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CONTENTS

Editorial

Meningitis – what precaution is needed for central neuraxial blockade

Meningitis remains as an acknowledged iatrogenic complication following spinal and epidural anesthesia performed for surgical procedure with a relatively low incidence (less than 4.5 per 1, 00,000)[1]. The infection is introduced during cerebral surgery, pneumoencephalography, placement of a ventriculoperitoneal shunt, epidural steroid injection, myelography or rarely by lumbar puncture. Patients undergoing urological procedures or women in active labour belong to a special group that is more prone to developing bacteremia.

Pertinent question is how prevalent is the apparent lack of familiarity with this rare but dreadful complication in the medical community. World wide only 60 cases have been identified with only 3 deaths (5%)[2]. The death rate is considerably lower than that of the community acquired meningitis (3-29%)[3,4].

The latency period from the offending procedure to the appearance of the symptom is 8 hours to 30 days. (mean 41.1 hour, median 2.5hour)[2]. Patient usually develops the symptoms of acute meningitis like headache associated with vomiting, photophobia, fever, followed by altered mental status within 48 to 72 hours after spinal anesthesia[2]. Most of the patients belong to age group of 16 to 76 years (mean 45.7 year, median 44 year) with equal male and female distribution. The patient recovering from the acute phase of the disease sometimes left with neurological consequences like cranial nerve palsies, hemiparesis, quadriparesis and aphasia which is also in a low rate in comparison 33-50% of cases of community acquired meningitis[5].

The mechanism of infection is not always clear and may be due to aseptic failure with direct introduction of bacteria in the sterile cerebro spinal fluid or presence of asymptomatic bacteremia during the lumbar puncture and contamination of subarachnoid space by microscopic bleeding caused by insertion of the contaminated needles. Interference of the skin sterilization and contamination of the lumbar puncture equipment or the anaesthetic agents are the possible sources of infection. Reuse of spinal needles are also responsible as they may contain fragments of skin and iodine. Manipulation of the uterus for retained placenta, use of blood patch for post dural puncture headache elevates the rate of infection. Other possible route of infection is droplet contamination by oropharyngeal secretions of the medical personnel.

Among the various organisms implicated in iatrogenic meningitis 83% is gram positive bacteria and 17% is gram negative bacteria. Among the gram positive organisms viridans group of Streptococci are the most prevalent group of organisms isolated in 60% cases followed by Staphylococcus (6%). Recent reports indicate that s*terptococcus. salivaris* may be the most commonly associated organism followed by *Streptococcus mitis* and *Streptococcus sanguis*[2]. Causative gram negative organism are Pseudomonas (15%) and E.coli (2%). Aspergillus spp. may gain access to the lumbar subarachnoid space during spinal anesthesia via haematogenous spread from an extra cranial site or extension from contagious extra cranial focus.

The Streptococci are indigenous to the oropharynx, female genital tract and the gastrointestinal tract. These organisms are typically of low virulence and when isolated from culture they are often dismissed as contaminants but once in spinal fluid they rapidly multiply causing a full blown purulent meningitis in 7-24 hours[6]. No deaths or major complications occurred as a consequence of streptococcal meningitis.

One hypothesis for the mechanism of infection relates "The sudden lowering of the CSF pressure with a breaking down of the blood brain barrier". Other hypothesis is that the spinal needle picks up the organism as it punctures the small vessels on its path toward the spinal canal and then directly deposits the organism into the CSF[7].

The meningeal pathogen must sequentially colonize the host mucosal epithelium, invade the intravascular space, cross the blood brain barrier

and survive in the CSF.The first two of these antibacterial obstacles involve IgA proteases, bacterial pilli, binding epitopes and molecular basis of complement evasion. The meningeal pathogen circumvents the first three obstacles in those cases where it is inoculated directly into the CSF. At the onset tumor nurotic factor and other host cytokines may be found in the CSF. There is strong experimental evidence that these inflammatory cytokines induce inflammation and break down the blood brain barrier. Other mechanisms allow entrance into the CSF of leucocytes which on break down emit toxic metabolites that can lead to vasogenic brain edema. There is a resulting loss of cerebrovascular autoregulation subjecting the brain to the risk of hyperperfusion or hypoperfusion.

The suspicion of meningitis should immediately trigger the collection of blood and CSF for microscopy, culture and analysis. Head Computed Tomography scan is advised before lumbar punctured to exclude signs of mass lesion and increased intracranial pressure.

Gram stain is of considerable value as it is positive for 42% cases. This rate is lower than the corresponding rate of 75% in non iatrogenic meningitis[2]. Blood culture is positive in 15% cases and 2.6% of it is Viridans group of Streptococci.

The CSF appears cloudy, sometimes fluid is described as having 'shut out'. The CSF characteristics are typical of bacterial meningitis. White cell count range from 1400 to 56000 with polymorphonuclear predominance. Protein content is high ranging from 45 to 1080mg/dl and glucose level of 8 to 82 mg/dl[2]. Despite the CSF negative culture a bacterial cause for the patients condition cannot be excluded as most of the time LP is performed after starting antibiotic. The antibiotics might render the CSF gram stain and culture negative. DNA bacterial probes and rapid identification of the organism to species level are available. Their application in the clinical settings will provide a earlier detection and identify the possible break in sterile techniques.

Diagnosis of iatrogenic meningitis may be confused and delayed for conditions like viral meningitis, chemical meningitis from disinfectants and detergents and drug associated meningitis.

There may be a significant interval between establishing the diagnosis of meningitis and the initiating appropriate therapy. In these patient appropriate and adjunctive therapy given prior to lumbar puncture or before the patient is sent for CT. Delay in the initiation of therapy introduces the potential for increased mortality and morbidity. Targeted antimicrobial therapy is based on primitive pathogen identification by CSF gram stain, although the combination of vancomycin plus either ceftriaxone or cefotaxime is used.

A study by Van doern et al.[8] found that only 44% of Viridans Streptococcus were highly susceptible to penicillin while 43% were intermediately resistant (with minimal inhibitory concentration 1-2 μg/ml) and 13% were highly resistant to penicillin (MIC e"2.0μg/ml). This emerging resistance indicates a concern for acceptable alternatives to penicillin include vancomycin, teicoplanin, imipenem and chloramphenicol[8,9]. 15-20% of Viridans Streptococci are resistant to ceftriaxone, with an MIC of 8.0μg/ml[2]. The IDSA (Infection Disease Society of America) guidelines recommend the adjunctive dexamethasone be continued for 2-4 days only if CSF gram stain reveals gram positive diplococci in blood or in CSF cultures are positive for *S. pneumoniae* [12].

Guidelines for spinal anesthesia should underline the need to wear a surgical face mask with high bacterial filtering efficiency and thus reduce the bacterial contamination in proximity to the upper airway[10, 11]. Any manipulation of the mask should be avoided. The facemask should be changed whenever it is touched and every 3 hours. Adequate aseptic precautions such as washing hands and skin cleaning with antiseptic solution, wearing sterile gloves, using properly sterilized needles before and during the procedure may reduce the incidence of this preventable and often fatal disease.

(Journal of BSA, 2009; 22(1): 1-3)

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Review Article

Pre-operative fasting guidelines: An update

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Introduction:

Pre-operative fasting aims to reduce residual gastric volume and acidity prior to surgery or other non-surgical procedures requiring general anaesthesia, regional anaesthesia or intravenous sedation. This helps to prevent regurgitation and aspiration of gastric contents. Majority of serious cases of pulmonary aspiration occurs in emergency cases particularly trauma, obstetrics, abdominal surgery and pain. Patients with history of symptomatic gastro-esophageal reflux, hiatus hernia, morbid obesity, difficult airway are at increased risk of regurgitation and aspiration of gastric contents. Increased fasting time leads to decreased injury if aspiration occurs[1].Clinical studies show the incidence of pulmonary aspiration is 1 in 10000[2].

However prolonged periods of fasting is unnecessary and may cause thirst, dehydration, biochemical imbalance, hypoglycaemia especially in children. There is also a tendency for gastric volume to increase after a prolonged period of fasting.

Historical Background:

The present books on anaesthesia did not mention about fasting. In 1883, the famous surgeon Lister recommended that there should be no solid matter in the stomach, but that patient should drink clear liquid about 2 hours before surgery[3]. For the next 80 years until the 1960's most textbooks recommended a 6 hour fast for solids and 2-3 hours for clear liquids.

During the 1960's in North America the pre-operative orders 'nothing by mouth after midnight' was applied to solid as well as liquid. Concern about the risk of pulmonary aspiration was fuelled by Roberts and Shirley's 1974 statement[4], those patients with 25 ml (in adults) of gastric contents with pH<2.5 are at high risk of pulmonary aspiration. Raidoo et al[5] have demonstrated that >50ml of gastric contents (in adults) is required to produce pneumonitis.

In 1983, Miller et al reported no difference in gastric fluid volume or pH in patients who were 'nothing by mouth after midnight' and those who had tea and toast 2-4 hours before surgery[6]. Fasting guidelines at Foothills Medical Centre in Calgary were changed in 1988. Since then, 'nothing by mouth after midnight' has applied only to solids and clear liquids are encouraged until 3 hours before the scheduled time of surgery or 2 hours before the actual time of surgery.

Gastric emptying:

The human stomach can accommodate upto 1 litre before intragastric pressure increases[7]. After an overnight fast the volume of gastric contents averages 25-30 ml and varies from 0 to>100 ml. Minimum volume of gastric fluid required to overcome the lower esophageal sphincter (main barrier) varies from 500ml to >1200 ml.Normally peristaltic waves sweep from cardia to pylorus at a rate of 3 per minute. The rate of gastric emptying is proportional to the volume of gastric contents with 1-3% of total gastric contents reaching the duodenum per minute[8]. Carbohydrates empty faster than protein and fat is the slowest. Clear liquids (like water, diluting juice, carbonated beverages, black tea or coffee) empty exponentially,90% within 1 hour and virtually all within 2 hours. The pylorus prevents passage of particles more that 2mm, so digestable solids must be broken down to particles < 2 mm before they reach small bowel. Milk tea or coffee made with milk is treated as solid because with gastric juice it curdles (becomes semi solid) in the stomach. Delayed gastric emptying may occur in pyloric obstruction, gastro esophageal reflux, disorders of gastric motility and diabetic gastro paresis. All emergency cases especially trauma and women in labour should be assumed to have delayed gastric emptying. Gastric emptying is normal in three trimesters of pregnancy and beyond 18 hours post partum, but is delayed in the first 2 hours post

partum[9]. Drugs like opioids can cause marked delay in gastric emptying especially in women in labour. Less rigid fasting guidelines will be followed in women in labour who are not expected to require operative treatment[10].

Development of Fasting Guidelines:

The minimum fasting time prior to surgery have long been debated. The first proposition came from British Anaesthetists stating that patients should be nothing by mouth from midnight. However, since then the American Society of Anaesthesiologists (ASA) followed by the Association of Anaesthetists of Great Britain and Ireland recommended new fasting guidelines for the minimum fast prior to surgery[1].This was based upon evidence by Canadian anaesthesiologists who found that drinking clear fluids 2 hours prior to surgery decreased pulmonary aspiration compared to those nil by mouth since midnight[11]. The following are the recommended guidelines for nil by mouth prior to surgery[12].

Table-I

Age	Solid	Clear Liquid
<6 months	4 hours	2 hours
6-36months	6 hours	3 hours
>36 months (including adults)	8 hours	3 hours

Table -II

American Society of Anaesthesiologists Fasting Guidelines

Ingested	Material Minimum Fast (to all ages)
Clear liquid	2 hours
Breast milk	4 hours
Infant formula	6 hours
Non human milk	6 hours
Light meal	6 hours

The guidelines recommend no routine use of gastro intestinal stimulants,gastric acid secretion blockers or oral antacids.

Application of the Fasting Guidelines:

Patients for a morning list should eat nothing for 6 hours before surgery. Realistically, most patients do not usually eat after midnight .Patients for an afternoon list should have a light breakfast (like a slice of white toast with jam, honey but no butter) at least 6 hours prior to the start of the list.

Prescribed medication especially premedication can be taken within 2 hours prior to surgery with a small drink of water (<30ml).

Patients with diabetes mellitus presenting for surgery will be managed by established regimes for fasting, fluid and insulin and blood sugar monitoring. All patients should be encouraged to drink clear fluid up to 2 hours prior to the start of the list unless it is contra indicated due to the type of surgery. If a patient has been fasted for fluids for more than 6 hours, consideration should be given to start maintenance intravenous fluid in the ward. Whenever possible, children should be scheduled at the start of the list and in age order (i.e. youngest first).

Patients requiring regional anaesthesia should follow the fasting guidelines as for general anaesthesia, as these cases may need to be converted to general anaesthesia or need intravenous sedation.

Some non-surgical procedures (like radiological and endoscopic procedures, endovascular procedures, DC cardio version and ECT) requiring general/regional anaesthesia or intravenous sedation, fasting guidelines apply as for surgical procedure.

For patients requiring local anaesthesia only –no fasting required. Patient should eat a normal diet. In patients with delayed gastric emptying steps should be taken to increase gastric pH and reduce gastric volume preoperatively. Fasting guidelines as for surgical procedure.

Fast guidelines may need to be overridden in order to expedite surgery in emergency cases. Anaesthetists are able to take steps to prevent regurgitation/aspiration e.g. rapid sequence induction of anaesthesia, use of pro-kinetic drugs.

Conclusion:

The purpose of fasting guidelines for healthy patients undergoing elective surgery is to minimize the volume of gastric contents while avoiding unnecessary thirst and dehydration. So, the order

'nothing by mouth after midnight' should be applied to solids for patients scheduled for surgery early in the morning. Clear fluid should be allowed up to 2 hours before the actual time of surgery. For patients with delayed gastric emptying, to minimize gastric acid secretion, proton-pump inhibitor or H2 receptor blocker may be advisable.

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Original Article

Epidural administration of ketamine or fentanyl with bupivacaine for postoperative analgesia – A comparative study

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Abstract

The purpose of the study was to compare the analgesic effectiveness of epidural administration of ketamine mixed bupivacaine with fentanyl mixed bupivacaine in the management of postoperative pain. This prospective study was carried out in CMH, Bogra in one calendar year from July 2004 to June 2005. For postoperative pain management 100 patients of both sex, age ranging between 20 to 50 years, ASA physical status I and II scheduled for lower abdominal, pelvic and inguinal surgery were included in the study. All patients were divided into two groups. Epidural catheter was inserted in each patient through space between L_3 to L_2. Surgery was done under epidural anaesthesia in both groups. In group A (n=50) surgery was done with 0.5% bupivacaine and fentanyl (bupivacaine 1.5 ml/segment + fentanyl 2µg/ml). In group B (n=50) surgery was done with 0.5% bupivacaine and ketamine (bupivacaine 1.5ml/segment + ketamine 0.3mg/kg body weight). Epidural analgesia was continued in postoperative ward with 6 ml 0.25% bupivacaine + fentanyl 2µg/ml in group A and with 6 ml 0.25% bupivacaine + ketamine 0.3mg/kg bodyweight in group B, 4 hourly for 24 hours. The efficacy of analgesia was assessed by using Visual Analogue Scale (VAS) and Verbal Rating Scale (VRS). Mean VAS and mean VRS were less than 3 in both groups, which proved adequate postoperative analgesia. Differences of mean VAS and mean VRS between two groups were statistically not significant. Haemodynamic parameters, respiration and oxygenation were within normal range in both groups. Postoperative complications, like inadequate analgesia, post operative nausea and vomiting (PONV), headache and vertigo were less in both groups. It was observed that epidural administration of both bupivacaine mixed with ketamine and bupivacaine mixed with fentanyl found safe, effective and tolerable for postoperative pain management.

***Key Words:** Post operative analgesia, bupivacaine, ketamine, fentanyl, epidural.*

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Introduction

Postoperative pain management is an essential part of modern anaesthesia and surgery. Anaesthesiologists generally best manage it, because they offer regional anaesthetic techniques as well as pharmacologic expertise in analgesics. Usually postoperative pain has been treated with intramuscular pethidine as and when basis or 8 hours interval. But study showed that traditional postoperative pain management does not provide adequate postoperative analgesia[1]. Recently there is an increased interest in regional techniques, studies suggest that regional anaesthesia and analgesia especially epidural block can provide better postoperative analgesia and block neuroendocrine response to surgery; the sensory level of block should be above L_1 to have a significant effect on cortisol response[2]. Epidural anaesthesia and analgesia can be achieved through any intravertebral space from C_{3-4} to sacral hiatus[3]. An epidural catheter is used for top ups or continuous infusion of local anaesthetics during postoperative period. Local anaesthetics, short or long acting, remain the foundation of regional anaesthesia. However, local anaesthetics have central nervous and cardiac toxicity in overdose and have other disadvantages

such as motor blockade, tachyphylaxis or hypotension when used in clinical concentrations. The strategy was to add other substances to local anaesthetics. Apart from epinephrine, opioids were the first drugs to be associated with the local anaesthetics. The efficacy of this mixture has been extensively demonstrated and animal studies showed synergism between these two classes of analgesics[4]. Opioid may be mixed with the local anaesthetic solution to intensify the block or to manage postoperative pain. Opioid receptors are present in level I and II of substantia gelatinosa of the dorsal horn. The clinical behavior of the opioid can be predicted by its lipid solubility. Highly lipid soluble opioids like fentanyl, passes through membranes and binds quickly to the receptors. Fentanyl has a rapid onset, short duration and unlimited spread. However, risk of opioid-induced respiratory depression, so the search for alternative analgesic drugs continues.

Ketamine has been used as an anesthetic analgesic agent for more than 30 years[5]. Ketamine has been reported to produce not only general but also local anesthesia[6]. It also interacts with N-methyl-D-aspartate (NMDA) receptors[7], opioid receptors[8], monoaminergic receptors[9], muscarinic receptors[10], and voltage gated calcium channels[11]. Ketamine has been studied in the epidural route alone or combination with local anaesthetics alternative to local anaesthetic mixed with opioid. The combination of epidural ketamine and bupivacaine increased the level of sensory block, improved analgesia and reduced analgesic consumption compared with bupivacaine alone[12]. This prospective study was designed to compare the analgesic effectiveness of epidural administration of fentanyl mixed bupivacine to ketamine mixed bupivacaine in the management of postoperative pain after lower abdominal, pelvic and inguinal operations.

Materials and Methods

We performed a prospective study on one hundred patients of both sex, age ranging between 20-50 years, ASA physical status I and II scheduled for routine lower abdominal, pelvic and inguinal operations, who gave written informed consent to the protocol. The study was performed at Combined Military Hospital, Bogra in one calendar year from July 2004 to June 2005 and BSMMU. Patients with known bleeding disorders, sepsis near injection site, previous extensive back surgery were excluded from the study. During preanaesthetic assessment, total procedure was explained to each patient and every patient was familiarized with Visual Analogue Scale (VAS). Each patient was preloaded with 500ml Hatmann's solution before performing block. Taking all aseptic precautious an 18(G) catheter was introduced through 18(G) epidural needle between L_2, L_3 space.

Patients were divided into two groups. Group A contained 50 patients received a bolus dose of 0.5% bupivacaine 1.5ml/segment with fentanyl 2µg/ml through epidural catheter. Group B contained 50 patients received a bolus dose of 0.5% bupivacaine 1.5ml/segment with ketamine 0.3mg/kg body weight through epidural catheter. Level of sensory block was tested by pinprick. Surgery was allowed after 20 minutes of initial dose. Heart rate, blood pressure, ECG and SpO_2 were monitored continuously. After completion of operation, all patients were taken to postoperative ward and nursed for 24 hours. In group A, postoperative analgesia was maintained with 6ml of 0.25% bupivacaine with fentanyl 2µg/ml, injected through epidural catheter 4 hourly for 24 hours. In group B, postoperative analgesia was maintained with 6ml of 0.25% bupivacaine with ketamine 0.3mg/kg body weight injected through epidural catheter 4 hourly for 24 hours. Postoperative analgesia was assessed in both groups subjectively by VAS and postoperative nurses assessed pain by mean of Verbal Rating Scale(VRS). Observations were made at 4 hours interval for 24 hours. A rescue dose of intramuscular injection of pethidine 1 mg/kg bodyweight was given if any patient complained inadequate analgesia. Patient's heart rate, blood pressure, respiratory rate and SpO_2 were observed accordingly. Postoperative complications, like inadequate analgesia, post operative nausea and vomiting (PONV), headache and vertigo were also recorded. All results were expressed in percentage or mean$\pm$SEM as applicable. Statistical analysis were carried out using Statistical Package for Social Science (SPSS) for Windows version 10.0. Results were considered statistically significant if P value less than 0.05.

Results

Patient's demographics were similar and comparable in both groups and differences were statistically not significant (Table-I). Duration of

Table-I
Characteristics of patients

Parameters	Group A (n=50)	Group B (n=50)	Result Student's 't' test (unpaired)
Age (years)	43.98 ± 3.11	40.78 ± 2.87	NS
Sex (M/F)	22/28	24/26	
Body Weight (kg)	52.17 ± 1.68	53.25 ± 1.76	NS
Height (cm)	157.48 ± 1.32	156.36 ± 1.26	NS
Duration of Surgery (min)	72.34 ± 4.37	74.85 ± 5.25	NS

Values are Mean ± SEM
NS - No significant differences between two groups.

Table – II
Types of operation performed

Name of operations	Group A (n=50)	Group B (n=50)	Total (n=100)
Abdominal hysterectomy	23(46%)	20(40%)	43(43%)
Inguinal herniorraphy	18(36%)	22(44%)	40(40%)
Uterine myomectomy	3(6%)	4(8%)	7(7%)
Sulpingo - oophorectory	4(8%)	2(4%)	6(6%)
Appendicectomy	2(4%)	2(4%)	4(4%)

surgical procedure was similar in both groups and differences were statistically not significant (Table-I). No patient was withdrawn from the study. The types of operation performed were shown in Table-II. Operating conditions were pronounced satisfactory by the surgeon concerned in all the cases. In the postoperative period, mean VAS was 2.21 ± 0.13 minutes in group A and 2.31 ± 0.15 minutes in group B. Mean VAS was more in group B than in group A but difference between two group was statistically not significant.(Table-III). Mean VRS was 2.68 ± 0.11minutes in group A and 2.87±0.16 minutes in group B. Mean VRS was more in group B than in group A, but difference between two group was statistically not significant (Table-III). There were no instances of hypotension, bradycardia, and respiratory depression to both groups during and after administration of epidural drugs during surgery and in postoperative period. Two patients in group A and four patients in group B complained about inadequate analgesia in first 6 hours after operation and managed with single rescue dose of intramuscular pethidine 1 mg/kg bodyweight. However, the difference of inadequate analgesia between two groups was statistically not significant. Incidence of postoperative complications like PONV, headache, vertigo were recorded and shown in (Table-IV). Incidence of PONV is more in group B than group A and difference was statistically significant ($p<0.01$). Incidence of headache and vertigo were similar and less in both groups and differences were statistically not significant. Two patients in group B complained mild transient burning sensation in back during epidural injection of ketamine mixed bupivacaine.

Table – III
Comparison of mean VAS and mean VRS between two groups

Groups	VAS	VRS
Group A (n=50)	2.21 ± 0.13	2.68 ± 0.11
Group B (n=50)	2.31 ± 0.15	2.87±0.16
Result Student's 't' test (unpaired)	NS	NS

Values are Mean ± SEM
NS – No significant differences between two groups

Table – IV

Complications during postoperative period

Group	Number	Inadequate analgesia	PONV	Headache	Vertigo
Group A	50	2(4%)	2(4%)	2(4%)	2(4%)
Group B	50	4(8%)	8(16%)	2(4%)	4(8%)
Result Chi-square test	-	NS	P<0.01	NS	NS

NS - No significant differences between groups.
P < 0.01 – Statistically significant.

Discussion

Surgery represents a form of legally allowable premeditated injury inflicted on the body of the patient, hence it is reasonable to expect and experience pain after surgery. In spite of recent advances in medical science, in surveys, nearly one third of patients unfortunately still complained inadequate relief of postoperative pain[13]. Postoperative analgesia is usually achieved by time-honoured method of intramuscular injection of pethidine, which is inadequate. In the last few years regional analgesia especially epidural block with catheter technique provide an excellent means of postoperative analgesia. To avoid the complications, risk of local anesthetics, anaesthesiologists seek to reduce the dose of local anesthetics, while maintaining the analgesic efficacy, and different adjuvents were tried. The efficacy of mixture of local anesthetics and opioid has been extensively demonstrated. Animal studies showed synergism between these two classes of analgesics [4] and opioids act mainly on presynaptic receptors and reduce neurotransmitter release[14]. Since the first publication on the epidural administration of ketamine in human in 1982, various studies on pharmacology, toxicology and clinical use of ketamine by the epidural and intrathecal routes have been published. Ketamine is a phencyclidine derivative, has a chemical structure similar to that of lignocaine and procaine[6]. Ketamine antagonizes NMDA receptors and prevents wind up and long term potentiation[14]. There is considerable evidence that ketamine inhibits spinal transmission of nociceptive stimuli[15,16].

In this present study, we confirm the previous reports that ketamine exerts significant effects on postoperative pain mechanism. In this study, we tried to compare the analgesic effectiveness of epidural administration of ketamine mixed bupivacaine with fentanyl mixed bupivacaine for postoperative analgesia. We used 0.25% bupivacine 6ml with fentanyl 2 μg/ml in group A and 0.25% bupivacaine 6ml with ketamine 0.3 mg/kg bodyweight in group B, 4 hourly through epidural catheter for 24 hours in the postoperative period. The pain intensity was assessed accordingly by using VAS and VRS. The mean VAS and mean VRS was less than 3 in both groups which indicate adequate postoperative analgesia was maintained in both group. However, mean VAS and mean VRS were less in group A than group B, but the differences were statistically not significant.

This analgesic effectiveness of ketamine mixed bupivacaine may correlate the study undergone for postoperative pain management for upper abdominal surgery with epidural ketamine combined with bupivacaine[12]. Ketamine antagonizes NMDA receptors in substantia gelatinosa in the spinal cord[17,18]. It also interacts with spinal opioid receptors but seems to play a minor role. The affinity of ketamine for opioid receptors may be 10,000 fold weaker than morphine[19]. In vitro and animal studies also suggested ketamine involve the descending inhibitory monoaminergic pain pathways, through inhibition of reuptake of neurotransmitter[9]. With epidural block postoperative analgesia is confined to area of operation, thus minimizing the vasomotor paralysis and haemodynamic stability of postoperative patients are well maintained[20]. In this study patient's haemodynamic parameters were within normal range. There were no reports of hypotension and bradycardia in both groups. Respiratory rate and SpO_2 were also acceptable in both groups.

Incidence of postoperative complications like PONV, headache and vertigo were observed in both groups.

Incidences were less and almost similar in both groups, though PONV was more in group B than group A and difference was statistically significant. Two patients complained mild transient burning sensation in back during epidural administration of ketamine added bupivacaine in group B. This may correlate with study undergone epidural ketamine for postoperative analgesia for gallbladder operation[21]. This mild burning sensation was may be due to ketamine itself and well tolerated by the patients.

Conclusion

Epidural administration of bupivacaine mixed with ketamine produced satisfactory level of postoperative analgesia. The quality of analgesia did not significantly differ from that of fentanyl added bupivacaine. Both the techniques were found safe, effective and acceptable.

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Original Article

Effect of ephedrine on rapid intubation and haemodynamics using propofol and rocuronium: A randomized controlled trial

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Abstract:

Ephedrine is a suitable drug to increase the cardiac output and tissue perfusion, in adequate dose, resulting in faster delivery of drug to muscles. This study was designed to compare the effect of pretreatment with ephedrine 75,100, 150 µg/kg and saline on intubating conditions and haemodynamics during rapid tracheal intubation using propofol and rocuronium. The aim of this study was to evaluate the effects of different doses of ephedrine, given before induction, on intubating conditions and haemodynamics during rapid tracheal intubation. One hundred and twenty adult patients randomized into one of the four groups- I, II, III and IV were received iv ephedrine 75, 100, 150µg/kg and saline 0.9% (5ml) respectively, one minutes before administering propofol 2.5 mg/kg and rocuronium 0.6 mg/kg. Patients' mean arterial pressure, heart rate, were recorded before induction (base line), just before intubation, and 1, 3, and 5 minutes after tracheal intubation. Data were analysed between the groups and within the groups using ANOVA test and X^2-test. A p*-value of <0.05 were considered as significant. Patients characteristics, baseline heart rate, and mean arterial pressure were comparable between the groups. Iutubating conditions were significantly better in group II (p=0.002). Pulse rate at different times were statistically significant (p<0.001) except base line and just before intubation. The mean difference of average mean blood pressure at different times were statistically significant (p<0.05) except baseline. In conclusion, pre-treatment with ephedrine 100 µgm/kg improved the intubating conditions during rapid tracheal intubation using propofol and rocuronium.*

Keywords*: propofol, haemodynamics, intubation condition, premedication, ephedrine.*

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Introduction:

Laryngoscopy and endotracheal intubation is performed during most of the general anaesthetic procedure. The time from loss of consciousness to tracheal intubatoion is a period during which the patient is at risk of hypoxia and pulmonary aspiration. To minimize the chance of hypoxia, regurgitation and aspiration of gastric content the rapid sequence intubation is commonly used to secure the patients airway[1]. Traditionally, suxamethonium is the gold standard and drug of choice for rapid sequence intubation but some side effects preclude its use in all patients[2]. Rocuronium is the currently preferred non-depolarizing neuromuscular blocking agent used as an alternative to suxamethonium for rapid tracheal intubation. The onset time of a neuromuscular blocking drug is an important factor in determining the speed and ease with which the trachea can be intubated during a rapid sequence intubation[3]. In rapid sequence intubation, the time from loss of consciousness to tracheal intubation is usually determined by the establishment of neuromuscular blockade, so it is usually desirable to use a muscle relaxant with a short onset time. The onset time is partly determined by the speed with which these drugs reach the neuromuscular junction, a factor that appears to be proportional to cardiac output and muscle blood flow[4]. Rocuronium used in the lower dose of 0.6 mg/kg for rapid tracheal intubation is

known to provide suboptimal intubation conditions in 20-25% patients [5,6]. This could be as a result of a decrease in cardiac output cause by the induction agent, resulting in slower onset of action at the laryngeal muscles and the diaphragm [7,8]. So it is desirable to use a suitable drug just before induction to increase the cardiac output and tissue perfusion, and resulting in faster delivery of rocuronium to laryngeal and diaphragmatic muscles, for rapid onset of action of rocuronium and improving the intubation conditions during rapid sequence induction. Objective of present study is to compare the effect of pre-treatment with ephedrine 75, 100, 150 μg/kg and saline on intubating conditions and haemodynamics during rapid tracheal intubation using propofol and rocuronium.

Materials and Methods:

This study was conducted after obtaining approval from the institutional ethical committee. ASA physical status I or II patents, either male or female, between 18-60 years of age undergoing elective surgical procedures requiring general tracheal anaesthesia were included. Patients with concomitant medical illness, anticipated difficult airway, pregnancy, presence of drugs that influence induction and history of known allergy to drugs were excluded from the study. Patients were randomly selected into one of the four groups by sealed envelope lottery technique. Sample size was 30 in each group. The four groups were- Group I, Group II, Group III and Group VI (control).

Selection of patients, grouping, entry of name of the patient in the case record form and the written informed consent was taken from all patients on the pre-operative day. Pre-medication with oral diazepam .1 mg/kg was given in the night before the surgery. Patients were fasted 6 hours before operation.

After transferring the patents into the operating room, standard monitoring (five lead ECG, SpO_2, NIBP) was instituted. I/V lactated Ringer's solution was started at a rate of 2 ml/kg/h. Fentanyl 1 μgm/kg was given 1 min after the start of oxygenation. Then one minute after ephedrine in the dosage of 75, 100, or 150μgm/kg in the groups I, II, III respectively, or saline 0.9% (5ml) for group IV was injected. Three minutes after pre-oxygenation with 100% oxygen anesthesia was induced with propofol 2.5 mg/kg. Mask ventilation was not done till tracheal intubation, unless the oxygen saturation goes to <95%.

Laryngoscopy and tracheal intubation was done by investigator with an appropriate sized Macintosh blade 60 s after administration of rocuronium. The intubating conditions were assessed as per the intubation scoring system of the Consensus Conference on Good Clinical Research Practice in Pharmacodynamic Studies of Neuromuscular Blocking Agents, Copenhagen consensus[15]. Oral tracheal tubes 7.0 and 8.0 mm internal diameter were used for female and male respectively. The cuff was inflated with air until the disappearance of a leak on positive pressure ventilation.

Patients' mean arterial pressure, heart rate, and oxygen saturation were recorded before induction (base line), just before intubation, and 1, 3, and 5 minutes after tracheal intubation. TOF ratio, and response of the patient to tracheal intubation were recorded (Table II). Anaesthesia was maintained with oxygen 40%, nitrous oxide 60% and halothane with intermetant positive pressure ventilation maintaining normocapnia. All relevant data were collected from each patient by a pre-designed questionnaire and comparison was made between the groups. Data were analyzed using SPSS version 12 for Windows. ANOVA test and X^2-test were used for comparative analyses. A p-value of <0.05 was considered as significant.

Results:

Demographic characteristics were comparable among the groups (Table I). Baseline heart rate and mean arterial pressures were comparable between the groups.

The mean difference of pulse rate (Fig-1) at different times were statistically significant ($p<0.001$) except base line and just before intubation. The mean difference of average mean blood pressure (Fig-2) at different times were statistically significant ($p<0.05$) except baseline. The mean difference of TOF ratio at 60 seconds was statistically significant ($p<0.001$). The intubation condition (Table III) was statistically significant ($p<0.002$) in group II when compared with group IV.

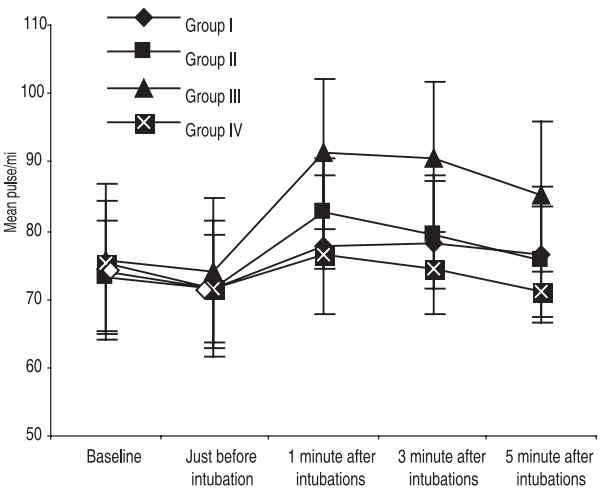

Fig.-1: *Line diagram showing mean pulse at different times in four groups*

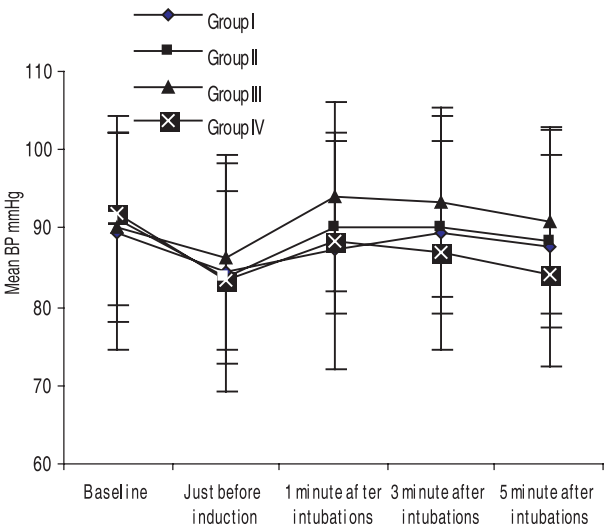

Fig-2: *Line diagram showing mean blood pressure at different times in four groups*

Table-I

Demographic characteristics of the study subjects (N=120).

Demographic variables	Group I(n=30)		Group II(n=30)		Group III(n=30)		Group IV(n=30)	
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD
Age (years)	35.6	±10.6	32.9	±9.1	36.6	±10.9	31.5	±9.5
Weight (kg)	54.3	±6.1	54.7	±6.1	54.7	±5.0	55.9	±5.6
Male	9	(30.0)	9	(30.0)	12	(40.0)	9	(30.0)
Female	21	(70.0)	21	(70.0)	18	(60.0)	21	(70.0)

Values within parenthesis are expressed as percentage over column total,

Chi square =1.03, df=3, p=0.795

Not significant (p > 0.05) with chi square test for sex distribution,

Table-II

Scoring and Assessment of intubating conditions.

Score	Jaw relaxation (easy to laryngoscopy)	Vocal cords	Response to intubation
0	Poor (impossible)	Closed	Severe Coughing or bucking
1	Minimal (difficult)	Closing	Mild coughing
2	Moderate (fair)	Moving	Slight diaphramatic movement
3	Good (easy)	Open	None

Excellent (score8-9), Good (score 6-7), Fair (score 3-5), Poor (score 0-2)

Table-III

Assessment of intubation condition of the patients between groups

Pair group	Excellent		Good		Fair/poor		Chi value	P value
	n	%	n	%	n	%		
Group I	15	50.0	10	33.3	5	16.6	4.72	0.094^{NS}
Group IV	7	23.3	14	46.7	9	30.0		
Group II	20	66.7	8	26.7	2	6.7	12.35	<0.002
Group IV	7	23.3	14	46.7	9	30.0		
Group III	12	40.0	10	33.3	8	26.7	2.04	0.360^{NS}
Group IV	7	23.3	14	46.7	9	30.0		

Chi square =13.40, df=6, p=0.037
Significant ($p < 0.05$) with chi square test

Discussion:

The results from the present study show that ephedrine in the dose of 100μgm/kg given intravenously before rapid tracheal intubation with propofol 2.5mg/kg and rocuronium 0.6 mg/kg improved intubation conditions. However, there was no clinically significant difference in mean arterial pressure and heart rate among the groups during the first 5 minutes after intubation. In this study age ranged of the patients in four groups were belongs to 19 to 55 years. Male female ratio was comparable with the earlier studies[9-12]. The mean heart rate was comparatively higher in group III followed by group II, group I and than group IV, since 1 minute to 5 minutes after intubations, however group I was almost stable. The heart rate difference were found statistically significant ($p<0.001$) from 1 minute to 5 minutes after intubations. The result obtained in the present study is comparable with the previous studies [3,9,13,14]. The mean arterial pressure at different times was found 89.4±4.6mmHg in group I, 91.1±4.1mmHg in group II, 90.2±3.7mmHg in group III and 91.9±3.8mmHg in group IV during baseline. But Just before intubation the mean(±SD) mean arterial pressure (MAP) was significantly ($p<0.05$) decline in all four groups. However one minute after intubation the mean arterial pressure was significantly raised in all four groups.Three minute and 5 minutes after intubation the mean arterial pressure were almost comparable in group I and group II but discrepancy were observed in group III and group IV. Mean arterial pressure at different times were statistically significant. Despite ephedrine pre-treatment, there was a decrease in mean arterial pressure in the immediate post-induction period. There was no clinically significant difference in mean arterial pressure and heart rate among the groups during the first 5 min after intubation (considering 20% change as clinically significant). Thus, prophylactic injection of ephedrine only attenuates, but does not completely abolish the decrease in arterial pressure associated with induction of anaesthesia using fentanyl and propofol. The present study findings strengthen by the finding of the earlier authors[14] . TOF ratio at the end of 60 s of rocuronium injection were comparable among the groups. In the present study the mean TOF ratio at 60 sec was 62.7±4.4 in group I, 57.2±5.2 in group II, 66.5±5.3 in group III and 72.8±5.3 in group IV just before intubation and the mean difference of TOF ratio was statistically significant ($p<0.05$) in all four groups, which support the previous observation [14].

Assessment of intubation condition of the patients was observed in the current study and the difference was statistically significant ($p<0.05$), which indicates that the excellent assessment was significantly higher in group II than others groups. In this study it was observed that the ephedrine 75 and 100 μmg/kg pretreatment before propofol induction resulted in better intubating conditions, similar to the findings of the earlier study. An additional finding is that increasing the dosage of ephedrine from 100 to 150 μmg/ kg did not improve the intubating conditions. Probably, ephedrine in the excess dosages may produce vasoconstriction of blood vessels supplying laryngeal muscles, thus limiting the access of the relaxant to its site of action.

The present study strongly support the earlier study[14].

Conclusion:

Pre-treatment with ephedrine 100 µgm/kg improves the intubating conditions during rapid tracheal intubation and reduce degree of hypotension using propofol and rocuronium.

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Case Report

A case of convulsion resembling masseter muscle spasm (MMS) during caesarean delivery under subarachnoid block

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Abstract

A 28 yrs old female forty weeks gravida was scheduled for caesarean section for less fetal movement. She did not have any bad obstetric history and any complication during previous operation and anaesthetic procedure. Subarachnoid block was performed at L_3-L_4 interspace with 2.5ml (12.5mg)5% bupivacaine heavy. Suddenly the patient became cyanosed and she tried to tell something but could not talk. Then she was given 100% O2 by face mask but it was not fruitful. Then endotracheal intubation was attempted but failed to achieve due to increased jaw muscle tension and mouth could not be opened like masseter muscle spasm (MMS). At that stage patient became unresponsive and no pulse was palpable, blood pressure was not recordable. Intravenous adrenaline was given immediately and then 100mg of suxamethonium adminstered intravenously. The jaw relaxed within minutes and tracheal intubation was done. General Anaesthesia was maintained with O_2/N_2O, 0.4% halothane and atracurium. The reversal was good enough and the patient was haemodynamically stable. The patient transferred to the recovery room.

***Key wards:** subarachnoid block (SAB), masseter muscle spasm (MMS), caesarean section (CS).*

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Introduction

Obstetric anaesthesia is a demanding but gratifying sub speciality of anaesthesiology. The wide spread acceptance and use of regional anesthesia for labour has made obstetric anaesthesia a major part of anaesthetic practice. Spinal or epidural anaesthesia has become the preferred technique because general anaesthesia(GA) has been associated with higher maternal mortality[1]. Other advantages of regional anaesthesia includes,less maternal exposure to potentially depressant drugs, a decreased risk of maternal pulmonary aspiration, an awake mother gets the pleasure of birth of her baby and also the option of using spinal opioid for post operative pain relief[2]. Spinal anaesthesia was first used in 1900, popular in the USA in 1920s.Its popularity increased in UK towards the end of 1900s[3]. The spinal anaesthesia is easier to perform, has more rapid, predictable onset, produces more intense block, and does not have potential for serious systemic drug toxicity, because of smaller doses of local anaesthetic employed[4]. Though spinal anaesthesia have proved to be extremely safe, but it is not without complications. Complications are relaed to medications or needle used to perform given the procedure. Adverse reactions and complications range from severe hypotension to permanent neurological deficit and even death. Here we report one such case of convulsion resembling masseter muscle spasm(MMS) during caesarean delivery under spinal anaesthesia.

Case History

A 28 years old female, forty weeks gravid, was admitted to hospital with the complaints of less fetal movement & scar tenderness. Her weight & height were 55 kg & 5'55" respectively. She has a previous history of caesarean section under spinal anaesthesia & a live female baby. She did not have any bad obstetric history & no history of any complication

during the previous operation & anaesthetic procedure. Her Hb% was 10.6 gm/dl & pre-operative blood pressure was 110/70 mmHg. Her pulse rate was normal. She didn't have any significant respiratory or cardiovascular abnormality with normal body temperature. She was conscious & no neurological abnormality was present.

After an initial assessment, she was preloaded with about 800 ml of Hartmann's solution. Then spinal anaesthesia was administered after proper painting with providone iodine solution and with a 25 gauge Quinke needle in the interspace between the lumber third & fourth vertebra in a single shot. Then 2.5 ml (12.5 mg) 5% Bupivacaine heavy was administered intrathecally. After 3-5 mins blood pressure was falling rapidly & reached 80/50 mmHg. Then 5mg ephedrine hydrochloride was given intravenously to the patient. Meanwhile the operation was started & incision was made in the lower abdomen & the patient did not complain of any pain.

Suddenly the patient was became cyanosed & she tried to tell something but could not speak. Then she was given 100% O_2 by face mask,as there was no improvement of SpO_2 assisted ventilation was started. But it was not fruitful. Then endotracheal intubation was attempted but failed to achieve due to increased jaw muscle tension & mouth could not be opened. At that stage patient became unresponsive, no pulse and blood pressure was recordable. Immediate 1mg of adrenaline was given intravenously when pulse & blood pressure became recordable within 30sec. Then 100mg of suxamethonium was given intravenously and the jaw relaxed within minutes and tracheal intubation was done.General anaesthesia was maintained with O2/NO2, 0.4% Halothane. and a bolus dose of 25 mg atracurium was given. After 15 mins the patient was spontaneously breathing. Within that period about 2000 ml of Hartman's solution was given to the patient intravenously & the urine output was about 800 ml. The operation was completed within 30 mins & the patient was reversed with 2.5 mg of Neostigmine & 1.2 mg of Atropine. At that time the patient was spontaneously breathing.

The reversal was good & the patient was haemodynamically stable with post operative blood pressure of 120/90 mmHg & pulse rate was 78 beats/min. The patient showed no evidence of further respiratory difficulty & the lung was clear & the air entry was good. The patient was sent to post anaesthesia care unit. The period was eventless. The patient was stable & sent to the ward next morning.

Discussion

Masseter muscle spasm (MMS) is a major & serious problem to the attending anaesthetists as it causes clinical problem in opening the mouth in order to achieve tracheal intubation. It has got a strong co-relation with Malignant Hyperthermia (MH). The first common use of the term MMS arose when Malignant Hyperthermia reaction subsequently occurred in patient whose mouths had been difficult to open following the use of suxamethonium[5]. This association was apparent in 70% of patients given suxamethonium who went to develop MH. Awareness of the association between MMS & MH led to the referral of many patient who developed MMS for investigation of their MH status. Of those with MMS as the only abnormal feature 28% have been proven to be susceptible to MH. The proportion rises to 57% if there were accompanying metabolic features or to 76% if the MMS was followed by other features of muscle damage such as myoglobinurea or severe incapacity from muscle pains. From this experience which is similar amongst MH investigation centres, it seemed clear that, patients developing MMS were at high risk from MH until proven otherwise & MH is still one of the major potential anaesthetic hazards despite the mortality rate for MH declining from above 70% before1980 to below 4% over the past five years.

Suxamethonium is a known triggering agent for MH as well as MMS. Suxamethonium is thought to produce a rapid & marked rise in intracellular calcium concentration but it's duration of effect is limited. The predominant feature is thus increased muscle activity, evident as rigidity[6].

The muscle rigidity is sometimes generalized, but may be limited to the jaw muscles. The term MMS is therefore of practical & clinical significant only if it's use is restricted to severe & perhaps more prolonged (more than 21 mins) episodes of restricted mouth opening following suxame-thonium administration.

Inhalation anaesthetics can also trigger MH as well as MMS. Halothane is the most potent triggering agent. But other inhalation anaesthetics like enflurane, desflurane, isoflurane & sevoflurane can also trigger MH[7,8].

Patient was well preoperatively. She did not give any history of metabolic disorder or features of muscle damage. Even though when suxamethonium or halothane was administered to facilitate intubation for conversion of spinal anaesthesia to general anaesthesia, her body temperature was quite normal. So in this case there is no apperent relation with prolonged masseter muscle rigidity & MH. Patient received spinal anaesthesia & there was hypotension. But there is no co-relation with MMS & hypotension. The patient experienced a period of hypoxia due to hypotension & ongoing respiratory failure. There is also no evidence of MMS in hypoxemic state. The patient's temperature was quite normal all through the perioperative period & no shivering occurred. So there was no chance of hypothermia induced muscle stiffness.

The local anaesthetic that was used for spinal anaesthesia was 5% bupivacaine heavy. Bupivacaine has got a wide safety margin & even slow intravascular injection of epidural may not precipitate convulsion. Early signs of intravascular injection like numbness of the tongue & circumoral area were absent in our patient[8].

So, which factors triggered that jaw muscle rigidity was misleading & not clear as an isolated solitary event. The possibilities may be that it was due to toxic effect of local anaesthetic or it was possibly more due to hypoxic convulsion due to acute hypotension from a very high up SAB. Convulsion could not be generalized due to the motor blockage of skeletal muscle by SAB in the lower limb & thoracoabdominal region but leaving the masseter muscle unblocked as it is supplied by cranial nerves mandibular division of trigeminal nerve. However the final cause of masseter muscle rigidity could not be confirmed in this case.

Conclusion

This was an isolated solitary event. The possibilities may be a toxic effect of local anaesthetic or hypoxic convulsion due to acute hypotension .

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Original Article

Audit of general intensive care unit of Bangabandhu Sheikh Mujib Medical University

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Abstract:

All patients admitted to the Intensive Care Unit of BSMMU between January 2006 and December 2006 on whom data had been entered into the study. A total of 473 admissions with complete records were available. Hospital mortality was 60.6%. Nonsurvivors were older than survivors and had longer ICU stays. Patients admitted from wards had a higher mortality than patients from the operating room / recovery or the emergency department. Thirty-four percent of patients were in the ICU for >2 days, and they accounted for nearly 81% of bed occupancy.

Early identification of patients at risk, both before admission and after discharge from the ICU, may allow treatment to decrease mortality. Research and resources may be best directed at patients who die, despite a relatively low predicted mortality. Many patients die after discharge from ICU and this mortality may be decreased by minimizing inappropriate early discharge to the ward, by the provision of high-dependency and step-down units, and by continuing advice and follow-up by the ICU team after the patient has been discharged.

Key Words: intensive care; BSMMU; audit, morality

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Introduction:

Intensive care is expensive and scarce worldwide including Bangladesh.[1] Total number of ICU beds in Bangladesh is about 190 for 150 million people. Therefore admission to the intensive care unit (ICU) should be restricted, so that patients likely to benefit from ICU care [2]. This restriction excludes patients whose death is inevitable as well as those patients who should survive and do well without the need for intensive care. Unfortunately, our postoperative care is based on isolation of patient only and minimum facilities are available. Therefore, surgical team and also patient's party preferred to shift his patient to the intensive care unit. Because, judicious use of fluids and blood products, management of cardiac output and blood pressure, control of temperature, provision of good analgesia, nutrition and respiratory support are only available in the intensive care unit. Admission to an intensive care unit allows close monitoring and early intervention if problems arise and thereby many surgical deaths can be prevented. There is no substitute for an adequate number of intensive care beds to which appropriate surgical patients can be admitted. The numbers of intensive care and hospital beds were not constant over this period; it varies from hospital to hospital and also from ownership. We have three corporate hospitals and allocation of bed for acute care varies. In UK recommendation that 1% to 2% of acute hospital beds to be ICU beds dates from the 1970s [9] and is recognized to be inadequate for most hospitals. They have also specified the number of intensive care consultant sessions indicating the degree of senior medical personel involvement in

running the ICU. One session approximates to one half day/wk of consultant "intensivist" time dedicated to the ICU. In the United Kingdom, the Intensive Care Society recommends a minimum weekly allocation of 15 consultant sessions to an ICU of more than 2 to 4 beds to cover daytime and out-of-hours commitments [10]. A minimum of seven fixed daytime sessions with a consultant dedicated to the ICU is required for training recognition. All of the ICUs are also staffed by doctors receiving training in intensive care. Most of these doctors are anesthesiologists on rotation. There is considerable variation between and within ICUs in the experience and training of these doctors and in the amount of supervision and responsibility they are given.

The working practices and outcomes from intensive care units are poorly documented in our country.

The patients were admitted in the Intensive Care Unit from different discipline of Bangabandhu Sheikh Mujib Medical University Hospital and also referred from other hospitals.

A prospective analysis of 473 patients admitted to General Intensive Care Unit of Bangabandhu Sheikh Mujib Medical University Hospital was conducted between January to December 2006. This audit was instituted to investigate retrospective review of stored data from the archive. Demographic details, referral source, admission time, admission diagnosis and outcome were recorded to provide data for future development of Intensive Care Facilities.

Materials and Methods:

We have studied retrospectively of 473 patients admitted to General Intensive Care Unit of Bangabandhu Sheikh Mujib Medical University Hospital in the year 2006. Ethical clearance was taken from the Departmental Ethical Clearance Committee of the Department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU. In accordance of the criteria for analysis, data obtained from admission register and mortality record books and also from patients admission files were studied. We observed patient's mortality and male female ratio. We divided the total patients in three age groups, 10-44 years younger age group, 45 to 65 years middle age group and above 65 years. We also studied patients of different specialty referred to the ICU. We also observed relationship of mortality with organ (s) involvement. We categorised the patients as single, double and triple organ/system involvement and their relation with mortality. Duration of stay in the ICU was defined as the number of days between the ICU admission and discharge with a minimum stay of 1 day and also the duration of stay in days and their relationship with mortality.

Statistical analysis:

All data were plotted in a pre-design data collection sheet appropriate for the study. All data are expressed as simple mean or ranged. Statistical analyses were done by Students t test or chi square as appropriate using SPSS.

Results:

A total of 473 admissions with complete records were available. They were divided into three groups. Out of this younger age groups (10-44 years) were 175 in number, middle age group (45-65) were 175 and older age group (>65 years) were 123. Three hundred thirty six patients were male and 137 patients were female and the male female ration is about 2.5:1.

Table-I

Distribution of age and sex with their outcome of ICU admitted patient of BSMMU

Parameters		Numbers	Percentage
Age in years	10-44	186	39.32
	45-65	164	24.67
	>65	123	26.00
Sex	male	295	62.36
	female	178	37.64

Values are expressed as frequencies and percentage over column total

Overall mortality rates were 60.6 (473). Crude mortality varied widely by admission category, age of the patient, hospital stay and organ involvements. The numbers of nonsurvivors were highest who referred from other hospital than from the in patient department of BSMMU. Ward admissions had a much higher percentage of mortality rates (52.9%)

than patients admitted from either operating room / recovery area (22.3%).

There was highly significant difference ($p < 0.01$) between the mean age of survivors, 54 ±19 yrs, and non survivors, 63 ± 17 yrs. Percentage of mortality increased with increasing age, as did the percentage dying in the hospital after surviving a first ICU admission. In younger age (10-44 years) group out of total 186 patients, 96 patients died and 90 patients survived. In middle age (45-65 years) group out of total 164 patients, 114 patients died and 50 patients survived. In older age (>65 years) group out of 123 patients, 81 patients died and 42 survived.

Table-II

Patient source and duration of stay in the ICU

Characteristic	No of patient	No of death
Source of admission		
Patient referred from ward of BSMMU	203 (42.91%)	79 (43.64%)
Operating Room / Recovery Room	58 (12.26%)	7(3.86%).
Other than BSMMU	212 (44.82%)	95 (52.48%)
Duration of stay in ICU		
up to 7 days	284 (60%)	207 (48.6%)
8-14 days	77 (16%)	44 (10%)
>15days	65 (14%)	33 (7.75%)

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

Table-III

Distribution of patient as department basis

Department	Total number
Neurosurgery	120 (25%)
Neurology	81 (17%)
Nephrology	54 (11%)
Oncology	5 (1%)
Others	213 (45%)

Values are expressed as frequencies. With in parenthesis are percentages over column total.

We also observed the duration of stay in ICU. maximum patients (284) stayed in ICU for around 0-7 days, 77 patients stayed for 8-14 days, 34 patients stayed for 15-21 days, 18 patients stayed for 22-30 days and 13 patients stayed for around 30 days and above.

There was a highly significant ($p < 0.01$) difference in the distribution of ICU stays between survivors and nonsurvivors. Of nonsurvivors, 45% were in the ICU for ≤1 day, 66% of deaths were within 3 days, and 75% of the deaths were within 5 days. Only 12% of nonsurvivors were in the ICU for >10 days. We also observed that patients came to this ICU from different specialty, but maximum patients amounting 200, came from neurological system which includes both neurosurgery and neuromedicine. Minimum 5 patients came with diagnosis of carcinoma involving multi-organ.

323 patients admitted in ICU with single involvement. Out of this, 179 patients died and 144 patients survived. 98 patients admitted in ICU with more than one organ involvement. Out of this 92 patients died and 6 survived.

Table-IV

Relationship between outcome and number of organ involvement

Parameters		No of patient	No of death	p value
Organ involvement	Single organ	323 (42.91%)	144 (43.64%)	<0.001
	Multi organ	98 (12.26%)	92 (93.87%)	

Values are expressed as frequency. With in parenthesis are percentages over column total. Statistical analysis is done by x^2 test.

Discussion:

Our analysis was based on total number of ICU admissions for the time period of one year. The data were gathered as a collaborative clinical ICU audit project. The method of data collection, training, and data validation is designed to minimize errors [3]. However, the information is likely to be most accurate for objective information, such as patient's location before ICU admission, ICU stay and mortality rates, which are used to support the main themes of this article.

In our country, by the time patients reach the ICU, it may be possible to identify those with a high risk of death but it may be too late to do much to influence the outcome of those who die within the first day or two of admission. Such patients include those patients with brain damage after trauma or anoxia, with terminal cancer, and with end-stage respiratory failure. Many of these patients will have had underlying pathology and physiology too deranged to respond to a short period of intensive care therapy. Much intensive care research is focused on treatments directed at sepsis, adult respiratory distress syndrome, and multiple organ failure, problems that occur primarily in the long-stay ICU patient. To appreciably decrease early ICU mortality, it may be necessary to intervene before ICU admission. There is some supporting evidence in high-risk surgical patients showing that optimization of physiologic values before surgery and ICU admission may decrease mortality[4].

Early intervention may improve survival, observed mortality may decrease but, since mortality prediction for ICU patients is based on the patients' status shortly before, or on admission to the ICU, predicted mortality will also decrease as physiologic abnormalities and arrest are prevented.

Our analysis provides little hope for early identification of long-stay ICU patients unlikely to survive. Although long-stay patients consumed a majority of the resources, our analysis could not clearly differentiate early between survivors and nonsurvivors, and this finding is supported by other studies [5-8]. Daily assessment, taking account of changes in the patient's physiology and treatment, may provide a means for earlier detection of poor outcome. One way of decreasing costs in the ICU is to refuse admission to patients for whom there is little chance of benefit. Consultation and planning before considering ICU admission may minimize the number of such admissions.

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Original article

Conceptual prevalence in palliative care amongst the physicians of Bangabandhu Sheikh Mujib Medical University: a comparison between the post-graduate trainees and the trainers

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Abstract:

Background*: Palliative care program has no place either in the national health care service or in undergraduate or post graduate medical curriculum in Bangladesh.*

Introduction*: First Palliative Care Service began in the only medical university of the country in 2007 and still in its early infancy. We hypothesized that medical practitioners mostly have low level of understanding in palliative care*

Aim of the study*: To assess the level of self- perception and understanding in palliative care amongst the post graduate trainees and their trainers in the university and to find out if there is any difference between the two groups.*

Materials and methods*: 127 post graduate trainees and 81 post graduate teachers participated in a survey study during the first one year of the beginning of the service in the university. The data were collected after the survey and the responses were analyzed.*

Results*: The reported level of perception in palliative care appeared to be present in both the groups even without any formal teaching or training. The trainees claimed to have more exposure and understanding than the post graduate teachers who happen to be their trainers. Actual level of understanding was difficult to assess.*

Conclusion*: The result of this survey make a strong case of further evaluating the actual level of understanding and skill determination required in the field of palliative care in different institutions. This will enable to compare and to determine the sharp contrast for palliative care need versus lack of education and training in this field.*

Key words: *palliative care; concepts; doctors; medical education; Bangladesh*

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Introduction:

Palliative care is all about looking after people with illnesses that can not be cured, relieving their sufferings and supporting them through difficult time. It is a fast growing field in the developed part of the world as contemporary medicine has begun to reemphasize the importance of palliative and end-of- life care[1].

Aranda rightly said in 1999 that 'Bangladesh has one cancer unit for a population of 120 million people, and although most patients are diagnosed with advanced cancer, there is no plan for palliative care program[2].

This remark remains more or less same till date except for a few more cancer units in the country. Appropriate symptom control and palliative care for incurably ill patients is not explicitly acknowledged as an important issue neither in public nor in private health care facilities. Medical education and health care service is more cure oriented and Quality of

Life (QOL) issues are rarely considered. There is a huge unmet hidden need in the society for appropriate Palliative Care (PC).

Since 2006, individual attempts are being taken to introduce PC in the country. The major breakthrough came when Bangabandhu Sheikh Mujib Medical University (BSMMU), the only Medical University of the country introduced and incorporated PC in its services on 6th October, 2007.

Like any other country, this initiative has to be associated with a corresponding change in the education and attitudes of the health care professionals[3,4] .There is an enormous need for palliative care education and training of health professional in the developing world where palliative care is most needed[5]. Bangladesh is no exception to this. Unfortunately, symptom management of terminally ill patients, clinical use of opioids, communication skill of breaking bad news and end of life issues and ethics discussion remains astonishingly poor amongst health care professionals during both undergraduate and post graduate teaching and training. There are 15 medical colleges in public sector and 34 in private sectors in the country which produce about 2600 doctors a year. According to HRD 2007 data sheet, total number of estimated doctors available in the country is approx 39000 [6]. None of these to our best knowledge have palliative care in their undergraduate training. The Medical University has recently begun a 3 day introductory course which is the first of its kind in the country. Before the introduction, we decided to conduct a survey to determine the level of perception and understanding in palliative care both amongst future specialists working as trainee as well as the specialist doctors working as trainers in this university.

Materials and methods:

The palliative care service team of the university developed a questionnaire (Appendix-A) with their own exposure and experience in the field of palliative care.

The intent of the survey was to estimate the physicians perceived level of proficiency based on their own assessment of the quality of their education in palliative care. This survey was also a part of the awareness developing program amongst the professionals. One Hundred and Eighty Nine post graduate trainees (Group-1) were requested to fill in the questionnaire when they attended a lecture on Palliative Care as part of their orientation program during the beginning of their two year residency in the university. After explaining the aim of the survey 15 minutes were allocated to complete the form. Those who were not willing to participate were allowed to do so. Permission was obtained from the coordinator of the orientation program who was the Dean of the Faculty of Surgery.

Eighty one post graduate qualified doctors (Group - 2) were requested to fill-in the survey while they came to attend the three day introductory course on palliative care or showed their interest to develop the service in the university before the course. They were also approached by the authors on individual basis.

Both were a heterogeneous cohort from different clinical subspecialty like internal medicine, anesthesiology, gynaecology, surgery etc but all were working in the BSMMU at the time of the survey.

Participants were asked in first five questions to rate their self perception of education in Palliative Care at MBBS level, ability of pain management in palliative care setting, to prescribe oral morphine in cancer pain, ability of breaking bad news to patients/ families and to face end-of-life issues of the patients. The range of possible positive responses like 'Excellent'; 'Very good' & 'Adequate' and negative responses like 'Poor' and 'Nil' were provided to the participant at the end of each question of the first five. The last five questions, sixth to tenth, were more subjective in nature, of an opinion inviting type covering basic theoretical issues commonly discussed in palliative care teaching and training modules.

The focus was the participants own perception of their level of education as well as an attempt to validate that perception. Therefore, no other data regarding the participants, e.g. gender, age etc were collected. The intention was to assess the responses as a percentage of positive responses as well as negative response.

Results:

One Hundred and Twenty Seven postgraduate trainees out of 189 filled out the survey questionnaire (response rate 67%). Out of nearly 200 Postgraduate

clinical teachers of the BSMMU, 81 completed the survey which is about 41% of the trainers of the university. In total, 181 participants completed the survey although not every question was answered by each respondent. 61 % respondents answered completely.

With regard to education in Palliative Care (Q1) positive response was much higher in Postgraduate Trainees (72%) compared to the trainers (3.7 %). Similar was the level of confidence about the ability in pain management (Q2) which was higher in Gr. 1 (63%) than Gr. –2 (40.7%). Not many trainees and trainers (33.8% vs. 25.9%) felt adequately trained to prescribe oral morphine in cancer pain (Q.3) Ninety percent trainees felt confident to communicate in breaking bad news to Patients/ families whereas 66.6% Postgraduate trainers felt the same.(Q.4). Postgraduate trainees felt more confident to face end-of -life issues of patient (Q.5) (88.8% vs. 59.2%) than their trainers. (Table-I & Table II).

Regarding the second part of the questionnaires, most of the physicians of both the group were of the opinion that the patient and the family had the right to know the diagnosis of the disease (90.5% & 85%). Seventy four percent of the postgraduate physicians know that Palliative medicine is a subspecialty in some countries (Q.7) and this fact is known to 52.7% of the trainees. Most of the physicians of both the groups felt that skill in communicating with patients/ families can be improved with training (Q.8). Regarding Euthanasia, many respondents (32%) did not answer this question. However, fewer trainers than trainees (41% vs. 48%).thought that there could be any logic in favor of euthanasia. Approximately 40% of both the groups are against the idea of euthanasia. Most of both the groups prefer to die in their own home. (Table III).

Palliative care concepts among postgraduate trainees and Postgraduate trainers.

Table-I

Postgraduate Trainees (n = 127)

Questions	Excellent (%)	Very good (%)	Adequate (%)	Poor (%)	Nil (%)
Q.1	7(5.5%)	12(9.4%)	53(41.7%)	46(36.2%)	7(5.5%)
Q.2	5(3.4%)	20(19.6%)	55(43.7%)	39(10.7%)	7(5.5%)
Q.3	2(1.5%)	7(5.5%)	34(26.7%)	40(31.4%)	46(36.2%)
Q.4	9(7.8%)	41(32.2%)	64 (50.3%)	12(9.4%)	0 (0%)
Q.5	8(6.2%)	24(18.8%)	72(56.6%)	20(15.7%)	0 (0%)

Data are expressed as absolute number. Within parenthesis are percentage over total of the group.

Table-II

Postgraduate trainers (n= 81)

Questions	Excellent (%)	Very good (%)	Adequate (%)	Poor (%)	Nil (%)
Q.1	0	0	3(3.7%)	36(44.4%)	30(37%)
Q.2	0	12(14.8%)	21(25.9%)	36(44.4%)	9(11.1%)
Q.3	3(3.7%)	9(11.1%)	9(11.1%)	27(33.3%)	24(29.6%)
Q.4	3(3.7%)	15(18.5%)	36 (44.4%)	18(22.2%)	3 (3.7%)
Q.5	0	24(29.6%)	24(29.6%)	21(25.9%)	0

Data are expressed as absolute number. Within parenthesis are percentages over total of the group.

Table-III

Comparison between the Postgraduate trainees (Group 1) and Postgraduate Trainers (Group-2).

	Questions	(Group-II, n=127)		(group-II,n = 81)	
		Yes (%)	No(%)	Yes(%)	No (%)
1.	Your education in Palliative care during your MBBS level	72(56.6%)	53 (41.7%)	3 (3.7%)	66(81.4%)
2.	Your ability in pain management in palliative care setting	80 (62.9%)	46 (36.2%)	33 (40.7%)	45 (55.5%)
3.	Your ability to prescribe oral Morphine in cancer pain	43 (33.8%)	86 (67.7%)	21 (25.9%)	51 (62.9%)
4.	Your ability to communicate in breaking very bad news to patients/families	114 (89.7%)	12 (9.4%)	54 (66.6%)	21 (25.9%)
5.	Your ability to face end of life issues of your patients	104 (88.8%)	20 (15.7%)	48 (59.2%)	21 (25.9%)
6.	If a patient gets an incurable disease, do you think that He/She should know the diagnosis & prognosis.	115 (90.5%)	7 (5.5%)	69 (85.1%)	3 (3.7%)
7.	Do you know that palliative medicine is a sub specialty in some countries	67 (52.7%)	30 (23.6%)	60 (74.0%)	9 (11.1%)
8.	Do you think that training can improve doctor's skill in communicating with patient/family	116 (91.3%)	11 (8.6%)	66 (81.4%)	9 (11.1%)
9.	Do you think that there is any logic in favor of Euthanasia	61 (48.0%)	30 (23.6%)	33 (40.7%)	30 (37.0%)
10.	If you are given a choice, where would you like to die (at home?)	86 (67.7%)	30 (23.6%)	18 (22.2%)	48 (59.2%)

Table-IV

Comparison between the two groups as a percentage of the total response. Postgraduate trainees/ Postgraduate trainers

Questions						
Q.6	Yes 71(55.9%) / 45 (55.5%)	No 7(5.5%) / 3 (3.7%)	Always 1(.78%) /0(0%)		If Patient wants to know (%) 18(14.1%)/ 12(14.8%)	If family wants to know (%) 25(19.6%)/ 12(14.8%)
Q.7	Yes 67(52.7%) / 60(74%)	No 30(23.6%) / 9(11.1%)				
Q.8	Yes 108 (85%) / 66(81.4%)	No 11 (8.6%) / 0(0%)	Sometimes 8(6.4%) / 9(11.1%)			
Q.9	Yes 31 (24.4%) / 18 (22.2%)	No 17 (13.3%) / 15 (18.5%)	Sometimes 30 (23.6%)/ 15 (18.5%)	Don't know 35 (27.5%) / 15 (18.5%)		
Q.10	Hospital 15 (11.8%) / 12 (15.8%)	Home 86(67.7%) / 48 (49.2%)	ICU 10 (7.8%)/ 3 (3.7%)	best hospital abroad 5(3.9%) / 3 (3.7%)		

APPENDIX: I

Questionnaires:

1. Your education in Palliative care during your MBBS level
   a) Excellent b) Very good, c) Adequate d) Poor e) Nil
2. Your ability in pain management in palliative care setting
   a) Excellent b) Very good, c) Adequate d) Poor e) Nil
3. Your ability to prescribe oral Morphine in cancer pain
   a) Excellent b) Very good, c) Adequate d) Poor e) Nil
4. Your ability to communicate in breaking very bad news to patients/families
   a) Excellent b) Very good, c) Adequate d) Poor e) Nil
5. Your ability to face end of life issues of your patients
   a) Excellent b) Very good, c) Adequate d) Poor e) Nil
6. If a patient gets an incurable disease, do you think that He/She should know the diagnosis & prognosis?
   a) Yes b) No c) Always d) if the pt wants to know e)if family wants to know
7. Do you know that palliative medicine is a sub specialty in some countries
   a) Yes b) No
8. Do you think that training can improve doctor's skill in communicating with patient/family
   a) Yes b) No c)Sometimes
9. Do you think that there is any logic in favor of Euthanasia
   a) Yes b) No c) Sometimes d) Don't know
10. If you are given a choice, where would you like to die (at home?)
    a) Hospital b) Home c) ICU d) Best hospital abroad

Discussion:

This is, to our knowledge, the first such study conducted on palliative care concept among the physicians in Bangladesh. We compared the results of the post graduate trainee versus their trainers (Table IV) .Our assumption was that the physicians, in general, in Bangladesh had very limited knowledge of palliative care. A staggering low level of only 4 per cent post graduate trainers claiming their undergraduate exposure in palliative care education as adequate supported our assumption. The survey revealed that approximately half of this group (55% and 69%) expressed their lack of confidence in cancer pain management as well as in prescribing oral morphine. The finding of the survey was surprisingly different in case of group 1, which is the trainee group. A very positive response by this group for the first five questions both in absolute and relative number took us by surprise. This group claimed an overall higher ability than their trainers in all the basic components of palliative care issues mentioned in the questionnaire. The dilemma is that a number of valid arguments could be proposed both in favor and against this observation. It could be argued that the trainees are relatively fresh medical graduates, more recent knowledge based and motivated by their self learning attitude which places them as post graduate trainees. Mention of palliative care and the concept are more pronounced in the latest text books that these trainee have to study for their post graduation[8]. On the contrary, one must also consider that these responses do not indicate the actual level of education in palliative care. These are the perceived level of proficiency and ability based on one's own perception and self assessment. This suspicion is also supported by the observation that rate of positive response goes down when the issues of specific skill like managing cancer pain and oral morphine prescription arise. It is also known that in most of the medical schools of the world students significantly lack personal or academic knowledge about pain and negative attitudes toward opioids[9]. The main reason is possibly the global trend towards

a disease and cure oriented approach and this is reflected in the medical and nursing education. But, then why such unanticipated high positive response rate, particularly by the trainees! The findings need to be judged also in the context of arrogance –ignorance paradox[10]. Our findings of the survey are interestingly similar to a few other surveys done in the some other developing as well as developed countries[11,12,13]. A similar percentage to our finding of interns (82%) and students (86%) reported to be familiar with the concept of Palliative Care in a recent survey in India[7,11]. This study investigated Palliative Care concepts among medical interns and students in India who had no mandatory Palliative Care curriculum. Another similar study show that students (97.9%) and interns (81.2%) reported familiarity with the concept of Palliative Care in a study in Vienna[12]. Results of a recent survey of resident physicians in post –graduate training programs in Chile shows that approximately 50% respondents perceived that their level of palliative care education was adequate. Interestingly, only 11% of the residents received formal palliative care education and 25% considered themselves to have very good proficiency in the use of opioids for pain control[8].

Conclusion:

The main draw back of this study are quite a number including the heterogeneity of the participants, too generalized questions, not piloting the questionnaire before the actual survey .The findings of this study tend to reflect the experience and perception of one institution where physicians with better academic background aggregate together. However, this was an attempt to determine the level of perception of the doctors in Bangladesh in their own understanding. It was also a part of the awareness creation program in the university. The authors are confident in stating that the actual level of understanding may not be the same as the perceived level showed by the study. This survey can be replicated in other institutions also. This study can be followed by more objective study to evaluate the actual knowledge base of the physicians regarding palliative care.

The ultimate goal of medical education, as well as clinical interventions, is improved patient care. The dying members of the society should not be deprived of a 'good death' due to the lack of proper education and skill attainment.

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Original Article

Outbreak of bacterial meningitis after spinal anaesthesia in Bangladesh

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Abstract:

Iatrogenic meningitis following spinal anaesthesia is very rare. Recently we have experienced severe headache, vomiting, fever, restlessness, nuchal rigidity and altered level of consciousness 5-6 hours after spinal anaesthesia in one hundred and nineteen patients diagnosed as iatrogenic bacterial meningitis during the period of September 2008 to March 2009. Patients were successfully treated with Inj. Ceftriaxone 2gm BID for 14 days, Inj. Dexamethasone 20mg daily in four divided dose for five days. Purulent CSF, high cell count (1570mm^{-3}), elevated protein level (269mg/dl) and normal glucose (57mg/dl) levels in CSF were noted. There were 5 (4.2%) cases of mortality. No causative organisms were isolated from CSF, blood of the affected patients and anaesthetic agent used for the block. In conclusion, the cause of meningitis was diagnosed as bacterial in origin though no organism was isolated.

Key words: *spinal anaesthesia, neurological complications, bacterial meningitis*

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Introduction

Meningitis is a common and devastating complication that presents as a medical emergency requiring high level of diagnostic and therapeutic skills. The mortality and morbidity is very high if intervention delayed. The incidence of meningitis after central neuraxial blocks is difficult to quantify and it is as high as 1:506,000 in one retrospective study [1]. The etiology of meningitis after spinal anaesthesia in obstetrics has been extensively reviewed by Roberts et al [2]. The cause may be bacterial, viral, fungal and chemical or aseptic. Pandian et al reported 27 cases of post lumbar puncture iatrogenic meningitis in India that occurred between 1984 to 2002. They have isolated the causative organism and mostly were streptococcus and 5 cases were Aspergillus fumigatus [3]. Rodrigo et al reported a cluster of fungal meningitis in Sri Lanka after Tsunami in the year 2005 [4]. To find out the cause, they carried out an extensive search. They have carried out culture and sensitivity test of representative amount of syringes, spinal needles, Bupivacaine and fentanyl ampoules and found bacillus in 27 syringes, Aspergillus fumigatus in 13 syringes and 2 spinal needles. They also found staphylococcus and coliform species in the wall of ampoules, fluid insight the ampoules were sterile.

Central neuraxial block especially spinal anaesthesia is very popular in Bangladesh because of low cost, easy to perform and maintenance. Recently, there are reports of one hundred and nineteen cases of severe headache, vomiting, restlessness, fever and altered mental state after five to six hours of spinal anaesthesia suggestive of meningitis. Turbid cerebrospinal fluid is also noted in some cases. There were five deaths related to the outbreak also [5]. We believe that the outbreak gives an important message to the Anaesthesiologists to face the historical challenge that occurred in UK in 1950s [6]. We also believe that the cause and source of the recent out break should be addressed as early as possible to stop the further mortality and morbidity.

A Case

Twenty six years old primi gravid mother with her 38 weeks of pregnancy was admitted to an ISO certified private clinic at 7am in the morning on January 15, 2009 with early stage of labour pain. She was 65kg weight, non diabetic and normotensive. Labour was augmented with synthetic oxytocin and membrane was ruptured spontaneously. Due to non-progression of labour and foetal distress, it was decided to perform emergency caesarean section. She remained nil by oral from the morning. Intravenous fluid (Hartmann's solution) was started from the labour room as preloading and Inj. Ceftriaxone 1gm, Inj, Metoclopramide 10mg and Inj. Ranitidine 50mg was given IV. Her body temperature was 98^0F at axilla.

She had a history of sore throat and fever ranging from 101-102^0F 15days back from the date of caesarean section. She was treated with paracetamol, antihistamine and Azythromycin for 5 days and temperature was subsided.

At 3.30pm on the same day spinal anaesthesia was performed with the patient in the left lateral position. The skin was prepared with Chlorhexidine in alcohol. Lumbar puncture was done in single prick at L_{3-4} interspaces with 25G Quincke type spinal needle. The bevel of the needle remains parallel to the dural fibre. After free flow of clear cerebral spinal fluid (CSF), 2.25ml of 0.5% hyperbaric bupivacaine was injected slowly. The caesarean section proceeded uneventfully. During the whole surgery period, she was infused of total 1700ml of lactated Ringers solution. Synthetic oxytocin of 5unit was given after delivery of baby. Her haemodynamic status was stable and no vasopressor was required. Total duration of surgery was 45minutes and blood loss was average. Per rectal Diclofenac 50mg and misoprostol 400µg was given after the end of surgery and patient transferred to the post operative ward at 04.30pm.

The patient received 100mg of Inj. Pethidine with Inj. Prochlorperazine at 07.30pm after complaining of pain. The patient became restless at 08.45pm. Considering the cause of restlessness as extra pyramidal syndrome (EPS), Inj. Procyclidine IM was given to the patient. During the time she was afebrile, haemodynamically stable, jerks normal but slight confused. On January 16, 2009 at 02.45am, the patient became unconscious. She was haemodynamically stable, body temp 98.6^0F at axilla, pupil 3mm, symmetrical, reacting to light, nuchal rigidity and positive Kerning's signs. All jerks were brisk and planter extensor was found in the right. Inj. Ceftriaxone 2gm was given empirically to cover bacterial meningitis. She was transferred to intensive care unit of another private hospital, because of the fear that tracheal intubation and artificial ventilation may required at any time.

Laboratory investigations revealed leukocytosis of 21.2 K/µL (ref 4-11 K/µL) but negative for any growth. Lumbar puncture was performed on the same day at 09.10am; the CSF appeared turbid, pressure raised. Analysis of CSF revealed a white cell count of 3090 mm^{-3} (92% were polymorphs), protein 485mg/dl (reference value- 15-40mg/dl) and normal glucose contents. Gram stain showed plenty of pus cells per high power field. No organism was detected on gram stain. The culture (routine, anaerobic) and sensitivity showed no growth. Diagnosis of bacterial (pyogenic) meningitis was made depending on CSF study. Inj. Ceftriaxone 2gm twice daily continued for ten days.

On the third postoperative day, she was transferred to the primary hospital and discharged home on the eleventh postoperative day with out any residual neurological effect. The patient was examined again on April 30, 2009 three and half month from the incidence, no neurological deficit was detected.

Action plan

Sporadic reporting from practicing anaesthesiologists were received by BSA regarding post spinal severe headache, vomiting, fever, restlessness, nuchal rigidity and diffuse mental orientation provisionally diagnosed as case of meningitis. A multidisciplinary meeting was arranged by Bangladesh Society of Anaesthesiologist (BSA) in the form of panel discussion comprising of a neurologist, a microbiologist and senior anaesthesiologists. The panel has decided to include the cases of severe headache, vomiting, fever, restlessness, nuchal rigidity and obtunded level of consciousness after spinal anaesthesia for any surgery retrospectively and in future cases. A course of action plan was chalked out and a questionnaire was designed. BSA has taken an initiative to send it to all of their members. We have decided to utilise Sri Lanka's experience tackling meningitis after lumbar puncture in 2005[4]. In the meantime short term measured has taken as autoclaving of pre-packed spinal needle, gloves, syringes and local anaesthetics ampoule.

Methodology

1. Retrospective review of cases:

All data were recorded in a pre-design data collection sheet (Appendix: I) after report of any case. The attending Anaesthesiologist fill in the Form and

further follow up was carried out by the Principal Investigator up to six month from the date of incident.

2. Laboratory Procedures for CSF and Blood:
A. Under full aseptic condition lumbar tap was done and CSF sample was collected in four sterile tubes. Pressure and Colour was also recorded at Data Sheet. One test tube was stored at liquid nitrogen for future use.

Laboratory Procedures for CSF and Blood:
CSF

Under full aseptic condition lumbar tap was done and CSF sample was collected in four sterile tubes. Pressure and Colour was also recorded at Data Sheet. One test tube was stored at liquid nitrogen for future use.

Following cytological tests were done:

Total count of WBC by Neuber counting chamber,

Differential count of WBC by Leishman staining,

Zeihl-Neclson staining for Acid Fast Bacilli

Biochemical test:
Total protein and glucose content were estimated by spectrophotometer.

Culture and sensitivity tests were done by conventional method

B. Under aseptic condition Blood was collected for culture and sensitivity. Culture and Sensitivity test was done by conventional method

3. Culture and sensitivity of local anaesthetic solution was done by traditional method

Surveillance of twenty one cases

One hundred and nineteen cases of suspected meningitis so far identified after the outbreak has noticed. Out of these, it was possible to perform repeat lumbar puncture only in twenty one cases for collection of CSF.

Table-I

CSF and blood biochemical, cytology and microbiological profile of twenty one cases

Case no	Blood leukocyte count/ cu mm	CSF study				Culture and sensitivity test	Culture and sensitivity of Blood
		Protein content mg/dl	Glucose content mg/dl percentage of plasma glucose level	Total Cell count cells /cu mm	PMN absolute number (%) of total		
1	21.9k	485	61 (51%)	3900	92	Bacterial antigen for Streptococcus B, Hae mophilus influenzae type b, Streptococcus Pneumoniae, Neisseria meningitis A, B, C, Y and Escherichia coli K1 negativeNegative for growth of any aerobic bacteria.	Culture and Sensitivity (aerobic) of blood is negative for all cases.
2	-	312	59 (52%)	1674	89	Culture (routine aerobic) and sensitivity of CSF negative in 19 cases.	
3	-	268	46 (54%)	4200	94		
4	-	432	58 (49%)	3219	82		
5	-	278	62 (52%)	1793	75		
6	-	179	49 (48%)	1643	87		
7	-	289	52 (51%)	2147	91		
8	-	345	84 (53%)	1259	79		
9	-	239	53 (54%)	2154	68		
10	-	376	49 (53%)	1027	74		
11	-	274	58 (54%)	942	91		
12	-	394	53 (45%)	496	85		
13	-	123	75 (63%)	742	84		
14	-	140	37 (43%)	294	79		
15	-	134	59 (53%)	528	84		
16	-	264	63 (49%)	2473	76		
17	-	284	67 (53%)	1634	69		
18	-	173	41(43%)	1954	57		
19	-	394	49 (57%)	200	60		
20	-	264	62 (64%)	295	80		
21	-	198	59 (53%)	276	87		

Within parenthesis are percentages over plasma glucose concentration.

Distribution of hospital

Complete data were available for twenty one patients only out of one hundred and nineteen reported cases. Data were collected 7 cases from teaching hospital, 4 from govt general hospital and 10 from private hospital (Fig. 1). Unfortunately, we have failed to collect data of other 98 cases (24 from teaching hospital, 11 from govt general hospital and 57 from private hospital).

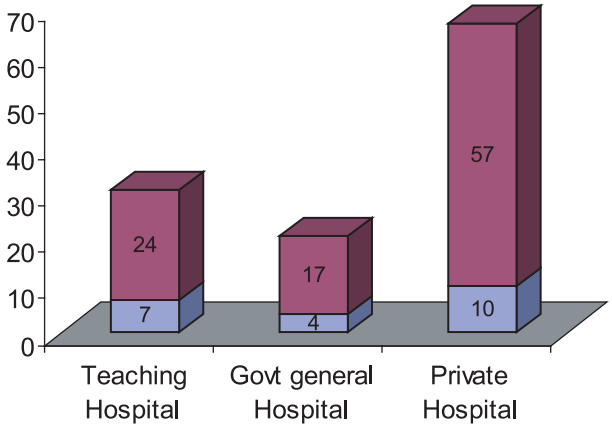

Fig-1: *Type of hospital reported for post spinal meningitis*

Type of surgery

Out of twenty one cases, spinal anaesthesia was induced 7 patient for caesarean section, 3 patient for total abdominal hysterectomy and 11 for other surgery (Fig.-2) mostly urological procedure in the same day list of a teaching hospital.

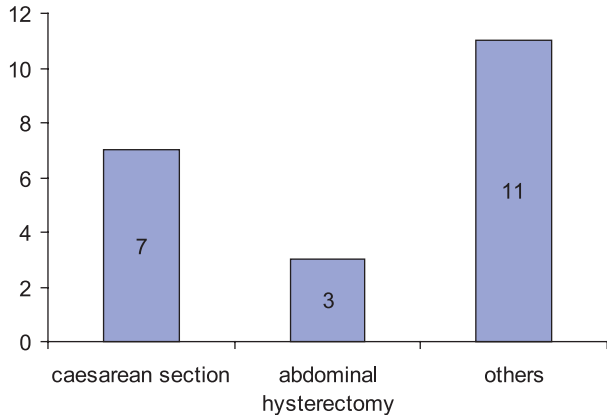

Fig-2: *Surgery performed in the case series of post spinal meningitis*

Death review of five cases

There are reports of five deaths after spinal anaesthesia during the period. Out of five cases, one was in a govt general hospital and other four were in private hospital. Spinal anaesthesia was induced for caesarean section in all five cases. After 5-6 hours of surgery, they complaints of severe headache, nausea and vomiting, restlessness and altered mental state but no change of haemodynamic status. They all were put on artificial ventilator but died after 2-3days.

Culture of drug used for block

Hyperbaric bupivacaine ampules presently marketed by the manufacturers were collected from the market in a random fashion Five ampoules for each batch were collected and out of these two ampoules in each batch used for aerobic culture to identifying bacteria and fungus present if any in local anaesthetic solution. All samples were negative for any growth.

Discussion:

Central neuraxial especially spinal anaesthesia is used almost all patients undergoing caesarean delivery in all over the World. It is also used in lower abdominal and pelvic surgery. Despite aseptic techniques, sporadic cases of bacterial, chemical and viral meningitis have been reported after spinal anaesthesia [1]. Infectious complications especially bacterial meningitis is extremely rare and difficult to quantify. Horlocker et al retrospectively reviewed infectious complications as a whole after spinal anaesthesia and it was from 0 to 0.04% [7]. Michael Kremer published his experienced of eight cases of meningitis after spinal anaesthesia and proposed the theory that might explained the aetiology in the year 1945. These were chemical theory, secondary meningitis theory and infective theory [8]. On the other hand, Lee JJ et al. classified post spinal meningitis etiologically into bacterial, viral and aseptic or sterile [9]. Differentiation between bacterial and aseptic meningitis is difficult, but the later is characterized usually by a negative culture, normal CSF glucose concentration, high polymorphonuclear leukocytosis and elevated protein level. The symptom of aseptic or chemical meningitis usually starts as early as 6-24 hours after spinal anaesthesia with the complaints of nausea, vomiting, headache, fever and nuchal rigidity [10]. On the other hand, symptoms of bacterial meningitis frequently begins within 12-72 hours after spinal puncture with nausea, vomiting, headache, malaise, neck stiffness, photophobia, somnolence, agitation and

fever[1]. During the time of study by Rendell C, syringe usually sterilized by irritant chemicals but presently it is replaced by Ethylene Oxide. It is usual practice in Bangladesh to start third generation cephalosporin therapy before surgery. Probably that is why; no organism was isolated in our cases.

The death rate of iatrogenic meningitis is relatively low than community acquired meningitis which ranges from 3-29% [11] . In the present study, death rate is 4.2%, spinal anaesthesia was performed for caesarean section and no neurological deficits were noted in other patients. The death of all five obstetric cases may be due to increased susceptibility and it is proposed by Rodrigo N et al [4]. The rapid diagnosis and provision of effective treatment may explain this favorable outcome.

Meningitis after spinal anaesthesia is a rare complication but can be a significant clinical problem with mortality and morbidity in our country. Adequate Aseptic precautions such as wearing a face mask, proper washing of hands with an antiseptic solution, wearing a sterile gloves, cleaning the skin with iodine solution and wait for three minutes then clean with alcohol or chlorhexidine, use of pre-pack sterile spinal needles, blister pack syringes and sterile local anaesthetic ampoules or wiping of ampoule with alcohol hopefully decrease the incidence of this preventable conditions in anaesthetic practice.

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APPENDIX I:

Record Sheet For Post Spinal Meningitis Patient
Particulars of Patient:
Name:_____; Age:_____yrs; Body Weight:_____kgs;
Type of surgery: Scheduled / Emergency; Name of surgery:_____

In case of caesarean section:
Cause of emergency: LFM / Ruptured Membrane / Obstructed labour / Chorioamnitis; Gravida: primi / multi

Other Data:
Date: ; Time of block: am / pm; end of surgery: am /pm; Type of Hospital: teaching /specialized / Up zilla Hospital / private clinic

Past medical history in one month:
Type of illness: Fever / sore throat / nasal discharge; Duration: days; Antibiotics used: yes / no; Bacterial culture: done / not done
Fever at the time of block: yes / no; If yes please mentioned: ^{0} F / C

Antibiotic prophylaxis:
Antibiotic given before block: yes / no; Name of group with amount: Cephalosporin / Amoxacillin / Cephradine 500mg / 1000mg

SAB data:
Space: L 2-3, L 3-4, L 4-5; Number of prick- Single / Twice / Multiple; Bloody tap: yes / no

Information regarding Needle:
Type of Block: SAB/ Epidural / Caudal; Type of Needle: Quincke / Touhy; Gauze: 25G / 26G/ 18G Manufacturer: B Braun / Terumo/ BD / others; No of use: single / reuse with autoclave;

Information about Drugs used:
Infiltration done: Yes / No; Type of vial: new / used before; Aspiration Needle remains in situ: Yes / No; LA vial top clean with antiseptic: yes / no; type of antiseptic: Chlorhexidine / 70% alcohol
Bupivacaine / Lignocaine; Volume: ml; Manufacturer: Jaysons / Popular / Incepta / Ganoshyasta
Batch no: ; Date of manufactured: Date of expiry:
Vasopresore used: yes / no; amount: mg in total
Fluid used for Preload: ml; Intraoperative: ml
Uterine stimulant: Oxytocin unit / Ergometrine mg /
Co-analgesic used: yes / no; if used: Ketamine mg / Pethidine mg
H_2 receptor blocker: Ranitidine / Omeprazole; Anti emetic: prochlorperazine / Metoclopramide / Ondensetron mg before block / after block

Back sterilization before block:
By: 10% povidine Iodine / 70% Alcohol / both;
Hand wash before block: yes / no; Glove used: new / autoclaved; Wear mask & cap: yes / no; Use sterile drape: yes / no; Spinal Needle tip touched before skin puncture: yes / no

Intra-operative events:

Parameters	Before block	10 min after block	20 min after block	After surgery	POW
BP					
HR					
Nausea / vomiting					
Shivering					
Headache / neck ache					

RECORD SHEET FOR POST SPINAL MENINGITIS PATIENT

Post operative events:

First analgesic demand: am / pm; Analgesics used: IM pethidine / rectal Diclofenac

Complication first noted: am / pm on

Parameters/ Day and Date	Day 1	Day 2	Day 3	Day 4	Day 5
Treatment					
Headache / Neck ache					
Nausea / Vomiting					
Temp					
Restlessness					
Neck rigidity					
Kernig Sign					
Level of consciousness					
Jerks					
Diplopia					
BP / HR					
CBC					

CSF Study: Date: ; Time: am / pm

Colour	clear	hazy / turbid
Pressure	normal	raised
Microscopic examination		
Isolation of causative agent		
CT Scan /MRI		
Blood culture		

Follow up:

Contact name: Tel No:

Parameters	1st week	1st month	3rd month	6th month
Persistent Diplopia				
Motor deficit				
Sensory deficit				
Headache				
Fever				

Case Report

Thoracic epidural anaesthesia for thymectomy in myasthenia gravis

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Abstract

Myasthenia gravis is a disease of great significance to the anaesthesiologist, because it affects the neuromuscular junctions. Many patients with this condition are treated by surgical thymectomy. Thymectomy for myasthenia gravis requires special attention as far as the type of anesthesia and use of muscle relaxants. We use high thoracic epidural anaesthesia for trans-sternal thymectomy to avoid the use of muscle relaxants and volatile anesthetic agents which prevented the laryngeal injury and potential post-operative respiratory failure.

Key words : *Myasthenia gravis, Thymectomy.*

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Case report

A 40 years old 50 Kg female patient was admitted into a private clinic for thymectomy. She was diagnosed as a myasthenia gravis. Her medical management included pyridostigmine and corticosteroids for controlling her symptoms. In this case we decided to perform the operation under thoracic epidural anaesthesia (TEA). We discussed the procedure with the patient. After taking informed consent on the day of surgery, early in the morning the patient was pre-medicated with 7.5 mg midazolam orally 1 hour before arrival at operation theater. A thoracic epidural catheter was inserted at the T_1 and T_2 level under local anaesthesia using 18G Tuohy needle with patient in sitting position through midline approach using hanging drop technique. The block level was tested by 3ml 2% lignocaine.

Anaesthesia was induced with a mixture of 8 ml of 0.25% bupivacaine + 7 ml of 1% lignocaine + 25µg fentanyl citrate administered through the epidural catheter as a bolous. After 20 minutes the onset of anaesthesia was completed and level of block was tested by pin-prick discrimination. The upper level of block was C_6 and the lower level was T_{10}. The patient breathed 6 liters of Oxygen per minute using a face mask. The patient was continuously monitor by Intra-Arterial Blood Pressure, ECG, SpO_2, ABG analysis, S. Electrolytes, Respiration and Urine output. The mean operating time was 1 and 1/2 hour and the patient was able to drink within 1 hour after operation. Post-operative analgesia was maintained with 0.125% bupivacaine 4 ml and fentanyl citrate 1 µg/ml through epidural catheter 6 hourly. No other recue analgesia was required.

Discussion

Trans-sternal thymectomy in awake patient without general anaesthesia was performed with high thoracic epidural anaesthesia. Thoracic epidural anaesthesia is also have been perform in awake CABG on beating heart. TEA provides excellent conditions for thymectomy in myasthenic patient because general anaesthesia require muscle relaxant which may need to prolonged post-operative ventilation of the patient and increased chances of post-operative respiratory failure[3,4]. TEA was advantageous in that- avoidance of muscle relaxants and volatile anaesthetic agents prevented the laryngeal injury and potential post-operative respiratory failure[1,2]. So, ultimately the choice of anaesthetic technique depends on patient's suitability, preference of the surgeon and anaesthetist's experience and expertise.

Conclusion

Use of TEA for awake thymectomy was feasible and the patient was maintained with good analgesia,

stable cadio-respiratory and haemodyanamic status, early ambulation, oral feeding, better post-operative analgesia and reduced peri-operative morbidity.

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