VOLUME 25
NUMBER 2
JULY 2012

ISSN 2220-8992

Journal of the Bangladesh Society of Anaesthesiologists

INFORMATION FOR THE AUTHORS

For preparation of manuscripts, please follow the guidelines as described in "**Uniform requirements for manuscripts submitted to Biomedical Journals"** published in the Ann lalern Medi 1997; 126: 36-37 Authors are requested to visit the Web site www.icmje.org for this purpose.

Condition for publication of the articles:

The BSA Journal is intended to promote prompt publication of concise, scientific article based on the study in all fields of medical and health sciences.

- Manuscript submitted for printing in this journal must not be published in whole or in part in any other journal
- All submitted articles will undergo double blind peer review as per recommendations by subject specific experts selected by editors
- Reviewed manuscripts will be sent to the corresponding author for appropriate response if it is indicated
- Acceptance is based on significance, originality, clarity and fulfillment of the criteria of the publication policy of this journal.
- The Editor-in-Chief will take all final decisions regarding acceptance
- The editors reserves the right to style, if necessary to shorten the manuscript accepted for publication
- The editors also reserves the right to determine the priority and intended for publication of the reviewed and accepted manuscripts in a particular issue.
- Rejected manuscript will be returned if accompanied by stamped or self-addressed envelope
- Upon acceptance for publication the copy right of the paper automatically transfers to the BSA and will not be published elsewhere either in part or whole without written permission of the copy right holder
- Review article should be written by a subject expert
- It is not the duty of the editor to investigate scientific fraud paper.

Ethical aspects:

- Ethical aspect of the study will be very carefully considered at the time of assessment of the manuscript
- Articles on clinical investigation should abide by the ethical standards laid down in the 1964 Declaration of Helsinki revised 2000
- Manuscript must contain a statement in the method section that ail human subjects involved studies have been approved by appropriate ethical committee
- Use of names, initials etc. should be avoided so that patients must be unrecognizable
- Permission of the patients or their families to reproduce photographs of the patients where identity is not disguised
- Author should obtain written permission to reproduce any table, illustration from any other source
- About animal studies, the author should convince that the involved animals have not been subjected to pains or suffering not absolutely necessary for the sake of the finding.

Preparation of manuscript:

a. Manuscript Organization:

- Manuscript should be written in English
- Margin should be 5 cm for the header and 2.5 cm for the remainder
- Font type is Time New Roman with size 12
- Printed in double space on one side good quality A4 80 gm paper
- Manuscript should have uniform style, correct journal format, carefully proofread for grammar, spelling and punctuation.

b. Manuscript format:

The article should be divided in general into the following parts:

- Title page
- Abstract and keywords
- Text
- Acknowledgement
- Table with titles
- References
- Attentively graph with title and illustration with legends
- Each of the sections is to start on a separate page. Pages should be numbered consecutively beginning from the title page.

Manuscript submission:
The authors are requested to strictly follow the guide lines below for submission of manuscript to JBSA for publication. The following documents with manuscripts are to be submitted for publication.

- A covering letter addressed to the Editor-in-Chief of the journal (Sample given at the end)
- A Title page (Sample given at the end)
- Abstract and key words in the first page followed by the text, prepared in the format of IMRAD
- Authors must submit 2 hard copies of all documents and one copy in electronic form preferably written in a CD-RW with adequate labeling
- In special case, submission through E-mail with file attachment of all documents is welcome

Covering letter:

- All authors must sign after seeing the manuscript with the statement that they are the only authors
- The corresponding author should mention the contribution of each author to the work
- It should contain a declaration that this manuscript has not been submitted elsewhere or not under consideration in any journal
- It should clearly indicate the publication type (Original/Review/Case report/Letter etc.)
- Should also mention the expected benefit of the medical science from publishing of this article

Title Page:

- The title page should be in a separate sheet which will include apart from the title of the article (concise but informative and self-explanatory), the name of all authors with their designation and institutional affiliation
- Name of the institute and department where the study was carried out
- Name of the corresponding author with contact address, telephone number, Email address
- Name and address of the authors to whom request for reprint should be addressed
- Number of tables given
- Number of figures given
- Word count of abstract
- Disclosure of sources of funding or sponsor
- A short running head having not more than 50 letters should also be suggested

Abstract and Keywords: The abstract should state the purposes of the study main findings and the principal conclusion.

- Structured with headings- Background, Objectives, Methods with statistical analysis, Result and Conclusion
- Preferably within about 250 words
- Avoid abbreviations except standard
- A non structured abstract is suggested for review article and case report
- Authors name should not be given
- Below the abstract provide and identify as such upto maximum 7 key words or phrases that will assist indexers in cross indexing. Use terms from the medical subject headings list of Index Medicus.

Text:

- The text of observational and experimental articles is usually but not necessarily should be arranged into following sections with the four main heading; Introduction, Methods, Results and Discussions.
- Other type of articles such as case reports, reviews and editorials are likely to need other formats.

Introduction:

- Provide a context or background for the study that is the nature of the problem and its significance
- Review of the literature directly related to the problem with pertinent reference
- Nature/rationale/objectives/hypothesis/benefits of the study expected stated in 1-2 paragraph.

Methods:

- This section should include only information that was available at the time the plan or protocol for the study was being written
- Methods, subjects, grouping and variables should be described in detail sufficient to allow the work to be interpreted and repeated by the reader
- Modifications of previously published methods should be explained and appropriately referenced

- Approval of the study by ethical review committee
- Mention study type, place, time, selection and exclusion criteria
- Description of procedure, methods, apparatus, drugs or chemicals as applicable

Statistics:

- Statistical analysis should be described with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results
- When possible, quantify finding and present them with appropriate indicators of measurement error
- Specify the computer software used

Results:

- All information obtained during the study should be described here and it should be in the text, table and illustration with the main or most important finding firs
- Described without comment
- Results of the experiments should be brief and in logical sequence
- Total number of tables, charts and figures should be limited need to support assessment of paper
- Avoid unnecessary repetition of data, table and figure. Emphasize or summarize only the important observations
- Use graph as an alternative to tables with many entrees

Table:

During preparation of tables following principle should be followed:

- All tables should be on separate sheets with proper captions and be simple, self explanatory and supplement, not duplicate the text
- They should be numbered consecutively using Roman numbers in order of text
- Units in which data are expressed should be given in brackets at the top of the relevant column
- Ditto sings, internal horizontal and vertical rules should not be sued
- Uses of many tables are not encouraged

Illustrations:

Graph, chart, drawing, photographs etc. surfaces should not be marred by clips, pins or heavy writing on the back

- All illustrations must be clearly numbered consecutively in Arabic numerals as they appear in the text
- Submit print photograph of each illustration along with its electronic file
- Original drawing, graphs, charts and lettering should be prepared on an illustration board or high-grade white drawing paper by an experienced medical illustrator

Figures and photographs:

- Should be used only where data cannot be expressed in any other form
- Should be unmounted glossy print in sharp focus, 12.7 X17.3 cms in size
- Figure number, title of manuscript, name of the corresponding author and arrow indicating top should be written on a sticky label affixed on the back of each or on the back preferably with soft pencil

Discussion:

The discussion section should reflect:

- The authors comment on the results, important aspects of the study and the conclusion
- Explore possible mechanism or explanation for the findings
- The discussion should not merely recapitulate the results but compare and contrast the results with other relevant studies
- State the limitations of the study
- Explore the implication of the finding for future research and for clinical practice

Conclusion:

- Conclusion follows from the new and important aspects of the study in the context of the totality of the best available evidence
- Link the conclusion with the goals of the study but avoid unqualified statements and conclusions not adequately supported by the data

Legend:

- Must be typed in a separate sheet of paper
- Photomicrograph should indicate the magnification, internal scale and the method of staining.

- All drugs should be mentioned in their generic form. The commercial name may be used in parenthesis

Units:

- All scientific units should be expressed in System International (SI) units

Abbreviations and symbols:

- Use only standard abbreviations; use of non-standard abbreviations can be confusing to readers

Acknowledgement:

- Institution, organization, sponsor, individuals or any bodies can be acknowledged in the article for financial, material, technical or any form of assistance or contribution to the work with their consent.
- Acknowledgement should be placed at the end of the text before the references list.

References:

It is required that each of the papers submitted for printing is accompanied by a list of references at the end.

- These references should be arranged according to the **Vancouver** system which is based on an **American National Standards Institute (ANSI)** style for its database adapted by the **National Library of Medicine (NLM)** and used in Index Medicus**.**
- References should be numbered consecutively in the order in which they are first mentioned in the text
- Identify references in the text, tables and legends by Arabic numerals in superscript
- All citations to electronic references should be presented in numbered references following the text
- The titles of the journals should be abbreviated according to the style used in Index Medicus
- Write names of 6 authors followed by et al. if authors' number is more than six.
- The reference list is not usually checked by the editorial staff or reviewer. It is the total responsibility of author to provide accurate information.

Examples:

- **Standard journal article:**
  Coetzee GJ. Flow through disposable alternatives to the laryngeal mask. Anaesthesia 2003; 58:280-281
- **Standard book with initials for authors:**
  Bowman WC. Pharmacology of Neuromuscular function. 2nd ed; London: Wright, 1990: 196-202.
- **Contributed chapter of a book:**
  Carter EP, Wang Y, Campbell AR. Resolution of alveolar edema. In: Malthy MA, Ingbar DH (eds). Pulmonary edema. New York: Marcel Dekker, 1998
- **Standard journal article on the internet:**
  Kaul S, Diamond GA. Good enough: a primer on the analysis and interpretation of noninferiority trials. Ann Intern Med [Internet]. 2006 Jul4 [cited 2007 Jan4]; 145(1):662-9

Available from : http:/www.annals.org/cgi/reprint/145/1/62.pdf.

COVERING LETTER FOR SUBMISSION TO J B S A

Date…….....……..

To

The Editor-in-Chief

Prof…….....……

Journal of the Bangladesh Society of Anaesthesiologists.

Sub: Submission of manuscript

Dear Sir,

We are submitting our manuscript entitled by 1…....…2…....…3…....…for publication in your journal. This article **has not been published or submitted for publication elsewhere.**

We believe that this article may be of value to medical professionals engaged in Anaesthesiology/surgery. We are submitting 2 copies of manuscript along with an electronic version (CD).

We therefore, hope that you would be kind enough to consider our manuscript for publication in your journal as **Original/Review article/Case Report.**

Thanks and best regards

A (X)

Professor, Department of ……..……

BSMMU, Dhaka.

B (X)

Dr., Department of ……..……

BSMMU, Dhaka.

C (X)

Associate Professor, Department of…….....……

Chittagong Medical College, Chittagong.

D (X)

Assistant Prof., Department of……..……

Dhaka Medical College, Dhaka.

TITLE PAGE OF ARTICLE

The title of the article……..……..

……

1. Authors' names and institutional affiliations:

   A (X) Professor, Department of ……..……...BSMMU, Dhaka.

   B (X) Dr. ……, Department of ……..BSMMU, Dhaka.

   C (X) Associate Professor, Department of…….....……Chittagong Medical College, Chittagong.

   D (X) Assistant Professor, Department of……..…… Dhaka Medical College, Dhaka.

2. The name of the department(s) and institution(S) to which the work should be attributed: Department of ……..…….. Rangpur Medical College, Rangpur. Bangladesh.

3. Disclaimers any: Yes, subject to nonprofit purpose

4. Corresponding author:

The name:……...

Mailing address:……

Telephone:…….....

E-mail address: ……..

5. The name and address of the author to whom requests for reprint should be addressed:……

Mailing address:……

6. Source(s) of support in the form of grants, equipment, drugs or all of these- [Self finance]

7. A Short running head:……...

8. Word counts of abstract: [ ]

9. The number of tables: [ ]

10. The number of figures: [ ]

JOURNAL OF THE BANGLADESH SOCIETY OF ANAESTHESIOLOGISTS

VOLUME - 25 **NUMBER - 2** **JULY 2012**

CONTENTS

Bispectral index (BIS): A monitoring device to assess depth of anaesthesia

BIS monitors are intended to replace or supplement Guedel's classification system for determining depth of anesthesia and it is one of several technologies which purport to monitor depth of anesthesia. Titrating anesthetic agents to a specific bispectral index during general anesthesia in adults (and children over 1 year old) allows the anesthetist to adjust the amount of anesthetic agent to the needs of the patient, possibly resulting in a more rapid emergence from anesthesia. Use of the BIS monitor is thought to reduce the incidence of intraoperative awareness in surgeries. The algorithm is proprietary information, which means that it is kept secret by the company that developed it.

Bispectral index (BIS) was introduced in 1994[1] as a novel measure of the level of consciousness by algorithmic analysis of a patient's electroencephalogram during general anesthesia. This is used in conjunction with other physiologic monitoring such as electromyography to estimate the depth of anesthesia in order to minimize the possibility of intraoperative awareness. The US Food and Drug Administration (FDA) cleared BIS monitoring in 1996 for assessing the hypnotic effects of general anesthetics and sedatives. The FDA further stated in 2003 that "A reduction in awareness provides a public health benefit, in that BIS technology can now provide anesthesiologists with a way to reduce this often debilitating, yet preventable medical error".[2]

The bispectral index is a statistically based, empirically derived complex parameter. It is a weighted sum of electroencephalographic subparameters, including a time domain,frequency domain, and high order spectral subparameters.[3] The BIS monitor provides a single dimensionless number, which ranges from 0 (equivalent to EEG silence) to 100 (equivalent to fully awake and alert). A BIS value between 40 and 60 indicates an appropriate level for general anesthesia, as recommended by the manufacturer. The BIS monitor thus gives the anesthetist an indication of how "deep" under anesthesia the patient is.[4] The essence of BIS is to take a complex signal (the EEG), analyses it, and process the result into a single number. Several other systems claim to be able to perform the same thing. This calculation is very computer-intensive. The recent availability of cheap, fast computer processors has enabled great advances in this field. When a subject is awake, the cerebral cortex is very active, and the EEG reflects vigorous activity. When asleep or under general anesthesia, the pattern of activity changes. Overall, there is a change from higher-frequency signals to lower-frequency signals and there is a tendency for signal correlation from different parts of the cortex to become more random.

The BIS is an electroencephalogram-derived multivariate scale that correlates with the metabolic ratio of glucose. From this metabolic activity the brain obtains its functionality, the ability to capture information from outside and inside the body and integrate that information into conscious perception, with the ability to remember it later. Both loss of consciousness and awakening from anesthesia are correlated with this scale. The efficacy of BIS index monitoring is not without controversy.[5] Some controlled studies have found that using the BIS reduced the incidence of memory but this was not confirmed in several very large multicenter studies on awareness.[6,7] BIS, however, is not explicitly endorsed. In fact, they cite an American Society of Anesthesiologists (ASA) statement saying that the decision for cerebral function monitoring should be made on an individual basis.[8] The bispectral index has not been proven to measure the level of consciousness, independently of the cause of reduced consciousness (whether this be drugs, metabolic disease, hypothermia, head trauma, hypovolemia, natural sleep and so on. Not all unconscious patients will have a low BIS value,

although the general clinical state may be very different from one to the other, and the prognosis may also differ. The bispectral index is prone to artifacts. Its numbers cannot be relied upon in all situations, including brain death, circulatory arrest or hypothermia. A monitor of the autonomic nervous system may be more appropriate for purposely assessing the reaction to noxious stimuli during surgery. However, a monitor of the central nervous system may be more appropriate for monitoring consciousness. After the publication of the *B-Aware Trial* 004) BIS is suggested as a parameter that allows the anesthetist to reduce the risk of anesthesia awareness during surgery for a 'high risk' group.[9] However, this result was not reproduced by a recently published randomized control trial, the "B-Unaware Trial".[10] In it, the use of BIS monitoring was not associated with a lower incidence of anesthesia awareness. In some cases, the BIS may underestimate the depth of anesthesia, leading the anesthetist to administer a higher than necessary dose of anesthetic agent(s). In such cases, the patient may be anesthetized to a lower BIS level than is necessary for the surgery or procedure—this is called "treating the BIS," and may result in a deeper level of anesthesia than required. The monitoring of EEG in ICU patients has been employed in one form or other for more than two decades. BIS monitoring is also being used during transport of critically ill patients in ambulances, helicopters and other vehicles.

(JBSA 2012; 25(2): 39-40)

MK Rahman
Honourary Senior Consultant, Dept. of Anaesthesiology & Surgical ICU, BIRDEM, Dhaka

References

1. Sigl JC, Chamoun NG. "An introduction to bispectral analysis for the electro-encephalogram." Journal of Clinical Monitoring. 1994; 10(6):392-404
2. http://investor.covidien.com/phoenix.zhtml?c=207592&p=irol-newsArticle&ID=1352467&highlight=
3. H.L. Kaul and N Bharti. "Monitoring depth of anaesthesia". Indian J Anaesth 46 (4): 323–332
4. Zhang L and Burnside BA. Introduction of BIS. Anesthesia and Analgesia.2000; 90(5) 1114-1117
5. Rosow C, Manberg PJ. Bispectral index monitoring. Anesthesiol Clin North America. 2001; 19(4): 947-66
6. "Use of BIS monitoring was not aassociated with a reduced incidence of awareness". Anesthesia and Analgesia. http://www.anesthesia-analgesia.org/cgi/content/full/100/4/1221
7. Avidan MS; Zhang L; Burnside BA; Finkel KJ; Searleman AC; Selvidge JA; Saager L; Turner MS et al. "Anesthesia awareness and the Bispectral index". New England Journal of Medicine. 2008; 358 (11): 1097–108
8. "Enlaces". SAR Madrid. http://www.sarmadrid.org/html/enl/enlacesDoc.html#docSedar
9. A. Morley and J. R. Sneyd; How low can we go? BJA. 2008; 92(3), 454
10. http://content.nejm.org/cgi/content/abstract/358/11/1097

Original Article

Study of effect of fentanyl and tramadol added to low dose bupivacaine in subarachnoid block for caesarean section – a comparative study

Mohammed Rashidul Haque[1], Montosh Kumar Mondal[2], Beauty Rani Roy[3], Sabina Yeasmeen[2], Faizul Haque[2], Nurul Islam[4], AKM Akhtaruzzaman[4]

[1]Maternity and Child Health Training Institute, Azimpur, [2]Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, [3]Department of Obstetric and Gynaecology, OGSB Hospital and Reproductive Centre, Mirpur, Dhaka, [4]Department of Anaesthesia, Dhaka Medical College

Corresponding Author: E-mail: r_haque@yahoo.com

Abstract

Background *Caesarean section is one of the most common operation. Adjuvent added to low dose bupivacaine for caesarean section is a better option.*

Objectives *The study was designed to observe the effects of fentanyl and tramadol added to low dose bupivacaine in subarachnoid block for caesarean section.*

Methods *Sixty parturient were randomly divided into three groups, 20 (twenty) parturient in each group. Group-A was received 0.5% bupivacaine 7.5 mg (one and half ml) in 0.5ml of 5% dextrose in water-total 2 ml, Group-B was received of 0.5% bupivacaine 5mg with fentanyl 5O µgm -total 2mL. and in Group-C was received 0.5% bupivacaine 5mg with tramadol 50 mg- total 2 ml were used for spinal anaesthesia. Height of sensory block was assessed by pin prick method and quality of motor block was assessed by Bromage scale. Duration of effective analgesia was recorded as the patients request for the first dose of analgesic. APGAR score was recorded at 1 and 5 minute after delivery of the baby.*

Result *The mean duration of block in group-A was 117,75± 22.96; in group-B was 166,00± 29-62 and group-C was 213.00± 27.35 min which was significant among three groups (P = 0.01). The mean change of systolic blood pressure among the three groups at 3 min., 4 min., 5 min., 6 min., 8 min., 9 mim, 10 min., 20 min. and 30 min. after SAB was found significant and the mean change of diastolic blood pressure was significant at 2, 3, 8, 9, 10, 20 min and p value was 0.020, 0.035, 0.058, 0.031, 0.040, 0.063 respectively after SAB. Hypotension occured 7 (seven) patients in group-A; 9 (nine) patients in group-B and 4 (four) patients in group-C. Itching was not found in group-A; 6 patients in group-B and no patient in group-C. Measurement of VAS after SAB was significant among the groups. There were also significant difference of VLAS among the groups in 1st hour (P =0.00049), 2nd hrs (P- 0.007) and 3rd hrs (P = 0.001) after of SAB, and interaction between groups were significant (P =0.001).*

Conclusion *Bupivacaine and tramadol combination may be a better choice for intrathecal anaesthetic agent in comparison to 0.5% of bupivacaine in 0.5ml of 5% dextrose with water or 0.5% of bupivacaine with fentanyl combination.*

Keywords *SAB, bupivacaine, fentanyl and tramadol*

(JBSA 2012; 25(2): 41-47)

Introduction

Obstetric anaesthesia is a demanding but gratifying sub-specialty of anaesthesiology. The widespread acceptance and use of regional anaesthesia for labour has made obstetric anaesthesia is a major part of most anaesthetic practices. The common indications for anaesthesia for parturients are caesarean section. Regional anaesthesia for caesarean section become the preferred technique because general anaesthesia has been associated with higher maternal mortality. Regional anaesthesia is advantageous in terms of less neonatal exposure to potentially depressant drugs, decreased risk of maternal pulmonary aspiration

and an awaken mother at the birth of her child[1]. Hyperbaric bupivacaine is the most common local anaesthetic used in subaracnoid block for caesarian section. A variety of ways have been tried to improve the quality of spinal anaesthesia during caesarian section, injecting large dose of local anaesthetic, making hyperbaric local anaesthetic solutions, addition of adrenaline, morphine or fentanyl to local anaesthetic agents. Adding an adjunct (opioids or non opioids) has allowed reduction in the dose of bupivacaine and provides cardiovascular stability[2]. In the context of " augmentation stratagies" a wide variety of opioids and non opioids are used as an adjunct to subarachnoid block to improve the quality of anaesthesia and prolongation of analgesia in the post operative peroid[3]. Opioids added to local anaesthetic for subarachnoid block was first introduced into clinical practice in 1979 with morphine sulphate as a forerunner. Morphine is a hydrophilic agent, may not be optimal as intrathecal drug for intraoperative analgesia because of less lipid soluble drug have a slower rate of onset of action and the drug may reach the medulla and cause delayed respiratory depression[4]. Fentanyl , a lipophilic opioid, has rapid onset of action following intrathecal administration[5]. So, fentanyl is suitable as intrathecal drug for intraoperative analgesia and also prolongs analgesia in the postoperative peroid[6].

Tramadol a pseudo opioid drug when used intrathecally binds with opioids receptor in the spinal cord. The analgesia produced by combination of bupivacaine and tramadol reports rapid onset and less degree of motor blockade . Respiratory depression, retention of urine, pruritis and limited doses are main problem of opiods, which has been eliminated by use of tramadol[7]. Tramadol of induced antinociceptive activity is mediated by the both opioid (mu) and non- opioid (inhibition of monoamino uptake) mechanisms[8]. Tramadol is a synthetic analgesic as it has both opioid and non opioid mechanism of action and may produce analgesia with less respiratory depression, sedation, gastrointestinal stasis and abuse potential. In therapeutic doses, the effects on ventilation and the cardiovascular system are clinically insignificant[9]. In one study it is seen that intrathecal tramadol causes a dose related suppressive effects on both sensory (A 6, C) and motor neural conduction in the spinal cord[10]. Tramadol administered epidurally has demonstrated to decrease postoperative analgesic requirements. However, its effects on post operative analgesia after intrathecal administration has not been yet studied. The effect of intrathecal tramadol administration on pain control after TURP was studied[11]. There are no such reports yet published that compares the efficacy of bupivacaine fentanyl and bupivacaine tramadol mixture for caesarean section by intrathecal technique. Thus in this study, we have compared the anaesthetic effect with effectiveness and adverse effects of these two regimens with bupivacaine in 0.5 ml of 5% dextrose in water after applied intrathecally during caesarean section.

Methods

This randomized prospective study was carried out in the department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University, Shabagh, Dhaka. With approval from the hospital ethical committee and written informed consent, a total of sixty parturients of ASA class I and II undergoing caesarean section were included in the study. Any one who had contraindication for regional anaesthesia were excluded from the study. All parturient were randomly divided into three groups 20 (twenty) parturient in each group. Group-A : 0.5% bupivacaine 7.5 mg one and half ml in 0.5ml of 5% dextrose in water-total 2 ml. Group-B:Concentraton of 0.5% bupivacaine 5mg with fentanyl 50 µgm -total 2mL.Group-C:Concentraton of 0.5% bupivacaine 5mg with tramadol 50 mg- total 2 ml. After arrival of the patient to the operation theatre baseline parameter (pulse, blood pressure, rate, lungs, respiratory rate and Spo2) recorded and anesthetic procedure was explained again to each patient. A 18 Gauge indwelling iv. canula was inserted into a peripheral vein. All parturient preloading with a 20 ml per kg Hartmann's solution during the 10 min.presiding spinal block. Under all aseptic precaution spinal anesthesia was performed in the left lateral decubitus position with a 27 Gauge Quincke spinal needle. After subarachnoid injection, mothers were immediately turn supine with left uterine displacement. All patients were received supplementation of O_2 via face mask.

Immediately after spinal anaesthesia pulse, blood pressure and Spo2 was recorded. Then pulse, blood pressure, respiratory rate and Spo2 was recorded every 3 minute for first 20 minutes, at 5 minutes interval for remainder of peration and thereafter 30 minutes interval until the patients complaints of pain. The occurrence of discomfort and side effects like pruritus, nausea and vomiting, shivering, chest pain restlessness etc. were recorded upto 24 hours. Hypotension was defined as a decrease in systolic blood pressure to less than 20% from the baseline was treated with bolus of IV fluid and ephedrin as required. Height of sensory block was assessed by pin prick method at 20 minutes after administration of spinal anaesthesia. The quality of motor block was assessed by Bromage scale. The quality of anaesthesia was assessed depending on quality of motor lock (onset time, bromage scale) and quality of sensory block(onset time, level of block) and on incidence of side effects and by interviewing the parturient for their satisfaction, Verbal rating Scale(VRS). According to quality of anaesthesia was categorized as excellent / good / fair / poor. Duration of effective analgesia(first dose of rescue analgesic) was recorded as the patients request for the first dose of analgesic. APGAR score was recorded at 1 and 5 minute after delivery of the baby.

Values were expressed as mean ± SD. Analysis was done by one-way and two-way ANOVA; chi - square and student's t-test (unpaired). P value <0.05 was considered significant.

Results

Table-I *Demographic data of study subject*

Chracter (s)	Groups			P	
	Group -A	Group-B	Group-C		
n	20	20	20		
Age (yr)	30.30+7.01	31.85±6.80	29.8515.60	0.597	NS
Height (cm)	150.95±3.61	151.70±1.41	150.4511.35	0.228	NS
Weight (kg)	56.7518.48	56.1013.80	56.6515.56	0.942	NS
Duration of Pregnancy	38.30±0.923	38.0011.076	38.601.820	0.120	NS

Legend : NS = Not Significant P > 0.01, VS = Very Significant P < 0.01, S = Significant p<0.05, HS= Highly Significant P<0.001.

Value are expressed as mean ± SD. Within parenthesis are percentage over column total. Between groups analysis were done by student's t' test (unpaired) and chi-squared one way or *two* way ANOVA as applicable. Values are regarded as significant if P< 0.05 (CI=95%).

There were no statistically significant differences in mean age, weight, height and gestational age between the three groups.

Hemodynamic changes during preoperative preriod

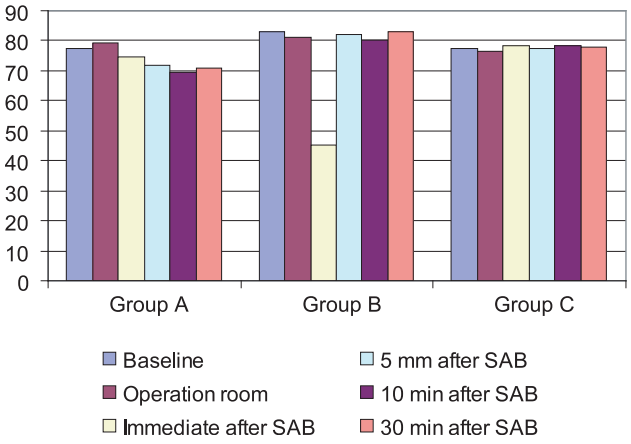

Fig 1 *Changes of heart rate during perioperative peroid*

Change of blood pressure

The mean change of systolic blood pressure of three groups are shown in Figure 2.

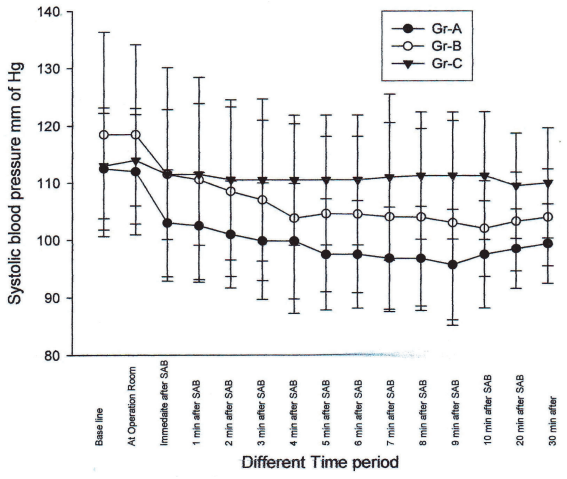

Fig 2 *Showing changes of systolic blood pressure in three groups at different time period*

The mean change of systolic blood pressure among the three groups were compared by ANOVA and found mean systolic bood pressure at preanaesthetic level was not significant (P=0.285), at operation room before SAB was not significant (P=O.209); at immediate after SAB was not significant (P=O.111) and at 1 min., 2 min., 7 min. was also not significant but at 3 min., 4 min., 5 min., 6 min., 8 min., 9 mim, 10 min., 20 min. and 30 min. after of SAB was found significant. P < 0.05.

The mean change of diastolic blood pressure of all groups are shown in Figure 3.

The mean change of diastolic blood pressure among the three groups were .compared by using ANOVA and founded mean diastolic blood pressure at immediate after SAB was not significant (P =0.268) at 1 min, 4 min, *5* min, 6 min, 7 min, 30 min and p value was 0,632,0.251,0.206,0.516, 0.167 respectively but it was significant at 2, 3, 8, 9, 10, 20 and p value was 0.020, 0.035, 0.058, 0.031, 0.040, 0.063 of after SAB.

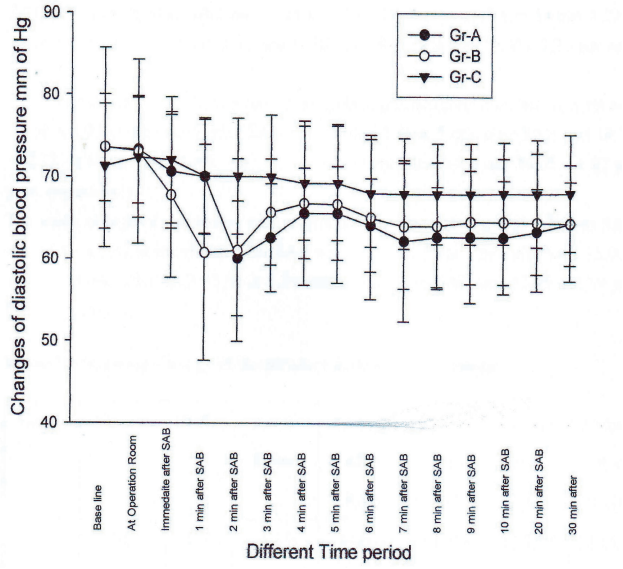

Fig 3 *Showing changes of diastolic blood pressure in three groups at different time period*

Table II *Showing occurence of hypotension in three groups.*

Group	Number	Yes	No	x^2	P
Gr-A	20	7	13		
Gr-B	20	9	11	2.85	0.230
Gr-C	20	4	15		

Values are expressed as mean + SD. Between groups analysis were done by student 'st' test (unpaired). Values are regarded as significant if p<0.05 (% = 2.85).

Hypotension occur 7 (seven) patients in group-A; 9 (nine) patients in group-B and 4 (four) patients in group-C.

Table III *Showing Occurrence of itching in three groups.*

Group	Number	Yes	'No	X^2	P
Gr-A	20	00	20	13.333	0.001
Gr-B	20	06	14		
Gr-C	20	00	20		

Values are expressed as mean ±SD. Between groups analysis were done by student's t' test (unpaired). Values are regarded as significant if p<0.05.

Itching was experienced no patient in group-A; 6 patients in group-B and no patient in group-C.

Table IV *Showing duration of block in min. between study groups.*

Group	Number	Mean± SD
Gr-A	20	117.75 ±22.96
Gr-B"	20	1 66.00 ± 29.629
Gr-C	20	213.00 ±27.357
f		63.187
P		0.000

Values are expressed as mean ± SD. Between groups analysis were done by student's 't'test (unpaired). Values are regarded as significant if p<0.05.

The mean duration of block in group-A was 117,75± 22.96; in group-B was 166,00± 29-62 and group-C was 213.00± 27.35 It was significant among three groups (P = 0.01).

Quality of analgesia:

Quality of analgesia was assessed by visual linear analogue scale (VLAS) and as well as by interviewing the patient intraoperatively. Datas have been shown in Table V.

Table V *Showing analysis of intensity of pain by VLAS in Three groups.*

Groups	First hour	Second hour	Third hour	F	P	
Gr-A	21.95 ±	18.65±	14.44 ±	11.96	0.004	vs
Cr-B	1.5423.30 ±	5.4523.00±	3.2414.38 ±	40.815	0.001	vs
Gr-C	1.1321.90 ±	5.1924.30±	1.5427.00±	39.047	0.001	vs
f	1.685.8491	1.418.2522	0.87114.5740			
P	0.0049VS	0.0007HS	0.001HS			

Values are expressed as mean ± SD. Between groups analysis were done by student's 't test (unpaired). Legend : NS = Not Significant P > 0.01, VS = Very Significant P < 0.01, S = Significant p<0.05, HS=Highly Significant P<0.001.

VAS after SAB significantly felt in group-A, group-B (P - 0.001) and group-C (P=0.001). There were also significant difference of VLAS among the groups in 1st hour (P =0.00049), 2nd hr (P= 0.007) and 3rd hr (P = 0.001) after of SAB, and interaction between groups was significant (P=0.001).

Discussion

Regional anaesthesia has become the preferred technique because general anaesthesia (G/A) has been associated with high maternal mortality. Preservation of conciousness and early postoperative analgesia is considered to be an advantage of regional anaesthesia.

The one cause limiting the choice of spinal anaesthesia for caesarean section is the possibility of neonatal depression because of severe hypotension after spinal anaesthesia. A variety of ways have been tried, to improve the quality\and reduce the complication of regional anaesthesia like the addition of adrenaline , morphine[12] or fentanyl[13]added to hyperbaric bupivacaine solution. More over the apparent synergistic effect between the two types of agents decreases dose requirements and provides excellent analgesia with few maternal side effects and little or no neonatal depression[14].

Fentanyl is a unique drug can be used intrathecally which binds with the poioid receptors and in combination with low dose bupivacaine provide adequate analgesia and decrease need of large volume of local anaesthetic agents when as a soal agent it does not.

Respiratory depresion effect of opioid commonly used interthecally can be attenuated by tramadol. Jones et al. used bupivacanine with fentalyl 37.5 µ.g without any adverse effect to neonate [13]. Reyburn et al. 1989 administered up to 600 µg of fentanyl in pregnant women during labour without any harmful effect on newborn[15]. Respiratory depression, retention of urine, pruritis and limited doses are main problem of opioids, which has been eliminated by use of tramadol[7]. Tramadol a pseudo-opioid drug when used intrathecaly binds with opioids receptors in the spinal cord. The analgesia produced by combination of bupivacaine and tramadol reports rapid onsest less degree of motor blockade[7].

During examination of the neuro chemical profile of tramadol revealed that, unlike morphine it also inhibited the uptake of norepinephrine (Ki=0.79 micro M) and serotonin (0.99 micro M)[8].

In therapeutic doses, the effects on ventilation and the cardiovascular system are clinically insignificant[9].

In one study it is seen that intrathecal tramadol causes a dose related supprcssive effects on both sensory (A S, C) and motor neural conduction in the spinal cord[10]. This result indicate that tramadol exerts a dose-related cental neural blockade. Antinociception is mediated by opioid (mu) and non-opioid (inhibition of monoamine uptake) mechanisms is advantage of tramadol.

Bupivacaine is longer acting commonly used local anaesthetic with no tachyphylaxis. As plain bupivacaine is unpredictable in dose requirement and achieving the block for pain fibres supply along the proposed operative field. Severeal reports[16] have suggested that the total dose of bupivacaine is more important than volume or concentration of anaesthetic solution in determining spread of

anaesthetic solution in cerebrospinal spinal fluid (CSF). To get the advantage of hyparbaric solution of local anaesthetic, 0.5 ml of 5% dextrose with water was added.

Bupivacaine alone on the otherhand is longer acting drug and have found analgesia for operative condition was good with minimal motor block with a dose of 7.5mg to 10 mg for spinal anaesthesia in casarean section required supplementary analgesia because of visceral pain during sergery[17].

Petersen and co-workers[17] reported that similar spread of sensory block to above T_3 developed in patients who received 7.5-10 mg and 10-12.5 mg of 0.5% hyperberic bupivacaine solution, but the use of a larger dose of bupivacaine resulted in a lesser frequency of moderate to severe visceral pain. In other study, the frequency of visceral pain and the requirement for supplementary opioid were significantly less in the 3-4 ml and 4-4.4 ml groups than in the 13.6 ml group (Chung, et al 1996)[18]. In our study, the duration of block (Group-A, Group-B, Group-C) were significantly difference among three groups. In Group-C, shown longer duration of block (sensory. and motor) than other groups. In this study, change of heart rate in Group-A, was significantly decreased from preanaesthetic value at immediately after SAB, at 5 min, at 10 min and at 30 min of after SAB.

But the change of of heart rate in group-B and group-C was not significant as group-A It is found that change of heart rate of group-C was more stable than other groups.

The change of blood pressure in group-A and group-B was significantly decreased immediate after SAB at 2 min, 3 min, 8 min, 9 min, 10 min, 20 min and at 30 min after block but the change in group-C was not significant as for as group-A and group-B.

The result of haemodynamic changes in our study consistent with the report of Lee B.Bet al[19].

The respiratory rate of group-B has significant changes at 5 min, immediate and at 30 min after performing the SAB. But in other groups change was not that much significant.

In this study, hypotension, bradycardia, nausea, vomiting and itching were found more-in gronp-B and group-A but a few in group-C, In groop-A, few patients had been shown-bradycardia and hypotension.

It has been shown, in this prospective experimental, randomized blind-envelop study that the benefit of lower incidence of motor block; equal effective anaesthesia is achievable for operative procedure using the combination of smaller dose[1] of bupivacaine in dextrose with water, or with bupivacaine and fentanyl, or the combination of bupivacaine-tramadol. No undue respiratory depression to both mother and neonate was recorded.

The result consistent with the result of Vaughan, et al 2001 they have been shown pruritus occur in some patient out of 62 on which one required treatment[20]. There were two incidence of nausea and vomiting requiring no treatment.

This study concluded that bupivacaine and tramadol combination may be a better choice for intrathecal anesthetic agent in comparison to 0.5% of bupivacaine in 0.5ml of 5% dextrose with water or concentration of 0.5% of bupivacaine with fentanyl combination.

References

1. Morgan GE, Mikhai MS, Murray MJ. Obstetric Anaesthesia. In: Clinical Anaesthesiology 3rd edition; New York: Mc Grow-Hill, 2002;43: 819-829
2. Dyer RA, Joubert A, Ivan A. Low-dose spinal anaesthesia for caesarean section. Anaesthesiology 2004; 4: 303-308
3. Saxena, AK, Arava, SK. Current concept in neuroaxial administration of opioids and non opioids: an overview and future perspective, Indian J. Anaesth 2004; 48: 13-24
4. Alan, RA, David J, Rowbotham, Smith G, 'postoperative pain', Textbook of anaesthesia, 4th edition, Churchill Livingstone:2002; 544-554
5. Etches, Rc, Sandler, AN, Daley, MD. Respiratory depression and spinal opioids. Can J. Anaesth 1989; 36: 165-85
6. Biswas, BN, Rudra, A, Bose, BK, et al. Intrathecal fentanyl with hyperbaric bupivacaine improve analgesia during caesarean delivery and in early postoperative period. Indian J. Anaesth. 2002;46:469-472
7. U Chandra. Current trends in Obstetric Analgesia, (Review, Report and Recommen-

dation) Abstract in 5th SACA and 1st SARPS congress, 75-80, Dhaka-2003

8. Raffa RB, Friderichs E, Reimann W, Shank RP, Codd EE, Vaught JL, R.W. Opioid and nonopioid components independently contribute to the mechanism of action of tramadol, an 'atypical' opioid analgesic, J Pharmacol Exp Ther. 1992; 260(1) 275-85
9. Aitkenhad AR, Rowbotham DJ and Smith G. Drugs acting on the cardiovascular and autonomic nervous system, Text book of Anaesthesiology 4th edition 2001;7:76
10. Jou IM, Chu KS, Chen HH, Chang PJ, Tsai YC, The effects of intrathecal Tramadol on spinal somatosensory-evoked potentials and motor-evoked responses in rats, Anesth Analg, 2003; 96(3):783-8
11. Alhashemi JA, Kaki AM. Effect of intrathecal tramadol administration on postoperative pain after transurethral resection prostate Br J Anaesth, Oct. 2003;91 (4):536-40
12. Abouleish E, Rawal N, Fallen K, Hernandez. Combined intrathecal morphine and bupivacaine for caesarian section, Anesthesia and Analgesia, 1988; 67: 370-374
13. Jones G, Paul DL, : Comparison of bupivacaine and bupivacaine with fentanyl in continuous extradural analgesia during labour. British Journal of Anaesthesia, 1989; 63:528-34
14. Morgan GE, Mikhali MS, Murray MJ, obstetric Anaesthesia, Clinical Anesthesiology 3rd edition 2002; 43: 822-829
15. Rayburn W, Rathke A, et al: Fentanyl citrate analgesia during labour. Am J Obstel Gynaecol, 1989;161: 202-6
16. Sheskey MC, Rocco AG, Bizzarn-Schmid M, Ptatter-DM, Lidstron H,Covino BG. A dose-response study of bupivacaine for spinal anaesthesia. anaesthesia and analgesia, 1983; 62, 931-935
17. Pedersen H, Santos AC, Steinberg ES, Schapiro HM, Harmon TW, Finster M. Insidence of visceral pain during caesarean section: the effect of varing dose of spinal bupivacaine. Anaesthesia and Analgesia, 1989; 69, 40-49
18. Chung C.J. Bae S.H. Chae K.Y. and Chin Y.J. spinal anaesthesia with 0.25% hyperbaric bupivacaine for caesarean section: effects of volume, Br J of Anaeshthesia 1996; 145-149
19. Leed B.B. Combined spinal epidural analgesia in labour : comparison of two doses of intrathecal bupivacaine witgh fentanyl Br J of Anaeshthesia 1999; 83: 868-71
20. Vaughan DJA, Ahmad N, Lewis N. Choice of opoid for initiation of combined spinal epidural analgesiain labour- fentanyl or diamorphine. Br J Anaesth.2001; 86:567

Original Article

Effective pain relief by autologous platelet rich plasma injection in patients suffering from plantar fasciitis - a new thought to culture

Md. Abu Taher[1], Md. Nur-E-Elahi[2], Md. Abul Kalam Chowdhury[3], Debasish Banik[4]

[1,2,3]Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka. [5]Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka

***Correspondence:** e-mail: doctorabutaher@yahoo.com.

Abstract

Background *To date the response of plantar fasciitis (PF) to any treatment is unpredictable. Autologous blood might provide cellular and humoral mediators to induce healing in areas of degeneration at the site of the underlying pathology of plantar fasciitis.*

Objective This randomized controlled study was designed to compare the effectiveness of local injection of autologous platelet rich plasma (PRP) and local steroid in reducing pain and improving function in patients with plantar fasciitis (PF).

Methods *The study population comprised two groups; patients of PF treated with steroid injection (n = 15) and patients of PF treated with PRP injection (n = 15). Patients were allocated randomly to receive either a steroid or PRP injections. All patients filled in visual analog scale (VAS) and foot health status questionnaire (FHSQ) for PF at base line and after 6 weeks at follow up.*

Results *PF patients comparison of VAS and FHSQ at base line and 6 weeks after treatment between control group and PRP group showed significant differences for VAS ($p = 0.005$ and $p < 0.001$, respectively), and for FHSQ ($p = 0.03$ and $p < 0.001$, respectively). While highly significant difference were observed between both groups regarding VAS and FHSQ changes ($p = 0.001$).*

Conclusion *Local injection of autologous PRP proved to be a promising form of therapy for PF. It is both safe and effective in relieving pain and improving function and superior to local steroids.*

Keywords *Autologous platelet rich plasma; plantar fasciitis; Foot health status questionnaire (FHSQ);*

(JBSA 2012; 25(2): 48-53)

Introduction

The most common cause of foot pain in the world may be due to plantar fasciitis (PF), a degenerative tissue condition near the origin of plantar fascia making up to approximately 11 to 15% of the foot symptoms requiring professional care among adults[1,2]. The incidence peaks in people between the ages of 40 to 60 years with no bias towards either sex [3].

Near the site of origin of the plantar fascia, at the medial tuberosity of the calcaneous there is degenerative changes that can be characterized in acute condition by classical signs of inflammation including pain, swelling and loss of function[4]. But surprisingly in more chronic conditions histology has shown infiltration with macrophages, lymphocytes, and plasma cells; tissue destruction; and repair involving immature vascularization and fibrosis into the affected area , resulting the usual fascia to be replaced by an angiofibroblastic hyperplastic tissue which spreads itself throughout the surrounding tissue creating a self-perpetuating cycle of degeneration [5].

To date various methods for treatment of this notorious condition including rest, nonsteroidal anti-inflammatory medication, night splints, foot orthosis, stretching protocols and extracorporeal shock wave therapy, steroid injection have been

tried but only seem to be useful in the short term and only to a small degree [6]. Other various types of surgical procedures have also been recommended [2,7-11]. The use of corticosteroids is particularly troubling as several studies have linked plantar fascia rupture to repeated local injections of a corticosteroid [2,11-13] .

Platelet Rich Plasma (PRP) uses the natural healing properties of patient's own blood. At the time of treatment venous blood is collected into a special tube similar to a simple blood test. The platelets and growth factors are separated. PRP is injected into the area of injury or degeneration under imaging control. Platelets in PRP contain alpha granules that release certain growth factors. These growth factors are natural chemical substances that stimulate the healing cascade involving naturally occurring Stem Cells that are required for repair of damaged tissue. PRP 'directs' stem cells in our body to generate a healing response by regenerating the damaged part. Thus PRP enhance wound healing, bone healing and also tendon healing [14, 15]. PRP injection is a safe procedure with very minimal risks. In addition PRP possesses antimicrobial properties that may contribute to the prevention of infections [16]. In humans it has been shown that the injection of whole blood into the tendon decreases pain [17]. The introduction of platelet rich plasma (PRP) as a possible adjunct to conservative and operative treatment has motivated significant research in the topic [18].

In PF the injection of PRP into the affected tissue addresses the healing stages necessary to reverse the degenerative process which are going on in the base of the plantar fascia. Moreover the treatment of tendinosis with an injection of PRP may be a nonoperative alternative. This treatment concept directly addresses the existing condition and should prove to be a superior alternative to current conservative treatments for chronic PF[19].

All these new lines of evidences inspired us to evaluate the effectiveness of local injection of autologous PRP in reducing pain and improving function in patients with plantar fasciitis (PF) compared with local injection of corticosteroid.

Methods

This randomized clinical study was carried out in the Mahalatye District Hospital, Botswana from July, 2010 to December, 2012. A total of 30 patients recruited for the studies were divided into control group received steroid injection; (n=15) and PRP group (n-15) received pRP injection each.

Thirty patients diagnosed as Plantar Fasciitis (PF) of both genders, aged above 18 years were included: they had inferior heel pain that was usually worse with their first steps in the morning or after a period of inactivity, with maximal tenderness over the anteromedial aspect of the inferior heel. None of our patients received local steroid injections, non-steroidal anti-inflammatory at least 4 weeks prior to the study.

Patients with previous surgery for PF, vascular insufficiency or neuropathy related to heel pain, hypothyroidism and diabetics were excluded. History of anemia (hemoglobin <7.0 g/dl), thrombocytopenia (platelets <150 × 103 ìL) or bleeding dyscrasias, significant cardiovascular, renal or hepatic disease, local malignancy were also excluded.

All included patients on the 1st visit were evaluated by a full medical history and physical examination and then each patient marked the level of pain on the visual analog scale (VAS) (0–10). The score records the patient's reported pain where 0 is pain-free and 10 is the worst pain imaginable.

All affected patients in both groups were screened with standard X-ray projections to exclude bony abnormalities of the calcaneus. The functional assessment and satisfaction was measured using the foot health status questionnaire (FHSQ).

Preparation of Platelet Rich Plasma

Various blood separation devices have differing preparation steps essentially accomplishing similar goals. We used the Biomet Biologics GPS III system for simplicity. About 30–60 ml of venous blood is drawn with aseptic technique from the antecubital vein. An 18 or 19 g butterfly needle is advised, in efforts of avoiding irritation and trauma to the platelets which are in a resting state. The blood is then placed in an FDA approved device and centrifuged for 15 min at 3,200 rpm. Afterward, the blood is separated into platelet poor plasma

(PPP), RBC, and PRP. Next the PPP is extracted through a special port and discarded from the device. While the PRP is in a vacummed space, the device is shaken for 30 s to re-suspend the platelets. Afterwards the PRP is withdrawn. Depending on the initial blood draw, there is approximately 3 or 6 cc of PRP available.

Injection procedure

All patients gave an informed written consent, which was approved by local ethical committee in the Hospital. The patients were informed of the rare possibility of temporary worsening symptoms after the injection. This is likely due to the stimulation of the body's natural response to inflammatory mediators. Although adverse effects are uncommon, as with any injection there is a possibility of infection, no relief of symptoms, and neurovascular injury. Scar tissue formation and calcification at the injection site are also remote risks. All these issues were discussed with the patient prior having consent.

The area of injury was marked while taking into account the clinical examination and data from imaging studies such as MRI and radiographs. We used a dynamic musculoskeletal ultrasound with a transducer of 6–13 Hz in an effort to more accurately localize the PRP injection. Under sterile conditions, the patient received a PRP injection with approximately 1 cc of 1% Lignocaine and 1 cc of 0.25% Bupivacaine directly into the area of injury. Recommendation according to NICE guideline of using a peppering technique spreading in a clock-like manner to achieve a more expansive zone of delivery was followed.

The patient was observed in a supine position for 15–20 min afterwards, and was then discharged home. Patients typically experienced minimal to moderate discomfort following the injection which lasted for up to 1 week in 3 cases. They were instructed to ice the injected area if needed for pain control in addition to elevation of the limb and modification of activity as tolerated. They were instructed to rest and to avoid weight bearing for 48 hours after injection with a subsequent increase in ambulation over the next days. If needed they were only allowed acetaminophen for pain and use of any non-steroidal anti-inflammatory medication were strictly prohibited. Patients were allowed to return to a comfortable shoe after two days. Six weeks later, all patients were re-evaluated and refilled VAS and FHSQ during follow-up.

Quantitative variables were described using mean ± standard deviation (SD) and categorical data by frequency and percentage. Student's t-test was used to compare quantitative variables between groups of patients. Levene's test for equality of variances and t-test for equality of means were used to examine the changes of VAS and FHSQ at base line and at follow-up after treatment. In all tests, p value <0.05 was considered to be statistically significant.

Results

The mean age of the control group in PF patients was 44.5 ± 15.5 years, and among PRP group were 42.5 ± 17.5 years. The control group includes 5 males and 10 females, while the PRP group includes 6 males and 9 females. In the control group, 7 patients had right heel affection, and 8 had affection of the left heel. In the PRP group, 11 patients had right heel affection and 4 had affection of the left heel.

Table I *Comparison of patients' outcome regarding VAS and FHSQ Scores in both groups.*

Parameter	Control Group (mean ± SD)		*P Value*	PRP Group (mean ± SD)		*PValue*
	1st Visit	2nd Visit		1st Visit	2nd Visit	
VAS (0-10)	8.26 ± 8.33	5.67 ± 5.6	<0.005*	8.26 ± 1.22	2.2 ± 0.9	<0.000**
FHSQ Score	57.6 ± 8.64	40.06 ± 9.89	<0.030*	58.87 ± 6.32	23.6 ± 7.19	<0.000**

VAS, visual analog scale; PF, plantar fasciitis; PRP, platelet rich plasma; FHSQ, foot health status questionnaire.

* Significant ($p < 0.05$).

** Highly significant ($p < 0.001$)

Significant differences were observed between both groups relative to VAS assessment (1st visit versus 2nd visit) in both control group ($p = 0.005$) and PRP group of patients ($p = 0.03$). Relative to FHSQ score highly significant differences were observed between control group and PRP group of patients ($p < 0.001$).

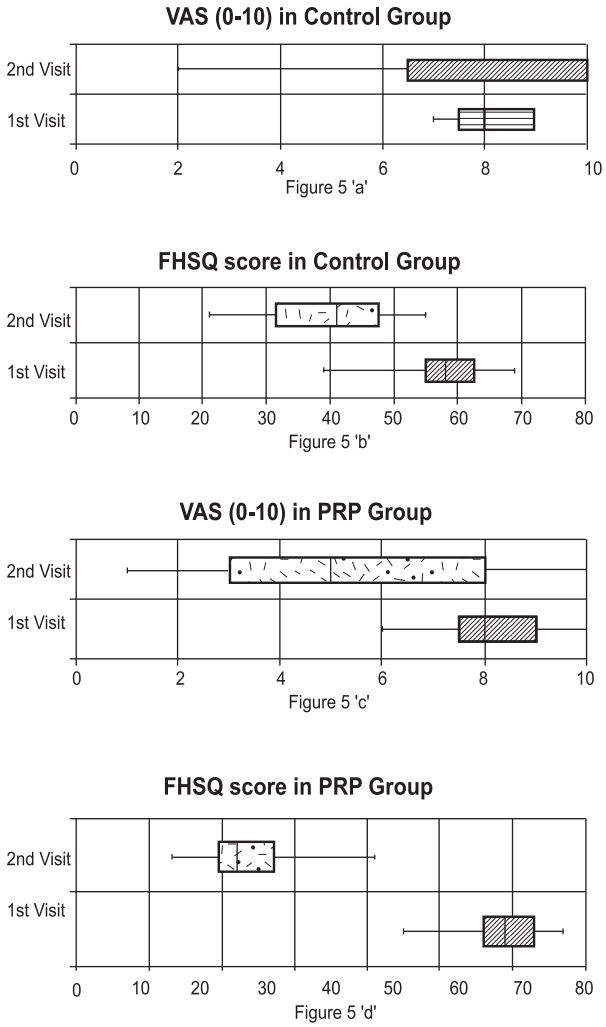

Fig 5(a-d) *Box plot showing the significant difference between VAS and foot health status questionnaire (FHSQ) scores (1st visit) versus (2nd visit) in both control group and PRP group of patients.*

VAS and FHSQ score changes among control and PRP groups of patients with PF showed no significant difference between both groups regarding base line VAS ($p = 0.147$) and baseline FHSQ ($p = 0.741$). While highly significant difference were observed between both groups regarding VAS 2nd visit ($p < 0.001$) and FHSQ 2nd visit ($p = 0.001$) and another highly significant difference between both groups regarding VAS and FHSQ changes ($p = 0.001$). However PRP treated group of patients showed much significant improvement compared to control group reflecting better efficacy.

Discussion

The current study revealed that local injection of PRP, which is a novel form of treatment, provides significant relief of pain and improvement in function that is superior to local steroid injection. Moreover, it provides a safer option for patients who have contraindications to steroid therapy (e.g. diabetics), and an option for patients who are considered for surgical intervention.

Although refractory chronic tendinopathy may be responsive to PRP injection, yet the data available to date are limited by quality and size of study, as well as length of follow-up, and are currently insufficient to recommend this modality for routine clinical use [16]. However autologous PRP was proved to improve the early neotendon properties [17] and improve tissue healing by enhancing cellular chemotaxis, proliferation and differentiation, removal of tissue debris, angiogenesis, and the laying down of extracellular matrix [18,19].

However treatment with corticosteroids has a high frequency of relapse and recurrence, probably because intra fascial injection may lead to permanent adverse changes within the structure of the fascia and because patients tend to overuse the foot after injection as a result of direct pain relief [20]. Additionally and more seriously repeated corticosteroids injections could predispose to rupture of the plantar fascia and consequently amend for surgical intervention. The later complication was critically addressed in the study by Acevedo and Beskin [21] . In their study a total of 765 patients with PF were evaluated. Fifty-one patients were diagnosed with plantar fascia rupture, and 44 of these ruptures were associated with corticosteroid injection. Most important to conclude from their study is that thirty-nine of these patients were evaluated at an average 27-month follow-up. Thirty patients (68%) reported a sudden onset of tearing at the heel, and 14 (32%) had a gradual onset of symptoms. In most cases the original heel pain was relieved by rupture. However, these patients subsequently developed new problems including longitudinal arch strain, lateral and dorsal midfoot strain, lateral plantar nerve dysfunction, stress fracture, hammertoe deformity, swelling, and/or antalgia.

In our study we observed significant difference between control and PRP group regarding VAS and FHSQ scores (1st visit versus 2nd visit) and highly significant difference regarding VAS ($p < 0.001$) and FHSQ scores changes ($p < 0.001$) between both groups. Importantly the PRP treated group showed much significant improvement compared to control group reflecting better efficacy. However sustained efficacy should be further evaluated in longitudinal follow-up studies.

In previous work Lee et al. [22] conducted prospective, randomized, controlled, observer-blinded study over a period of 6 months. In their study Sixty-four patients were randomly allocated to either the autologous blood or corticosteroid treatment group. The authors reported that the reduction in VAS for both groups was significant over time ($p < 0.0001$). At 6 weeks and 3 months, the corticosteroid group had significantly lower VAS than the PRP group ($p < 0.011$ and $p < 0.005$, respectively), but the difference was not significant at 6 months. The authors concluded that intralesional autologous blood injection is efficacious in lowering pain and tenderness in chronic PF, but corticosteroid is more superior in terms of speed and probably extent of improvement. A forthcoming randomized controlled multi center trial will be performed by Peerbooms et al. [19]. The study population will consists of 120 patients of 18 years and older. Patients with chronic PF will be allocated randomly to have a steroid injection or PRP injections. Data will be collected before the procedure, 4, 8, 12, 26 weeks and 1 year after the procedure. The authors postulate that the concentrated growth factors work in a synergetic manner to initiate a tendon healing response. Their authors suggested that transforming growth factor â1 is shown to significantly increase type I collagen production by tendon sheath fibroblasts. This same mechanism is likely to be active in chronic PF [23].

In our study PRP treated group of patients with PF showed much significant improvement compared to steroid treated group reflecting better efficacy.

Conclusion

Local injection of autologous PRP proved to be a promising form of therapy for Plantar Fasciitis. It is both safe and effective in relieving pain and improving function. The current available data support that repeated steroid injections is deleterious and may lead to serious consequences. However sustained efficacy of this promising and safer therapeutic option should be further evaluated in longitudinal follow-up studies that include larger number of patients.

References

1. Pfeffer G, Bacchetti P, Deland J, Lewis A, Anderson R, Davis W, et al. Comparison of custom and prefabricated orthoses in the initial treatment of proximal plantar fasciitis. *Foot Ankle Int* 1999, 20: 214-221
2. Cole C, Seto C, Gazewood J. Plantar fasciitis: evidence-based review of diagnosis and therapy.*Am Fam Physician* 2005, 72: 2237-2242
3. Taunton J, Ryan M, Clement D, McKenzie D, Lloyd-Smith D, Zumbo B. A retrospective case-control analysis of 2002 running injuries. *Br J Sports Med* 2002; 36: 95-101
4. Buchbinder R. Clinical practice. Plantar fasciitis. *N Engl J Med* 2004; 350:2159-2166
5. Lemont H, Ammirati K, Usen N. Plantar fasciitis: a degenerative process (fasciosis) without inflammation. *J Am Podiatr Med Assoc* 2003; 93: 234-237
6. Crawford F, Thomson C. Interventions for treating plantar heel pain (Review). *Cochrane* 2003
7. Wolgin M, Cook C, Graham C, Mauldin D. Conservative treatment of plantar heel pain: long-term follow-up. *Foot Ankle Int* 1994; 15: 97-102
8. Martin R, Irrgang J, Conti S. Outcome study of subjects with insertional plantar fasciitis. *Foot Ankle Int* 1998; 19: 803-811
9. Davies M, Weiss G, Saxby T. Plantar fasciitis: how successful is surgical intervention? *Foot Ankle Int* 1999; 20: 803-807
10. Speed C, Nichols D, Wies J, Humphreys H, Richards C, Burnet S, Hazleman B. Extracorporeal shock wave therapy for plantar fasciitis. A double blind randomised controlled trial. *J Orthop Res* 2003; 21: 937-940

11. Acevedo J, Beskin J: Complications of plantar fascia rupture associated with corticosteroid injection. *Foot Ankle Int* 1998; 19: 91-97

12. Sellman J. Plantar fascia rupture associated with corticosteroid injection. *Foot Ankle Int* 1994; 15: 376-381

13. Leach R, Jones R, Silva T. Rupture of the plantar fascia in athletes. *J Bone Joint Surg [Am]* 1978; 60: 537-539

14. Nirschl R. Elbow tendinosis/tennis elbow. *Clin Sports Med* 1992; 11: 851-870

15. Sclafani A, Romo T, Ukrainsky G, McCormick S, Litner J, Kevy S, Jacobson M. Modulation of wound response and soft tissue ingrowth in synthetic and allogeneic implants with platelet concentrate. *Arch Facial Plast Surg* 7: 170-171

16. Edwards S, Calandruccio J. Autologous blood injections for refractory lateral epicondylitis. *J Hand Surg Am* 2003, 28: 272-278

17. Ranly D, Lohmann C, Andreacchio D, Boyan B, Schwartz Z. Platelet-rich plasma inhibits demineralized bone matrix-induced bone formation in nude mice.*J Bone Joint Surg [Am]* 2007; 89:139-147

18. J.F. Woessner Jr. The determination of hydroxyproline in tissue and protein samples containing small proportions of this imino acid. *Arch Biochem Biophys* 1961, 93: 440

19. Buckmire MA, Parquet G, Greenway S et al. Temporal expression of TGF-â1, EGF, and PDGF-BB in a model of colonic wound healing. *J Surg Res* 1998; 80: 52

20. Rots WI, Mokoena T. Successful endoscopic closure of a benign gastrocolonic fistula using human fibrin sealant through gastroscopic approach: A case report and review of the literature. *Eur J Gastroenterol Hepatol* 2003; 15: 1351

21. T.E. Bucknall.The effect of local infection upon wound healing: An experimental study. *Br J Surg* 1980; 67: 851

22. T.G. Lee, T.S. Ahmad. Intralesional autologous blood injection compared to corticosteroid injection for treatment of chronic plantar fasciitis. A prospective, randomized, controlled trial. *Foot Ankle Int* 2007; 28: 984–990

23. M. Wrotniak, T. Bielecki, T. Gazdzik. Current opinion about using the platelet-rich gel in orthopaedics and trauma surgery. *Orthop Traumatol Rehabil* 2007; 9: 227–238.

Original Article

Post dural puncture headache following subarachnoid block for caesarean section: A comparision between 25G and 27G Quincke spinal needle

Md Raihan Uddin*[1], Mahbubul Hasan Munir[1], AKM Nurnobi Choudhury[1], Md Shafiqul Islam[2], AKM Faizul Haque[2], MA Hye[2]

[1]Department of Anesthesiology& SICU, IMC & BIRDEM, [2]Department of Anesthesia, Analgesia and ICU, BSMMU

Corresponding Author: E-mail

Abstract

Background *Post Dural puncture headache is an iatrogenic complication following subarachnoid block. Fine gauge spinal needle especially 27G though requiring technical expertise to use, probably represents the optimum needle for SAB in respect to frequency and severity of PDPH.*

Objective *To compare the frequency and severity of post Dural puncture headache in obstetric patients using 25G and 27G Quincke spinal needle.*

Methods *Forty full term parturient aged between 18-45 years, with ASA physical status I &II underwent elective Caesarean section under SAB were randomly divided into two groups. Anesthetic technique was standardized using 1.5-2.0 ml 0.5% hyperbaric bupivacaine at L3-4 interspace.Frequency and severity of post dural puncture headache (PDPH) were recorded. Data were analyzed using SPSS program.*

Results *Frequency of PDPH following the use of 25G Quincke (Group I) and 27G Quincke (Group II) spinal needs was 20% (4/20) and 0% (0/20) respectively. All PDPH in Group I was moderate in type and no severe PDPH developed in any Group. Most of the patients with PDPH developed it on 1st and 2nd post-operative day.*

Conclusion: *when using a 27G Quincke spinal needle, the frequency and severity of PDPH was significantly lower than when a 25G Quincke spinal needle was used.*

Key words *SAB, PDPH, 25G & 27G QSN*

(JBSA 2012; 25(2): 54-58)

Introduction

General anesthesia for Caesarean section is associated with relatively greater maternal risk than regional anesthesia. Spinal anesthesia has therefore become more widely practiced anesthetic technique in Caesarean delivery. It is simple to institute, rapid in its effect and produces excellent operating conditions.[1]It also avoids fetal as well as maternal risks of general anesthesia, requires minimum postoperative anesthesia care and provides adequate postoperative analgesia.[2]

Post dural puncture headache (PDPH) is an complication of SAB and results from puncture of the duramater. The signs and symptoms of PDPH results from loss of cerebrospinal fluid, traction on the cranial contents, and reflex cerebral vasodilatation.[3]Two most important factors influencing the frequency and severity of PDPH are the patient's age and the size of the dural perforation.[4] The parturient is at particular risk of PDPH because of her sex and young age.[5] Fine gauge spinal needles, 29G or smaller, are technically more difficult to use, and are associated with a high failure rate for SAB.[6] 25G, 26G and 27G needles probably represent the optimum needle for SAB regarding frequency and severity of PDPH .[7]

The aim of this study was to compare the frequency and severity of PDPH in obstetric patients undergoing Caesarean section under SAB with

different size spinal needles: 25G Quincke and 27G size Quincke spinal needle.

Methods

This prospective, randomized study was undertaken in obstetric units of BIRDEM General Hospital. The patients were selected randomly. The randomization was double blind except for the anesthetist performing spinal block. Patient surgeon and the assessor in the ward did not know which spinal needle was used. Study was approved by the institutional ethics committee. Written informed consent was obtained from each patient. Forty full term parturient aged between 18-45 years, with ASA physical status I &II underwent elective caesarean section under SAB were randomly divided into two groups. Uncomplicated pregnancy and normal fetal heart rate at the time of surgery were mandatory inclusion criteria. The exclusion criteria were: patient refusal, contraindication to spinal anesthesia for infections, hemodynamic, hemostatic or neurological reasons, emergency Caesarean section, severe pre-eclampsia or failure of spinal anesthesia.

All patients fasted for 6-8 hours and received ranitidine 150 mg orally on the morning of surgery. On arrival in the operation theatre, patients were positioned supine with left lateral displacement of 20^0 by putting a wedge under the right hip. A 3-lead ECG monitor, pulse oximeter and an automated non-invasive blood pressure monitor were applied. A fluid preload of crystalloid solusion15-20 ml/kg body weight was administered via 18G intravenous cannula over a period of 10-15 minutes before proceeding for spinal anesthesia. Spinal anesthesia was performed with the patient in sitting position after disinfection with povidone iodine. Spinal needle was inserted through the L3-4 interspace.

After return of clear cerebrospinal fluid, hyperbaric bupivacaine 0.5%, 7.5-10 mg (1.5-2.0 ml) was injected over 10-20 seconds, through either a 25G Quincke (Group I) or a27GQuincke (Group II)spinal needle. The bevel of the spinal needles was kept parallel to the sagittal plane to prevent cutting of the dural fibers. Patients were then positioned supine with wedge under the right hip, and O_2 was given at a rate of 2 liters/min via a facemask. Numbers of attempts at subarachnoid block were limited to one. Patients with more than one attempt were excluded from the study.

ECG and oxygen saturation were monitored continuously, and arterial pressure was measured every 3-minutes during surgery and every 15-minutes during immediate postoperative period. If patient developed hypotension, it was managed by intravenous crystalloids and/or colloids. Hypotension associated with bradycardia was managed with intravenous atropine and crystalloids or colloids. In case of refractory hypotension, injection ephedrine was used in 5-10 mg boluses.

Postoperatively, all patients were assessed daily for 4-days by an investigator, blinded to the size of needle used. PDPH was defined as a headache aggravated by assuming upright position and relived in the supine position. Other types of headache were considered as non-specific and were not included in PDPH category. Severity of PDPH was graded as mild, moderate and severe and was classified according to the criteria listed in table I.

Statistical analysis was performed using SPSS program. Quantitive variables were expressed as Mean ± SD (standard deviation) with qualitative variables were expressed as percentage. PDPH was analyzed using student's t test and chi-square test. A p-value <0.05 was considered significant.

Treatment of PDPH included bed rest, enhanced fluid intake, analgesics and caffeine and avoidance of straining. None of the patients required epidural blood patch, which is the definitive treatment in refractory cases.

Results

Patients received SAB using 27G Quincke spinal needle had a statistically significant less PDPH (p = 0.035) compared with those received 25G Quincke spinal needle. Moreover patients who suffered from PDPH in Group I (25G Quincke needle) was moderate in nature and were managed with conservative treatment without the requirement of epidural blood patch. There were no significant difference between two groups in respect to hemodynamic variables or side effect intraoperatively.

Table I *Grading of PDPH severity*[8]

Mild	No limitation of activity
	No treatment required
Moderate	Limited activity
	Regular analgesics required
Severe	Confined to bedAnorexia
	Unable to feed baby

Table II *Demographic data*

	Group I25 G Quincke	Group II27 G Quincke	p-value
Age (yrs) Means ± SD	25.8±5.60	26.4±5.86	0.340
Weight (kg) Means ± SD	60.0±8.36	61.7±8.45	0.165
Parity Primipara	8 (40%)	9 (45%)	0.808
Multipara	12 (60%)	11(55%)	0.835
Physical status ASA I	9 (45%)	8 (40%)	0.808
ASA II	11 (55%)	12 (60%)	0.835

Values are expressed in mean ± SD.The value is significant if p<0.05
ASA I = A normal healthy patient
ASA II = A patient with mild systemic disease with no functional limitation

Table III *Frequency of PDPH*

PDPH	Group I (n=20) 25G Quinckeneedle(%)	Group II (n=20) 27G Quinckeneedle(%)	p-value
Present	4 (20%)	0 (0%)	0.035
Absent	16 (80%)	20 (100%)	

The value is significant if p< 0.05

Table IV *Grading of PDPH*

PDPH	Group I (n=20) 25G Quinckeneedle(%)	Group II (n=20) 27G Quinckeneedle(%)
Mild	0	0
Moderate	4(20%)	0

Table V *Onset of PDPH*

Onset (POD)	25G Quincke needle (%) (n=20)	27G Quinckeneedl (%)(n=20)
1st POD	1(5%)	0
2nd POD	3(15%)	0
3rd POD	0	0

POD= Postoperative day

Discussion

General anesthesia for Caesarean section is associated with an increased incidence of maternal mortality.[9] It is therefore a popular practice to use regional anesthesia wherever possible.[10]

Headache after dural puncture is a complication of spinal anesthesia and is believed to result from leakage of CSF both at the time of dural puncture and probably more importantly, continuing leak afterwards.[11]Post dural puncture headache is a complication that should not be taken lightly. There is a potential for considerable morbidity due to postdural puncture headache[12] and there are reports of PDPH symptoms lasting for months or years[13],untreated PDPH leading to subdural hematoma[14,] and even death from bilateral subdural hematomas.[15] Therefore anesthesiologists are advised to prevent PDPH by optimizing the controllable factors like spinal needle size as well as shape while conducting spinal anesthesia.[16]Obstetric patients are at high risk of PDPH being female and under 40 years of age.[17] Indeed, the highest incidence of PDPH is in the parturient and may partly explain the higher incidence of PDPH in females as a whole.[18]

Diagnosis of dural puncture headache depends upon its association with body position; the pain is aggravated by sitting or standing and relieved or decreased by lying down flat.[19]

Apart from other factors, post dural puncture headache is related to the size as well as the type of the spinal needle used.[20] It is progressively reduced with the use of thinner Quincke type spinal needles.[21] The overall incidence of post dural puncture headache ranges from 0% to 37% as reported by various authers.[22]

Reported incidence of PDPH ranges from 4%[23] to 40%[24] when 25G Quincke spinal needle is used in young female patients. Incidence of PDPH with 27G Quincke needle ranges from 1.1%[25] to 12.8%[26.] In the study by Roheena andcolleagues[25,] severity of PDPH was ranges from mild to moderate. None of the patient complained of severe PDPH. It was more on the 1st and 2nd postoperative day and gradually decreased on the subsequent days.

In our randomized study, the frequency of PDPH was 20% with 25G needle, 0% with 27G needle and was moderate in all patients PDPH was not

observed in any group. Our study, therefore, clearly demonstrated a significant reduction in frequency of PDPH when 27G Quincke spinal needle was used. In a recent study by Muhammad *et al*[27]frequency of PDPH was 0% with 27G Quincke spinal needle, which closely resemble our study.

Conclusion

Performing subarachnoid block using 27G Quincke spinal needle offers a safe, well tolerated anesthetic technique for caesarean section and has definite advantage over 25G Quincke spinal needle.

References

1. Ranasinghe JS, Steadmann J, Toyoma T, Lai M.Combind spinal epidural anesthesia is better than spinal or epidural alone for Caesarean delivery. Br J Anesthesiology 2003; 91(2): 299-300
2. Fauzia B,Saleem S, Safia Z, Nabeela R, Mirza NI. Saeeda H, Intrathecal fentanyl as adjunct to hyperbaric bupovacaine in spinal anesthesia for Caesarean section. JCPSP 2006;16(2):87-90
3. Hawkins JL, Koonin LM, Palmer SK, Gibbs CP. Anesthesia related death during obstetric delivery in the United states. Anesthesiology 1997; 86(2): 277-84
4. Reid JA, Thorburn J, Editorial H. Headache after spinal anesthesia. Br J Anesth 1991; 67: 674-7
5. Flatten H, Rodt SA, Rosland J, Vamnes J. Postoperative headache after spinal anesthesia. Anesthesia 1987; 42: 202-5
6. Flatten H, Rodt SA, Rosland J, Vamnes J, Wisborg T, Koller. Post dural puncture headache : A comparison between 26 and 29 gauge needles in young patients. Anesthesia 1989; 44: 147-9
7. Kang SB, Goodnough DE, Lee YK, Olson RA, Borshof JA, Furiano MM *et al.* Comparison of 26 and 27 gauge needle for spinal anesthesia for ambulatory surgery patients. Anesthesiology 1992; 76(5): 734-8
8. David C, Campbel MD, Joanne DM, Timothy JG, Pamela MB, Graham H *et al.* Comparison of 25 gauge whitacre with the 24 gauge Sprotte spinal needle for elective Caesarean section. Can J Anesth 1993; 40: 1131-5
9. Tortosa JC, Parry NS, Mareier FJ, Mazoit JX, Benhamou D. Efficacy of of augmentation of epidural analgesia for Caesarean section. Br J Anesth 2003; 91(4): 532-5
10. Choi PT, Galinski SE, Takeuchi L, Lucas S, Tamyo C, Jadad AR. PDPH is a common complication of neuraxial blockade in parturients: a meta-analysis of obstetrical studies. Can J Anesth 2003; 50: 460-9
11. Wayne Kleinman, Majed Mikhail. Spinal, epidural and caudal block in: GE Morgan, MS Mikhail, MJ Murry. Clinical Anesthesiology 4th Edition 2006. p 319
12. Eorola M, Kaukinen L, Kaukinen S. Fatal brain lesion following spinal anesthesia. Report of a case. Acta Anesthesial Scand 1981; 25: 115-6.
13. Gerrtse BM, Gielen MJ. Seven month delay for epidural blood in PDPH. Eur J Anesthe 1999; 16: 650-1
14. Zeidon A, Farhat O, Maaliki H, Baraka A. Does PDPH left untreated lead to subdural hematoma! Case report and review of literature. Int J ObstetAnesthe 2006; 15(1): 50-8
15. Grieff J, Cousins MJ. Subarachnoid and extradural anesthesia. In: Nimmo WS, Row Bothom DJ, Smith G. Anesthesia 2nd edition. Blackwell Scientific Publication London 1994; P1411-54
16. Gunadyn B, Keraka G. Prevention strategy for postdural puncture headache. Acta Anesthe Bel 2006; 57(2): 163-5
17. Ahsan S, Kitchen N, Jenkins C, Margery J. Incidence of postdural puncture headache following spinal anesthesia for lower segment Caesarean section with 25 gauge polymedic spinal needle. J Pak Med Assoc 1996; 46: 278-81
18. Hopkinson JM, Samaan AK, Russell IF, Birks RJS, Patric MR. A comparativemulticentre trial of spinal needles for Caesarean section. Anesthesia 1997; 52: 998-1014

19. Garry M, Davies S. Failure of regional blockade Caesarean section. Int J ObstetAnesthe 2002; 11:9-12

20. Halpern S, Preston R. Post dural puncture headache and spinal needle design. Anesthesiology 1994; 81: 1376-83

21. Lambert DH,Herly RJ,Hertwing L, Datta S. Role of needle gauge and tip configuration in the production of lumber puncture headache. Regional Anesth1997; 22: 66-72

22. Shut LE, Valentine SJ, Wee MYK, Page RJ, Prosser A, Thomas TA. Spinal anesthesia for Caesarean section: comparison of 22 gauge and 25 gauge Whitacre needle with 26 gauge Quincke needles. Br J Anesthe 1992; 69: 589

23. Nazh H, Subhana T, Tayyab M. Spinal anesthesia for Caesarean section. JSP 2002; 7(1): 19-21

24. Roheena W, Nasreen L, Fayaz AQ, Akbar SJ. The frequency of PDPH in different age groups. J Coll Physicians Sur Pak 2006; 16(6): 389-99

25. Lynch J, Kasper SM, Strike K, Topalidis K, Schaaf H, Zeeh D, Kings-Ernst I. The use of Quincke and whitacre 27 gauge spinal needles in orthopedic patients: incidence of failed spinal anesthesia and PDPH. AnesthAnalge 1994;79: 124-8

26. Saul Wiesel, Michael JT, Jane E. Post dural puncture headache: a randomized prospective comparison of the 24 gauge Sprotte and the 27 gauge Quincke spinal needles in young patients. Can J Anesthe 1993; 40(7): 607-11

27. Muhammad SK, Ghulam NM, Safia MS, Maksood AS. Post dural puncture headache in obstetric: a comparative study using 25 gauge Whitacre and 27 Quinckeneedls. Medical channel July-Sept 2007; 13(3): 45-8

Original Article

A comparative study on the maternal and foetal outcome between normal and high risk pregnancy patient

***Afroza Sultana[1], Beauty Rani Roy[1], Montosh Kumar Mondal[2],Sabina Yeasmeen[2], Saleha Begum Chowdhury[3]**

[1]OGSB Hospital and Reproductive Centre, Mirpur, Dhaka, [2]Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University, Shahabag, Dhaka. [3]Department of Gynae and Obstetrics, Bangabandhu Sheikh Mujib Medical University, Shahabag, Dhaka

***Corresponding author**: Email- drafroza12@gmail.com*

Abstract

Background *Pregnancies and deliveries are potentially at risk. Well supervised antenatal, intranatal and postnatal care can reduce this risk to a minimal acceptable level.*

Objective *To find out perinatal outcome of high-risk pregnant patients in comparison with the normal pregnant women and to evaluate the utility of numerical scoring system in identifying high-risk pregnancy.*

Methods *200 patients were selected from the admitted patients in the obstetric ward of Bangabandhu Sheikh Mujib Medical University, Dhaka. Study patients were divided into three groups: 100 patients (control group) were normal pregnancy (score 0-2), 85 patients were high-risk (score 3 – 6), and 15 patients were severe-risk (score 7 or more). Both case and control subjects were followed intranatally and postnatally up to the discharge from the above institutions. All types of abnormalities or complications like prolonged ist stage, 2nd stage, APH, PPH and all types of operative and non operative interventions were recorded in order to correlate with perinatal mortality, morbidity and maternal morbidity. Each patient was followed up to discharge from the hospital and abnormalities important for the study were recorded. Neonatal morbidity was defined for surviving newborn by Apgar score <7 at 5 minutes or birth weight < 2.5 kg.*

Results *In normal pregnancy group, 43% needed to be delivered by caesarean section in comparison to 63 (74.1%) and 14 (93.33%) patients respectively in high-risk and severe-risk group (P <0.001). Maternal complication following normal vaginal delivery was highest (100%) in severe-risk group, followed by high-risk group (36.36%) and normal pregnancy (19.30%). Complications following caesarean section were also highest in severe-risk group (28.47%), followed by normal pregnancy (25.59%) and high-risk pregnancy (20.63%). Neonatal complications in normal pregnancy group was 30.23% in comparison 38.46% in high risk group. 6 (6%) of neonates in the normal pregnancy group had Apgar score < 7 at 5 minutes and in high risk and severe-risk groups, 10 (11.76%) and 7 (43.75%) of the neonates respectively had Apgar score <7 at 5 minutes (P < 0.001). In the severe-risk group, 8 (50%) of the babies had birth weight <2.5kg, which is higher than high and normal pregnancy group, i.e. 25 (28.41%) and 3 (3%), respectively(P<0.001). Higher perinatal deaths also occurred in high-risk and severe risk groups.*

Conclusion *It can be concluded that the perinatal morbidity, mortality and maternal morbidity are significantly higher in high-risk pregnancies. This group, though represent only 20-30 percent of all pregnant patients, is responsible for 70-80 percent of the perinatal morbidity and mortality.*

Keywords *High risk pregnancy, perinatal mortality, morbidity and maternal morbidity.*

(JBSA 2012; 25(2): 59-65)

Introduction

All pregnancies and deliveries are potentially at risk. But well supervised antenatal, intranatal and postnatal care can reduce this risk to a minimal acceptable level. In the developed countries significant improvement has been achieved in the field of obstetrics care. Consequently, their maternal mortality has been brought down into desired minimal level, as such; they consider only perinatal morbidity and mortality in identifying high risk cases. But in the developing countries with a high maternal and perinatal mortality, the maternal factors should also be considered[1].

In our country, three Bangladeshi women die every hour of complications related to pregnancy and child birth. The current estimated maternal mortality rate (maternal death per 1000 live births) of 3.20 is the highest in the world[2]. Same is true in the case of perinatal mortality. It is estimated that about 7.3 million perinatal deaths occur annually in the world, most of these in the developing countries[3]. Bangladesh is having very high infant mortality rate i.e. 52 per 1000 births[4].

In our country, most of the deliveries (> 95%) occur at home and are not recorded; most of the women can not even mention their last menstrual period and do not go regularly for antenatal care (ANC) [2]. One of the important purposes of the ANC is to identify the high-risk patients and to give more attention both antenatally and intranatally.

Many high risk cases remained undetected due to sub-optimal antenatal care. If we want to change the situation with a reasonable short period of time, we need some radical changes in antenatal and intranatal care. Bangladesh in one of the few countries that have very well-developed health infrastructure for delivery of healthcare to the vast majority of rural population, but still we have failed to reduce our maternal mortality, prerinatal mortality and morbidity to the expected rate.

Risk scoring may be defined as a formalized method of recognizing, documenting and cumulating antepartum and intrapartum factors, in order to predict later complication for mother, fetus and infant[5]. The system for scoring and identification of high-risk mothers was selected from well-accepted scoring systems developed by Nesbitt and Aubry[6], Goodwin *et al.*[7] and coopland *et al.*[8]. A study comprising the applicability of the scoring system was done by Knox in New Zealand [9]. Das and Dutta [10] of India adopted a more detailed scoring system covering age, parity, previous obstetric history, associated medical diseases and pregnancy complications.

In our country, there is no scoring system and antenatal care card which does not include all the factors responsible for the low obstetrical outcome. Moreover, we need a well-developed, appropriate and acceptable risk scoring system for proper care of the pregnant mothers and improvement of perinatal outcome and maternal morbidity.

It is important to mention that only risk identification is not sufficient to reduce perinatal outcome, along with this, a good referral system supported with transport and first referral institution are necessary as a part of primary healthcare if perinatal mortality and maternal mortality rates are to be reduced.

The main aim of the present study was to determine the extent of the association of high-risk pregnancies with perinatal mortality, morbidity and maternal morbidity. The risk scoring system was selected for this study was developed by Coopland *et al.*[8.]

A high-risk pregnancy diagnosis shouldn't automatically have a negative connotation. With proper care, a majority of high-risk pregnancies produces healthy, viable babies. The earlier a problem is detected, the better the chances that both mother and baby will stay healthy. Regular supervised antenatal intranatal and postnatal care reduces the complication for mother and the baby.

Methods

This prospective comparative and purposive study was carried out on the admitted patients in the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from July 2007 to December 2007.With approval from the hospital ethical committee and written informed consent,100 high-risk pregnant women (case) and 100 normal pregnant women (control) were identified for the study on the basis of selected parameters. The patients were selected for the study by using numerical risk scoring system developed by Coopland *et al.* (1977). On the basis of this system 100 patients were selected randomly. Out of 100

cases, 85 with a risk score 3-6 were identified as high-risk group and 15 with a risk score 7 or above were identified as severe-risk group. Another 100 women (control) were selected using same scoring system and having score 0-2 as normal pregnancy group. Any risk factor like any abnormal past obstetric history, such as history of previous caesarean section, infertility, etc. and having risk score 1 or 2, and also history of medical diseases, such as diabetes mellitus, hypertension etc. and risk score 1 or 2 , were excluded from normal pregnancy group (control). Study patients were divided into three groups:Normal pregnancy (score 0-2),High-risk (score 3 – 6), and Severe-risk (score 7 or more). Both case and control subjects were followed intranatally and postnatally up to the discharge from the above institutions. Using a proforma, in order to avoid biasness, all events like 1st stage, 2nd stage and 3rd stage of labour, LSCS, were collected from the records of the patients. All types of abnormalities or complications like prolonged ist stage, 2nd stage, APH, PPH and all types of operative and non operative interventions were recorded in order to correlate with perinatal mortality, morbidity and maternal morbidity. Each patient was followed up to discharge from the hospital and abnormalities important for the study were recorded. For the purpose of the study, perinatal death was defined as intrapartum stillbirth or neonatal death after 28 weeks of pregnancy to first week after birth and perinatal mortality rate was defined as perinatal death per 1000 total birth. Neonatal morbidity was defined for surviving newborn by Apgar score <7 at 5 minutes or birth weight < 2.5 kg. Neonatal illnesses included in the study were those illnesses that developed by the study neonates during their presence in the obstetric units up to their discharge or referred to the paediatric unit.

Maternal morbidity was defined by the occurrence of primary or repeat Caesarean section or delivery by forceps or ventouse. In this study, none of the study subjects were delivered by forceps or ventouse. Maternal complications were defined as complications that arouse during delivery (either normal or Caesarean section) or postpartum period up to their discharge from the hospitals.

All collected data were compiled and analyzed by using Unpaired 't' test, Chi-square (x2) or ANOVA as appropriate. Results were considered statistically significant if P value < 0.05.

Results

In normal pregnancy group, 57 patients(57%) had normal vaginal delivery and 43 (43%) needed to be delivered by Caesarean section. In high-risk group, 22 (25.88%) patients and 1 (6.67%) in severe-risk group of patients delivered vaginally, Caesarean section were done in 63 (74.1%) and 14 (93.33%) patients respectively(P <0.001). One (1%) neonate in the normal pregnancy group, 4 (4.54%) in high risk group and 1 (6.25%) in severe risk group died (Table-II). Higher perinatal deaths occurred in high-risk and severe risk groups. Table-III shows that 6 (6%) of neonates in the normal pregnancy group had Apgar score < 7 at 5 minutes and in high risk and severe-risk groups, 10 (11.76%) and 7 (43.75%) of the neonates respectively had Apgar score <7 at 5 minutes, which is highly significant (P < 0.001). Table-IV shows that in the severe-risk group, 8 (50%) of the babies had birth weight <2.5kg, which is higher than high risk and normal pregnancy group, i.e. 25 (28.41%) and 3 (3%), respectively(P<0.001). Maternal complication following normal vaginal delivery was highest (100%) in severe-risk group, followed by high-risk group (36.36%) and normal pregnancy (19.30%). Complications following caesarean section were highest in sever-risk group (28.47%), followed by normal pregnancy (25.59%) and high-risk pregnancy (20.63%). Table-VII shows neonatal complications of patients delivered by Caesarean section in relation to various risk groups. In normal pregnancy group, neonatal complication arose in 13 neonates (30.23%) in comparison to high-risk group in 25 (38.46%).

Table I *Mode of delivery in relation to various maternal risk groups*

Risk group	Total number of patients	Normal vaginal delivery		LSCS	
		No.	(%)	No.	(%)
Normal pregnancy	100	57	(57.00)	43	(43.00)
High risk pregnancy	85	22	(25.88)	63	(74.10)
Severe risk pregnancy	15	1	(6.67)	14	(93.53)
Total	200	80	(40.00)	120	(60.00)

Chi-square test: $X^2 = 26.045$, df = 2, P < 0.001 (significant)

Table II *Perinatal mortality in relation to various maternal risk groups*

Risk group	Total number of patients	Total number of birth	Total neonatal death	
			No.	(%)
Normal pregnancy	100	100	1	(1.00)
High-risk pregnancy	85	88(3 twins)	4	(4.54)
Severe risk pregnancy	15	16(1 twin)	1	(6.25)
Total	200	204	6	(2.94)

Chi-square test: $X^2 = 2.727$, df = 2, P = 0.2556 (not significant). One (1%) neonate in the normal pregnancy group, 4 (4.54%) in high risk group and 1 (6.25%) in severe risk group died (Table-II). Higher perinatal deaths occurred in high-risk and severe risk groups

Table III *Apgar score < 7 at 5 minutes in relation to various maternal risk group*

Risk group	Total number of patients	Total number of birth	Apgar score < 7 at 5 minutes	
			No.	(%)
Normal pregnancy	100	100	6	(6.00)
High-risk pregnancy	85	88(3 twins)	10	(11.76)
Severe risk pregnancy	15	16(1 twin)	7	(43.75)
Total	200	204	23	(11.27)

Chi-square test: X2 = 19.412, df = 2, P < 0.001 (significant). 6 (6%) of neonates in the normal pregnancy group had Apgar score < 7 at 5 minutes and in high risk and severe-risk groups, 10 (11.76%) and 7 (43.75%) of the neonates respectively had Apgar score <7 at 5 minutes.

Table IV *Low birth weight babies in relation to various maternal risk factors*

Risk group	Total number of patients	Total number of birth	Birth weight <2.5kg	
			No.	(%)
Normal pregnancy	100	100	3	(3.00)
High-risk pregnancy	85	88(3 twins)	25	(28.41)
Severe risk pregnancy	15	16(1 twin)	8	(50.00)
Total	200	204	23	(11.27)

Chi-square test: X2 = 33.299, df = 2, P < 0.001 (significant). In the severe-risk group, 8 (50%) of the babies had birth weight <2.5kg, which is higher than high risk and normal pregnancy group, i.e. 25 (28.41%) and 3 (3%) respectively.

Table V *Maternal complications following normal vaginal delivery in various risk groups*

Maternal complications	Normal pregnancy (n = 43)		High-risk pregnancy (n = 63)		Sever-risk pregnancy (n = 14)	
	No.	(%)	No.	(%).	No.	(%)
Without complications	46	(80.70)	14	(63.64)	0	
With complications	11	(19.30)	8	(36.36)	1	(100.00)
Postpartum haemorrhage (PPH)	6	(54.55)	4	(50.00)	1	(100.00)
Perineal tear	3	(27.27)	3	(13.64)	0	
Urinary retention	1	(9.09)	1	(12.50)	0	
Urinary incontinence	1	(9.09)	1	(12.50)	0	

Maternal complication following normal vaginal delivery was highest (100%) in severe-risk group, followed by high-risk group (36.36%) and normal pregnancy (19.30%).

Table VI *Maternal complications following LSCS delivery in various risk groups*

Maternal complications	Normal pregnancy (n = 43)		High-risk pregnancy (n = 63)		Sever-risk pregnancy (n = 14)	
	No.	(%)	No.	(%).	No.	(%)
Without complications	32	(74.41)	49	(79.37)	10	(71.49)
With complications	11	(25.59)	14	(20.63)	4	(28.57)
Postpartum haemorrhage (PPH)	6	(54.55)	8	(57.14)	2	(50.00)
Urinary tract Infection (UTI)	1	(9.09)	2	(14.28)	1	(25.00)
Wound infections	2	(18.18)	1	(7.14)	1	(25.00)
Breast complications	0		1	(7.14)	0	
Others	2	(18.18)	2	(14.28)	0	

Complications were highest in sever-risk group (28.47%), followed by normal pregnancy (25.59%) and high-risk pregnancy (20.63%).

Table VII *Neonatal complications among caesarean deliveries in relation to various maternal risk groups*

Complications	Normal pregnancy (n = 43)		High-risk pregnancy (n = 65) [a]		Sever-risk pregnancy (n = 14)	
	No.	(%)	No.	(%).	No.	(%)
Without complications	30	(69.77)	40	(61.54)	8	(57.14)
With complications	13	(30.23)	25	(38.46)	6	(42.86)
Birth asphyxia	2	(4.65)	9	(13.85)	5	(35.71)
Neonatal jaundice	5	(11.63)	10	(15.38)	0	
Respiratory distress syndrome (RDS)	1	(2.33)	2	(3.08)	0	
Sepsis	1	(2.33)	1	(1.53)	0	
Feeding problem	0		2	(3.08)	0	
Others	4	(9.30)	1	(1.53)	1	(7.14)

In normal pregnancy group, neonatal complication arose in 13 neonates (30.23%) in comparison to high-risk group in 25 (38.46%).

Discussion

This study was aimed to determine the extent of association of high-risk pregnancies with perinatal morbidity, mortality and maternal morbidity and was to test a simplified antepartum numerical risk scoring system. This well accepted risk scoring system was developed by Coopland in 1977. The incidence of maternal morbidity was significantly higher in high-risk and sever-risk groups (P<0.001). It was about 93.53% in sever-risk group, 74.10% in high-risk and 43% in normal pregnancy group. This is comparable with that of Datta et al.[13] who showed incidence of maternal morbidity in high-risk group as 50% (P< 0.001).

The Table-II shows out of 6 perinatal deaths, one (16.67%) occurred in normal pregnancy group, 83.33% occurred in high-risk and sever-risk groups. This is comparable with that of Thakur *et al.*[11] , 77.7%. In present study, the perinatal mortality was relatively low. This is due to the fact that almost all admitted patients had regular or at least one or two antenatal check-up, in this institution. Besides patients receive appropriate intranatal care and any babies who develop complications after birth are referred to paediatrics unit and were not included in this study. In this study, perinatal mortality rate was 10/1000 total births in normal pregnancy group which is comparable with Thakur *et al*,[11]18.3/1000 total births. Perinatal mortality rate was 45.4/1000 total births in high-risk group and 62.5/1000 total births in sever-risk group, which are comparable with the study of Daga *et al.* [12] 67.9/1000 total births. In the present study, result

is well-supported by Gupta *et al.*[13] who found preinatal mortality as 8/1000 total births in control group, whereas 68/1000 total births in 'at-risk' group. In this study, there is a significant association of perinatal deaths with risk factors. Table-III shows Apgar score <7 at 5 minutes in relation to various risk groups. Apgar score <7 at 5 minutes indicates moderate asphyxia. Out of 21 neonates having Apgar score <7 at 5 minutes, 6 (28.57%) belonged to normal pregnancy group and 15 (71.43%) belonged to high-risk patient group. Distribution was highly significant (P<0.001). This relationship between high-risk patients and birth of neonates with low Apgar score was also observed by Thakur *et al.*[11] (P<0.001). Table-IV & V show relationship between low birth weight babies of various maternal risks groups. In the normal pregnancy group 3 (3%) neonates, in the high-risk group 25 (28.41%) neonates and in the severe-risk group 8 (50%) neonates had birth weight <2.5 kg. This association was highly significant (P<0.001). This study is well-supported by Thakur *et al.*[11] 6.4% in low-risk group, 22.6% in moderate-risk and 25.0% in high-risk group. Table-V shows maternal complications following normal delivery in various risk groups and Table-VI shows maternal complications following LSCS in various risk groups. In this study, wound infection after Caesarean section in normal pregnancy group was 2 (4.65%), in high-risk group 1 (1.59%) and in severe-risk group 1 (7.14%). Among 120 patients, wound infection developed in 4 (3.33%). This is comparable with the study of Watson *et al.*[15] 1.54% in patients who had Caesarean delivery without labour. Urinary tract infection (UTI) following Caesarean section, in this study, was 1 (2.33%) in normal pregnancy group, 2 (3.17%) in high-risk group and 1 (7.14%) in sever-risk group. This is comparable with the study of Watson *et al.*[15] who showed UTI among Caesarean delivery with labour in 2.72% and without labour as 4.65% in high-risk obstetric patients.

All pregnancies and deliveries are potentially at risk. It is the duty of the obstetricians to identify the risk for better care and every obstetrician does the same. But the system varies from person-to-person, institution-to-institution and country-to-country, but still neonatal death occur, indicating risk identification is not sufficient to reduce perinatal mortality or maternal morbidity. Perinatal morbidity and mortality, and maternal morbidity and mortality are influenced by socioeconomic, nutritional and educational factors, besides the inherent risk associated with pregnancy and method of risk identification system. Since the maternal mortality of our country is high, we need definitive system of risk scoring, both antenatally and intranatally, including proper care after delivery. We need improvement in socioeconomic condition and increase in literacy rate. Our neonatal care needs further improvement. In order to reduce maternal mortality, World Health Organisation (WHO) has formulated "Risk Approach" strategy. The main goal of anternatal care in the developing countries is to identify women whose pregnancy or delivery is likely to raise problem and refer them to a hospital where necessary medical equipment and expertise are available[14].

This study concluded that the perinatal morbidity and mortality, and maternal morbidity are significantly higher in high-risk pregnancies. This group, though represent only 20-30 percent of all pregnant patients, this group is responsible for 70-80 percent of the perinatal morbidity and mortality.

References

1. Dutta DC. Textbook of obstetrics including perinatology and contraception. 5th ed. New Central Book Agency (P) Ltd., 2001: 651-4, 673-7
2. Begum SF. Maternal mortality in rural Bangladesh: an appraisal (abstract). In: Proceedings of CME Programme of First South Asian Conference on Reproductive and Child Health, 1999; 26: 33-40
3. Rao KB. Perinatal mortality. In:Ratman SS, Rao KB, Arulkumaran S, editors. Obstetrics and Gynaecology for postgraduates. Vol. II, Ist ed. Orient Longman Limited, 1994: 252 – 8
4. Bangladesh Demography and Health survey 2007 (Preliminary report)
5. Sokol RJ, Rosen MG, Stojkov J, Chik L. Clinical application of high-risk scoring on an obstetric service. Am J Obstet Gynecol 1977; 128:652-61
6. Nesbitt RLL, Aubry RH. High-risk obstetrics. II. Value of semi objective grading system in

identifying the valuable group. Am J Obstet Gynecol 1969; 103:972-85

7. Goodwin JW. Antepartum identification of foetus at risk. Can Med Assoc J 1969; 101: 458-67
8. Coopland AT, Peddle LJ, A simplified antepartum high-risk pregnancy screening form: statistical analysis of 5459 cases. Can Med Assoc J 1977; 116:999-1006
9. Knox AJ, Sadler L, Pattison NS, Mantell CD, Mullins P. An obstetric scoring system: its development and application in obstetric management. J Obstet Gynecol 1993; 81:195-9
10. Datta S, Das KS. Identification of high risk mothers by a scoring system and its coordination with perinatal outcome. J obstet Gynaecol Ind 1990; 40:181-90
11. Thakur S, Kaur H. Identification of high-risk mothers by a scoring system and its correlation with preinatal outcome. J obstet Gynaecol Ind 1994; 361-4
12. Daga As, Daga SR. High-risk scoring for prediction of pregnancy outcome at a teaching hospital. J obstet Gynecol India 1995; 52-5
13. Gupta N, Jani KK, Kumari S, Maya S. Early neonatal morbidity and mortality in 'At Risk' and 'Normal' term pregnancies. Indian J Pediatr 1997; 64:523-7
14. Dujardin B, Claryssi G, Criel B, Brouwere DE, Wangata N. The strategy of risk approach in antenatal care: evaluation of the referral compliance. Soc Sci Med 1995; 40:529-35
15. Watson WJ, George RJ, Welter S, Day D. High-risk obstetric patients: maternal morbidity after caesarean. J Reported Med 1997; 42:267-70

Special Article

Use of one lung ventilation during repair of oesophageal atresia (OA) with tracheoesophageal fistula (TOF) in neonates to improve survibility

Dilip Kumar Bhowmick[1], M Isa[1], M Paul[1], M Ali[1], K Islam[1], AKM Faizul Hoque[2]

[1]Department of Anaesthesia; Square Hospital Ltd; Dhaka; Bangladesh, [2]Department of Anaesthesia; East West Medical College Hospital; Uttara; Dhaka; Bangladesh.

Corresponding address: E-mail: dilipbhowmick@yahoo.com

Abstract:

Background *Oesophageal atresia (OA) and tracheo-oesophageal fistula (TOF) is one of the surgical emergencies in newborn. Survival rate after corrective surgery is not encouraging in our country.*

Objective *To describes a new technique of airway and ventilatory management during surgical repair of oesophageal atresia and tracheo-oesophageal fistula in neonates.*

Methods *A total number of 12 neonates both male (10) and female (02) with Type- C oesophageal atresia have been operated to correct the anomaly since 2007. The patient's age range was 1 to 17 days, weighing 1.7 to 3.04 kg, maturity range 32 wks to 40 weeks having congenital cardiac anomalies in 8 cases. One lung (left lung) ventilation by inserting 2.5 to 3mm internal diameter uncuffed Endo Tracheal Tubes (ETT) into left main stem bronchus were used in all cases.*

Results *Out of 12 patients having single lung ventilation, 7 patients (55%) survived. 8 out of 12 (66%) needed ventilator support to a variable extent after surgery. Most of the mortality is due to prematurity, postoperative sepsis and associated congenital anomalies.*

Conclusion *Result of OA surgery is still not encouraging in our country. In a tertiary hospital, we have studied this surgery since 2007. The rate of survival in this hospital is 55%. One lung ventilation is one of the prime factors for this result. So, it should be the choice in any form of oesophageal atresia and tracheoesophageal fistula repair in neonates.*

Key words *Oesophageal atresia with tracheo-oesophageal fistula, newborn, one lung ventilation.*

(JBSA 2012; 25(2): 66-70)

Introduction

Oesophageal atresia (OA) with tracheo-oesophageal fistula (TOF) is one of the common congenital anomalies in newborn. OA is often associated with prematurity, aspiration pneumonitis and other congenital anomalies. These patients are candidates for early thoracotomy, division of the fistula and primary oesophageal repair. Surgical approach is usually right thoracotomy. One lung ventilation (left) using traditional uncuffed ETT facilitates good surgical exposure and prevents right lung injury. The treatment of esophageal atresia and TOF can be both challenging and satisfying for the anesthesiologist due to intimate relationship between pulmonary and gastrointestinal tract. Tracheo-oesophageal fistula occurs in about 1 in every 3000 to 1 in 4500 births and remains one of the major challenges in neonatal surgery[1]. Advancements in pediatric anesthetic techniques and monitoring, neonatology, and pediatric surgery have reduced mortality figures and survival is now higher than 90%[1] in advanced countries. Prematurity and severe associated congenital abnormalities continue to be the biggest contributors to mortality associated with TOF[2].

There are several classification systems of OA and TOF have been developed based on the presence

of atresia and the relation of the fistula location to the atresia. The Gross classification system describes OA with and without TOF, types A through F[3] (Fig 1).

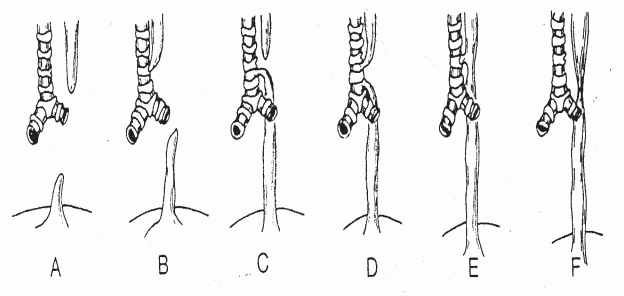

Fig-1 *Gross's classification of esophageal atresia without fistula (A), esophageal atresia with proximal fistula (B), esophageal atresia with distal fistula (C), esophageal atresia with proximal and distal fistula (D), tracheoesophageal fistula without atresia (E), and esophageal stenosis (F).*

The two main pathological entities in the neonate with TOF are dehydration and aspiration pneumonitis. Saliva and secretions accumulate in the upper esophageal pouch and normal swallowing is disturbed. Contamination of the lungs as a result of spillage from the pouch and/or aspiration of gastric contents through distal TOF results in atelectasis and pneumonitis[6].

Methods

A total number of 12 neonates both male (10) and female (02) with Type C Oesophageal Atresia (Fig-2) have been operated to correct the anomaly .The preoperative assessment of upper pouch was done with plain X-ray chest (posterior-anterior and lateral view). The diagnosis of associated congenital anomalies was performed on the basis of careful systemic examination, radiological and sonographical investigations. The patients's age range was 1 to 17 days, weighing 1.7 to 3.04 kg, maturity range 32 wks to 40 weeks having congenital cardiac anomalies in 8 cases. One lung (left lung) ventilation by inserting 2.5 to 3mm internal diameter uncuffed Endo Tracheal tubes (ETT) into left main stem bronchus were used in all cases. All surgeries were performed using general anesthesia and patients were extubated right away postoperatively unless they had respiratory distress, associated cardiac anomalies or marked tension at the anastomotic site. All patient was on an endotracheal tube or not he or she was shifted to neonatal intensive care unit for ventilatory support and further management. Before starting feeding a routine Ba-swallow has been done in all cases usually 7th or 8th post operative day. All stabilized before surgical correction. An isotonic fluid 0.9% normal saline used to correct hypovolamia followed by maintenance fluids containing glucose (5% dextrose in ¼ normal saline) at 4 ml/kg/hour. Acid-base abnormalities respiratory impairment treated appropriately. Prophylactic antibiotics were administered to reduce the risk of perioperative respiratory infection[3]. Standard monitoring including ECG, SpO2, EtCO2, noninvasive blood pressure, temperature and chest auscultation. Permission had been taken from the concerned authority before starting the study.

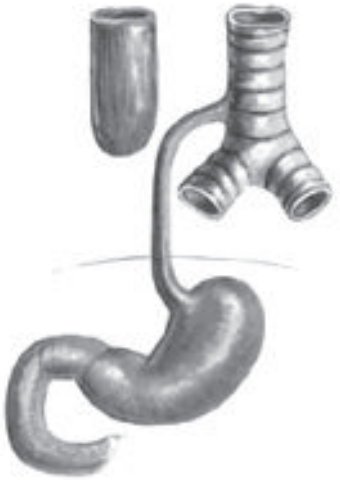

Fig-2 *Type C oesophageal atresia with tracheo-oesophageal fistula*

Anaesthetic technique and surgical management focuses on ventilating the lungs without ventilation of the fistula to avoid gastric distension. Hence reduce risk of aspiration and hypoxia. Common difficulties encountered during anesthetic management include ineffective ventilation due to the endotracheal tube being placed in the fistula, massive gastric dilation, severe pre-existing lung disease from previous aspiration of gastric contents and/or respiratory distress syndrome of prematurity, and associated anomalies, particularly cardiac. Awake with local anaesthetic spray and inhalational technique with without muscle relaxant can be used..

The infants were kept in supine with slight head up tilt. Suction was applied to the upper esophageal pouch and oropharynx , stomach decopressed, a stethoscope fixed on the left axilla and other monitors.

Induction of anaesthesia was done with inhalational technique (oxygen & sevoflurane) Intubation was facilitated under inhalational induction with atracurium 0.5mg/kg.Selective left bronchial intubation was achieved by rotating the tube in the trachea 90º before advancing it down into the left main bronchus. The endotracheal tube was secured in position. The intubation was confirmed by chest auscultation and unilateral chest movement. The tube was secured in position and ventilation was controlled manually via modified T piece (F). Positioning was left

lateral for a right thoracotomy to ligate the fistula and perform oesophageal anastamosis. Anaesthesia was continued with 2.5-3% sevoflurane in 100% O2 with muscle relaxant. Fentanyl 1-2µg/kg was administered for per-operative analgesia. At the end of repair, the ETT was withdrawn from the left bronchus into the trachea above the carina to achieve both lung ventilation as well as to check any leakage from fistula site. At the end of operation Sevoflurane anesthesia was discontinued. After resuming spontaneous breathing, 5 babies were extubated & 7 babies with ETT in situ were sent to neonatal intensive care unit(NICU) for elective ventilation.

Result

Out of 12 patients having single lung ventilation, 7 patients (55%) survived. 8 out of 12 (66%) needed ventilator support to a variable extent after surgery. Most of the mortality is due to prematurity, postoperative sepsis and associated congenital anomalies.

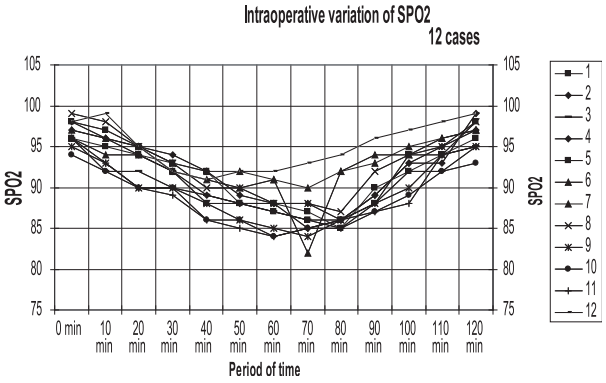

Fig 3 *Graph showing intraoperative variation of SpO2*

Table 1 *Patient criteria and associated anomalies*

Case	Sex	Maturity	Age	Weight (grams)	Associated cong. anomalies	Survival
1	Male	38 weeks	6 days	2600	Nil	No
2	Female	39 weeks	3 days	3000	ASD	Yes
3	Female	32 weeks	1 day	1800	PDA	No
4	Male	38 weeks	3 days	1700	Nil	Yes
5	Male	35 weeks	3 days	2300	ASD+PDA	Yes
6	Male	38 weeks	4 days	2500	Nil	Yes
7	Male	35 weeks	2 days	1900	MR+PDA	Yes
8	Male	39 weeks	17 days	2500	ASD+PDA	Yes
9	Male	35 weeks	2 days	1800	Nil	No
10	Male	38 weeks	1 day	2700	ASD+PDA	No
11	Male	34 weeks	6 days	2000	PDA	No
12	Male	39 weeks	1 day	2000	ASD	Yes

Discussion

Tracheoesophageal fistula manifests in the neonate within hours to days of life. The knowledge and ability of the anesthesiologist to anticipate the challenges in managing neonates presenting for repair, plays an important role in their treatment and survival The world wide incidence of OA with TOF is 1 in3000 to 4500 births with no particular preponderence of sex or race[1] in our study we found that 83% of cases were males.. The reason perhaps lies in the social realm, given the strong anti-female bias existed. Parents perhaps, shy away from bringing their daughters with congenital anomalies to the hospital, and are reluctant to incur the expenses and hardships associated with the anomalies.

Patients of OA with TOF are prone to have other associated congenital anomalies-the presence of which adversely affects the outcome. A particular combination of anomalies called VATER assocation[2] consists of Vertebral defect, Anal defect, Esophageal atresia and Radial anomalies (V also indicate Ventricular septal defect whereas R may also indicate Renal anomalies).

Prior to the first successful staged repair in 1939, oesophageal atresia and associated TOF were uniformly fatal. Advancements in pediatric anesthetic techniques and monitoring, neonatology, and pediatric surgery have reduced mortality figures and survival is now higher than 90%[3] in the developed world.

Although low birth weight, presence of other associated congenital anomalies and presence of pneumonia are all risk factors in their individual right, relating each of them alone with mortality may not be a good idea as they are often co-existent. Waterston's criteria[4] to classify risk factors includes weight, presence and severity of congenital anomalies and pneumonia which is very relevant to the developing world. Further risk stratification has been done by Splitz et al [5] excluding pneumonia.

Several authors[6,7,8] still advocate use of awake intubation in cases of OA with TOF, but a struggling infant can regurgitate from the stomach into the trachea by way of distal fistulous tract[8,9] awake intubation in neonates causes hypertension, that may pre-dispose to intra-ventricular haemorrhage which is still a major cause of mortality in premature infants[8,9] This claim of hypertensive response has its opponents too, there is a study.[10]

Both lung ventilation requires proper positioning of the endotracheal tube tip just avobe the carina but below the fistula. Patient movement or surgical manipulation may lead to subtle changes in the position of the tube and problems with ventilation such as hypoxia ,and gastric distension.

We have described the use of one lung ventilation by inserting 2.5 mm-3mm ETT into left mainstem bronchus which isolate the right mainstem bronchus & TOF that existed near to carina[11,12]. These approaches afforded a "quiet" right lung as well as prevent gastric distension [13]. This approach greatly facilitated surgery and minimized trauma to the right lung[14]. Occurance of desaturation during one lung ventilation need to be slightly withdrawn ETT to ventilate both lungs. Traditional use of both lung ventilation has been used in many centers. But during OA/TOF repair retraction of right lung may cause trauma to the right lung. Gastric distention may also occur through fistula tract when fistula is near to carina[13]. Use of two embolectomy catheters to simultaneously isolate the right mainstem bronchus and TOF that existed near the carina has also been described but requirement of fibreoptic bronchoscopy and complexity make it unsuitable for the procedure[15]. The disadvantages of embolectomy catheters also include the possibility of retrograde migration of either blocker into tracheal lumen, resulting in partial or complete airway obstruction; and insufficient blockade of mainstem bronchus leading to partial ventilation of the collapse lung; and bronchial rupture[16].

S. Mehta et al. studied 25 cases of OA/TOF repair. They used both lung ventilation and there survival rate was 36% (9 cases) [17]. In our experience by using one lung ventilation our survival rate is 55% (7 cases). Although we have done small number of cases (12) by using OLV; this experiences may improve survival rate in future.

Conclusion

Result of OA surgery is still not encouraging in our country. The rate of survival in this hospital is 55%.Early referral and proper NICU support may improve survival rate. One lung ventilation

is one of the prime factors for this result. This appears to be a viable technique and may be considered when TOF is too proximal to the carina to be easily blocked by ETT. So, it should be the choice in OA/TOF repair in neonates.

References

1. Adzick NS, Nance ML. Pediatric surgery: first of two parts. New Eng J Med 2000; 342(22):1651-1657
2. Diaz LK, Akpek EA, Dinavahi R, Andropoulos DB. Tracheoesophageal fistula and associated congenital heart disease: implications for anesthetic management and survival. Pediatr Anesth 2005; 15: 862-869
3. Al-Rawi O, Booker PD. Oesophageal Atresia and tracheo-oesophageal fistula. Continuing Educ Anaesth Crit Care & Pain 2007; 7(1): 15-19
4. Morgan GE, Mikhail MS, Murray MJ: Pediatric Anesthesia. Clinical Anesthesiology, 4th ed. McGraw-Hill 2006, p. 941
5. Merei J, Hutson J: Embryogenesis of tracheo-esophageal anomalies. Saudi Med J; 2003, 24(5 Suppl): 39-40
6. Cote' C J: Pediatric Anesthesia In: Miller Ronald D, editor, Anesthesia' 2000; 2088-2117.
7. Topkins MJ. Tracheoesophageal fistula In : Fun-Sun-F-yao;Anesthesiology-Problem oriented patient management, 4th Edition Lippincott Raven Publishers, Philadelphia 1998; 86-99.
8. Berry FA, Gregory GA : Do premature infants require anesthesia? Anesthesiology 1987; 67: 291-3
9. Friesen RH Anesthesia Analgesia 1987; (66) 874
10. Charlton AJ, Greenhough SG. Anaesthesia 1988; 43(9): 744-6.
11. Krosnar S, Baxter A. Thoracoscopic repair of esophageal atresia with tracheoesophageal fistula: anesthetic and intensive care management of a series of 8 neonates. Paediatric Anesth 2005; 15:541-6
12. Tercan E,Sungun MB, Boyaci A, Kucukaydin M. One lung ventilation of a preterm newborn during esophageal atresia and trache-oesophageal fistula repair. Acta Anaesthesiol Scand 2002; 46:332-3
13. Baraka A, Akef S, Haroun S, Yazigi A. One-lung ventilation of newborn with trache-oesophageal fistula. Anesth Analg 1988; 67: 189-91
14. Ho AMH, Wong JCP, Chui PT, Karmakar MK. Case Report: Use of two balloon-tipped catheters during thoracoscopic repair of a type C tracheosophageal fistula in a neonate. Can J Anesthe 2007; 54: 223-6
15. Kalfa N, Allal H, Raux. Tolerance of laparoscopic and thoracoscopy in neonates. Pediatrics 2005; 116: 785-91
16. Borchardt RA, LaQuaglia MP, McDowall RH, Wilson RS. Bronchial injury during lung injury during lung isolation in pediatric patient. Anesth Analg 1998; 87: 324-5
17. Mehta S, Porecha M, Nagre SW, Mehta PJ, Udani D, Patel K. A Study of 25 Cases of Tracheoesophageal Fistula Repair. The Internet Journal of Surgery. 2009; 18(1): DOI: 10.5580/1b95.

Review Article

Paediatric Spinal Anaesthesia

***Md. Habibur Rahman, S. O. Shafiullah, Mizanur Rahman**

*Department of anaesthesia, Sher-e-Bangla Medical College, Barisal

Corresponding Author: E-mail dr.habib20@gmail.com

Abstract

Spinal anesthesia was probably the earliest form of regional anesthesia that was considered a useful practice for children. Since that time, spinal anesthesia have become an important anesthetic technique for reducing the incidence of postoperative apnea in premature and ex-premature infants .Spinal anaesthesia provides a good alternative to general anaesthesia in newborns with increased anaesthesia-related risk, and for infants undergoing lower abdominal or lower extremity surgery during the first 6 months of life. It is most successful as a single shot technique, limited to surgery lasting less than ninety minutes. Spinal anaesthesia in children requires the technical skills of experienced anaesthesia providers.

Key words *Paediatric, Spinal Anaesthesia, Regional Anaesthesia*

(JBSA 2012; 25(2): 71-74)

Introduction

Spinal anaesthesia consists of inserting a spinal needle into the subarachnoid space and, when a free flow of cerebrospinal fluid (CSF) is obtained, injection of a solution of local anaesthetic directly into the CSF. Spinal anaesthesia (SA) was first described in children in 1909 [1]. But did not become part of routine practice until the 1980s when regional anaesthesia increased in popularity. Since that time, spinal anesthetics have become an important anesthetic technique for reducing the incidence of postoperative apnea in premature and ex-premature infants. Infants who have continuing apnea at home or haematocrit less than 30% are at particular risk for postoperative apnoea. Spinal anesthesia may also reduce the need for postoperative mechanical ventilation in those infants who are less than 60 weeks' postconceptual age after hernia repair [2]. Although spinal anaesthesia may be used in any age group, there are relatively few true indications for a spinal anesthetic in older children. Older children may be at increased risk of postdural puncture headaches [3].

Indications

1. Ex-premature neonates who may prove difficult to extubate even after limited surgery. The classic operation involved is repair of inguinal hernia which is common in premature infants. There is evidence that these patients experience a lower rate of postoperative apnoea after spinal, compared with general anaesthesia[4].
2. Older children with muscular or neuromuscular disease who are increase risk of the complications of general anaesthesia; performing a spinal block in these children is essentially the same as in adults, with a small amount of sedation, sensible 12-year-olds will cooperate sufficiently to allow successful spinal anaesthesia[4].
3. SA has been used for general surgery (rectal biopsy, incision of rectal abscess), urological surgery (orchidopexy, circumcision), lower limb orthopaedic surgery and may be of particular use in developing countries as an alternative to general anaesthesia[8].
4. Family history of malignant hyperthermia or a full stomach with. aspiration risk[8].
5. GA in children undergoing complex surgery
6. SA has also been described for use in chronic pain management[6].

Contraindications

1. Coagulation abnormalities
2. Systemic sepsis or local infection at the puncture point
3. Uncorrected hypovolaemia
4. Parental refusal or an uncooperative child

5. Neurological abnormalities such as spina bifida, increased intracranial pressure
6. Procedures lasting more than 90 minutes.

Anatomy

Several anatomic differences between adults and children affect the performance of regional anesthetic techniques. The conus medullaris (the terminus of the spinal cord) in neonates and infants is located at the L3 vertebral level, which is more caudal than in adults. It does not reach the adult level at L1 until approximately 1 year of age owing to the difference in the rates of growth between the spinal cord and the bony vertebral column[7]. A line connecting the top of the iliac crests crosses the spinal axis at the L5-S1 level in neonates and infants up to one year of age and at the L4-L5 level in older children. The dural sac in a newborn ends at S3. To avoid the risk of spinal cord puncture in a neonate, a spinal should be performed at the L4-5 interspace. After the first year of life, the spinal cord is in its adult position with the dural sac at S1 and conus medullaris at L1 The distance between the skin and the subarachnoid space is influenced by age –approximately 10 mm at birth and 16 mm at 3 years. The distance between skin and subarachnoid space can be related to height or weight using the formulae:

Distance from skin to subarachnoid space (cm) = 0. 03 x height in cm (cm)

Distance from skin to subarachnoid space (cm) = (2 x weight in kg) + 7(mm)[15]

The subarachnoid space in newborns is very narrow (0.6 to 0.8cm) and successful lumbar puncture in this population requires great precision and avoidance of lateral deviation. The volume of cerebrospinal fluid in infants is 4 mL/kg (2 mL/kg in adults) with 50% being in the spinal canal compared with 25% in adults. These factors produce proportionately more dilution of local anaesthetic solution in the cerebrospinal fluid in children than in adults and contribute to the short duration of subarachnoid anaesthesia in children[8].

Physiological effects of spinal anaesthesia

Hemodynamic consequences of SA

Cardiovascular changes related to the SA are less common in children than in adults. In children under 5 years of age, minimal changes in heart rate and blood pressure have been reported [8]. In older patients (>8 years old), the sympathetic block can induce bradycardia or hypotension. A few studies of SA in newborns have noted hypotension ten minutes after injection of the local anaesthetic. Cardiovascular changes due to spinal block are generally short lasting and respond to a bolus of intravenous fluid (10ml.kg- 1) [9]. Cardiovascular stability in infants undergoing SA is probably related to smaller venous capacitance in the lower limbs leading to less blood pooling, and to relative immaturity of the sympathetic nervous system resulting in less dependence on vasomotor tone to maintain blood pressure.

Respiratory effects of SA

Respiratory effects of SA are generally seen in association with high motor block above T6 [8].Children with severe chronic lung disease should receive supplemental oxygen or Continuous Positive Airway Pressure (CPAP) during SA.

Technique

1. The technique is similar to adult subarachnoid block.
2. Performed with the infant held in the sitting or the lateral position. This is largely matter of personal preference. Care is taken to avoid flexing the neck and obstructing the airway[8].
3. IV access is mandatory
4. The skin is infiltrated with a minute quantity of 1% lidocaine (less than 0.25 mL should be sufficient; use a 30-gauge needle on an insulin syringe), or a small amount of EMLA cream is applied to the infant's lumbar area at least 1 hour before spinal placement [7].
5. The lumbar puncture is performed using a midline approach with a 22-gauge 1.5-inch stiletted spinal needle. Using a needle without a stylet is not recommended since epithelial tissue can be deposited in the intrathecal space and may cause dermoid tumours of the neural axis[7].
6. Lumbar puncture is performed only at the L4-L5 or L5-S1 interspaces [7].
7. Assessing the block is difficult. The response to cold spray can be useful, as may observation of paradoxical respiratory muscle movement and loss of response to a low amperage tetanic stimulus
8. Spread of the block is less predictable than in adults and high blocks are relatively common[10].
9. The feet must not be raised above the head, e.g. when placing a diathermy pad, or a high block may be produced [7].
10. Sedation is not given in this group because, like general anaesthesia, it carries the risk of postoperative apneas [11].

Dose of local anaesthetic for SA in children:[8]

Weight	<5 kg	5 to 15 kg	>15 kg
Isobaric or Hyperbaric	1ml.kbg-1	0.4mg.kg-1	0.3mg.kg-1
bupivacaine 0.5%	[0.2ml.kg-1]	[0.08ml.kg-1]	[0.06ml.kg-1]
Isobaric or Hyperbaric		0.4mg.kg-1	.4mg.kg-1
tetracaine 0.5%		[0.08ml.kg-1]	0[0.08ml.kg-1]
Postoperative care			

Children are discharged from the post anaesthesia care unit when the block disappears, i.e. free lower limb movement returns. Children are allowed to feed on demand, provided there are no surgical restrictions. All infants younger than 60 week post conception are monitored on the ward for 24 hours after SA.

Complications

There are a number of potential complications of SA that are listed below:

1. Relatively high failure rate of 10-20% [4].
2. Potential traumatic puncture with spinal damage. Careful technique with the appropriate equipment and a trained assistant is essential [8].
3. Although hypotension is rare, bradycardia occasionally occurs
4. Respiratory (+/-cardiovascular) insufficiency due to high SA or secondary to intravenous sedation. Resuscitation measures must be taken (ABC) - tracheal intubation and volume resuscitation may be required [8].
5. Convulsions due to overdose of local anaesthetic. All doses should be calculated carefully and checked with another practitioner [8].
6. Post dural puncture headache. This has been reported in children >8 years old, but the incidence in younger children is unknown, in part since headaches in infants and young children are difficult to assess [8,3].
7. Total spinal block with respiratory arrest and bradycardia is another complication of spinal anesthesia [14].
8. Infectious complications such as meningitis. The incidence like meningitis is very low – careful aseptic technique must be used at all times and multidose ampules of local anaesthetic must never be used [8].

Conclusion

The incidence of serious complications associated with SA is very low even in small premature infants. We think that this technique provides a good alternative to general anaesthesia in newborns with increased anaesthesia-related risk and for infants undergoing lower abdominal or lower extremity surgery during the first 6 months of life. SA may be used to avoid GA in patients outside the neonatal period, if needed combined with intravenous sedation. SA is most successful as a single shot technique, limited to surgery lasting less than 90 minutes. SA in children requires the technical skills of experienced anaesthesia providers. Neonates and infants are at high risk of complications during surgery, irrespective of the type of anaesthesia, and the presence of clinician trained in paediatric anaesthesia is mandated.

References

1. Tyrell-Gray, 1909. Tyrell-Gray HT: A study of spinal anaesthesia in children and infants. Lancet 1909; 2:913-7
2. Huang and Hirshberg, 2001. Huang JJ, Hirshberg G: Regional anaesthesia decreases the need for postoperative mechanical ventilation in very low birth weight infants undergoing herniorrhaphy. Paediatr Anaesth 2001; 11:705
3. Wee et al., 1996. Wee LH, Lam F, Cranston AJ: The incidence of PDPH in children. Anaesthesia 1996; 51:1164
4. Graham Bell. Regional Anaesthetic Techniques In: Doyle, Edward. Paediatric anaesthesia. Ist edition. New York: Oxford University Press.2007;210

5. Dalens B, Tanguy A. Intrathecal morphine for spinal fusion in children. Spine 1988: 13: 494-7

6. Tobias JD. Spinal anaesthesia in infants and children. Paediatric Anaesth 2000; 10: 5-16

7. David M. Polaner, Santhanam Suresh, and Charles J. CoteCote, Lerman, Todres. Regional anaesthesia In: Charles J. Coté, Jerrold Lerman, I. David. A Practice of Anesthesia for Infants and Children. 4th edition.Philadelphia: Saunders Elsevier. 2009; 877

8. Rachel, Christophe. paediatric spinal anaesthesia. Update in Anaesthesia 2009;25-1:21-24

9. Mahe V, Ecoffey C. Spinal anesthesia with isobaric bupivacaine in infants. Anesthesiology 1988; 68: 601-3

10. Allison Kinder Ross and Robert B. Bryskin. Regional anaesthesia In: Peter J. Davis, Franklyn P. Cladis, EtsuroK. Motoyamata. Smith's Anesthesia for Infants and Children. 8th edition. Philadelphia: Saunders Elsevier.2011;463-464

11. Disma N, Tuo P, Astuto M, Davidson AJ. Depth of sedation using cerebral index in infants undergoing spinal anaesthesia. Pediatric Anesthesia 2009; 19: 133-7

12. Giaufre et al., 1996. Giaufre E, Dalens B, Gombert A: Epidemiology and morbidity of regional anesthesia in children: A one-year prospective survey of the French-language society of pediatric anesthesiologists. Anesth Analg 1996; 83:904

13. Tobias JD. Spinal anaesthesia in infants and children. Paediatric Anaesth 2000; 10: 5-16

14. Desparmet, 1990. Desparmet JF: Total spinal anesthesia after caudal anesthesia in an infant. Anesth Analg 1990; 70:665

15. Arthurs, Murray M, Zubier M, Tooley J, Kelsall W. Ultrasonographic determination of neonatal spinal canal depth. *Archives of Disease in Childhood - Fetal and Neonatal* Edition 2008; **93**: F451-4

Case Report

Transversus abdominis plane block for postoperative analgesia in a symptomatic bronchial asthma patient-a case report

Lt Col Hasan Murshed, Col Mozibul Hague, Maj Md. Abdullah AL Atif Hossain

BNS Potenga, Chittagong, CMH Jesshore, BNS Uposom, Khulna

Corresponding Author: E-mail: bsabd@gmail.com

Abstract

An emergency appendectomy for acute appendicitis with severe acute bronchial asthma was in a 15 years girl under subarachnoid block. Transversus abdominis plane (TAP) block using landmark technique was administered for postoperative analgesia on completion of surgical dressing. After recovery from anaesthesia paracetamol 500 mg suppositories six hourly was given for analgesia but was not enough effective. Then in ICU ***Transversus Abdominis Plane*** *block continued again and her pain subsided significantly (4/10 at rest and 6/10 on coughing). Thereafter she could cough effectively and respiration smoothly.After 48 hours patient was shifted to ward and discharged on 7th post operative day uneventfully. Because of simplicity, safety and low cost TAP block may offer an effective alternative for postoperative analgesia. Use of ultrasound-guided technique as in other regional technique will increase its safety profile.*

(JBSA 2012; 25(2): .75-77)

Introduction

Emergency surgical procedures in patients with symptomatic bronchial asthma always present a unique set of challenges to the anaesthesiologists during perioperative period. Provision for effective postoperative analgesia is essential to relief pain and to facilitate effective cough and respiration. Use of opioids for postoperative analgesia in patients with severe acute asthma is controversial due to their respiratory depressive effect on central nervous system. Non-steroidal anti-inflammatory drugs (NSAIDs) are contraindicated in those patients as these drugs block the synthesis bronchodilator group of leukaetrins. Transversus abdominis plane block is a promising new regional anaesthetic technique with a potential for wide range of application. [1-4] Recent randomized trials have demonstrated the efficacy of transversus abdominis plane block in providing postoperative analgesia after abdominal surgery.[1] We report the effectiveness of TAP block as postoperative analgesic technique in a girl with symptomatic bronchial asthma after appendectomy.

Case Report

A 15-year old girl brought to emergency room of Naval Hospital, Khulna in a state of severe respiratory distress with pain over right iliac fossa for 12 hours. She was diagnosed as a case of acute appendicitis with severe acute bronchial asthma and was placed for emergency appendectomy. She was a known case of bronchial asthma for 7 years and was on irregular medication. Cardiovascular examination revealed 110 beat per minute and non-invasive arterial blood pressure 110/70 mm Hg. She was tachyponic with respiratory rate 32 per min and was maintaining SpO_2 93 ± 2% on room air. She was referred for intensive management of bronchial asthma in intensive care unit (ICU). In ICU she was aggressively treated with intravenous hydrocortisone, salbutamol and ipratropium nebulization, parenteral antibiotic and chest physiotherapy. After 4 hours of intensive care management respiratory distress decreased significantly but she developed rise of body temperature and was complaining of more intense abdominal pain. Decision was taken to perform

emergency appendicectomy with this condition. She was accepted in ASA physical status IV. After a preload of 500 ml Ringer's solution, appendectomy was performed under subarachnoid block at L_2 and L_3 interspace with 0.5% hyperbaric bupivacine 3 ml. Appendectomy was done through Lanz's incision. Peroperatively the patient had one episode of respiratory distress, treated with sulbutamol and ipratropotium nebulization. During the whole procedure in the operating room the patient was haemodynamicaly stable. After the placement of dressing pad over the surgical wound, TAP block was performed through the lumber triangle on right side using landmark technique with 0.25% plain bupivacine 20 ml. The patient was transferred to ICU at the end of all procedures.

Post operatively analgesia was maintained with paracetamol 500 mg suppositories six hourly avoiding non steroidal analgesics. Intravenous hyosine –N –butyl bromide 10 mg was added eight hourly for the first 24 hours. Tramadol 1.5 mg per kg body weight was used intravenously as rescue analgesic. For management of bronchial asthma she was nebulized with salbutamol and ipratropium 8 hourly. Initially she tolerated active chest physiotherapy and was able to clear her respiratory secretions effectively. Post operative pain was assessed by the use of verbal rating on a visual analogue scale (VAS) of 0 to 10. After 14 hours of placement of TAP in the operating room, her pain scores increased substantially (7/10 at rest and 8/10 on coughing) along with respiratory distress. She was finding it difficult to cough. After a dose of rescue analgesic with tramadol intrvenously, her pain score reduced to 4/10 at rest and 6/10 on coughing, but not enough to be able to cough effectively. Then in ICU under all aseptic precaution TAP block was performed again using landmark technique. Thirty minutes later her pain subsided significantly and pain score became 1/10 at rest and 2/10 on coughing. She was able to cough effectively and allowed her to undergo chest physiotherapy again. Thereafter patient was slept for 10 hours, pain free and could take care of herself. After 48 hours patient was shifted to ward and discharged on 7th post operative day.

Discussion

Effective analgesia has been shown to reduce the postoperative stress response and accelerate recovery from surgery. [5] There has been an increasing need to find effective analgesic techniques that have lower risks. The use of sensory block of the anterior abdominal wall with local anaesthetis for postoperative analgesia is an attractive option, because of its simplicity, safety and low cost. The TAP block is a new regional anaesthetic technique that blocks the abdominal neural afferents by introducing local anaesthetic into the neurofascial plane between the internal oblique and the transversus abdominis muscles. The technique described based on the so called Petit triangle. The borders of "Petit" triangle formed of latissmus dorsi muscle posteriolrly, external oblique muscle anteriorly and iliac crest forming the base. McDonnell et al described the block using these landmark technique. [13] Hebbard et al subsequently described an ultrasound-guided technique for the TAP block with low complication rate. [14]

Although epidural techniques can provide excellent analgesia but rare complications (epidural haematoma and abscess) are potentially catastrophic. [6] Opioid-based analgesic regimens can also provide satisfactory analgesia, but in large doses may be associated with adverse effects including sedation, respiratory depression, paralytic ileus and nausea and vomiting. Non-steroidal anti-inflammatory drugs are relatively contraindicated in our patient. Our patient had a high risk for early postoperative respiratory failure resulting from basal atelectasis caused by pain and inability to clear secretions on a background of chronic obstructive airway disease. Recently efficacy of transveresus abdominis plane block in postoperative analgesia after abdominal surgery has been published in different literature. [1-4] TAP blocks eliminate somatic pain relating to the surgical incision but do not treat visceral pain. However in our patient TAP block has provided analgesia for 14 hours postoperatively. Addition of hyosine-n-butyl bromide may have role in reliving visceral pain. First rescue analgesic was administered at 14 hour postoperatively. This prolonged effect of TAP block may be due poor vascularization of transverses abdominis plane.

In our patient pain was not relived adequately with a rescue dose of tramadol, moreover she was in symptomatic asthma. Young age with respiratory distress may be the reason to make her intolerance to pain. After the placement of TAP block for the second time in the ICU her pain relived significantly

and could cough effectively. Singh et al. demonstrated that bilateral TAP blocks in addition to noninvasive positive pressure ventilation was effective in the management of a 74-year-old patient with impending respiratory failure resulting from excessive pain and narcosis following emergency laparotomy.[7] Similarly effectiveness of TAP block as rescue analgesic has been shown by Niraj G et al. and Petersen PL et al. [8-9] The duration of opioid sparing effect after a single shot injection into the transversus abdominis plane has been reported to range from 24 to 36 hours. [10-11]These features of the TAP block may have aided the recovery of patients after emergency surgery. Analgesic effect may be due to systemic absorption of local anaesthetic in addition to blockade of nerves in transverses abdominis plane. [12] General risks of regional anaesthesia like inadvertent intravascular injection, local anaesthetic toxicity, infection, and poor/failed block are also applicable to TAP block. Complications of TAP block techniques are rare. This case report demonstrates the utility and safety of transverses abdominis plane (TAP) block in postoperative analgesia of symptomatic asthma patient after appendectomy.

Conclusion

TAP block provides prolong abdominal wall analgesia and thus avoids opioid related side effects. This is especially beneficial in patients that are particularly sensitive to the respiratory depressant effects of opioid. TAP block is relatively easy, safe techniques requiring less nursing supervision for prolong period of time. Because of simplicity, safety and low cost TAP block is likely to be an effective adjunct to multimodal postoperative analgesia for abdominal surgery.

References

1. McDonnell JG, O'Donnell B, Curley G, Heffernan A, Power C, Laffey JG. The analgesic efficacy of transversus abdominis plane block after abdominal surgery: a prospective randomized controlled trial. Anesth Analg 2007; 104: 193-197
2. arney J, McDonnell JG, Ochana A, Bhinder R, Laffey JG. Transversus abdominis plane block provides effective postoperative analgesia in patients undergoing total abdominal hysterectomy. Anesth Analg 2008; 107: 2056-2060
3. McDonnell JG, Curley G, Carney J, Benton A, Costello J, Maharaj CH, Laffey JG. The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a randomized controlled trial. Anesth Analg 2008; 106: 186-191
4. Belavy D, Cowlishaw PJ, Howes M, Phillips F. Ultrasound-guided transversus abdominis plane block for analgesia after cesarean delivery. Br J Anaesth 2009; 103: 726-730
5. Kehlet H. Surgical stress: the role of pain and analgesia. Br J Anaesth 1989; 63:189-195
6. Rigg JR, Jamrozik K, Myles PS, Silbert BS, Peyton PJ, Parsons RW et al. Epidural anaesthesia and analgesia and outcome of major surgery: a randomised trial. Lancet 2002; 359: 1276-1282
7. M. Singh, K. J. Chin, and V. Chan, "Ultrasound-guided transversus abdominis plane (TAP) block: a useful adjunct in the management of postoperative respiratory failure," J Clin Anesth 2011; 23: 303-306
8. Niraj G, Kelkar A, Fox AJ. Application of the transversus abdominis plane block in the intensive care unit. Anaesth and Intensive Care 2009; 37: 650-652
9. Petersen PL, stjernholm P, Kristiansen VB, Torup H, Hansen EG, Mitchell AU, Moeller A. Roseenberg J, Dahl JB,Mathiesen O. The beneficial Eefect of transversus abdominis plane block after laparoscopic cholecystectomy in day-case surgery: A randomized clinical trial. Anesth and Analg 2012; 115: 527-533
10. Shibata Y, Sato Y, Fujiwara Y, Komatsu T. Transversus abdominis plane block. Anesth Analg 2007; 105: 883
11. McDonnell JG, Curley G, Carney J, Benton A, Costello J, Maharaj CH et al. The analgesic efficacy of transversus abdominis block after caesarean delivery. Anesth Analg 2008; 106:186-191
12. Kato N, Fujiwara Y, Harato M, Kurukowa S, Shibata Y, Harada J, Komatsu T. Serum concentration of lidocaine after transversus abdominus plane block. Journal of Anaesthesia 2009; 23: 298-300
13. O'Donnell BD, McDonnell JG, McShane AJ. The transversus abdominis plane (TAP) block in open retropubic prostatectomy. Reg Anesth Pain Med 2006; 31:91
14. Hebbard P, Fujiwara Y, Shibata Y, Royse C. Ultrasound guided transversus abdominis plane (TAP) block. Anaesth Intensive Care 2007; 35: 616-617