amnesic premeditation. Acta Anaesthesiol Stand 1981; 25: 381-6.
8. Klotz U., Antonin KH., Bieck PR. Pharmacokinetics and plasma binding of diazepam in man, dog, rabbit, guinea pig and rat. J Pharmacol Exp Ther 1976; 199: 67.
9. Draper R. Clinical experiences with RO 5-3350 (Bromazepam) Journal of international medical research, 1975; 3: 214-22.
10. Kaplan SA., Jack ML., Weinfeld RE., Glover W., Weissman L., Cotler S. Biopharmaceutical & clinical pharmacokinetic profile of Bromazepam. Journal of pharmacokinetic & Biopharmaceutics 1976; 4: 1-16

11. Chalmers P., Norton JN. Oral Bromazepam in premeditation. A comparisn with diazepam. Anaesthesia 1984; 139: 370-2.

12. Greenblatt DJ., Allen MD., Harmatz JS., Shader RI. Diazepam disposition determinates. Clim pharmacol Ther 1980; 27: 301-12.

13. Aldrete JA., Kronlik D. A post anaesthetic recovery score. Anathesia Anag. 1970;49:924 & Aldrete JA., The post anaesthetic recovery score revisited, J Clin. Anathe. 1995; 7: 89.

14. Fontain, R., Annable, L., Chouinard, G. & Ogilvie, R.I. Bromazepam and diazepam in generalized anxiety: A placebo controlled study with measurement of drug plasma concentration. Journal of Clinical Psych opharmacology 1983; 1: 180-7.

15. Hallett C., Dean BC. Acute benefit risk-assessment in general practice. Curr Med Res Opin. 1984; 8 (10): 683-8.

16. Kerry R J., Jenner FA., Pearson IB. A Double blind cross over comparison of Ro 5-3350 bromazepam, diazepam & chlordiazepoxide in the Treatment of Neurotic Anxiety Psychosomatic 1972; 13: 122.

17. Ponnudurai R., Hardley J. Bromazepam as oral premedication: A comparison with lorazepam. Anaesthesia 1986; 41:.541-3.

18. Herbert M. Recovery from anaesthesia: Assessment and management. In: Healy TEJ., Cohen PJ., eds. A practice of anaesthesia. Edward Earnold. England 1995; 851-63.

Journal of BSA, Vol. 18, No. 1 & 2, 2005

Original Article

STUDY OF HAEMODYNAMIC STATUS AFTER ANTICHOLINERGIC PREMEDICATION DURING ELECTROCONVULSIVE THERAPY - A COMPARATIVE STUDY BETWEEN ATROPINE AND GLYCOPYROLATE.

Md. Shahjahan[1], Md. Shahidul Islam[2], AKM Aktharuzzaman[3], K. M. Iqbal[4]

ABSTRACT

Electroconvulsive therapy (ECT) is a highly successful treatment for severe depression and some other psychiatric disorder. 70%-80% patients respond to pharmacological therapy and at least 50% who do not respond to antidepressants do respond favourably to ECT. ECT is quicker, safer and more effective and has fewer side effects than drug therapy. ECT needs general anaesthesia; therefore interactions between psychotropic drugs, ECT and anaesthetic agents can occur. ECT is often associated with acute hyperdynamic response. CNS stimulants on the other hand may prolong seizure, also dysrrhythmias and elevate haemodynamic responses. Initial vagal responses immediately after application of current may lead to bradycardia and salivation, which may cause laryngospasm, bronchospasm and airway obstruction. There may be even asystole and hypoxic episodes. To prevent possible asystole, bradycardia and airway obstruction during ECT, atropine as premedication can be considered.

Atropine premedications produces anticholinergic mediated tachycardia, which is in addition to intense sympathetic response after ECT stimulus that contributes to greater myocardial workload. On the other hand, glycopyrolate is a long acting muscarinic antagonist five to six times as potent as atropine. It does not cross blood brain barrier, placenta and eye. It controls secretions with doses that don't cause marked changes in heart rate. Its effect on blood pressure is less than atropine. Atropine crosses blood brain barrier and thus affecting CNS. Our present study was performed to compare haemodynamic status after anticholinergic premedication with atropine and glycopyrolate during ECT. This study was randomized, prospective study. 90 patients for ECT, age 15-50 years, ASA grading I&II, and receiving antipsychotic therapy with major depressive illness were randomly selected by blind envelop method and divided into three groups of 30 patients each. Group-I received atropine, group-II received glycopyrolate and group-III received no premedication. Results of the study showed that anticholinergic premedication is not essential for safe and effective ECT therapy, if at all needed glycopyrolate is the therapy of choice.

Key words: *ECT; Atropine premedication; glycopyrolate*

INTRODUCTION

Electroconvulsive therapy is an effective treatment for severe depression and different psychiatric disorder. ECT is performed under general anaesthesia; therefore interaction may occur between psychotropic drugs, ECT and anaesthetic agents utilised.

ECT is usually associated with hyperdynamic responses eg. tachycardia, hypertension and dysrrhythmia. CNS stimulation may also prolong seizure. Initial vagal discharge just after ECT application may lead to bradycardia and increased salivation, which may cause laryngospasm, bronchospasm and airway obstruction. Even asystole and hypoxic episodes may occur. To prevent possible asystole, bradycardia and airway obstruction during ECT, atropine premedication may be considered[1]. Routine atropine premedication during ECT has been recommended[2], who claimed that the risk benefit

1. Consultant, Anaesthesiologist, Dept. of Anaesthesiology, CMCH, Chittagong
2. Jr. Consultant, Burn Unit, DMCH
3. Associate Professor, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU, Dhaka
4. Professor & Chairman, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU, Dhaka

analysis favours the use of anticholinergic. Though a report by the Royal College of psychiatrists recommended avoiding atropine premedications during ECT[3].

Cardiovascular changes occur consistently during ECT. Acute rises, albeit transient, occur in heart rate and arterial pressure and hence rate, pressure product (RPP), an index of myocardial O---$_2$ consumption. During modified ECT, a reduction in arterial O_2 saturation can occur even after adequate ventilation. An increase in RPP during ECT can create an imbalance between myocardial O_2 supply and demand. Treatment variables, such as ECT laterality (bilateral vs. unilateral) and anaesthetic agents (thiopental vs. methohexital) do not differentially reduce heart rate or arterial pressure after ECT[4]. Stimulus laterality may not offer a means of controlling cardiovascular responses during ECT. Other strategies aimed at reduction of heart rate and arterial pressure include pretreatment with nifidipine, labetalol or esmolol. Although these methods are effective in attenuation of the cardiovascular response, they are usually reserve for patient with compromised cardiac function.

Atropine premedication produces anticholinergic mediated tachycardia. This effect in addition to intense sympathetic response after ECT stimulus can potentially contribute to greater myocardial workload.

On the other hand, glycopyrolate is a long acting muscarinic antagonist 5 to 6 times as potent as atropine. As it is positively charged quaternary amine it does not cross blood brain barrier (BBB), placenta and eye. It is possible to control secretions with doses that don't cause marked changes in heart rate. It has less effect on blood pressure. Atropine tertiary amine are neutrally charged and can cross blood brain barrier, thus affect CNS.

There are reports that atropine could compromise cardiac stability[5] and for this reason current 'guidelines from Royal college of psychiatry recommend avoiding atropine during ECT[6].

In Bangladesh, some institutes use atropine premedication and some institutes (e.g. BSMMU) don't at all during ECT. No comparative study between two groups has been undertaken in our country. So, present study has been undertaken to compare haemodynamic effects of anticholinergic premedication.

MATERIALS AND METHODS

Approval of the ethical clearance committee of BSMMU was duly undertaken before carrying out the study. The clinical study on haemodynamic changes with premedication on ECT a comparison between atropine, glycopyrolate and control group was carried out in the department of Anaesthesia, Analgesia and Intensive Care Medicine collaboration with department of Psychiatry, BSMMU, Dhaka. Study comprised of 90 patients requiring ECT. They were recruited and grouped randomly over 90 patients, 30 patients in each group. The purpose of the study were clearly explained to each of the subject's legal guardian and recruited only after they had given written consent.

Selected patients were either sexes, between 15-50 years and ASA grading II & I. Those who were below 15 & above 50, raised ICP, with ICSOL, IHD, recent stroke, bone fracture, pregnancy, ASA grade III, IV and V and recent ingestion of food were excluded. Patients were divided into three groups, 30 in each group. Group-I- atropine premedication, group-II- glycopyrolate premedication and group-III- without premedication. All the above groups received TPS 2mg/kg, suxamethonium 0.5mg/kg and IPPV (Intermittent positive pressure ventilation) with 100% O_2.

METHODS:

After recruitment patients were randomly divided into three groups. Randomization was done using card sampling. According to card numbers, patients were grouped I, II and III. Group-I received atropine, group-II received glycopyrolate and group-III received no premedication, through an IV canula in the cephalic vein of forearm. Patients were assessed the day before ECT for G/A fitness. Patient was nil by mouth and no premedication was given the night before ECT. Anaesthesia was induced with thiopental 2mg/kg and suxamethonium 0.5mg/kg. Intermittent positive pressure ventilation with 100% O_2 using mask from Bain circuit was maintained from cessation of respiration until action of suxamethonium was dissipated as evidenced by disappearance of twitching. Cardiovascular monitoring (systolic and

diastolic blood pressure) was performed using automated cardiac monitor (Datex-Ohmeda) and heart rate by ECG lead II, and SPO_2 was continually displayed by using SPO_2 probe.

ECT was administered using a constant current bi-directional brief pulse. After seizure was over intermittent positive pressure ventilation with 100% O_2 was provided until resumption of spontaneous and regular breathing. The product of heart rate and corresponding systolic blood pressure regarded as RPP (Rate Pressure Product) was calculated. Cardiovascular recording was made before anaesthesia (just before administration of premedication), before stimulus application (45 second after injecting the premedication and just before stimulus application) and five times at 1 min. interval after the stimulus. Hypotension was defined as a systolic blood pressure less than 100 mmHg and less than 80% of base line blood pressure. Treatment option was kept for hypotension associated with bradycardia with rapid infusion of Ringer's lactate and atropine (0.3-0.6 mg IV). Treatment option was also kept for atropine induced tachycardia with small dose of thiopental (100 mg) or diazepam (0.1 mg/kg) may be given slowly to control convulsion. In study parameter A) Efficacy parameter were- pulse rate, non-invasive arterial pressure (systolic and diastolic), SPO_2 by pulse oximeter and ECG lead II tracing. B) Safety parameter – dysrrhythmias-bradycardia, tachycardia, ventricular ectopics and asystole, nausea, vomiting and salivation.

STATISTICAL ANALYSIS

Data were expressed as mean ± standard deviation. Data were analysed statistically using ANOVA, chi-square, and student's t test as appropriate with the help of SPSS version 6.0. P value less than 0.05 were considered significant.

OBSERVATIONS AND RESULTS

Demographic data (Table-I)

Observations of the present study were analysed in the light of comparison among groups. All results were expressed as mean ±SD. The studied groups became statistically matched for baseline for pulse (beat/min.) (p=0.33), baseline systolic blood pressure in mmHg (p=0.3), baseline diastolic blood pressure in mmHg (p=0.63) and baseline SPO_2.

HAEMODYNAMIC CHANGES:

1. Changes in pulse rate (beat/min.): (Fig.1 & 2)

Pulse rate was significantly higher in group-I during premedication (107±8beats/min) compared with group-II (91±10beats/min) and group-III (88±9beats/min) showing ($p<0.05$).

Pulse rate was significantly higher in group-I during induction (105±8beats/min) as compared with group-II (93±10beats/min) and group-III (91±11 beats/min) showing ($p<0.05$).

Pulse rate was significantly higher in group-I at three minute (91±9beats/min) compared with group-II (82±7 beats/min) and group-III (84±12 beats/min) showing ($p<0.05$).

Pulse rate was found significant at 4 minute (p=0.001) and 5 minute (p=0.001).

Table I

Characteristics of subjects

Variables	Group-I n=30	Group-II n=30	Group-III n=30	t-value	p-value
Age in year	34.75±4.90	334.45±5.66	34.40±5.68	0.215	0.837
Weight in Kg	62.95±6.09	63.88±9.48	64.83±9.45	0.455	0.628
Height in cm	155.42±3.42	155.20±4.68	156.20±4.88	0.729	0.468

Values were expressed as mean ± SD. Between groups analysis were done by ANOVA, values were expressed as significant df $P< 0.05$ (CI - 95%). * Indicate significant

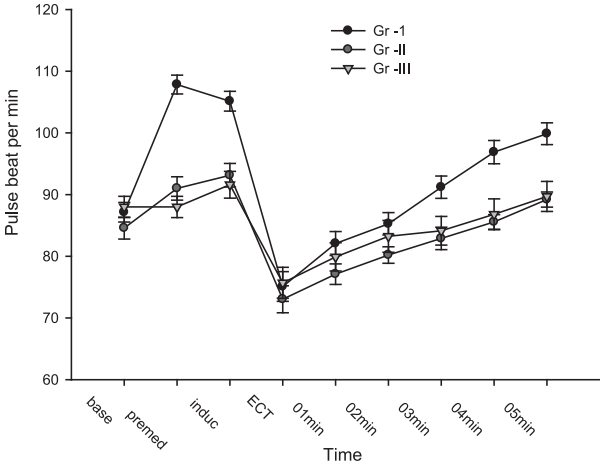

Fig.-1 : *Changes in Pulse Rate in different times.*

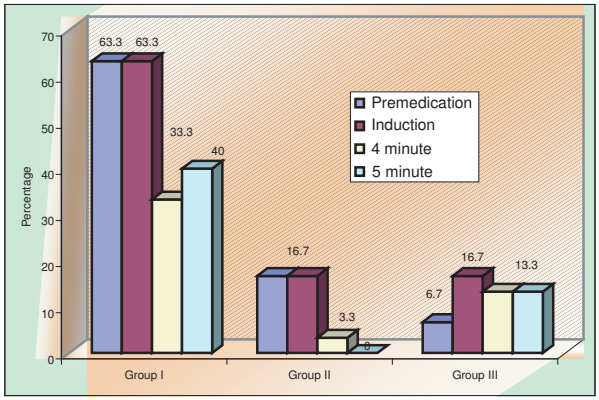

Fig 2: *Bar diagram showing the Tachycardia during different times among the three studied groups*

Incidence of tachycardia was found as follows- highest percentage (63.3%) of tachycardia occurred during premedication in group-I, followed by (16.7%) in group-II and only 6.7% in group-III. Difference was statistically significant ($p<0.05$) between group-I vs. group-II and the difference between group-I and group-III was also significant statistically during premedication. Similar statistically significant difference was found at induction and at 5 minute.

2. Changes in systolic blood pressure (mmHg)

The systolic blood pressure was significantly higher at premedication in Group-I (124 ± 19mmHg) as compared with group-II (111 ± 14 mmHg) and group-III (107 ± 9 mmHg) showing ($P<0.05$).

The systolic blood pressure was significantly higher at induction in Group-I (123 ± 18 mmHg) as compared with Group-II (114 ± 12 mmHg) and Group-III (116 ± 12 mmHg) showing ($P<0.05$).

The systolic blood pressure was significantly higher at 3 minute in Group-I (116 ± 13 mmHg) as compared with Group-II (108 ± 9 mmHg) and Group-III (110 ± 11 mmHg) showing ($P<0.05$).

Systolic blood pressure was also significantly higher at 4 min and 5 min in Group-I as compared with Group-II and Group-III as shown in Table-II.

Table II

Changes in Systolic blood pressure in different groups

Parameters	Group-I	Group-II	Group-III	F	P Value
Base line systolic blood pressure	109.67 ± 16.24	104.33 ± 13.11	107.33 ± 9.80	1.209	0.303
Systolic blood pressure in premedication	124.33 ± 19.73	111.50 ± 14.03	107.33 ± 9.80	10.358	0.001*
Systolic blood pressure at induction	123.33 ± 18.54	114.50 ± 12.96	116.17 ± 12.01	3.223	0.053
Systolic blood pressure during ECT	98.50 ± 13.46	93.63 ± 6.81	100.33 ± 13.64	2.607	0.079
Systolic blood pressure in 01 minute	107.17 ± 12.01	100.93 ± 9.96	105.17 ± 12.42	2.291	0.107
Systolic blood pressure in 02 minute	113.33 ± 12.62	104.00 ± 8.03	106.83 ± 12.56	5.403	0.006*
Systolic blood pressure in 03 minute	116.83 ± 13.29	108.83 ± 9.62	110.50 ± 11.99	3.882	0.024*
Systolic blood pressure in 04 minute	120.83 ± 13.84	111.90± 10.12	113.50 ± 11.15	4.881	0.009*
Systolic blood pressure in 05 minute	124.00 ± 13.98	114.33 ± 10.41	113.83 ± 11.04	6.941	0.001*

Values were expressed as mean ± SD. Between groups, analysis were done by ANOVA, values were expressed as significant df $P< 0.05$ (CI - 95%). * Indicate significant

Table III

Changes in diastolic blood pressure in mmHg in different groups.

Parameters	Group-I	Group-II	Group-III	F	P value
base line diastolic blood pressure	72.17 ± 10.80	70.77 ± 8.24	70.00 ± 7.19	0.459	0.633
diastolic blood pressure in premedication	86.00 ± 12.35	76.17 ± 9.16	70.00 ± 7.19	20.344	0.001*
diastolic blood pressure at induction	88.50 ± 12.47	79.33 ± 9.63	74.50 ± 8.02	14.504	0.001*
diastolic blood pressure during ECT	70.83 ± 12.67	67.33 ± 12.51	69.17 ± 11.75	0.606	0.547
diastolic blood pressure in 01 minute	76.33 ± 11.59	69.67 ± 8.09	74.03 ± 11.54	3.099	0.050
diastolic blood pressure in 02 minute	80.33 ± 9.46	73.13 ± 6.27	75.83 ± 10.91	4.801	0.011*
diastolic blood pressure in 03 minute	82.63 ± 8.37	74.63 ± 6.56	75.00 ± 5.72	12.587	0.001*
diastolic blood pressure in 04 minute	84.33 ± 7.96	76.17 ± 6.91	76.67 ± 5.47	13.379	0.001*
diastolic blood pressure in 05 minute	85.67 ± 7.28	78.33 ± 6.86	77.50 ± 5.53	13.903	0.00*

Values were expressed as mean ± SD. Between groups analysis were done by ANOVA, values were expressed as significant if P< 0.05 (CI - 95%). * Indicate significant

3.Changes in diastolic blood pressure (mmHg)

The diastolic blood pressure was significantly higher at premedication in group-I (86 ± 12 mmHg) as compared with Group-II (76 ± 9 mmHg) and Group-III (70 ± 7 mmHg) showing (P<0.05).

Diastolic blood pressure was significantly higher at induction in Group-I (88 ± 12 mmHg) compared with Group-II (79 ± 9 mmHg) and Group-III (74 ± 8 mmHg) showing (P<0.05).

Diastolic blood pressure was significantly higher at 3 minutes in Group-I (82 ± 8 mmHg) as compared with Group-II (74 ± 6 mmHg) and Group-III (75 ± 5 mmHg) showing (P<0.05).

Diastolic blood pressure was also found significantly higher at 4 min and 5 min as shown in Table III.

4. Rate pressure Product (RPP)

The base line mean ± SD value of RPP was 9485 ± 176 in Group-I, 8748 ±213 in Group-II and 9416 ± 165 in Group- III (P=0.214). There was no significant difference between the groups.

The mean ± SD value of RPP immediately after premedication was 13376 ± 132, 10104 ± 312 and 9424 ± 265 in Group-I, Group-II and Group-III respectively (P<0.05). They showed marked difference between the 3 groups.

The mean ± SD of RPP at induction were 12987 ± 265 in Group-I, 10623 ± 241 in Group-II and 9764 ± 134 in Group-III respectively were significant (P<0.05).

The mean ± SD of RPP at post ECT 2 minute, 3 minute, 4 minute and 5 minutes are significant and P<0.05 as shown in Figure-6.

5. SPO_2 changes are shown in Table-IV

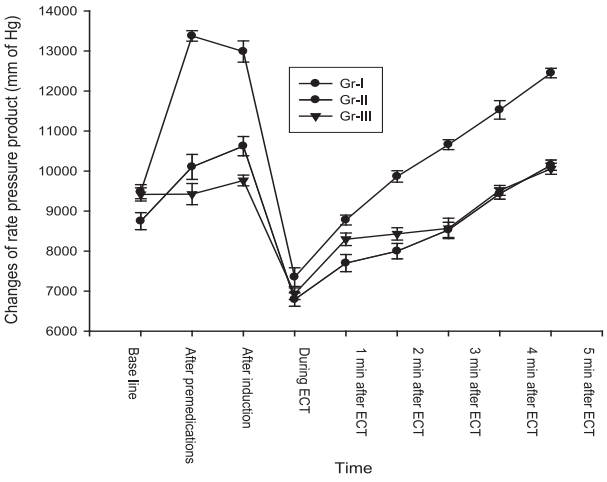

Fig.-3: *Effect of electroconvulsive therapy (ECT) on the product of heart rate and systolic arterial pressure (RPP) in patients who received atropine (Group-I), Glycopyrrolate (Group-II) and Control (Group-III) those who did not.*

Table IV

Changes in SPO_2 in different groups

Parameters	Group-I	Group-II	Group-III	F	P Value
Base line SPO_2	95.77 ± 1.19	96.20 ± 1.03	95.90 ± 1.06	1.226	0.298
SPO_2 in premedication	97.30 ± 0.84	97.67 ± 0.76	95.90 ± 1.06	32.566	0.001*
SPO_2 at induction	96.70 ± 2.02	97.60 ± 0.81	97.10 ± 0.80	3.397	0.037*
SPO_2 during ECT	96.37 ± 1.75	93.13 ± 2.11	93.00 ± 2.12	27.224	0.001*
SPO_2 in 01 minute	96.10 ± 1.32	96.13 ± 1.43	95.97 ± 1.27	0.129	0.878
SPO_2 in 02 minute	97.40 ± 0.93	97.60 ± 0.77	97.60 ± 0.86	0.547	0.580
SPO_2 in 03 minute	98.20 ± 0.61	98.37 ± 0.49	98.27 ± 0.58	0.664	0.517
SPO_2 in 04 minute	98.67 ± 0.55	98.87 ± 0.57	98.77 ± 0.43	1.110	0.333
SPO_2 in 05 minute	99.13 ± 0.68	99.17 ± 0.53	99.20 ± 0.48	0.101	0.903

Values were expressed as mean ± SD. Between groups, analysis were done by ANOVA, values were expressed as significant is P< 0.05 (CI - 95%). * Indicate significant

Table V

Perioperative complications in three studied groups.

	Group I (n=30)		Group II (n=30)		Group III (n=30)		Total (n=90)		c^2	P
Complications	n	%	n	%	N	%	n	%		
Nausea	3	10.0	1	3.3	0	0.0	4	4.4	3.662	1.160
Vomiting	2	6.7	1	3.3	0	0.0	3	3.3	2.068	0.355
Salivation	0	0.0	0	0.0	2	6.7	2	2.2	4.090	0.129
Bradycardia	0	0.0	0	0.0	2	6.7	2	2.2	2.022	0.363

Values were expressed as frequency with percentage over column total. Data were analysed by Pearson chi-square test. Values were expressed as significant if p (<0.05(CI – 95%).

Intra operative complications like nausea, vomiting, salivation, bradycardia, ectopic beat and asystole were observed in three groups. Bradycardia and salivation was not observed in-group I and II. Nausea and vomiting was not observed in group III. Ectopic beat, ST-change and asystole were not found in all groups. 4(4.4%) had nausea, 3(3.3%) had vomiting, 2(2.2%) salivation and 2(2.2%) had bradycardia of the three groups. No statistical significant (p>0.05) difference was found in the three study groups (Table-V).

No treatment was required for bradycardia in-group III as BP and SPO_2 was normal.

Vomiting and salivation were managed with suction, O_2 inhalation and lateral position of the patients and no other measure were needed as airway and SPO_2 was normal.

DISCUSSION

The mortality associated with ECT is low, it has been given variously as 1:10,000[7] or 5:70,000treatments[8] as 0.0036 percent[9]. Many of the reported deaths have occurred not during the convulsion itself but some times as late as 20 minutes after completion of the procedure[10].

No specific information about cause of death has been known. All that is known is that some fatalities have been shown as having been due to myocardial infarction[11]. It has been postulated that this may have been the result of increased cardiac work during shock with damage occurring perhaps slowly after rather than during convulsion[12]. Pretreatment anxiety may have been responsible for some deaths[13]. Cause of late death in literature mentioned fat embolism, a rupture duodenum, hemorrhage in the internal capsule and into thyroid as well as multiple fractures with pulmonary oedema[14]. It is doubtful whether any of these causes of death can be influenced by atropine in one way or the other.

Wide variety of studies had shown that there were a wide variety of attitudes towards premedication with atropine. There were those who give no atropine, either because it was not required in their estimation[15], while others considered it essential [16]. There were studies that complete atropinization with 1.5 to 2.0 mg IV [17]. Administration of atropine 0.4 to 6.5 mg even subcutaneously is quite common[18].

The side effects of anticholinergics manifest principally in the cardiovascular and central nervous system. During ECT initial vagal discharges may lead to bradycardia with decreased systolic blood pressure followed by sympathetic nervous stimulation and an increased heart rate and systemic blood pressure. These changes are undesirable if the patient has ischaemic heart disease. Patient receiving antipsychotics have adrenergic effect and hence tachycardia. Patient receiving further anticholinergic have additive sympathetic activity, which is undesirable. The most common cause of death due to ECT is myocardial infarction and cardiac dysrrhythmia.

Atropine has recently been shown to relax the lower esophageal sphincter, a some what unaccepted finding[19], and thus its omission may indeed be beneficial in the results of presence of the combination of succinylecholine and muscle contractions from electric shock.

CONCLUSION

Under the condition of present study it was concluded that anticholinergic premedication is not essential for safe and effective electroconvulsive therapy, if at all needed, glycopyrrolate is the drug of choice.

REFERENCES

1. Tang, W.K., and Ungvari, G.S., (2001), Asystoe during electroconvulsive therapy, a case report, *Aust-N-Z-J-Psychiatry*, 35 (3): 382-385.
2. Abrams, R., (1997), Electroconvulsive therapy in the high risk patient, *Electroconvulsive therapy*, New York, Oxford University press, 81-113.
3. Mayur, P.M, Shree, R.S, Gangadhar, B.N, Subbakrishna, D.K, Janakiramaiah, N. and Rao, G.S.U (1998). Atropine premedication and the cardiovascular response to electro-convulsive therapy. *British Journal of Anaesthesia*; 81:466-467.
4. Prudic, J., Sakeim, H.A., Decina, P., Hopkins, N., Foss, F.R., Malitz, S., (1987), Acute effects of ECT on cardiovascular functioning: relation to patient and treatment variables, *Acta Psychiatrica scandinavica*, 75: 344-351.
5. Kramer, B.A., Allen, R.E., Freidman, B., (1986), Atropine and glycopyrrolate as ECT Preanaesthesia, *Journal for clinical Psychiatry,* 47: 199-200.
6. Gaskell, (1995), Royal College of Psychiatrist. *The ECT handbook* (Council report CR 39). London.
7. Hussar, A.E., Pachter, M., (1968), Myocardial infarction and fatal coronary insufficiency during electroconvulsive treatment, *JAMA*, 204: 1004.
8. Alexander, S.P., Lawrence, N.G., Lewis, W.H., (1956) Deaths following electrotherapy, *JAMA,* 161: 577.
9. Barker, J.C., Baker, A.A., (1959) Death associated with electroplex'. *J Ment sciences*, 105: 339.
10. Crowley, P.J., (1958), Cardiac arrest following electroplexy. *Lancet*, 1: 376
11. McKnight, W.K., Burbridge. R, Guth, P., (1954), Electroconvulsive therapy in the presence of physical defects, *J Nerv Ment Dis,* 119: 478.
12. Altschule, M.D., Tillotson, K.J., (1948), Mechanisms underlying pulmonary and cardiac complications of electrically induced convulsions, N *Eng J Med*, 238: 113.
13. Barton, J.L., (1974), Death after E.C.T, *Br Med J*, 3: 409.
14. MacLay, W.S., (1974), Death due to treatment, *Proc R Soc Me,(1953)*, 46: 13.
15. Karlinger, W., (1965), Accidental convulsion induced by atropine, *Am J Psychiatry*, 122: 578.
16. Weinstein, M.R., Fischer, A., (1967), Electroconvulsive treatment of a patient with artificial mitral and aortic valves', *Am J Psychiatry,* 123: 882.
17. Barton, J.L., (1972), Death after E.C.T, *Br J Psychiatry,* 120: 355.
18. Rich, C.L., Pitts, E.N. jr., (1972), Fatal heart block with cardiac arrest following E.C.T, Br *J Psychiatry,* 121: 117.
19. Brock-Utne, J.G., Rubin, J. M.C., Aravey, R., et al. (1977), The effect of hyoscine and atropine on the lower esophageal sphincter, *Anaesth Intens*, 5: 223.

Original Article

RECOVERY STATUS IN CHILDREN AFTER GENERAL ANAESTHESIA: ROLE OF PRE-EMPTIVE LOCAL ANAESTHETIC INFILTRATION

Md. Maqsud lsa[1], Rubina Yasmin[2], Nur Syeeda[3], Suraiya Enam[4]. Md. Manowarul lsiam[5]. K.M. Iqbal[6]

ABSTRACT

This prospective clinical study was carried out in the dept. of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU. Dhaka during the period of January 04 to September 04. The study was done to emphasize the importance of giving analgesics preemptively instead of waiting for the child to complain or express their pain and to improve post operative recovery status and associated response by reducing the immediate post operative pain with simple local anaesthetic infiltration. The children scheduled for elective herniotomy operation through a hernial incision under general anaesthesia were recruited in this study. Immediate recovery status in children was compared with preemptive (group-1 and without preemptive (group-II) local infiltration of 0.25% bupivacaine in herniotomy operation. No. of patients was 20 in each group. Pulse, systolic, diastolic and mean pressure, oxygen saturation, pain (scored by TPPPS), anaesthetic recovery (scored by steward recovery system) and mental status if the children were observed postoperatively at different time interval up to one hour.

Pulse, systolic, diastolic, mean pressure were stable in group-1 then group-II. Oxygen saturation in both the groups were in clinically acceptable range but in group-11 5 mins after extubation fall more than that of group- l and statistically significant. Pain score (TPPPS) in group-1 was lower all the time period but in group-II the score was high, all the children required rescue pethidine within 10 mins after extubation, mean dose reqd, in group-II was 23.6+3.6mg. Steward recovery score in both group was not significant at early period but after 10 mins. P value become significant The mental state of group-I was calm & quite only 3 were excited, on the other hand in group-11 all children were excited & irritable and required rescue pethidine. So preemptive local infiltration of 0.25 bupivacaine improved the recovery status in children by reducing the immediate postoperative pain and there by decrease in postoperative morbidity.

INTRODUCTION

Recovery constitutes the transition state from general anaesthesia to the baseline state[1]. The definition of recovery is difficult because some drowsiness may persist for many hours. The period of recovery is the end of surgery to when the patient is alert and physiologically stable.

Pain is the major cause of distress during the emergence and immediate postoperative period, this is also true for infants & young children, even premature infants at 28 weeks of gestation show marked endocrine responses (epinephrine, nor epinephrine, glucagons, lactate and pyruvate) to surgically induced stress[2].

The goal of preemptive analgesia is to prevent the establishment of central sensitization, which amplifies postoperative pain; post injury analgesia usually has a reduced effect because central sensitization already has been established[3].

1. Consultant Anaesthesiologist, Square Hospital, Dhaka
2. Assistant Professor, Department of Anaesthesiology, DMCH
3. Medical Officer, Dept. of Gynae & Obst., BSMMU, Dhaka
4. Assistant Professor, Department of Pathology, BSMMU, Dhaka
5. Consultant, Dhaka National Medical College Hospital, Dhaka
6. Professor, Dept. of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU, Dhaka

The physiological basis of preemptive analgesia is complex and involves modification of pain pathways.

There are many methods for suppression of pain pathways eg.central neural block, local infiltration, NSAIDs, opioid etc. for management of postoperative pain but the local anaesthetics are most potent in relieving pain and which have also deferent mode of administration[5].

Analgesic effect after topical application of local anaesthetics are due to both local effect caused by nerve block at incision site and systemic effect due to absorption at raw surface and followed by central modulation mechanism[6].

There are several scoring system are used to quantify recovery from anaesthesia[1]. The most useful are Aldrete recovery score and Steward recovery score. The Aldrete scale is oriented toward adults; steward developed a more suitable scale for children[1]. The Steward Recovery scale scores airways, consciousness, and movement from 0-2 points, maximum points is-6.

This study was performed to see the immediate recovery profile in paediatric patients after preemptive wound infiltration with 0.25% Bupivacaine.

MATERIALS AND METHODS:

This randomised, prospective clinical study was carried out in the Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University Hospital, Dhaka during the period of January 04 to September 04. Children aged between 3-5 years with ASA grade I & II and scheduled for herniotomy under general anaesthesia were recruited in this study. Any physically or mentally retarded, hormonal imbalance, congenital abnormal children other than cong. Ing. hernia, and Children with known allergy to study drugs with hepatic, cardiac, hemorrhagic diathesis etc. were excluded from this study.

After recruitment, the children were randomly divided into two groups, 20 in each by card sampling. Group-1 - Infiltrate 0.25% bupivacaine (2 mg/kg) around the incision site and Group- II - Infiltration with distilled water of same volume at around the incision site.

All children were examined preoperatively and preoperative baseline (pulse, blood pressure, oxygen saturation) were recorded. Measuring tools for pulse, blood pressure and oxygen saturation were Multi Parameter Monitor. All children were given general anaesthesia. After pre-oxygenation for 2-3 min. with 100% oxygen, induction of anaesthesia was done with thiopentone sodium 3 mg/kg IV and tracheal intubation was done after giving atracurium besylate 0.5 mg/kg IV. Maintenance of anaesthesia with N_20 70%, 0_2 30% and halothane 0.5% with long acting muscle relaxant atracurium besylate and IV opioid analgesic: Pethidine 0.70 mg/kg. Ing. Local infiltration with inj. 0.25% bupivacane (2 mg/kg) was given in group-I & distilled water of same volume was given in group-II around the incision site 5 min. before incision.

Peroperative parameters (pulse. Blood pressure, 02 saturation etc.) was done accordingly. Peroperative fluid balance was done by 0.45 % NaCI with 5 % dextrose solutions at a rate of 4 ml/kg/hr. Residual effect of neuromuscular blocking drug was antagonised by Inj. Neostigmine 50 μg/kg with atropine 20 μg/kg and then tracheal extubation was performed.

In the postoperative period heart rate, blood pressure, Oxygen saturation, mental status(excitable or calm, quite), steward recovery score, pain score (TPPPS), requirement of rescue pethidine, any complication like nausea, vomiting etc. ware recorded in prescribed data sheet. In the postoperative period patients were monitored at least one hour. Inj. pethidine (1.50 mg/kg) was given to the patient who had TPPPS >3.

RESULTS

Baseline characteristics of the patients:

Table I describes the baseline characteristics of the patients participated in the study. The table shows that all the demographic variables like age and sex as well other parameters of interest were identical in both the groups.

Table-I

Baseline (preoperative) characteristics of the patients:

Group Characteristics	Gr-I (n = 20)	Gr-II (n = 20)	*P-value*
Age (months)	49.60 ±7.88	50.40 ± 8.00	0.752*
Sex (Male/Female)	14/6	14/6	0.634
Weight (Kg)	15,55+2.45	1572 ± 2.40	0826
Preoperative Pulse/m	93.70±7.69	92.30 ±17.87	0.573
Preoperative Systolic BP	91,75+7.00	9115± 8.92	0.814
Preoperative Diastolic BP	56.00 ± 4.58	56.15 ± 5.77	0.928
Preoperative mean pressure	67.92 ± 5.13	67.82 ± 6.64	0.958
Preoperative Saturation (%)	100.15 ± 2.37	99.75+44	0.462

Data are expressed as mean ± SD or is frequency as applicable. Sex is expressed as male-female ratio.

* ANOVA statistics was used to analyze the data and level of significance was 0.05. p-value <0.05 was considered as significant

Monitoring of *pulse* at different time intervals in postoperative ward:

Pulses of the group -1 were comparatively good through the 1st one hour period while the pulses of the group -II were somewhat higher than the former group for the 1st 20 minutes.

Monitoring of systolic BP at different time intervals

It was seen that systolic BP of the group -1 were in normal states throughout the 60 minutes , while the BP of the group -II were somewhat higher than the former group for the 1" 20 minutes. However the BP came down to normal level at 40 minutes interval following rescue analgesic administration p- values are <0.05, < 0.05, <0.05, <0.05,>0.05 and> 0.05 respectively.)

Monitoring of diastolic BP at different time intervals:

Diastolic BP of the group -1 were in better state through the 1st one hour period, while the BP of the group -II were comparatively high for the I 't 20 minutes and returned to normal level at 40 minutes interval as postoperative rescue analgesic was given (IT-values are <0.05 , < 0.05, <0.05, <0.05,>0.05 and> 0.05 respectively.)

Monitoring of mean pressure at different time intervals:

The mean pressure immediately, at 5,10 and 20 minutes after extubation were quite different between the two groups (p<0.05 in each case). However the mean pressures of the two groups became nearly equal at 40 minutes interval following administration of rescue analgesic and maintained the same thereafter (p- values >0.05, >0.05 respectively)

Monitoring of oxygen saturation at different time intervals:

There was no difference in the two groups with respect to oxygen saturation at any of the above intervals, except at 5 minutes, during the 1st one-our period (p>0.05). The mean oxygen saturation at 5 minutes interval in group-1 was (100 ± 0.31)% where as in group -II was (99 ± 0.79) % and the difference between the two groups was found to be statistically significant (p<0.001) .

Changes in TPPPS at different time intervals

The TPPPs was found always to be staggeringly higher in group -II compared to group - 1 (p<0.001), accept at interval of 60 minutes).

Monitoring of *Steward recovery score* at different time intervals:

Table-II explains the Steward recovery score of the patients at different time intervals (immediately, 5, 10, 20, 40 and 60 minutes after extubation) while getting recovered from GA. The table shows that Steward recovery scores immediately and at 5 minutes after extubation for both the groups were exactly equal (so significance level was undefined). But the two groups were significantly different at 10, 20, 40 and 60 minutes interval with respect to the same variable. (p-values <0.05, <0.05, <0.05, <0.05, respectively).

Table-II

Monitoring of Steward recovery score at different time intervals:

Steward recovery score	Group Gr-l (n = 20)	Gr-2 (n = 20)	P-values
Steward score immediately# after extubation	6.00 ± 0.0	6.00 ± 0.0	Undefined*
Steward score 5 minutes after extubation	6.00 ± 0.0	6.00 ± 0.0	Undefined
Steward score 10 minutes after extubation	6.00 ± 0.0	5.80 ± 0.41	0.036**
Steward score 20 minutes after extubation	6.00 ± 0.0	5.85 ± 0.37	0.075
Steward score 40 minutes after extubation	6.00 ± 0.0	5.80 ± 0.41	0.036
Steward score 60 minutes after extubation	6.00 ± 0.0	5.95 ± 0.22	0.324

All the variables are expressed as mean ± SD as ANOVA statistics was used to analyse the data.

** Level of significance was 0.05. Any p-value <0.05 was considered as significant

Mental state at different time intervals :

It was found that out of 20 patients in group -1, only 3 were excitable immediately after extubation, but none was excitable there after. Where as in the group-II 17, 20, 16 and 3 patients were excitable at immediately, 5 minutes, 10 minutes and 20 minutes after extubation respectively . However at 40 minutes interval all the patients of the latter group became calm and quite as rescue analgesic (pethidine) was given. The difference between the 2 groups in respect of mental state after extubation was found to be significant ($p<0.05$).

Rescue analgesic (pethidine):

All 20 cases in group -II needed rescue analgesic where as only one needed the same in group - 1. The difference between the two groups was statistically significant ($p<0.005$).

Distribution of complications :

Table 3 shows the distribution of complications between the 2 groups. A total of 10 patients developed complications like nausea and vomiting. Of them 7 (35%) developed in group -II and the rest 3 (15%) developed in group-1. The association between the group and complications was statistically significant ($p = 0.001$).

Table -III

Type of complications	Group-1	Group -II	
Nausea	02(33.3%)	04(66.7%)	06
Vomiting	01(25.0%)	03(75.0%)	04
Total	03(30.0%)	07(70.0%)	10

Table-III shows the type of complications in the two groups. Of the total 10 complications 6 (2 in group-1 and 4 in group -II) were nausea and 4 (1 in group-1 and 3 in group -II) were vomiting.

DISCUSSION

There are many factors that make the child unstable during the recovery stages. Among them the most important is surgical pain. Due to this pain or trauma there is increased sympathetic activity, hormonal changes(elevation of serum catecholamine, glucocorticoid, glucagon, growth hormone concentration [1]) that elevate the blood pressure, metabolic changes, make the patient restless, disoriented ultimately unstable the recovery status of the child.

Pain is the major cause of distress during the emergence and immediate postoperative periods[2]. Doxon and others, 1984 proved that pain causes prolonged disruption of behavioral development [7]. Patient outcome become worse if pain is not adequately treated[8].

Preemptive analgesia is an antinociceptive treatment that prevents establishment of altered central processing of afferent input from sites of injury[9]. The most important conditions for establishment of an effective preemptive analgesia are the establishment of an effective level of antinociception before injury and the continuation of this effective analgesic level well into the post injury period to prevent central sensitization during the inflammatory phase. The concept of preemptive analgesia was formulated by Crile at the beginning of previous century on the basis of clinical observation[10]. Later revival of this idea was associated with a series of animal studies started by Wolf[11,12]

There are lot of works using preemptive analgesia with different drugs along or in combination and thus reducing the postoperative pain and improved the postoperative recovery status.

In our study we randomly selected the patient in two groups. Preemptive local infiltration was given in group-I & preemptive local infiltration of distilled water of same volume was given in group-II before surgical incision. Then we see & compared the immediate recovery status within one hour, specially the pain, mental status, cardiovascular variabilities (Pulse, Blood pressure), oxygen saturation, requirement of analgesic and other vital functions etc. It was shown that the group-1 is improved recovery status in children after general anaesthesia.

Badner and colleagues demonstrated that administration of 0.5% bupivacaine in Knee surgery resulted in reduced morphine requirements[13]. Preemptive blockade of peripheral nerves with local anesthetics can have a beneficial effect on pain after hernia repair, outlasting the duration of the nerve block even when the repair is performed with spinal anesthesia[14]. Eriksson -Mjoberg-M and his colleagues also have shown significantly reduced morphine consumption in preincisional subcutaneous infiltration with 0.25% bupivacaine than placebo[15]. In against of these positive outcome of preincisional infiltration with bupivacaine Bourget JL and his colleagues have shown no difference between preincisional and postincisional infiltration with 0.25% bupivacaine in relation to pain score or morphine consumption[16]. Cobby-TF also has shown no difference in pain score or in morphine consumption with bupivacaine infiltration between study and control group after abdominal hysterectomy[17].

In non- surgical cases topical opioid has been used successfully by Krajnik and his colleagues with rapid relief of pain and analgesia lasted 7-8 hours[18]. Wound irrigation with dexamethasone acetate [19] and with triamcinolone[20] after lumber surgery reduces pain score and 24 hours morphine consumption significantly.

Analgesic effect of topical local anaesthetics are due to nerve block and anti inflammatory effect at incisional area and systemic effect due to absorption at raw surface and then by central modulatory mechanism in the dorsal horn by activation of the endogenous opioid system [21].

In our study it was shown that cardiovascular parameter (pulse, systolic, diastolic and mean pressure) was higher in group-II compared to group-1. Significant result was found before 40 minutes after extubation. After 40 minutes P-values was become insignificant, due to control of pain in group II by administration of IM pethidine. It is well established that in response to pain there is increase concentration of serum catecholamine (sympathetic activity) and other stress hormone like glucocorticosteroid, glucagons, growth hormone, which ultimately causes increased blood pressure(systolic, diastolic, and mean) and pulse. Hypertention, tachycardia and other pain-related behaviors are almost always results from pain and the treatment is administration of analgesic agents[1].

Oxygen saturation in our study was found insignificant at all time interval except at 5 minute where the p-value is significant. Although the $_{02}$ saturation in both the groups at all time interval was maintained clinically acceptable range but at 5 minute interval in group-II 02 saturation fall more in comparison with group- ($p<0.001$).

There are several scoring system used to quantify recovery from anaesthesia, the most useful are aldrete recovery score and Steward recovery score [1]. The aldrete recovery score is oriented towards adult, steward developed a more suitable scale for children [22]. In the group-I as because patients ware

awake at all the time period, so that higher score was found , where as in group-11 after giving rescue pethidine the score gradually become less. In this study at immediately and 5 minutes after extubation p-values is undefined but thereafter the values are significant.

Clare McCarthy and his colleagues investigate & found TPPPS to be suitable for the assessment of pain in children[13]. TPPPS (Toddler preschooler postoperative pain scale) is an observation scale and is suitable for children because the parameter is not depends on the patient comment. Preschool children usually lake the verbal and cognitive skills to describe their feeling of pain or physical discomfort[24]. At different tine interval TPPPS is highly significant. In group-II initially the score was higher but gradually become lower due to rescue pethidine, but in group-I there was least pain and the TPPPS was lower in comparison with group-II There are many study proved that the preemptive local infiltration reduces the postoperative pain score & less analgesic requirement, Huang-SJ and his colleagues have shown significantly less pain score at rest and with cough in lower abdominal operation in female, in this study 0.125% bupivacaine used for infiltration before incision. Morphine consumption was also less in study group from 6th hour to 24th than control group[25.]

Pain at awakening is the major cause of postoperative agitation and excitement, adequate analgesia minimizes the incidence of excitement in the recovery period [2]. Compared between this two groups at different time period found significant result. In group-I only 1 patient was excited at immediately after extubation but in group-II all patient ware excited & agitated at different time period, which was gradually reduced after giving pethidine.

Rescue pethidine was given IM when patient shown higher TPPPS (>3), excited and or pain related response. In group-II all the patient needed rescue pethidine within 10 minutes after extubation {no. 5(25%) at immediately, no.10 (50%) at 5 minutes and no. 5(25%) at 10 minutes after extubation} but in group-I most (19) of the patient needed no rescue pethidine, only one patient needed pethidine at immediately after extubation. The difference between the two groups was statistically significant. The mean dose of pethidine needed to bring the patients to calm & quite in group-II was 23.6 ±3.6 mg, where as in group-I all patients were calm & quite without any rescue pethidine except one case. Total duration of analgesic effect of bupivacaine is long, Karsten Hannibal & his colleagues has result with 0.25% bupivacane infiltration with late request of analgesic at 345 minutes (5.65 hrs) after incision ~.

Another study of Meena N Cherian and her colleagues has shown request for first dose of analgesic at 807.7 minute (13.45 hrs) after operation in 0.375% bupivacaine infiltration [27].

Preemptive local and regional anaesthesia leads to smoother emergence; the incidence of nausea and vomiting is decreased, since narcotics are avoided [28]. In our study nausea and vomiting seen in both the groups, but higher incidence (>double) 35% was found in group-II (Nausea-4, vomiting-3) where as in group-I the incidence was 15% (nausea-2, vomiting-1), which is statistically significant. Nausea and vomiting is a relatively frequent & unpleasant complication of anaesthesia in children at recovery room [2]. In this study group-I developed less complication (15%) compared with group-II (35%). In our study except nausea & vomiting there was no other complication seen in both the groups.

CONCLUSION:

It is concluded that preemptive local infiltration with 0.25% bupivacaine in children produces no or insignificant pain and pain related responses. There is no or less requirement of analgesics & improved comfort ness of the patients, also reduces the postoperative complications. Thus preemptive local infiltration reduces immediate postoperative morbidity which is turn improved immediate recovery status of the children..

REFERENCES:

1. Charles BC. Induction, maintenance, and Emergence. In George A Gregory; Pediatric Anesthesia, 3 rd Edition. Churchill Livingstone 1994; 227-259.
2. Motoyama EK. Recovery from Anesthesia. In Motoyama EK,-. Davis PJ. Smith's Anesthesia for Infants and Children, 5th Edition. The C.V. Mosby Company 1990; 313-329.
3. Hepner DL, Duvaldestin P, Motamed C, et al. Preemptive Analgesia: What Does It Really Mean ? Anesthesiology; 93: 1368, 2000.
4. Steven MY, Nicholas PH, Gart BS, In Anaesthesia and Intensive Care A- Z, 2 nd Edition. Butterworth, Heinemann. 2000; 448.
5. Cousins M. Acute and Post operative Pain. In Patrick DW, Ronald M_ ed. A Text book of pain. New York, Churchill Livingstone. 1994; 365.

6. Thomas EJ, Healy P, Cohen J. Physiology of nerve conduction and local anaesthetic drug. Wylie and Churchill Davidson's, A Practice of Anaesthesia, 6th ed, Edward areld 1995; 183.

7. Dixon S, Snyder J, Holve R, and Bromberger P. Behavior effects of circumcision with or without anesthesia. J Dev Behav pediart 1984; 5: 246.

8. Anand KJ, Hickey PR: Halothane-morphine compared with high –dose sufentanil for anesthesia and postoperative analgesia in neonatal cardiac surgery. N engl J Med 326:1, 1992.

9. Kelly DJ, Ahmed M, Brull ST Preemptive Analgesia; Recent advances & current trends. Canadian Journal of Anaesthesia. 2001; 48: 1091-1101.

10. Crile GW. The kinetic theory of shock and its presentation through anoci-association; lancet 1993; 185: 7-16.

11. Woolf CJ. Evidence for a central component of post injury pain hypersensitivity. Nature 1983; 308: 686-8.

12. Clifford JW. preemptive analgesia : treating postoperative pain. Anaes analgesia 1993; 362-68.

13. Badner NH, Bourne RB, Rorabeck CH, MacDonald SJ, Doyle JA. Intra-articular injection of bupivacane in knee-replacement operations. Results of use for analgesia and for preemptive blockade. Journal of Bone and Joint Surgery, American Volume 1996 ;May 78(5): 734-8.

14. Bugedo GJ, Carcamo CR, Mertens RA, Dagnino JA, Munoz HR. Preoperative percutaneous ilioinguinal and iliohypogastric nerve block with 0.5% bupivacaine for post-herniorrhaphy pain management in adult. Reg Anesth 1990;15:130-3.

15. Eriksson MM, Gustafsson W, Olund A. Preoperative infiltration of bupivacaine: effects on pain relief and trauma response (Cortisol and interlukin-6). Acta anaesthesiol Scand 1997; april (4): 466-72.

16. Bourget JL, ClarkJ, Joy N. Comparing preincisional with postincisional bupivacaine infiltration in the management of postoperative pain. Arch surg 1997; July 132(7):766-9.

17. Cobby-TF; Reid-MF, Wound infiltration with local anaesthetic after abdominal hysterectomy. British Journal of Anaesthesia, 1997 April ; 78(4): 431-2.

18. Krajnik M, Zylicz Z, Finlay I, Luczak J, Vanscore AA. Potential uses of topical opioids in palliative care :report of 6 cases. Pain 1999; March 80(1-2): 121-5.

19. Foulkes GD, Robinson JSJ. Intraoperative dexamethasone irrigation in lumber microdiskectomy. Clin. Orthopaedics related res 1990; 261: 224-8.

20. Pobereskin LH, and Sneyd JR. Does wound irrigation with triamcinlone reduce pain after surgery to the lumber spine ? British Journal of Anaesthesia 2000; 84(6): 731-4.

21. Wylei & Charchil, Davidsons. A practice of Anaesthesia 6th edition, chapter-10, page-183.

22. Steward DJ. A simplified scoring for the post-operative recovery room. Can Anaesth Soc J 1975; 22:111.

23. McCarthy C, Hewitt S and Choonara I. Pain in young children attending an accident and emergency department. J Accid Emerg Med 2000; 17:265-267.

24. Suraseranivongse S, Santawat S, Kraiprasit K, Petcharatana S. Cross- validation of a composite pain scale for preschool children within 24 hours of surgery. British Journal of Anaesthesia 2001;87(3): 400-405.

25. Huang SJ, Wang JJ, & et al. The preemptive effect of preincisional bupivacaine infiltration on post operative analgesia following lower abdominal surgery under epidermal Anaesthesia. Acta Anasthesiol Sin 1997 ;Jun 35(2): 97-102.

26. Hannibal K, Galatius M, Hansen A, Obel E, Ejlersen E. Preoperative wound infiltration with bupivacaine reduces early and late opioid requirement after hysterectomy. Anaesthesia and analgesia 1996; 83:376-81.

27. Cherian MN, Mathews MP. local wound infiltration with bupivacaine in lumber laminectomy. In Abstract book, Anaesthesiology: 1st world congress of Anaesthesiologists 1996; 14-20 april 1996. Sydney, Australia. Page 295.

28. Broadman LM, Rice LJ. Neural blockade for pediatric surgery. In Cousins MJ, Bridenbaugh PO, editors. Neural blockade. Philadelphia: Lippincott-Raven 1998; 615-638.

Journal of BSA, Vol. 18, No. 1 & 2, 2005

Review Article

ANAESTHETIST IN SBTP (SAFE BLOOD TRANSFUSION PROGRAMME)

Md. Nurul Amin

INTRODUCTION:

'Safe blood transfusion' is a worldwide slogan. Aneasthetist may play a very important role in implementing the programme. Blood transfusion has undoubted benefits but carries serious risks of transfusion transmitted diseases. So collection of safe, able and low risk donor and rational use of blood are the fundamental responsibilities of the concerned authorities. In Bangladesh about 2.5 Lac units of blood is required yearly. Efficacy of transmission of HIV through contaminated blood is almost 100%. Paid blood donors share the major portion (70%) of collected blood in the country suffering from hepatitis-B (29%), hepatitis-C (6%), syphilis (22%) significantly. Most of the blood used in the hospitals and clinics actually under the shadow prescription of anaesthetist. The blood demand for perioperative surgical patients and ICU encompasses about 60% of the total blood consumption in hospitals and clinics from both Govt and non Govt sectors which means actually total national consumption. No blood is screened as mandatory in either system: Govt and other non-govt hospitals before the Safe Blood Transfusion Programme (BGD/97/005) under H.P.S.P (1998-2003). As a consequence of which major portion of blood are transfused unscreened risking the recipients to many diseases like AIDS, viral hepatitis, syphilis, malaria and others under the SBTP total of 97 screening centres (Medical college & hospitals, district hospitals, armed forces hospitals and some specialised hospitals) in whole Bangladesh are ear marked with facilities for screening at least five transfusion transmitted vulnerable diseases like HIV, HBV, HCV, syphilis and malaria. So blood which has not been obtained from appropriately selected donors and/or which has not been appropriately screened for infectious agents should not be transfused at all. As the anaesthetist is the peri operative prescriber of most blood transfusion and in the ICU as a critical care physician has very important role in the safe and rational use of blood.

Anaesthetist to decide whether blood is at all required:

While reviewing the requirements who has lost blood or in future be subjected to a procedure which involves such a loss the question that to be answered is whether any blood transfusion is necessary. Blood transfusion should not be the first consideration during management of patients with acute-haemorrhage; because blood volume replacement is initially more urgent requirement than red cell replacement. Adequate oxygenation and volume replacement with plasma substitute (crystalloid and colloids) and prompt and meticulous surgical care, may obviate the need for blood transfusion. The supply of oxygen in healthy, resting adult with a normal Hb concentration is 3-4 times greater than that required by tissue for metabolism. A safety margin is therefore exists between oxygen supply and demand and this allows some reduction in Hb to occur without serious consequences(1). The compensatory mechanisms are facilitated and tissue oxygenation is better preserved if normal blood volume is maintained with fluid replacement. This can be understood with oxygen flux equation[1,2].

Oxygen supply = Hb x 1.36 x saturation x COP
(ml/min) (gm/ml) (ml/gm) (%) (ml/min)
(O_2 carried by plasma is neglected)

The amount of blood loss and the patients clinical condition assessed by measuring BP, pulse rate, CVP and urine flow. Generally a healthy man can tolerate and acute loss of upto 20% of circulating blood volume without any problem. Blood loss between 20-30% can be replaced by crystalloid/ colloid. Blood loss more than 30% or when hct < 30% blood should be transfused[2].

Anaesthetist is the motivator /councillor for recruiting low risk donor.

Surgeons of all disciplines (Gen. surgery, Ob-gyn, Orthopaedic, Cardiothoracic, Neuro, Uro, ENT etc)

Department of Anaes, BMCH, Dhaka

refer their patients to anaesthetist for anaesthetic check-up and anaesthetic fitness and advice for investigation required and blood transfusion as needed. Many attendants and relatives accompany the patients and show sympathy and extends their helps regarding blood donation and others. Hence the anaesthetist ask for voluntary donation and screening for high risk TTDs. He can take the history, can do physical examination and ask for investigation and thus boosts the non-reneumerated safe healthy donor pool. As Resolution 28.72 of World Health Assembly established the principle that blood donation should be voluntary and non-reneumerated (unpaid)[2]. {Voluntary non-reneumerated donor : A donor who gives blood freely and voluntarily without receiving money or any other form of payment[2]}. Aneasthetist can send family or replacement donor blood (which may involve a hidden paid donation system and thus carries risks) for re-screening and reject commercial or paid donor blood if it is proved to be unsafe (Commercial or professional donor: A donor who gives blood for money or other form of payment).

Anaesthetist can conserve blood and thus minimise homologous blood use:

He is as a chief of the team will reject the unscreened blood for transfusion and will advise cold-chain transfer of blood so that unused blood is not wasted as blood is scarce human resource. He as a member of HTC (Hospital Transfusion Committee) and actual user of the blood in the theatre and ICU and can adopt the policy of MSBOS (Maximum Surgical Blood Order Schedule). HTC should review blood usage and make tariff for each operation. If less than two units of blood requires then no blood should be cross-matched but grouped only. Single unit transfusion should be avoided except in paediatric and the patient is previously anaemic. Other than in the most exceptional life threatening situation blood should not be transfused unless it has been obtained from appropriately selected donors and has been screened for transfusion- transmissible infections in accordance with national requirements.

The anaesthetist can take measure to reduce blood loss. One of the most important techniques is hypotensive anaesthesia. Cerebral autoregulation can be well maintained within MAP (Mean Arterial Pressure) of 62-65 mm of Hg and with this 50% of surgical blood loss can be minimised. However this technique can not be recommended for inexperienced anaesthetist or where comprehensive monitoring facilities are unavailable(2). The following techniques and measures may be adopted to reduce operative blood loss:

(a) Meticulous surgical techniques,
(b) Use of posture,
(c) Use of vasoconstrictor,
(d) Use of tourniquets,
(e) Anaesthetic techniques,
(f) Use of anti-fibrinolytic drugs eg, DDAVP, Tranexemic acid, Aminocaproic acid and aprotinin etc[3].

Anaesthetist can use alternative to homologous blood:

With the help of department of transfusion medicine, anaesthetist can arrange autologous blood transfusion in the form of predeposite donation, acute normovolemic hemodilution, intra operative cell salvage and postoperative collection and transfusion. It is very much possible in our situation where major surgical procedure, for example, cardiothoracic or cardiovascular surgery is scheduled predonation of 4-6 pints of autologous blood may be collected during the period of 4-6 weeks from the otherwise healthy patients and stored in CPD-A and used during surgery. By this time the patient regains his volume and haematinics may be prescribed for enhanced erythropoiesis which has already been started. Alternatively on the OT table upto one litre of blood is drawn from the patient in an anticoagulant containing bag (ANH) and replacing volume with crystalloid/colloid and after homeostasis the blood is transfused again. Intraoperative cell salvation and post operative collection are cumbersome and may be done with special devices .Use of haematinics and erythropoietin in chronic cases, crystalloid/colloids to replace volume and for increasing oxygen carrying capacity PFC (perflurochemical emulsion) and stroma free Hb (SFHb) solutions are other alternative.

Safety of the team itself:

Anaesthetist, best user of blood with his team can reduce the risk of transfusion to himself, to his team (OT, ICU staffs) and to the patients by obeying

universal precaution and by encouraging others to abide by. This are very simple and nothing new. The health care workers should feel encourage to adhere to this practices who will protect himself and his patients from deadly infections like HIV, HBV and HCV. These are handwashing, use of gloves, safe decontamination of instruments and other equipments, save disposal of needles, sharps and wastes.

DISCUSSION:

It is clear that blood and it's products are the most important routes of transmitting diseases like AIDS and viral hepatitis of which there is no remedy, except prevention by proper screening of donors. Avoidance of homologous blood transfusion, discouraging paid donors and by motivation and counselling increasing the healthy voluntary donor pool will reduce the prevalence of the disease. Registered voluntary donor may participate in blood donations every 120 days, because red cell survival in 120 days , then they become worn out and decay and new cells are formed to replace the older one. Use of autologous blood will not only solve the problem of TTDs but also minimise the transfusion reactions, alloimmunisation to RBCs, transfusion transmitted graft verses host diseases, will stimulate erythropoiesis in predeposit and decrease viscosity and increases blood flow and oxygenation. Autologous transfusion will reduce homologous transfusion and it has got psychological benefit also. Later on they may become homologous donor and may boosts up voluntary donor pool. In some religious group like Jehovah's witness it is beneficial. Safe blood transfusion law has been passed by the parliament and was approved by the president of Bangladesh in 10th April 2002(4). There are only 97 centres for screening TTDs. But these are not sufficient for total screening in whole Bangladesh. So before execution of the law adequate services to be provided. Above elaboration showed that anaesthetist plays a key role in many stations from the beginning of selecting donors and upto postoperative transfusion if needed. So he has got the immense responsibility in safe blood transfusion programme.

CONCLUSION:

This is a message to the concern authorities of SBTP and surgeons and anaesthetists in particular that anaesthetist's role in limiting professional donors, boosting up of safe voluntary donors, encouraging autologous transfusion and using substitutes and alternative techniques of blood transfusion can have a great contribution to the nation-wide mandatory safe blood transfusion programme.

ACKNOWLEDGEMENT:

I would like to thank Prof. K. M. Iqbal FRCA(Eng.), chairman,department of anaesthesia, analgesia & intensive care medicine, BSMMU for kind suggestion and supplying informations which helped me a lot to prepare this article.

REFERENCES:

1. Wylie and Churchill-Davidson, a practice of anaesthesia, 6th edn., In: Autologus blood transfusion, Page 348.
2. The clinical use of blood, Hand book,WHO, Blood Transfusion Safety, Geneva.
3. Clinical use of blood in medicine,obstetrics, paediatrics, surgery & anaesthesia, trauma & burns, WHO, Blood Transfusion Safety, Geneva.
4. Pamphlets and booklets and papers supplied in different workshops and seminars.

Case Report

UNCONSCIOUSNESS AS A COMPLICATION OF LOCAL ANAESTHETIC IN PERIBULBAR BLOCK

Md. Rezaul Islam[1], ABM. Maksudul Alam[2], Rabeya Begum[3]. Golam Ambia[4]

ABSTRACT

Unconsciousness in seventy-five year old male after peribulbar block is reported.The patient was hypertensive, non diabetic, not well oriented, non sedated became unconscious, nonresponsive to painful stimuli without excitatory effect like convulsion.

Key words: Peribulbar block, Unconsciousness, Local anaesthetics.

INTRODUCTION:

Local anaesthetic rapidly crosses the blood brain barrier causing central nervous system stimulation followed by depression at a higher doses[1]. In retrobulbar block local anaesthetic mixtures of equal volumes of 2% lignocaine and 0.5%m (plain) bupivacaine are commonly used for quicker onset and longer duration[2] of local anaesthetic. Accidental injection of drug into optic nerve sheath results with spread of drug into CSF and CNS is exposed to higher concentrations of drug leading to apprehension and unconciousness[3]. The patient of old age, malnourished and debilitated are usually less expressive and may undergo unconscious without previous prodormal signs like perioral tongue numbness, restlessness etc.

CASE NOTE:

A geriatric male of 75 years, weight 42 kg was admitted into ophthalmology ward with bilateral mature cataract. During admission his heart rate was 68/min. Blood presure 180/100 mmHg; investigations showed low haemoglobin 7.9 gm/dl with normal ECG, blood sugar and serum creatinine. Chest skiagram coincides with COPD.

The patient was planned for intraoccular lens implant in both eyes. No pre-medication, sedation and anti-hypertensive were given. He was less communicative before operation. Facial nerve was blocked with 3 ml 2% lignocaine and 2 ml 0.5% (plain) bupivacaine by surgeon. The same procedure was done on the opposite side by same amount of local anaesthetic. Peribulbar block was done by equal volume and concentration of both local anaesthetics. As a result total 12 ml 2% lignocaine (240 mg) and 8 ml 0.5% (plain) bupivacaine (40 mg) were infiltrated to the patient.

Five minutes after, the patient became unconscious and was unresponsive to painful stimuli, anaesthesiologist was called for help. On arrival of anaesthesiologist it was found that patient's HR was 110/m, BP 220/110 mmHg, respiration- normal, haemoglobin- saturation was 97% detected by oximetry. Patient was observed closely for 40 minutes and gradually responded to painful stimuli and vocal command. No convulsion was observed.

DISCUSSION:

Local anaesthetic agents using lignocaine, combined with bupivacaine produce excellent sensory and motor block with rapid onset of action and reasonable duration of about 3 hours. Central nervous system is especially vulnerable to local anaesthetic toxicity and may be taken as guideline for signs of overdose in awake patient. Early symptoms are perioral numbness, tongue paraesthesia, dizziness, tinnitus, drowsiness, unconsciousness convulsion and finally respiratory arrest and cardiovascular collapse often occurs[3].

Toxicity depends on dose of the drug, systemic absorption, and accidental intravascular injection. Recommended maximum 'safe' doses are rough estimations only, since other factors are involved. Maximal safe doses for lignocaine are 3 mg.$^{-Kg}$ without vasoconstrictor and for bupivacaine is 2 mg.$^{-kg}$.

In the reported case the dose of lignocaine was 240 mg and bupivacaine 40 mg. The recommended 'safe'

1. Assistant Professor, FCPS, MD, Department of Anaesthesiology, Sir Salimullah Medical College
2. Associate Professor, FCPS, MD, Department of Anaesthesiology, Sir Salimullah Medical College
3. Junior consultant, DA, Department of Anaesthesiology , Sir Salimullah Medical College
4. Assistant Professor, DA, Department of Anaesthesiology, r Salimullah Medical College

dose of lignocaine in 42 kg is 146 mg. Administered dose of lignocaine 240 mg, which was about double of the safe dose, was absorbed into brain through CSF and blood stream. As mentioned earlier higher dose of local anaesthetic causes depressions of CNS without excitatory effect like convulsion.

CONCLUSION:

In regional anaesthesia LA drugs above the recommended safe dose in aged and less communicated patient can undergo unconsciousness without prodormal manifestations and they should be monitored during intraoperative period preferably by an anaesthesiologist.

REFERENCES:

1. Wood M, Wood JJA. Drug and Anaesthesia 2nd Edn. William and Wilkins London,. In. Local Anaesthetic agents, P-334
2. Aitinhead R A, Smith G, Rowbothham I D. Textbook of Anaesthesia, 4th Edn, Churchill Livingstone 2001 –In: Anaesthesia for optithalmic surgery, P-600.
3. Morgan EG, Mikhail SM, Murray IM et al. Clinical Anaesthisiology, 3rd Edn. In: Anaesthesia for optithalmic surgery, P-766.

Journal of BSA, Vol. 18, No. 1 & 2, 2005

Case Report

ANAESTHETIC MANAGEMENT OF A CASE OF HERIDITARY SPHEROCYTOSIS FOR SPLENECTOMY AND CHOLECYSTECTOMY

Shahnaz Afroza[1], Lutful Aziz[2]

ABSTRACT:

Objectives: *Hereditary spherocytosis is a heterogeneous group of disorder that results in the formation of abnormal red blood cells with fragile cell walls causing anaemia, jaundice, splenomegaly and ultimately gall stone formation. Most children have mild disease do not require splenectomy. Splenectomy is reserved for those with severe disease or who develop symptomatic gall stone. Individuals with symptomatic gallstones usually have a cholecystectomy and at the same time splenectomy if indicated.*

Case Report: *A 20 years old female diagnosed as hereditary spherocytosis since age of one year. After 19 years she was diagnosed as splenomegaly with cholelithiasis. After proper investigations and vaccination patient was posted for surgery splenectomy and cholecystectomy at the same time which is challenging from the anaesthetic point of view because the sickling oriented anaesthetic approach. Commonly recommended perioperatoive management includes preemptive erythrocyte transfusion, aggressive hydration and avoidance of hypoxia, aplastic crisis, hypothermia and acidosis.*

Conclusion: *Patients with Hereditary spherocytosis, as they are more prone to develop infection, were meticulously controlled through out the perioperative period. Removing the spleen does not cure the disease, but it does allow the red blood cells to live longer so that a child no longer became anaemic during periods of stress or infection. It is very important that all these patients should receive all of the normal childhood immunizations and a few special immunizations (pneumococcal and meningococcal) to prevent infection.*

Key Words*: Hereditary Spherocytosis, Splenectomy, cholecystectomy, aplastic crisis.*

INTRODUCTION:

Hereditary spherocytosis is an inherited disease that results in the formation of abnormal red blood cells with fragile cell walls which is usually transmitted as an autosomal dominant disorder. 25% of patients with hereditary spherocytosis have no previous family history and mostly represent as new mutation[1]. In hereditary spherocytosis erythrocytes shape changes are caused by membrane protein defects resulting in cytoskeleton instability. Spectrin deficiency leads to loss of erythrocyte surface area, which produces spherical RBCs. Spherocytic RBCs are culled rapidly from the circulation by the spleen ultimately develop splenomegaly. Four abnormalities in red cell membrane proteins have been identified and include-(a) spectrin deficiency alone, (b) combined spectrin and ankyrin deficiency, (c) Band 3 deficiency and (d) protein 4.2 defect. Spectrin deficiency is most common defect[2].

Normal RBC is shaped like disc.Spherocytes is round and fragile and does not change shape to pass through certain organs as easily as normal RBC. Because spherocyts cannot change their shape easily, they stay in the spleen longer than normal RBC and the membrane surrounding the cell becomes damaged. After circulating through the spleen many times, the cell eventually becomes so damaged that it is destroyed by the spleen which leads to anaemia and jaundice.Frequently patients with hemolytic anamia develop gallstones as a complication of the increased red cell hemolysis.

For practical purpose, the treatment of hereditary spherocytosis involves presplenectomy care, splenectomy and post splenectomy care. The presplenectomy care was taken before planed for surgery. The new pathophysiological model has a number of implications for anaesthgetic management. Commonly recommended perioperative management includes preemptive erythrocyte transfusion, aggressive hydration, avoidance of hypoxia, hypothermia and acidosis[3,4].

1. Sr.Registrar, Anaesthesia and ICU, Apollo Hospitals Dhaka.
2. Consultant, Anaesthesia and ICU, Apollo Hospitals Dhaka.

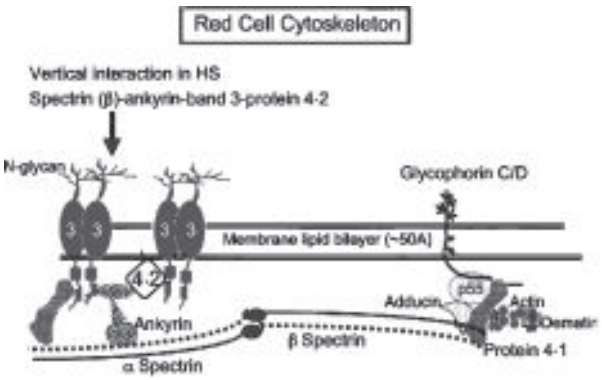

Fig.-1: *Schematic presentation of structural organization of red cell cytoskeleton(Bolton-Maggs,2004). â Spectrin is the key component in that it pairs with á spectrin to form a heterodimer, and it binding sites for ankyrin and protein 4.1.The common protein defects are associated with spectrin (á and/or â), ankyrin, band 3 protein and protein 4.2.*

Avoidance of hypoxaemia is the key goal in sickling-based management. Premadication and opioid based analgesia has been traditionally been used with extreme caution because of concern about respiratory depression, hypoxia and sickling.[5.] There is also a high level of analgesic tolerance in these type of patient due to recurrent episodes of sever pain. Hypothermia has also been suggested as a perioperative trigger of complications. Acute chest syndrome (ACS) is another important complication in which the onset of new lobar infiltration on chest x-ray, excluding atelectasis, accompanied by fever, respiratory distress or chest pain. After concerning all these complications anaesthetist should therefore concentrate on the basic standards generally accepted anaesthetic practice.

CASE REPORT :

A 20 year old female with known hereditary spherocytisis, presented with right upper quadrant pain and nausea. Physical examination was unremarkable except for right upper quadrant pain and moderately icteric sclera. There was also moderate splenomegaly. Her past medical history was typical of a patient with hereditary spherocytisis with frequent admission usually for fever and blood transfusion, but no history of major complications such as acute chest syndrome, Stroke etc. According to her clinical presentation, cholelithiasis was confirmed by abdominal ultrasound, which revealed a distended gallbladder with containing echogenic structures within it with normal wall thickness. Liver is enlarged in size and spleen is measuring 19.41 cm in its long axis. Subsequently patient was admitted under general surgery department for both splencetomy & cholecystectomy at the same sitting.

On admission blood work performed include a complete blood count, coagulation profile, Hb-Electrophoresis, S. Bilirubin, Liver function tests(LFTs), osmotic fragility tests, S. creatinine, S.urea, urine analysis & anaemia type & blood cross matching. The coagulation profile was normal. The complete blood count was remarkable for anaemia (Hb-7.5gm/dl). The Hb electrophoresis was in normal pattern. The presence of spherocytes on the peripheral smear associated with increased osmotic fragility test which is the usual pattern for spherocytosis reveals the diagnosis of hereditary spherocytosis. After conformation with ultrasonology our patient was decided to do the splenectomy and cholecystectomy at the same sitting. However before surgery she was given vaccine against pneumococci, H-influenza & hepatitis B. With all aseptic precaution, induction of anaesthesia was done with propofol, fentanyl, and rocuronium and was maintained with 50%N_2O in O_2 and vecuronoum and isoflurane.

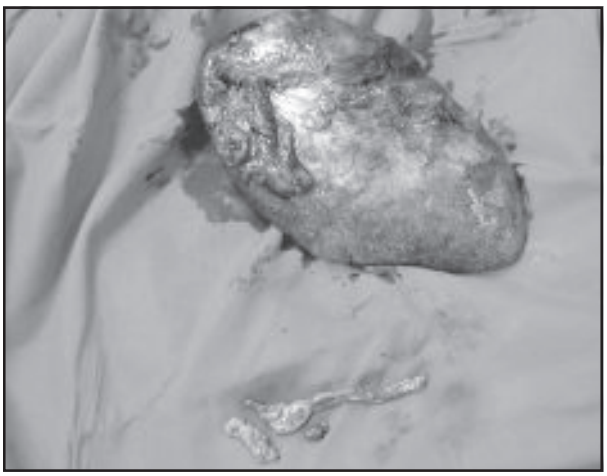

Fig.-2: *The dissected Spleen(19.41 cm) with spleenecules.*

Post operative analgesia was maintained with conventional intramuscular injection of Pethidine. Per operative 4 units of packed cell was given after

clamping of splenic vessels. 24hr after operation haemoglobin becomes 15gm/dl but 72 hr after Hb becomes 10gm/dl but the platelet count becomes > 7 lakhs and injection Clexane subcutaneously, 12 hourly was started as thrombo-prophylaxis. From the 1st POD prophylaxis injection Penicillin was also started in addition to other medication.

DISCUSSION:

Cholelithiasis is a known complication of hemolytic anaemia & is frequently associated with hereditary spherocytosis. Splenectomy is very effective in reducing haemolysis, leading to a significant prolongation of the red cell life span, although not necessarily to normal. The clinical manifestations & complications (anaemia & gallstones) are much reduce in sever hereditary spherocytisis, but at the price of one increased risk of life threatening sepsis from encapsulated organisms, particularly streptococcus pneumonia[6].

Our patient was also selected for splenectomy on the basis of her clinical symptoms & presence of complication such as gallstones, not simply on the basis of the diagnosis alone.

An analysis of decision making for mild hereditary spherocytosis, based on the available lecture & computer modeling, suggests that spleenectomy is of no benefit in the absence of gallstones (Marchetti, et. all, 1998), children or young adults with mild hereditary spherocytosis, who also have gallstones are likely to benefit from combined splenectomy & cholecystectomy in terms of life expectancy[6] .

Moreover many patients with such sickling disorder have impairment to oxygen delivery secondary to pulmonary damage, widespread macro and microvasculopathy, increased blood viscosity, anaemia, impaired vascular regulation and disturbed nitric oxide signaling[7].They therefore may have limited reserve to cope with further reduction in oxygen delivery. Thus the avoidance of hypoxaemia is the foundation of anaesthetic management of this patient.

The risk of postoperative sepsis is not completely eliminated by the current recommended preoperative vaccinations & post splenectomy antibiotic prophylaxis (BCSH, 1996, Davis et .all, 2002). The small but definite remaining risk of sepsis is also clearly explained to the parents of our patient & the indication for splenectomy must be clear.

For pre splenectomy vaccination & post splenectomy follow up., our pt was preoperatively vaccinated and also advised to repeat pneumococcal vaccination at 5 years intervals, although there is no clear evidence in the literature. Penicillin prophylaxis is recommended for life (reid 1994). Although preventive measures are very successful, it is clear that they do not completely eliminate risk. The risk of infection remains highest in the youngest patient but was reported to be reduced by 47% & the mortality by 88% in one study (Jugenberg et al 1999).

The risk of late past spleenectomy thrombosis[8] is also sought out for our patient, and standard thrombo prophylaxis that is subcutaneous heparin was also started.

CONCLUSION:

After family studied, this case may be a new genetic mutation case. As our patient. was diagnosed from the age of 1yr 9m^{n}, the complication of gallstone is obvious. Splenectomy is reserved for those with sever disease or who develop symptomatic gall stone, when cholecystectomy should be performed at the same time. After concerning all probable complications like aplastic or megaloblastic crisis, hemolytic crisis, acute chest syndrome, stroke etc anaesthetist should have better understanding of silent but insidious end –organ damage in the brain, kidney and lungs. This allows for more accurate preoperative assessment, with better grasp of the potential for perioperative organ dysfunction in the individual patient. It also points to the development of potentially effective ways of perioperative sickle cell complications.

REFERENCES :

1. Edwin Robins, et al. sickle cell disease & hereditary spherocytosis, a rare combination of hemolytic Anaemia presenting as cholelithiasis. International pediatrics, 3/2001; vol-16;164.

2. Agre P, Asimos A, Casella JF, McMillan C: Inheritance pattern and clinical response to splenectomy as a reflection of erythrocyte spectrin deficiency in hereditary spherocytosis. N Engl J Med 1986 Dec 18; 315(25): 1579-83

3. Steinberg MH. Management of sickle cell disease.N Eng J Med 1999; 340:1021-30.

4. Vichinsky EP, Haberkern CM,Neumayr L, *et al*. A comparison of conservative and aggressive transfusion regimens in the perioperative management of sickle cell disease.The preoperative Transfusion in Sickle Cell Dissease Study Group. N.Eangl J Med 1995; 333:206-13.

5. Shapiro ND, Poe MF. Sickle cell disease; an anaesthesiological problem.Anaesthesiology 1995;16: 771-80.

6. P.H.B.Bolton-Maggs, R.F. Stevens, et al.Guidlines for the diagnosis & Management of Hereditary spherocytosis, British Journal of haematology, 126, 455-474.

7. Klinefelter HF.The heart in sickle cell anaemia. Am J Med Sci 1942; 203:34-51.

8. Eldor A, Rachmilewitz EA.The hypercoagulable state in thalassemia. Blood 2002; 99: 36-43.