VOLUME 23
NUMBER 2
JYLY 2010

Journal of the Bangladesh Society of Anaesthesiologists

JOURNAL OF THE BANGLADESH SOCIETY OF ANAESTHESIOLOGISTS

VOL 23, NO. 2, JULY 2010

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JOURNAL OF THE BANGLADESH SOCIETY OF ANAESTHESIOLOGISTS

VOLUME - 23 **NUMBER - 2** **JULY 2010**

CONTENTS

Editorial

Adjuvant in central neuraxial blocks

Central Neuraxial Block (CNB) occupies an important part in anaesthesia and pain management. Local anaesthetic agents block the generation and propagation of action potential in all excitable tissues primarily by impairing the function on sodium channels in the axonal membrane[1]. The complex neurophysiology of dorsal horn involves many neurotransmitters. These substances including substance P, serotonin, acetylcholine, adenosine and glutamate are related in the dorsal horn and modulate peripheral nociceptive input [2]. A wide variety of adjuvant agents are used along with local anaesthetic mixtures to enhance and prolong their action, reduce unwanted motor weakness and autonomic dysfunction and reduce central nervous system and cardiovascular toxicity. The adjuvant drugs interact with one or more of these neurotransmitters exerting an anti-nociceptive effect. The most widely used drugs are opioid agonist like morphine, fentanyl, á$_2$ adrenergic agonist like clonidine, epinephrine, anti-cholinergic agent like neostigmine, NMDA receptor antagonist like ketamine and magnesium sulphate. Whatever the agent are used, it should be preservative free, nontoxic to neuron and should not contain any inhibitory neurotransmitters[3].

Neuraxial administered opioid produce significant dose-dependent analgesia through opioid receptors is abundantly present in the substantia gelatinosa. It inhibits a voltage- sensitive calcium channel on presynaptic nerve terminals. This action inhibits release of neurotransmitters, including substance P and glutamate that are active in spinal nociceptive transmission. Secondly, opioids can hyperpolarize and thus inhibit postsynaptic neurons by opening potassium channels [4]. Addition of opioid especially morphine and fentanyl is now routinely practiced world wide during central Neuraxial block. This practice is not popular in Bangladesh. It is probably due to lack of interest, availability of preservation free morphine and undue fear of respiratory depression.

Acetylcholine receptors are expressed in the dorsal horn. They contribute to the descending modulation of ascending nociceptive transmission. Neostigmine added to intrathecal bupivacaine has been shown to reduce postoperative analgesic requirements, improve sensory and motor block and delay resolution of block [5]. There is also some evidence that it can minimize the sympathetic blockade, reducing the hypotension that accompanies central neural local anaesthetic blockade. However, nausea and vomiting and faecal incontinence resistant to treatment preclude its use in current clinical practice in higher doses. .

Benzodiazepines receptors were first identified in the central nervous system in 1977. The highest concentration of receptors is found in the cerebral cortex, hypothalamus, cerebellum, corpus striatum and finally, medulla. Antinociceptive effect and safety of intrathecally-administered midazolam is well established[6]. Neuraxial administered magnesium sulphate also produce anti-nocicccptive effects and it is currently used in both obstetric and non-obstetric population[7]. It is also used in labour analgesia as an adjuvant[8].

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Original Article

Comparative study in prolapse lumbar intervertebral disc (PLID) surgery by spinal vs general anaesthesia

Md. Shahnewaz Chowdhury[1*], Sabya Sachi Roy[2], Md. Matiur Rahman[2], Md. Mozaffer Hossain[3], SMA Alim[4]

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Abstract

Background *Lumbar discectomy is most commonly performed under general anaesthesia, which can be associated with several perioperative morbidities including nausea, vomiting, atelectasis, pulmonary aspiration, and prolonged post-anaesthesia recovery. It is possible that fewer complications may occur if the procedure is performed under spinal anesthesia.*

Objective *We have compared patient satisfaction between spinal versus general anaesthesia in patients for single level lumbar surgery.*

Methods *Eighty consecutive patients of ASA grade I-II were recruited and randomized into two equal groups, with half of this patients receiving spinal anaesthesia (n-40) and the remainder general anaesthesia (n-40). A comprehensive postoperative evaluation was carried out documenting any anaesthetic complications, pace of physiological and functional recovery and patient satisfaction. Variables were recorded as pain level using a visual analogue scale (VAS) at 1, 6, 12 and 24 hours; patient level of satisfaction during the stay on the ward using verbal rating scale (VRS) as it was detected by A p-value < 0.05 were considered as significant.*

Results *Spinal anaesthesia patients achieved the milestones of physiological and functional recovery more rapidly and reported less postoperative pain. Perioperative hypotension in 25 % of patients and none was hypertensive in spinal group and in G/A Group 05% of patients was hypotensive and 20% were hypertensive. Postoperative pain intensity more in G/A group than spinal group. Patient satisfaction in spinal group was more comparative to G/A group.*

Conclusion *Spinal anaesthesia ensures better operating conditions, better postoperative pain control and a quicker postoperative recovery when compared to general anaesthesia for single level lumbar spine surgery*

Key words *Prolapse lumbar intervertebral disc (PLID) surgery, spinal vs general anaesthesia.*

(JBSA 2010; 23(2): 47-50)

Introduction

The surgical management of a prolapsed lumbar disc was first described by Mixter and Barr[1] in 1934. Different anaesthetic techniques have been used for lumbar spinal surgery. In this study normally healthy and co-operative group of patients all study undergoing spinal surgery requiring less than 90 minutes of anaesthesia, the type of anaesthesia employed has traditionally been left to the individual preference of the Anaesthetist. Patients may favour general anaesthesia (GA) due to traditional considerations of being completely pain free during the surgery and also unaware of the procedure. Spinal anaesthesia (SA) for spinal surgery is becoming increasingly more popular because this anaesthetic technique allows the patient to self-position and avoid neurological injury that may occur with prone positioning under general anaesthesia. Spinal anaesthesia reduces intraoperative surgical blood loss, improves perioperative haemodynamic stability and reduces pain in the immediate postoperative period.[2, 3] This leads to a reduced need for analgesics and a reduction in the incidence of nausea and vomiting

in the postoperative period. Spinal anaesthesia for lumbar spine surgery also decreases the incidence of lower extremity thrombo-embolic complications and does not increase the occurrence of problems with micturition. These benefits increase the patient's satisfaction, and they expedite discharge of the patient from the hospital[4,5]. Several studies have compared both anaesthetic techniques by measuring physiological variables. In our study we have compared patient satisfaction between spinal versus general anaesthesia in patients who underwent single level lumbar microdiscectomy. The aim of the study was to determine whether the mode of anaesthesia chosen for patients undergoing lumbar discectomy surgery has any significant influence on the immediate outcome in terms of postoperative pain, functional recovery and patient satisfaction.

Methods

Eighty healthy and co-operative patients ASA I-II undergoing Prolapse Lumbar Intervertebral Disc (PLID) surgery was included in the study from January 2008 to March 2010 at Sylhet M.A.G. Osmani Medical College Hospital & private hospitals in Sylhet district, Bangladesh. All patients were given written informed consent to participate in the study and also for the procedure they were going to undertake. The exclusion criteria included history of severe cardiac disease, bleeding dyscrasias, infectious process, previous lumbar surgery and multilevel lumbar surgery. Patients were randomized to either the GA or SA group. Each specific mode of anaesthesia was standardised. Patients in the GA group were anaesthetised with Propofol 2.5 mg/kg, fentanyl 2mcg/kg and rocuronium 0.6mg/kg to facilitate endotracheal intubation and mechanical ventilation. After achieving a general anaesthesia patients were then log rolled on to a prone position frame and special care was taken to protect the patient's arms, face, eyes and airway.[6] General anaesthesia was maintained with the use of halothane 0.8% conveyed with a mixture of 40% O_2 (FiO_2=0.4) and N2O 60%. Neuromuscular block was antagonised with neostigmine 0.4mg/kg and atropine 0.02mg/kg at the end of the surgical procedure.

Patients in the SA group received their block in a sitting position with hyperflexion of the lumbar spine. After the lower back was prepared and draped, the skin was infiltrated with 2-3 ml of 1% Lignocaine. Then a 25 G Quinkee spinal needle was introduced one or two levels above the herniated disc. 2.5 to 2.8ml of 0.5% Bupivacaine Heavyt + inj. fentanyl 12.5 mg was injected into the subarachnoid space. Patients were returned to the supine position and log rolled to the prone position frame once a stable spinal level was achieved. In both groups, Hartmann's solution (5ml/kg) was administered and when systolic B.P. below 90 mmHg was treated with an intravenous injection of Ephedrine (3mg). At the end of the surgical procedure, the patient was rolled to a supine position on a bed and transferred to the recovery room. Postoperative analgesia was administered in the form of Injection pethedine 2 mg/kg intramuscularly in both group of patient stat and 6 (six) hourly.

Comprehensive postoperative evaluation concentrated on documenting any complications specific to the particular mode of anaesthesia, recording the pace at which the various milestones of physiological and functional recovery were reached and the level of patient satisfaction with the type of anaesthesia used. The following variables were recorded: pain integrity was detected using a visual analogue scale (VAS) at 1,6, 12 and 24 hours; using a scale, verbal rating scale (VRS).as in : Excellent, Good, Fair, Poor .

Results

In this study demographic characteristics did not differ between the two groups (Table-I). The distribution of men and women in both SA and GA groups was comparable as well as the distribution in relation to the level of surgery. No serious complication specific to their particular mode of anaesthesia occurred in either group (Table II&III). Significance of difference between Spinal and G/A group in postoperative pain relief by VAS estimated after 1, 6, 12, 24, hours (Table IV). Level of comfort after surgery by VRS (verbal rating score) was better in spinal group comparative to G/A group (Table-V). Time of total duration of Surgery showed highly significant value in spinal group than G/A Group (Table VI).

TableI *Demographic characteristics of patients*

Group	Age (mean) in Years	Sex (M::F)	Body Weight (mean) kg
Spinal (n-40)	41.10±1.18	51:29	57.20±1.77
G/A (n-40)	42.80±1.59	47:33	56.80±2.36

Statistical analysis was done by student's 't' test

P value < 0.05 significant

TableII *Complication spinal vs General Anaesthesia*

Complication	Spinal Group	General Anaesthesia Group
Hypotension	10 (25%)	02 (05%)
Hypertension	00 (00%)	08 (20%)
Tachycardia	15 (37.5%)	26 (27.5%)
Bradycardia	12 (30%)	02 (05%)
Vomiting /Nausea	05 (12.5%)	00 (0%)
Shivering	04 (10%)	00 (0%)

Table III *Postoperative Complication*

Complication	Spinal Group	General Anaesthesia Group
Hypotension	02 (05%)	00 (0%)
Hypertension	03 (7.5%)	12 (27.5%)
Tachycardia	11(26.25%)	18 (44%)
Bradycardia	08 (19%)	04 (9.5%)
Vomiting /Nausia	02 (05%)	08 (19%)
Shivering	02 (05%)	03 (7.5%)
Urinary Retention	08 (19%)	04(9.5%)

Table IV *Assessment of postoperative pain relief by VAS score (mm) estimated after 1, 6,12,24,hours*

Time period	Spinal Group	G/ A Group	P-value
After 01 hrs	28.5±9.6	38.1±11.3	<0.001
After 6 hrs	37.8±11.5	45.2±6.5	<0.05
After 12 hrs	33.3±7.6	40.3±8.7	<0.01
After 24 hrs	31.4±9.6	38.3±9.2	<0.01

Mean±SEM P<0.05 significant

Table V *Levels of comfort after surgery. by VRS (verbal rating score)*

Comfort	Spinal Group	G/A Group
Excellent	45%	27%
Good	40%	48%
Fair	15%	23%
Poor	00%	02%

Table VI *Duration of Surgery:*

Time	Spinal Group	G/A Group	P value
Time of total duration of Surgery	74.06 min.	85.05 min.	<0.001

Statistical analysis was done by student's 't' test, Value are expressed p. p<.015 significant(**)

Discussion

General and spinal anaesthesia are both used for lumbar spine surgery. As previous studies have suggested, SA seems to be superior to GA in terms of postoperative pain and in decreasing perioperative undesirable results. However, no studies in the English literature have compared patient satisfaction evaluating functional recovery variables.[1,7]. A previous study by Dagher *et al*[2] shows similar results with SA patients performing better from the functional recovery point of view and scoring better pain level. The only other recent reports involving large numbers of patients are from Jellish *et al.*[3] in the USA. In our study SA has demonstrated to be superior to GA from the patient's satisfaction point of view. Pain level reported by GA patients was always higher than SA patients and the difference was especially significant at 8 hours. Similarly there are significant differences in the level of comfort, SA patients reporting a better level of comfort in general, similar studies reported by J. Perez Rodriguez *et al*[4]. Pethidine was used as postoperative analgesia. According VAS Score GA group reported a higher level of pain with similar significance at 1, 6, 12 and 24 hours. There is no significant difference between gender and level of pain. Direct relation between the age of the patient and the level of pain was found, especially in the SA group, with a higher level of pain in older patients[8]. Spinal anaesthetic patients reported a less incidence of urinary retention, which differs with previous

studies where both anaesthetic techniques have been compared[5,7]. Blinded to an extent by not having experienced the alternative, both groups appeared satisfied with their anaesthetic. However the level of satisfaction was significantly higher in the SA group. Spinal anaesthesia ensures better operating conditions, better postoperative pain control and a quicker postoperative recovery when compared to general anaesthesia for single level lumbar spine surgery. Spinal anesthesia was as safe and effective as general anaesthesia for patients undergoing lumbar laminectomy. Potential advantages of spinal anaesthesia include a shorter anaesthesia duration, decreased nausea, antiemetic and analgesic requirements, and fewer complications.

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Original Article

Caudal tramadol bupivacaine combination for postoperative pain releif in subumbilical paediatric surgery

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Abstract

Background Regional anaesthesia in children provides the advantage of reduced requirements of other anaesthetic agents and of excellent analgesia introduction. Rational use of adjuvant with local anaesthetic in caudal route for prolonged optimal analgesia in paediatric population.

Objectives To evaluate the quality and duration of postoperative analgesia in children undergoing subumbilical surgeries with caudally administered mixture of tramadol and bupivacaine.

Methods Sixty children of ASA physical status I & II scheduled for elective subumbilical surgery were included in this prospective case-control study. Children were randomly assigned to receive caudal analgesia with plain bupivacaine (Group-I) and a mixture of tramadol-bupivacaine (Group-II) respectively. Blood pressure, heart rate, oxygen saturation and duration of analgesia were recorded postoperatively.

Results Study revealed that mean duration of caudal analgesia in Group-I and Group-II were 245.67 ± 6.94 and 612.05 ± 16.49 minutes respectively which was significantly longer (P<0.001) in Group-II. Mean number of postoperative analgesics were 2.97±0.50 and 1.78±0.50 in Group-I and Group-II which was statistically highly significant (P=0.000). Postoperative nausea and vomiting was significantly high in Group-II (P=0.019).

Conclusion Combination of tramadol with bupivacaine results in prolonged analgesia when administered in caudal route. In addition, tramadol is more useful in young children considering less respiratory depression than other opioids.

Key Words: Caudal tramadol-bupivacaine mixture, paediatric post operative analgesia.

(JBSA 2010; 24(2): 42-46)

Introduction

Post-operative analgesia is essential to provide subjective comfort to restore the function of different organs and to allow the patient to breath, cough and move more easily. Regional anaesthetic techniques in paediatric patients have gained considerable popularity. The primary advantages of regional supplementation are lowering of general anaesthetic requirements and to provide intense post-operative analgesia[1].

Caudal anaesthesia is one of the most frequently used regional techniques in children, accounting for almost 50% of all regional techniques[2]. Many anaesthetic agents have been used for caudal analgesia in paediatric patients most common being

the lignocaine and bupivacaine. Although administration of bupivacaine into the caudal extradural space has been a standard method of providing post-operative analgesia for paediatric surgery, a single injection may have only a relatively short duration of action[3]. Attempts to overcome this problem by combining the local anaesthetic agents with other drugs such as adrenaline, clonidine[4], ketamine, or opioids[5] have met with varied degrees of success.

Tramadol hydrochloride is a synthetic opioid of the aminocyclohexanol group. Its dual mode of action (opioid and non-opioid) may provide some advantages over pure opioid analgesics. Specially considering the side effects[6]. Tramadol is not chemically related to opioids, but still it acts on opioid receptors. It is a racemic mixture of the two cis-isomers. The R(+)-isomer has some activity at the μ receptor, also inhibits serotonin (S-HT) uptake and S(-)-isomer inhibits noradrenaline uptake. Tramadol inhibits noradrenaline uptake and stimulates serotonin release and these are transmitted in the descending pathways which play an important role in its analgesic profile[7]. Caudal block with bupivacaine alone can provide analgesia for only three to four hours[8].

The aim of this study was to determine whether caudal administration of tramadol 2mg.kg^{-1} with bupivacaine prolongs the duration of analgesia compared with bupivacaine alone with respect to side effects and provides satisfactory analgesia in subumbilical paediatric surgery.

Methods

After approval of ethical committee, sixty children aged 2-10 years of ASA physical status I & II were selected randomly for this prospective case control study. Maintaining the inclusion and exclusion criteria, informed written consent were obtained from legal guardians after explaining them the purpose of this study.

Without pre-medication securing venous access general anaesthesia was induced with thiopentone (3-5 mg.kg^{-1}) after adequate pre-oxygenation. Tracheal intubations were facilitated with succinylcholine (1.5mg.kg^{-1}) and anaesthesia was maintained using nitrous oxide 66%, Halothane 0.5-1% in oxygen. Neuromuscular block were maintained with atracurium.

Children were allocated randomly into two groups (30 patients) and caudal analgesia was performed just after intubation and before starting surgery using a 23 gauge hypodermic needle under aseptic condition with the child in left lateral position. Group – I (Control group): children received 0.8ml.kg^{-1} of 0.25% plain bupivacaine plus 1ml normal saline. Group – II (Case group): children received 0.8ml.kg^{-1}) of 0.25% plain bupivacaine together with 2mg.kg^{-1} of tramadol in 1ml normal saline.

Child was placed in supine position and no analgesic supplement was given during operation. Surgery was started 15 minutes after caudal injection. Heart rate and oxygen saturation (SPO_2) were monitored continuously and arterial blood pressure was monitored every 5 minutes by electronic oscillometer. Residual neuromuscular block was antagonized with a mixture of neostigmin 50μg.kg^{-1} and atropine 20μg.kg^{-1} at the end of operation and duration of surgery was noted. The child was extubated in lateral recovery position. In post surgical ward the following parameters were recorded at 30 minutes interval for the first hour and at 2, 4, 6, 8, 12, and 24 hours after recovery from anaesthesia : heart rate, non invasive measurement of arterial blood pressure respiratory rate (RR) and oxygen saturation (S_pO_2) with pulse oximetry.

Pain score was assessed using modified TPPPS (toddler preschooler postoperative pain scale) to give a maximum score of 10 (Table-V) according to Tarbell et al[9]. Pain score more than 3 required administration of rescue analgesia either with diclofen sodium suppository (1mg.kg^{-1}) or oral paracetamol (20mg.kg^{-1}).

Total numbers of analgesic requirement in 24 hours postoperative period were recorded. Mean number of analgesic required in twenty four hours postoperatively were 2.97±0.50 and 1.78±0.50 in Group – I & II respectively (Fig 1).

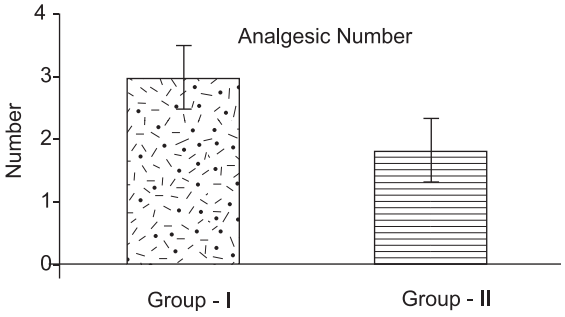

Fig 1 *Number of analgesic requirements*

The incidence of side effects if any occurred was recorded.

Data was collected on pre-designed data collection sheet and was analyzed for statistical significances by unpaired student's 't' test or chi-square (x^2) test as appropriate. P<0.05 was considered significant.

Results

There were no significant differences among the groups regarding demographic data and duration of surgery (Table I).

Haemodynamic data were analyzed by comparing heart rate (HR), systolic blood pressure (SBP). diastolic blood pressure (DBP) between two groups and no significant differences were observed as shown in Table II.

Mean durations of first analgesic requirement in the postoperative period were 245. 67 6.94 minutes in group – I and 612.05 16.49 minutes in group – II. There was statistically highly significant difference between two groups (P = 0.00) as shown in Table IV & Figure II.

The two groups were statistically matched for ventilator frequency (RR) and oxygen saturation (SpO_2) having no differences between them as shown in (Table III).

Table I *Patient characteristics and duration of surgery.*

Variables	Gr - I	Gr - II	't' value	P - value
Age (yrs)	5.30 ± 0.51	4.73 ± 0.46	0.83	0.408
Weight (kg)	14.43 ± 0.85	15.70 ± 0.85	1.06	0.295
Duration of surgery (min)	55.64 ± 2.46	64.33 ± 5.77	1.39	0.171

Values are expressed as mean±SD. Data are analyzed by Student's 't' test. p<0.05 significant

Table II *Changes of haemodynamic parameter*

Variables	Gr – I	Gr – II	't' value	P - value
HR/min	104.83 ± 1.87	108.20 ± 2.13	1.19	0.239
SBP (mm of Hg)	91.23 ± 1.50	86.67 ± 0.65	0.28	0.783
DBP (mm of Hg)	52.00 ± 1.65	47.67 ± 0.82	1.40	0.167

Values are expressed as mean±SD. Data are analyzed by Student's 't' test. p<0.05 significant

Table III *Changes of respiratory rate & Spo_2*

Variables	Gr – I	Gr – II	't' value	P – value
Respiratory rate	18.73 ± 0.64	20.40±0.75	1.70	0.095
SpO_2%	100.00±0.69	99.43±0.09	1.05	0.296

Mean -± SEM; P<0.05 – Significant.

Table IV *First analgesic requirements in minutes.*

Variable	Gr – I	Gr – II	P – value
1st dose analgesic rescue in minutes	245.67±6.94	612.05±16.49	0.00^{NS}

Mean - SEM; P<0.05 – Significant; P<0.01 highly significant. HS – highly significant.

Table V *Modified TPPPS pain score*

Variable	Score 0	Score 1	Score 2
Verbal complaint, cry	None	Once Only	> once
Groan / moan / grunt	None	Once only	> once
Facial expression	Neutral	Once grimace	Grimace > once
Restless motor behabiour	None	Once episode only	> once episode
Rub / touch painful area	None	Once only	> once

Mean number of analgesic required in 24 hours postoperatively were 2.97±0.50 in group-I and 1.78±0.50 in group-II which revealed statistically highly significant differences in analgesic requirement between two groups (P=0.00).

Though sedation score did not differ significantly between the two groups (P>0.05) but incidence of nausea/vomiting was significantly higher in group-II (P=0.019). It was mild and occurred once and well managed with safe anti emetic drugs like 5-HT_3 receptor antagonist e.g. Ondansetron ($0.1mg.kg^{-1}$) I/V or orally. No other side effects were seen.

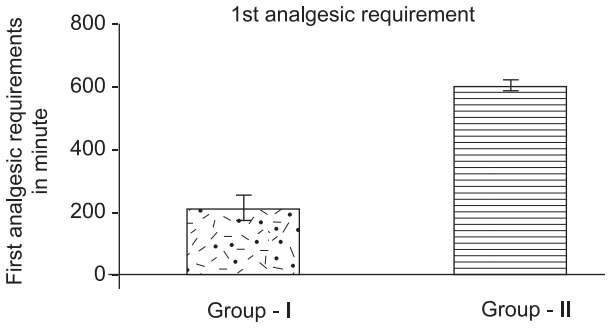

Fig 2 *First analgesic requirements in minute*

Discussion

Regional anaesthesia in children provides the advantage of reduced requirements for other anaesthetic agents and of excellent analgesia. The caudal approach to the epidural space has experienced a resurgence of interest among paediatric anaesthesiologists[10]. Any surgical procedure below umbilicus can be performed under caudal anaesthesia and can be benefited from the post operative analgesia that the caudal block might provide[11].

Caudal administration of bupivacaine is a wide-spread regional anaesthetic technique for intra and post-operative analgesia during various surgical procedures in children. The addition of opioid to bupivacaine is known to prolong the duration of caudal analgesia but the possibility of adverse effects like respiratory depression, pruritus etc. has limited the use of such mixture[12]. Caudal administration of bupivacaine has duration of action of only 2-4 hours[4]. As a result, systemic analgesia is usually required as the block wears off. It was observed that the peak serum concentration of tramadol occurred at 0.55 ± 0.11 hours after caudal administration[13] while Lintz et al[14] observed that serum concentration after i.m. injection of tramadol in healthy adults occurred at 0.75±0.38 hours.

In this study, addition of tramadol 2mg/kg to bupivacaine administered caudally provided post-operative analgesia for 612.05±16.49 minutes in comparison to 245.67±6.94 minutes with caudally administered bupivacaine alone. This results is in agreement with the results obtained by Stephan et al. who showed that tramadol when added to mepivacaine significantly prolong the duration of a brachial plexus block[15]. In our study all children (100%) in both groups required rescue analgesic.

On the basis of mean number of analgesic required in 24 hours post-operative period (POP), significantly less supplemental diclofenac sodium suppository was required in bupivacaine - tramadol group (1.78±0.50) compared to bupivacaine group (2.97±0.50). Modified TPPPS (Toddler Pre Schooler Post-operative Pain Scale) score[9] of more than 3 out of 10 (rather than 7 as in the original) was the indication of first rescue analgesic in all children. There was no significant difference in two groups as regards to haemodynamic parameters (heart rate, arterial blood pressure). In this study, incidence of nausea and vomiting was observed in bupivacaine - tramadol (group II) mixture group (16.7%)

probably due to its systemic absorption, which was mild and well managed with antiemetic drugs. No other adverse effects like facial and body flushing, urinary retention, pruritus, hypotension and any signs of motor weakness were observed in this study. So a combination of bupivacaine – tramadol mixture in caudal route significantly increases the potency and duration of caudal analgesia with minimal adverse effects than the bupivacaine or tramadol alone.Our results concluded that, addition of tramadol to bupivacaine in caudal route provides an optimal analgesia for a longer period than bupivacaine alone. Moreover as an adjunct to bupivacaine, tramadol might be more useful in young children considering less respiratory depression than the other opioids.

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Original Article

Comparison of haemodynamic alteration with laryngeal mask airway and endotracheal tube in intermediate duration of gynaecological operation

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Abstract

Background *Laryngeal mask airway insertion causes less changes of haemodynamic parameters. As haemodynamic changes during laryngoscopy and endotracheal intubation as result of intense stimulation of sympathetic nerves system.*

Objective *To find out the effective airway management by LMA during controlled ventilation, to avoid laryngoscopic and intubation induced haemodynamic changes and to avoid laryngospasm and bronchospasm.*

Method *A total number of 100 patients ASA grade I & II were selected randomly as per inclusion and exclusion criteria in two groups. Fifty in each group. In group A used LMA and in group B used ETT during general anaesthesia in intermediate duration of gynaecological operation. Pulse,NIBP,SpO2 were recorded in perioperatively.*

Result *Pulse, blood pressure were significant between the two groups ($p<0.00$) but in SpO2 was insignificant except in 2 min of intraoperative which was significant. ($p<0.013$).*

Conclusion *LMA insertion causes less changes of haemodynamic parameters when compared with that of ET intubation. Our finding suggests that LMA can be safe and beneficial alternative to ETT.*

Keywords *Laryngeal mask airway, endotracheal tube, gynaecological, haemodynamic.*

(JBSA 2010; 23(2): 51-55)

Introduction

The Laryngeal Mask Airway[1,2] has been designed as the missing link between the face mask and the tracheal tube[3] and it has been gained wide spread popularity. Advantages includes ease of use, efficient airway management, airtight seal if properly inserted[4], it frees the anaesthetist's hands. In most patients it can be inserted without laryngoscopy. Device is well tolerated by patient during recovery from anaesthesia. As haemodynamic changes during laryngoscopy and endotracheal intubation as a result of intense stimulation of sympathetic nervous system. These changes can be dangerous in patients with cardiovascular and cerebrovascular diseases as they may lead to intra operative and post operative life threatening consequences like ischaemia, infarction or cerebral hemorrhage. To avoid these complication LMA can be used as an alternative to endotracheal intubation for airway management during anaesthesia for intermediate duration of procedure-like total abdominal hysterectomy, vaginal hysterectomy, open ovarian cystectomy and laparoscopic ovarian cystectomy. There is an attenuated haemodynamic response to insertion of LMA as compared to endotracheal intubation[5,6]. In another study it was found that there is some haemodynamic alteration to insertion of LMA as compared to endotracheal intubation[7].

LMA insertion can be done without laryngoscopic assistance. LMA can be useful during management of difficult and failed intubation. It is also useful in patients with distorted airway anatomy as in tumour in the face and neck, congenital problems, poor cervical spine mobility. Sore throat can be avoided by using LMA which is some times a complication of endotracheal intubation. Insertion of LMA is possible with the patients neck and head in any position and with practice the operator can insert it from the side or from infront of the patient[8].LMA is reusable and can be reused up to 40 times and cost effective when used in place of disposable single use of tracheal tube.

To establish the benefits of LMA, more specifically the haemodynamic stability with LMA, we compare the cardiovascular response to LMA insertion and endotracheal intubation in intermediate duration (1-2 hours) operations with IPPV maintained manually. The LMA is in popular use for gynaecological surgeries (such as laparoscopy)[9].

Methods

After taking informed consent, all patients were premedicated with oral Ranitidine 150mg. the night before and the morning of surgery. After bringing the patient to the operation theater standard monitoring, comprising non-invasive blood pressure and pulse oximetry was attached to the patient and base-line blood pressure and heart rate was recorded. Pre oxygenation was done appropriately prior to induction of all hundred patients (50 patients in each group).Patient with H/O gastro esophageal reflux, hiatal hernia, previous esophageal and gastric surgery, were excluded from this study.Patient among the sample was assigned in two groups randomly by blind envelop method. 100 envelops of which 50 for group-A and 50 for group-B were kept in a box.

All patients were preoxygenated with well fitted face mask with oxygen at a rate of >6L/minute for 3-5 minutes. Induction of general anaesthesia was performed with injection thiopenton sodium 5mg/kg IV, Inj. fentanyl 1µgm/kg IV, Inj. suxamethonium bromide 2mg/kg IV. After that LMA of size 3 and 4 were inserted according to the patient status and then cuff of the LMA was inflated with 20ml and 30ml (respectively) of air, then anaesthesia was maintained with O_2/N_2O and halothane 0.5%. Muscle relaxation was ensured by Inj. Vecuronium bromide 0.1mg/kg. bolus IV followed by 25% of the initial bolus dose of vecuronium bromide every 20 minutes interval. Additional doses of Inj. fentanyl 0.5 to 1µgm/kg/hr were administered, through out the duration of surgery.Following the completion of surgery, muscle relaxation was antagonized with Inj. neostigmine 0.05mg/kg and Inj. atropine 0.02mg/kg IV together. Before removal of LMA all patients were allowed to breath spontaneously and wake up with the device in place. Immediately after removal of LMA and endotracheal tube patients haemodynamic parameters were recorded. Study parameters in pre-operative period Pulse, NIBP, SpO2.and Intra operative Pulse, NIBP, SpO_2, vomiting, laryngospasm, gastric insuflation, aspiration, cough and Post operative Pulse , NIBP, SpO_2, vomiting , regurgitations.

Results

Observation of the present study was analyzed in the light of comparison among the subject groups, each group having n=50.All result are expressed as mean ± standard deviation (SD). The studied groups became statistically matched for age (p=0.624), weight (p=0.422).

Table I *Demographic data of study groups*

Parameter	Group A (LMA)	Group B (ETT)	P value
Age	25.932±10.17	26.872±8.91	0.624
Weight	47.81±6.98	48.99±7.63	0.422

Values are expressed as mean ± SD. Data are analyzed by student's 't' test.

There was no significant changes,

NS – Not significant

Table II *Changes of pulse rate between two study groups*

Group/ Time	Base line	2 Min.	5 Min	10 min	Removal
Group-A (LMA)	78.54±8.67	79.92±7.61	78.96±6.23	74.36±6.61	69.48±6.77
Group-B (ETT)	71.20±5.00	104.00±6.84	108.58±5.02	91.64±9.54	109.52±6.73
P value	0.000	0.000	0.000	0.000	0.000

Values are expressed as mean ± SD. Data are analyzed by student's 't' test.
There was significant difference in pulse rate between groups from base line to removal of the tube i.e., (p=0.000).

Table III *Changes of systolic blood pressure*

Group/ Time	Base line	2 Min.	5 Min	10 min	Removal
Group-A (LMA)	103.10±6.22	105.10±5.60	101.86±4.79	104.46±5.34	105.08±5.75
Group-B (ETT)	101.58±7.132	130.92±13.00	130.92±9.83	126.40±13.92	138.50±8.41
P value	0.259	0.000	0.000	0.000	0.000

Values are expressed as mean ± SD. Data are analysed by student's 't' test.
There was significant changes in systolic blood pressure between groups except base line systolic blood pressure which was insignificant. ie (p=0.259).

Table IV *Changes of diastolic blood pressure between study groups*

Group/ Time	Base line	2 Min.	5 Min	10 min	Removal
Group-A (LMA)	65.94±3.75	65.62±4.19	69.52±4.51	65.86±3.53	66.86±3.37
Group-B (ETT)	67.20±4.33	88.40±4.90.00	90.34±3.48	84.26±6.60	92.06±4.28
P value	0.123	0.000	0.000	0.000	0.000

Values are expressed as mean ± SD. Data are analyzed by student's 't' test

There was significant changes in diastolic blood pressure between groups except base line diastolic blood pressure. ie(p=0.123).

Table V *Changes in* SpO_2

Group/ Time	Base line	2 Min.	5 Min	10 min	Removal
Group-A (LMA)	98.58±.70	98.64±.70	99.30±.76	99.34±.77	99.52±.71
Group-B (ETT)	98.86±.83	99.04±.88	99.50±.73	99.56±.73	99.66±.69
P value	.072	.013	.185	.147	.318

Values are expressed as mean ± SD. Data are analyzed by student's 't' test.
There was no significant difference between groups.

Discussion

Haemodynamic stability is an important goal of any anaesthetic management plan but haemodynamic alterations during endotracheal intubation especially in patients with heart disease, hypertension, increase ICP etc. are a big problem for anaesthesiologist. So it is highly desirable for anaesthesiologist to reduce these haemodynamic alteration by using newer techniques or drugs. A study by Verghese C et al. (1993) has done a prospective survey of the use of the laryngeal mask airway in 2359 patients undergoing anaesthesia

in which the laryngeal mask airway was used were prospectively audited over a 6-month period. A simple record sheet was completed at the time of anaesthetic administration and 2359 completed forms were analysed to assess problems encountered with its use. It was used successfully in 2350 patients (99.61%); of these, 1399 patients (59%) breathed spontaneously through the airway and 960 patients (41%) underwent intermittent positive pressure ventilation of the lungs. Two patients (0.08%) were reported to have regurgitated during the use of the laryngeal mask airway, but no serious sequelae associated with its use were encountered[13].Holden R et al. (1991) intra-ocular pressure was measured before and throughout airway establishment with either the laryngeal mask airway and tracheal tube. Similar measurements were made on removal of either airway and the amount of coughing noted in the first minute after removal. There was a significantly smaller increase in intra-ocular pressure ($p<0.001$) using the laryngeal mask airway both on placement and removal, than with the tracheal tube. Postoperative coughing was significantly reduced using the laryngeal mask airway ($p<0.001$). There was a significantly greater rise in heart rate using the tracheal tube ($p<0.01$) probably related to an increased cardiovascular response. The laryngeal mask airway is recommended as an alternative to tracheal intubation in routine and emergency intra-ocular surgery[10].

Some medication can be used to modify haemodynamic responses to laryngoscopic endotracheal intubation and these includes the use of premedication like, lignocane[7], fentanyl, esmolol and magnesium. But none of these pharmacological intervention was found effectively reducing the haemodynamic responses rather they are causing complications as there side effects.

Kihara et al. had demonstrated that LMA insertion has no significant haemodynamic effect compared to base line. They also shown that LMA removal too did not change haemodynamic parameter significantly[8]. In our study, LMA insertion compared to ETT intubation demonstrates statistically significant haemodynamic effect in ETT group.

Idress & Khan et al. in another study demonstrated LMA insertion and ETT intubation (for IPPV) that LMA did significantly attenuate ($P<0.05$) haemodynamic response compared to ETT group which is as like as our study. They also showed the cardiovascular response to extubation was similar in both LMA & ETT group[4].

Kihara et al. has demonstrated that LMA had no significant change on heart rate, systolic blood pressure, diastolic blood pressure compared to Macintosch laryngoscopy in hypertensive patient[11]. An our study we used normotensive sample and found the same result. However, for reason less understood. Kihara et al. did not found significant high pressure response in ETT group in normotensive patient. One reason may be they used propofol as induction agent which has better haemodynamic attenuation than thiopentone induction[12]. The later was used in our sample. Propofol 2 mg/kg induction was used in Yamallchl et al. series where they used LMA in normotensive and hypertensive group and compared to both groups and found similar haemodynamic response and concluded that propofol is an effective induction method preventing adverse cardiac response to LMA. But they did not compare with ETT.

Braude N et al. compared the haemodynamic response of LMA insertion with insertion of oropharyngeal airway. They showed that small rise in heart rate, blood pressure and intraocular pressure of LMA insertion compared with that of oropharyngeal airway. In our study less rise of heart rate, systolic blood pressure, diastolic blood pressure in LMA insertion compared with that of ET intubation.

Holders R et al showed an attenuated pressure response associated with laryngeal mask airway insertion compared with conventional laryngoscopy and tracheal intubation. In our Study we observed similar results.

In our study we used LMA and endotracheal tube in ASA Grade-I and Grade-II patients and we found less haemodynamic change with laryngeal mask insertion during the maintenance of anaesthesia in intermediate duration operation (1-2 hours) like, total abdominal hysterectomy, vaginal hysterectomy, open ovarian cystectomy and laparoscopic ovarian cystectomy in controlled ventilation done manually and there was no problem in maintaining SpO_2 in accurately placed laryngeal mask airway instead of endotracheal

tube.In my study groups no cases were found to develop significant regurgitation and aspiration in the perioperative period and all patients with LMA were maintained SpO_2 above 98% during the peroperative maintenance of airway.

Although in many occasions of short durated operations LMA were used safely without the complications of regurgitation and aspiration and haemodynamic alteration induced hazards. We also found its safe use in intermediate duration operation without any regurgitation and aspiration and CVS and cerebrovascular complications due to haemodynamic changes. Conclude that LMA insertion causes less changes of haemodynamic parameters when compared with that of ET intubation. Our finding suggests that LMA can be safe and beneficial alternative to ETT for ASA Grade-I and II patients undergoing intermediate duration of elective gynaecological operation in controlled ventilation done manually

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Special Article

Sub arachnoid block related complications - 5 years experiences

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Abstract

Sub Arachnoid Block (SAB) is a frequently used popular anaesthetic technique but it is not without complications. The objectives of this retrospective descriptive study was to report and evaluate the complications of SAB in Khulna city,which occurred in a period of 5 years from January 2004 to December 2008. It was a multicentre study. Related data from anesthetic procedure records were collected for above mentioned period. Total 10829 patients were operated under SAB in those centres during the study period. Majority of patients were female (72.22%), mean age was 39 ± 9.78 years, age groups between 20 to 39 years were 72.22%, ASA physical status between I and II were 87.01%. Complications of SAB were mild hypotension 3090(28.53%), severe hypotension 83(0.76%), cardiac arrest 20(0.18%), postdural puncture headache (PDPH) 1825(16.85%), meningism 10(0.09%), cuada equina syndrome 4(0.036) and death 3(0.027%). Most common complications were simple hypotension and PDPH. Serious adverse events such as severe hypotension, cardiac arrest, cauda equina syndromes and death were were more than other western countries and may be due to shortage of adequate skilled anaesthesiologist. A prospective study with a good number of qualified anaesthesiologists can be taken in hand on ward for further evaluations.

Key words: *Sub arachnoid block, Complications*

(JBSA 2010; 23(2): 67-71

Introduction

Professor Augst Bier performed the first surgical operation using spinal anesthesia at the Royal Surgical Hospital of the University of Kiel, Germany on August 16, 1898, heralding the advent of major regional anesthesia using neuraxial blockade. [1] In 1927, Gaston Labat performed spinal anesthesia at The Mount Sinai Hospital. [2] Since then, of course, it has been well incorporated into the practice of anesthesiology. Spinal is a term which denotes all form of Central blockade, although it usually refers to Sub arachnoid administration of local anaesthetic agent, term sub arachnoid block (SAB) to avoid the ambiguity.[3] SAB is employed to the surgery of lower limbs, buttock, anal region, perineum, and lower abdomen mostly.

SAB is easier to perform, has a more rapid, predictable onset, may produce a more intense block, and dose not have potential for serious systemic drug toxicity, because of smaller dose of local anaesthetic employed.[4] Though spinal anaesthesia have proved to be extremely safe, but it is not without complications and complications are related to medication introduced or the needle used to performed for the procedure. Adverse reactions and complications range from pain with injection to permanent neurological deficits and even death. Complications are hypotension,

bradycardia, shivering backache, post dural puncture headache (PDPH), and meningism. Incidences of serious complications for spinal anaesthesia include cardiac arrest, cauda equina syndrome, radiculopathy, and death.[5]

This retrospective descriptive study was carried out to find out the rate of morbidity and mortality of SAB city, which can develop the awareness among anaesthesiologists and ultimately the existing morbidity and mortality rate can be declined by our meticulous plan of action and also adapt and keep the data for further research in the near future.

Methods

We performed a retrospective descriptive study on patients underwent surgery under SAB in a period of 5 years from January 2004 to December 2008 in Khulna Medical College Hospital, Khulna Sadar Hospital and four private hospital of Khulna. In accordance of criteria for analysis, we made some structural table and related data from anesthetic, procedure records and history charts of patients were collected for above-mentioned period. General data included age, ASA physical status, body weight, and height. The anaesthetic data encompassed preanaesthetic problem, monitoring, complications envolved intra and postoperatively as well as follow up of complications. Clinical monitoring observed by the anesthetic personnel consisted of pulse, non-invasive blood pressure, pulse oximetry, electrocardiography. Results were reported as mean + standard deviation (SD) or percentage (%) where appropriate.

Results

Characteristics of patient's were shown in table I. Table II showed total number of SAB performed in five years at different hospital. Table III showed total number of different operations done under SAB; Table IV showed total number of complications with management, follow up and prognosis (drop of pre-existing systolic BP up to one third).

Table I *Characteristics of study group*

Characteristics	Number	Percentage
Sex		
Male	3017	27.87%
Female	7812	72.13%
Age(years)		
12-20 yrs	965	8.91%
20-29 yrs	3106	28.68%
30-39 yrs	4716	43.54%
40-49 yrs	1134	10.47%
50-59 yrs	785	7.24%
60-69 yrs	63	0.58%
> 70 yrs	60	0.55%
Mean age+SD(years)	39 ± 9.78	
Mean body weight+SD(Kg)	56 ± 7.58	
Mean body height+SD(cm)	157 ± 9.13	
ASA physical status		
I	7612	70.29%
II	1811	16.72%
III	875	8.09%
IV	531	4.90%

There were 10829 cases, but age and ASA physical status were not the same.

Table II *Number of SAB performed in yearly basis*

Year	KMCH	Sadar Hospital Khulna	Different clinics of Khulna	Total
2004	1015	461	654	2130
2005	940	484	564	1988
2006	1287	434	586	2307
2007	1748	369	660	2777
2008	893	254	480	1627
Total	5883	2002	2944	10829

Total numbers of cases were 10829

Table III *Total number of different operations in five years under SAB*

Name of Operations	Number	Percentage
LUCS	6732	62.16%
Gynaecological operation	775	7.16%
General Surgery	1328	12.26%
Orthopedic Surgery	1994	18.42%

Total numbers of cases were 10829

Table IV *Number and percentage of different complications of SAB and Follow up.*

Complications	Number	Percentage	Follow up / Prognosis
Mild Hypotension	3090	28.53 %	Corrected by crystalloid, and colloid infusion. Use of vassopressor drug -ephedrine, adrenaline.
Severe hypotension	83	0.76 %	Treated by crystalloid and colloid infusion, adrenaline, dopamine, dobutamine, blood transfusion.Recovery 63, Cardiac arrest 20.
Cardiac arrest	20	0.18 %	CPR, endotracheal intubations –articial ventilatory support, complete recovery – 15, Cerebral damage – 2, and death – 3.
PDPH	1825	16.85 %	Simple analgesic, no Epidural blood patch needed. Disappear spontaneously.
Meningism	10	0.09 %	Recovered by simple analgesic.
Cauda euina syndrome	4	0.036%	2 cases followed up for 3 months, but no improvement.2 cases could not be followed up.
Death	3	0.027%	After taking all measures 3 patient died from cardiac arrest.

Total numbers of cases were 10829

Table-V *Number and rate of complications of SAB in different operation*

Surgery	Simple Hypotension	Severe hypotension	Cardiac arrest	PDPH	Meningism	Cauda euina syndrome	Death
LUCS (n = 6732)	2525(37.50%)	58(0.86%)	16(0.23%)	1347(20%)	5(0.07 %)	2(0.03%)	3(0.04%)
Gynaecological operation (n = 775)	105(13.54 %)	12(1.54%)	2(0.25%)	102(13.16%)	2(0.25%)	1(0.12%)	__
General Surgery (n = 1328)	185(13.93 %)	6(0.45%)	1(0.07%)	165(12.42%)	__	__	__
Orthopedic Surgery (n = 1994)	275(13.8%)	4(0.20%)	1(0.05%)	211(10.58%)	3(0.15 %)	1(0.36%)	__
Total	3090	83	20	1825	10	4	3

Total numbers of cases were 10829

Discussion

The complications of SAB range from the bothersome to the crippling and life-threatning. Broadly, the complications can be thought of as those resulting from physiological excessive side effects, placement of the needle and drug toxicity.[6] Auroy, et al, demonstrate in a very large survey of regional anaesthesia from France, a relatively low incidence of serious complications from spinal and epidural anaesthesia.[7] In contrast, the American Society of Anesthesiolgists, Closed Claim Project helps to identify the most common causes of liability claims involving regional anesthesia in the operating room in a 20 years period (1980-1999). Serious injuries in the claims included death (13%), permanent nerve injury (10%), brain damage (8%), and other permanent injuries (4%). The majority of the claims involved either lumber epidural anaesthesia (42%) or spinal anaesthesia (34%), and tended to occur mostly in the obstetric patients. [8]

Most common early complication of spinal anaesthesia in patients is transient hypotension as sympathetic nerves are blocked. Spread of block are affected by many factors including dose, volume, site of injection, baricity of solution, position of patients, speed of injection, and direction of bevel of needle. [9] Hyperbaric solution affects the dependent parts, which prevents the unpredictable block. Drop of pre existing systolic BP up to one third is accepted in healthy patients and known as mild hypotension. [10] This usually responds to prompt fluid replacement starting with crystalloids followed by colloids. Occasionally hypotension can be severe and may require vasopressors along with fluids.[11] If the height of block extends much higher, serious hypotension, bradycardia, shock and cardiac arrest may happen. Care must be taken in patients with a cardiac history as they may develop myocardial ischaemia with minor drops in blood pressure.[12]

In these study total number of SAB were 10829, out of which 28.53% developed mild hypotension managed with crystalloid and colloid infusion and vasopressor drugs. Total 83(0.76 %) patients developed severe hypotension, 63 patients recovered with intravenous infusion and vasopressor drugs and cardiac arrest developed in 20(0.18 %) patients. CPR given, 15 patients recovered, 3 patients died, restoration of cardiopulmonary function with loss of consciousness (cerebral damage) obsereved in 2 patients. Incidences of cardiac arrests were more prominent in LUCS in this study 16(0.23%). Charuluxananan S. et al, reported in a prospective study, six cases of total cardiac arrest among them five were cesarean section patients. [13] Therefore, cesarean section parturient should be considered as high risk of severe hypotension and cardiac arrest.

Among delayed complications, PDPH is most common and troublesome, especially in young adults and obstetrics. The headache results from CSF leak age from the puncture site and decreased intracranial pressure. It is enhanced by use of larger gauge needles and reduced by pencil tipped needles.[14,15] Symptoms may include headache, photophobia, headache, vomiting and dizziness.[16] It is treated with simple analgesics, adequate hydration, caffeine, and epidural saline as a bolus or infusion. Rarely epidural blood patch is used at the site of the meningeal tear. [16,17] Neurologic complications are uncommon after spinal anesthesia with careful patient selection, meticulous technique, and use of safe concentrations of spinal anesthetic mixtures. Two thirds of anesthesia related neurological complications are associated with paresthesia, backache, pain and numbness in the extremity, and an occasional weakness in the leg. [18] Serious neurological complications related to SAB are fortunately very rare. In our study, we found PDPH in 1825(16.85%) patients among tthem majority were in obstetrical cases 1347(20%), and meningism found in 10(0.09%) patients. Cauda equina syndrome obsereved in 4(0.036) patients and out of 4 cauda equina syndrome 2 cases were followed up for 3 months, but no improvement seen and 2 cases could not be followed up. Data from Third National Audit Project of the Royal College of Anaesthetists are reassuring and suggest that central neuroaxial block has a low incidence of major complications, many of which resolve within 6 months and serious neurological effects like paraplegia, cauda equina syndrome are rare during spinal anaesthesia. [19]

During this retrospective study we found shortage of skilled anaesthesiologist. Some trainee anaesthesiologists were also involved in the study but they were not skilled enough. Workloads were high four clinics, the numbers of involved anaesthesiologists were 5 to 7. Incidences of more number of serious complications like; death, PDPH and cuada equina syndrome may be due to shortage of adequate number of skilled anaesthesiologist. With these limited numbers of anaesthesiologists, standard and satisfactory anaesthesia, service could not be provided. Therefore, the quantity and quality of the anaesthesiologists should be increased to overcome the alarming situation. Spinal anaesthesia is the most common and popular anaesthetic technique for caesarean section, surgery of lower abdomen, buttock, anal region, and perineum in Bangladesh as well as whole world. According to this study of anaesthetic adverse outcomes after spinal anesthesia in 10829 consecutive cases in 5 years revealed incidence of the most common complications were simple hypotension and postdural puncture headache. Serious adverse events such as severe hypotension, cardiac arrest, cauda equina

syndromes and death were recorded and incidences were more than other western countries and may be due to shortage of adequate number of skilled anaesthesiologists. Some complications were considered avoidable and preventable. Anaesthesiologists should be more aware about the complications of SAB and perform the procedure more meticulously, which will reduce the rate of complications.

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Case Report

Anaesthetic management of a case of Treacher - Collins syndrome

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Abstract

Treacher-Collins syndrome (TCS) is a rare congenital disease known to be associated with a difficult airway and represents some of the most hazardous and difficult challenges that anaesthetists may encounter during their entire practice of anesthesia. Successful anaesthetic management of a case with Treacher-Collins syndrome posted for laparoscopic cholecystectomy under general anaesthesia is presented in this report.

Key Notes: *Treacher-collins syndrome, anaesthetic management*

(JBSA 2010; 23(2): 72-75)

Introduction

Treacher Collins syndrome is referred to as mandibulofacial dysostosis, characterized by maxillary, zygomatic, and mandibular hypoplasia and known to be associated with difficult intubation. It is a congenital malformation of first and second bronchial arch, inherited as autosomal dominant trait.[1]The basic etiology is obscure. IdaMaan in 1943 mentioned that a disturbance in division and development of the mesodermal bone tissue at fifthweek of foetal life probably initiates this syndrome.[2] The syndrome consists of congenital and familial deformities of the ear, eyes, maxilla and mandible. It is often associated with deafness due to meatal atresia and malformation of the middle and inner ear. Coloboma of the lower eyelids, scanty lower eye lashes, microtia with hearing loss and micrognathia and retrognathia [3, 4] may be present. During the post operative period, pharyngeal and laryngeal edema may develop. Even respiratory distress and sudden death has been reported[4]

Case Report

A female patient age of 23 years, weighing about 65 kg was scheduled for laparoscopic cholecystectomy in a private hospital. On pre-anaesthetic evaluation the patient was found to have hypoplasia of facial bones (mandible, maxilla and cheek), micrognathia and nasal obstruction gross deviated nasal septum. These features raised the suspicion that it is a rare case of Treacher Collins syndrome .On airway assessment mouth opening was found to be less then 3 cm and Mallampati Grading Class-4. (Fig 1, 2).

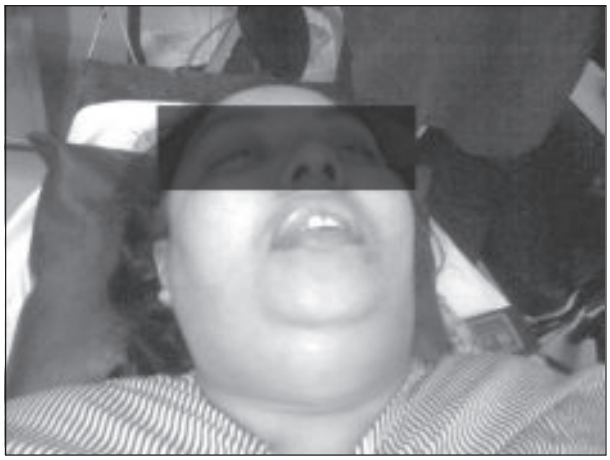

Fig 1

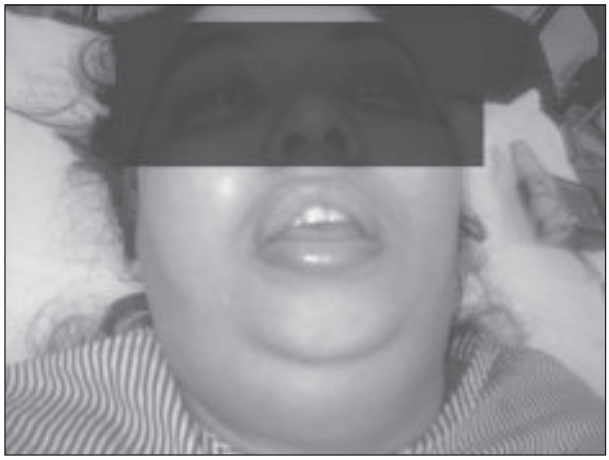

Fig 2

Neck movements and spine were normal. Preoperative blood investigations showed Hb- 11.5 gm%, No abnormalities were detected in other investigations.

Relatives were informed about the possibility of the difficult airway and on the event of failed intubation tracheostomy consent was taken. A trolley for difficult airway was kept readyi Including LMA, and tracheostomy set.

The patient was kept nil by mouth for six hours. We planned to go for smooth induction with a deeper plane of anesthesia, avoiding hypoventilation and trauma to the airway. The patient was premedicated with atropine 0.6mgIV to reduce the secretions. Sedatives were avoided as we anticipated a difficult airway. Dexamethasone 0.2mg.kg^{-1} IV was given. The patient was preoxygenated with 100% oxygen for five minutes. Induction was done with IV propofol 2 mg.kg^{-1} with fentanyl 2 μg/kg^{-1} and suxamethonium 2 mg kg^{-1}. Initially mask ventilation seemed to be difficult due to poor mask fit but improved to some extent after an orophrayngeal airway insertion and gauze packing of the space between the mask and the cheek. But even with these we could not ventilate adequately. Then one assistant was asked to lift forward both the angles of the jaw, and only then the patient could be ventilated. Now taking the patient in deeper plane, one assistant was asked to give a very good backward upward rightward pressure (BURP) on the airway. With this maneuver, Cormack Lehane classification of glottis visualization was Class III [5] during laryngoscopy. Now we were able to intubate with a 7mm cuffed endotracheal tube with the help of a stylet. Later the tube was secured properly and the patient was handed over to the surgeons. Further anaesthesia was maintained with N_2O + O_2+ halothane and rocuronium 0.6mgkg^{-1} with a supplementation of fentanyl 2μg.kg^{-1} IV for analgesia. The patient was monitored with pulse oximetry, $ETCO_2$, NIBP, and precordial stethoscope for heart rate throughout the surgical period which lasted for about 45 minutes and rest of the procedure was uneventful. At the end of the surgery, the patient was reversed with neostigmine 0.05mg.kg^{-1} and atropine 0.02mg.kg^{-1}. A smooth extubation was done. The patient was kept under observation and the postoperative period was uneventful. The patient was discharged from hospital after 2 days without any complication.

Discussion

Patients with Treacher-Collins syndrome present a serious problem to anaesthetists in maintaining their airway, as upper airway obstruction and difficult tracheal intubation due to severe facial deformity. Because of retrognathia, the airway management of these patients is often challenging.

Another cause for difficult intubation in such cases is due to relative macroglossia as a consequence of skeletal abnormalities. This reduces the space available for manipulation and insertion of the endotracheal tube (ETT).The associated abnormalities like limited mouth opening, reduced extension of the head on the neck, hypoplastic mandible, limited forward movement of hyoid may be present.

Treacher-Collins syndrome is caused by a defective protein called treache. More than half of the cases are thought to be due to new mutations. Because there is no family history of the disease, the condition may greatly vary in severity from generation to generation.[2]

Our patient a case of Treacher- Collins syndrome with most of the features of significant airway distortion. That's why we had expected difficulty in maintaining airway as well as difficult tracheal intubation. Various techniques have been described in management of such patients. These include; direct laryngoscopy, intubation with a flexible fiberoptic bronchoscope, lightwand, laryngeal mask airway, retrograde intubation technique and tracheotomy can also be employed.[5]

In our case we make three important modifications of the technique. These were:

1. We used a short acting muscle relaxation which give adequate relaxation but give less time to attempt intubation. [6,7] If we fail it is easy to recovered.
2. The forward lift of both the angles of the mandible by an assistant to overcome the main cause of difficult ventilation in TCS, the retrognathia.
3. And finally intubation was facilitated by a very good backward upward and rightward pressure (BURP) by an assistant.

Anesthesia is a field of challenges, especially when you encounter difficult to ventilate and difficult intubation scenario.[5] Hence every anaesthetist should be well prepared with the various techniques of the difficult airway algorithm. This case of Treacher-Collins syndrome illustrates how a modified conventional approach can still be a very good and gold standard approach when other newer techniques are not available.

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Original Article

Postoperative analgesia after lumbar disc surgery: A comparison between ketorolac and opioid

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Abstract

Background *Most spinal surgery is painful and good postoperative analgesia is important. Opioids are the traditional first-line treatment. Ketorolac has been used for postoperative pain relief. However, there is no data available about controlling postoperative pain with ketorolac after open lumbar discectomy or laminectomy in Bangladesah.*

Objective *To compare the efficacy of a Parentral ketorolac with conventional opioid for management of postoperative pain after lumbar disectomy or laminectomy.*

Methods *Sixty patients who underwent lumbar disectomy or laminectomy were randomly allocated into two groups. Group A (n = 30) patients received 30 mg intramuscular ketorolac upon surgical closure and every 6 hours for 24 hours and intramuscular pethidine 1.5 mg/kg/b.w. as needed (PRN). Group B (n = 30) patients received only intramuscular pethidine 1.5 mgkg-1/b.w. every 6 hours for 24 hours and as needed (PRN). Postoperative analgesia was assessed in both groups by Visual Analogue Scale at arrival in postoperative ward and at 6, 12 and 24 hours for 24 hours. Total postoperative narcotic consumption and side effects like post operative nausea and vomiting (PONV), dizziness, urinary retention and pruritus were also recorded.*

Results *Baseline data were comparable between the two groups. The mean VAS almost similar and less than 3 at different reading in both groups which indicate adequate postoperative analgesia and the differences were statistically not significant. The mean total cumulative amount of pethidine administered over 24 hrs period was less in group A it was 64.31+19.13 mg where as in group B was 161.23+21.25 mg. and the difference was statistically significant ($p<0.01$). Incidences of side effects like PONV, urinary retention and pruritus were more in group B than group A and differences were statistically significant ($p<0.01$).*

Conclusion *For postoperative pain management after lumbar spine surgery both ketorolac and traditional parental opioid found effective. Total opioid consumption is significantly less with ketorolac and side effects like PONV, dizziness, urinary retention and pruritus were more with opioid alone.*

Keywords *Ketorolac, opioid, postoperative pain, lumar spine surgery.*

(JBSA 2010; 23(2): 56-61)

Introduction

Many patients with lumbar spine surgery experience moderate to severe pain in the recovery room or postoperative period. Although opioids are the traditional first-line treatment,[1] the potential adverse effects often make physicians reluctant to increase the dosage to achieve adequate analgesia.[2] Nonsteroidal anti inflammatory drugs (NSAIDs) provide effective analgesia for acute pain after minor and major surgery as a substitute for or as an adjunct to opioid analgesia and reduces opioid requirement during postoperative period.[3-11]

The most recent parental non-steroidal anti-inflammatory drug available for control of postoperative pain is ketorolac, a pyrolizine carboxylic acid derivative, structurally related to indomethacin. Ketorolac inhibit both cyclo-oxygenase and lipooxygenase enzyme thereby preventing synthesis of both prostaglandin and leukotrienes, and may release endogenous opioids. These properties of ketorolac make it more potent than other non-steroidal anti-inflammatory drugs and it is used in the treatment of post-operative pain of moderate or severe intensity[12-16] The most common adverse effects reported with ketorolac include drowsiness, nausea, vomiting and dry mouth, but with no significant difference when compared to placebo.[17] The analgesic potency of ketorolac 30mg has shown to be comparable with morphine 10- 12 mg I/M. [18]

The postoperative pain requirements, however, depend on the type of procedure, size of skin incision and muscle dissection, and degree of bone involvement. Therefore, it is difficult to explorate the results of these investigations to other surgical procedures. Ketorolac has good analgesic potency and its opioid-sparing capacity. Because its onset of action is not immediate (about 30–60 minutes after IM injection), its use in severe acute pain in the postoperative period is best as an adjuvant to opioids, rather than as a sole agent for postoperative pain. This prospective randomized study was designed to assess the efficacy of a ketorolac with conventional opioid for the management of postoperative pain relief after lumbar disc surgery.

Methods

This randomized double blind prospective study was performed at BSMMU, Dhaka and Metropolitan Medical Centre, Dhaka in one calendar year from July 2009 to June 2010. After obtaining written informed consent from the patients, 60 ASA physical status I or II patients of either sex, aged 18-70 years scheduled for elective discectomy or decompressive laminectomy (1 or 2 levels) of the lumbar spine were included in the study. Patients with history of allergy, known or suspected to be drug abusers, renal diseases and history of peptic ulcer were excluded from the study. During the preoperative interview, patients were instructed how to assess postoperative pain by using the Visual Analogue Scale (VAS) 0-10, 0 = no pain, 10 = the worst imaginable pain.

Operation was done under general anaesthesia with controlled ventilation. All patients received oral diazepam (5 mg) at night surgery. Pethidine 1 mgkg-1 and diazepam 0.1 mg/kg-1 were slowly given intravenously before induction of general anesthesia. Induction was done with thiopentone 4-5 mgkg-1. After intubation with vecuronium 0.1 mgkg-1, anesthesia was maintained with 70% nitrous oxide in oxygen, halothane 0.5-1% and muscle relaxation was maintained with incremental doses of vecuronium. Patient's heart rate, blood pressure, respiratory rate and SpO_2 were monitored in every 5 minutes interval. After completion of operation the patients were extubated by reversal of muscle relaxant and then admitted to the postoperative ward for 24 hours.

All eligible patients were randomized in to two groups. Group A (n = 30) patients received 30 mg I/M ketorolac upon surgical closure and every 6 hours for 24 hours and IM pethidine 1.5 mgkg-1 b.w. as needed (PRN). Group B (n = 30) patients received only I/M pethidine 1.5 mgkg-1 b.w. every 6 hours for 24 hours and as needed (PRN).

Postoperative analgesia was assessed in both groups by Visual Analogue Scale (VAS). Observations were made in postoperative ward at arrival and at 6, 12 and 24 hours for 24 hours. Patient's heart rate, blood pressure, respiratory rate and SpO_2 were observed accordingly. Total postoperative pethidine consumption and side effects like post operative nausea and vomiting (PONV), dizziness; urinary retention and pruritus were also recorded.

All results were expressed in mean + SD or percentage as applicable. Statistical analyses were carried out using Statistical Package for Social Science (SPSS) for Windows Version 17.0. Results were considered statistically significant if P value less than 0.05.

Results

Patient's demographics and types of operation performed were similar and fairly comparable in both groups and differences were statistically not significant (Table I). Duration of surgical procedure and duration of anaesthetic procedure were similar

in both groups and differences were statistically not significant (Table I). No patient was withdrawn from the study. Operating conditions were pronounced satisfactory by the surgeon concerned in all the cases.

Table I *Demographic and operative patient data*

Characteristics	Group A (n=30)	Group B (n=30)	P Value
Age (Years)	48.7+10.1	49.1+10.3	0.564 NS
Body weight (Kg)	59.4+8.2	60.2+7.9	0. 579 NS
Height (Cm)	155.25+3.49	153.65+4.04	0.087 NS
Sex			
Male	20(66.66%)	19(63.34%)	0.768 NS
Female	10(33.34%)	11(36.66%)	0.789 NS
ASA physical status			
I	17(56.66%)	18(60%)	0.776 NS
II	13(43.44%)	12(40%)	0.784 NS
Types of operation			
Discectomy	16(53.33%)	15(50%)	0.812 NS
Laminectomy	14(47.67%)	15(50%)	0.797 NS
Duration of Surgry(min)	107.9+17.3	108.2+16.7	0.836 NS
Duration of Anaesthesia(min)	119.6+22.8	121.3+23.1	0.821 NS

Values are expressed in Mean + SD and P value <0.05 are significant
NS– Not significant

The pain intensity was measured by visual analogue scale in both groups. Statistical analysis revealed no significant difference in pain severity at arrival in postoperative ward and at 6, 12 and 24 hours (Table-II). The mean VAS almost similar and less than 3 at different reading in both groups which indicate adequate postoperative analgesia was maintained in both groups.

The mean total cumulative amount of pethidine administered over 24 hrs period following the end of surgery was less in group A compared to group B. Mean dose of pethidine in group A was 64.31+19.13 mg where as in group B was 161.23+21.25 mg. and the difference is statistically significant P<0.01 (Table III). Incidence of postoperative side effects like PONV, dizziness, urinary retention and pruritus were recorded and shown in (Table-IV).). Incidence of PONV, urinary retention and pruritus were more in group B than group A and differences were statistically significant (p<0.01). Dizziness was also more in group B than group A but difference was statistically not significant.

Table II *Mean pain score (VAS) after surgery*

Measurement time	Group A (n=30)	Group B (n=30)	P Value
After surgery	2.68+1.8	2.71+1.7	0.251 NS
After 6 hours	2.79+1.5	2.89+1.6	0.089 NS
After 12 hours	2.69+1.7	2.76+1.6	0.098 NS
After 24 hours	2.27+1.4	2.31+1.5	0.213 NS

Values are expressed in Mean + SD. Test are done by unpaired student 't' test

NS– Not significant

Table III *Mean total dose of pethidine administered over 24 hours period following surgery*

Variable	Group A (n=30)	Group B (n=30)	P Value
Mean dose of pethidine (mg)	64.31+19.13	161.23+21.25 S	P<0.01

Test done by chi-square test, Values are expressed in Mean + SD, P < 0.01 – Statistically significant

Table IV *Incidence of side effects during postoperative period*

Side effects	Group A (n=30)	Group B (n=30)	P Value
PONV	1(3.33%)	5(16.66%)	P<0.01 S
Dizziness	2(6.66%)	4(13.33%)	P<0.061 NS
Urinary retention	1(3.33%)	5(16.66%)	P<0.01 S
Pruritus	1(3.33%)	4(13.33%)	P<0.01 S

Values are expressed in Percentage. Test are done by chi-square test
P < 0.01 – Statistically significant
NS– Not significant

Discussion

Opioids remain the mainstay for postoperative analgesia, especially following major surgery. Pain, however, is a multi-factorial phenomenon that cannot be controlled adequately with simple monotherapy with opioids alone. [19] Furthermore, opioid use is associated with dose-related adverse effects such as respiratory depression, nausea, vomiting, urinary retention, itching, and sedation. Opioids also reduce gastrointestinal (GI) motility, which may contribute to postoperative ileus. [20,21]Their ability to control pain on movement also is limited, which may delay early mobilization and aggressive postoperative rehabilitation. [22] To improve pain relief, and reduce the incidence and severity of adverse effects, a multi-modal approach to postoperative analgesia should be used. It is well known that spine surgery patients report high-severity postoperative pain.[23, 24] Several studies have investigated risk factors for postoperative pain after spine surgery. These include psychologic, social profile, and preoperative pain severity. [25-28] The use of minimally invasive neurosurgical techniques may decrease the occurrence of significant postoperative pain, [29,30] but these techniques are not widely performed. The typical spine surgery patient has endured back pain chronically, with a good number of them on long-term pharmacologic analgesic therapy, sometimes requiring very large doses of analgesics and narcotics.

In this study we examined the effectiveness of a intramuscular ketorolac for treatment of postoperative pain after discectomy or decompressive laminectomy of the lumbar spine in the postoperative period. We also compare effectiveness with conventional intramuscular pethidine. The pain intensity was assessed using visual analogue scale (VAS). The mean VAS was less than 3 in both groups during different time periods during postoperative period, which indicate adequate postoperative analgesia was maintained in both group. Reports from several studies promote the use of NSAIDS in the perioperative period, but scarce information exists on their use for postoperative analgesia after spine surgery. Different routes of administration, different dosing regimens, and different drugs within this group have been studied. Le Roux et at reported that the use of NSAIDS as the sole medication for pain control after spine surgery was not sufficient to provide adequate analgesia, [31] but when combined with opioids, the combination results in much better results than with either one alone. [31-34] Reuben SS et al reported NSAIDS has opioid sparing effect for postoperative pain management after spine surgery. [35]

Ketorolac, given IM or IV, is the most investigated drug among the NSAIDS. It has good analgesic potency and its opioid-sparing capacity has been well documented. [31-33] Turner DM et al reported ketorolac has provided good analgesia after lumbar spine surgery and less opioid requirement as well as it was cost effective. [34] Because its onset of action is not immediate (about 30–60 minutes after IM injection), its use in severe acute pain in the postoperative period is best as an adjuvant to opioids, rather than as a sole agent. There is also a concern regarding the deleterious effects of NSAIDS on bone healing, because of the importance of PGE2 in the early stages of bone healing. [36]High-dose (120–240 mg/d), but not low-dose, ketorolac has been associated with nonunion following spine fusion surgery. [37]Low-dose ketorolac, in the absence of contraindications, may be a safe and effective adjuvant to an opioid-based regimen for acute postoperative pain management after spine surgery.

In this study cumulative narcotic doses were significantly lower with ketorolac ($P<0.01$). Reuben SS et el reported non-steroidal anti-inflammatory drugs have been found to enhance analgesia by reducing pain scores and reducing the amount of morphine used for analgesia. [38] Sevarino FB et al has been shown that intramuscular ketorolac when combined with opioids, the combination results in much better results than with either one alone. [39] Various studies conclude that both ketorolac administered was effective in reducing morphine consumption as rescue analgesic postoperatively.[40-42]

Incidence of postoperative complications like PONV, dizziness, urinary retention and pruritus were observed in both groups. Incidences were more with pethidine then with ketorolac and differences were statistically significant ($P<0.01$) regarding PONV, urinary retention and pruritus. These side effects such as nausea, vomiting, urinary retention, itching were associated with dose-related opioid use.

For management of postoperative pain following lumbar spine surgery ketorolac, when used with as needed narcotics (PRN) is effective like parental traditional opioid administration. The total opioid consumption is significantly less with ketorolac. Both the techniques were found effective and acceptable. But regarding side effects like PONV, dizziness, urinary retention and pruritus were more with opioid alone.

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Review Article

Role of pre-emptive analgesia in post operative Pain management - a review of literature

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(JBSA, 2010; 23(2): 62-66)

Introduction

Pain is not just a sensory modality but also an experience. The international association for the study of pain (IASP) defines pain as "an upleasant sensory and emotional experience associated with actual or potential tissue damage or described in-terms of such damage.[1]

Peripheral tissue injury provokes modification in the responsiveness of the neural circuit Peripheral sensitization, a reduction in the threshold of nociceptive afferent peripheral terminal and central sensitization, an actively dependent increase in the excitability of spinal neurons; contributes together to post injury pain hypersensitivity state [2].

Damaged tissue again produces two phases of sensory input. First, one is associated with tissue damaging stimulus i.e. during surgery. Second one results from inflammatory reaction to damaged tissue. Surgery produces local tissue damage with consequent release of algesics substances like prostaglandins, histamine, serotonin, bradykinin, 5-HT, substance P and generation of noxious stimuli [3].

Postoperative pain, which is a form of acute pain caused by noxious stimulation due to injury, is typically associated with neuro-endocrine stress response that is proportional to pain intensity [4]. Physical response to injury and stress include pulmonary, cardiovascular, gastrointestinal, urinary dysfunction, neuro-endocrine and metabolic changes [5]. Thus postoperative pain management is not only humane but also a key aspect of postoperative care.

Post Operative Pain

Postoperative pain is an acute pain, which starts with the surgical trauma and usually ends with tissue healing. When the patient first awakes after surgery, the period of first 'fast' pain is over and the pain of which the patient initially becomes aware is the poorly localized 'second' pain. The pain is most severe when the patient first awake after surgery. It is important during the first 24 to 48 hours. As time passes the pain gradually decreases in intensity. There are various factors, which can affect postoperative pain.

i) Site and type of surgery- In general, thoracic and upper abdominal surgery produces greater pain than lower abdominal surgery which in turn is associated with greater pain than peripheral surgery.

ii) The type of pain differs with different type of surgery. Operations on joints are associated with sharp pain; in contrast abdominal surgery is associated with two types of pain: a continuous dull nauseating ache (which responds well to morphine) and sharper pain induced by coughing and movements (which responds poorly to morphine). There is some evidence that minimally invasive, laparoscopic surgery produces less postoperative pain than do traditional techniques[6].

ii) Age, gender and body weight- The analgesic requirements of males and females are identical for similar type of surgery.

Psychological factors- The patient's personality affects pain perception and response to analgesic drugs. Thus, patients with a low anxiety and low neuroticism score on a personality scale exhibit less postoperative pain and require small doses of opioid than patients who rate highly on scales extent of patient's anxiety also affects pain perception, increased anxiety results in a greater degree of perceived postoperative pain and increased opioid requirements[7].

Pathophysiology of Post Injury Pain Hypersensitivity

An important conceptual breakthrough in our understanding of pain has been the recognition that the pain we experience in our everyday lives when exposed to noxious stimuli, physiologic pain is qualitatively quite different from the clinical pain experienced after frank tissue or nerve injury has occurred.

Physiologic pain has a high threshold, is well localized and transient, and has a stimulus-response relationship similar to that of other somatosensations. Its fundamental role is to operate as a protective system, warning of contact with potentially damaging stimuli.

Clinical pain can be divided into inflammatory and neuropathic pain; the former refers to pain associated with peripheral tissue damage e.g. that produced during surgery and the latter refers to damage to the nervous system.

Preventing peripheral sensitization has been assumed to be the major action of NSAIDs by virtue of the inhibition of prostaglandin production by the inhibition of the enzyme cyclo-oxygenase[8]. The second mechanism is a change in the excitability of neurons in the spinal cord, triggered by and outlasting nociceptive afferent inputs. This is the phenomenon of central sensitization[9].

Clinical pain differs from physiologic pain by the presence of pathologic hypersensitivity. The specific involvement of central sensitization in generating abnormal hypersensitivity in humans has been demonstrated in three different circumstances: 1 in volunteers after the application of the chemical irritants capasaicin or mustard oil, where after these intense but short-lasting noxious stimuli, low-threshold Ab mechano-receptors begin to produce pain[10], 2in patients in whom a reduction in nociceptive reflex excitability due to central changes has been demonstrated after abdominal surgery[11] and 3 in patients with neuropathic mechanical allodynia, where A-fiber blocks eliminate tough-evoked pain[12].

Postoperative Pain Management

Since the beginning of twentieth century, surgeons were aware of the importance of acute pain relief, particularly with regard to the affect of patients responses to injury on postoperative morbidity and mortality[13]. Recently anaesthesiologist have become increasing involved in the provision of postoperative analgesia and development of pain management services[14].

Postoperative pain control is generally best managed by anaesthesiologist because[15], they offer regional anaesthetic techniques as well as pharmacologic expertise in analgesics; they have adequate knowledge about pain pathways and their interruption.

Management of postoperative pain by anaesthesiologist can be professionally rewarding. Expression of gratitude from patient free from pain can contribute to feeling of self esteem and job satisfaction Additional contact with patients, nurses, other physicians and the administration in the postoperative period helps to define anaesthesiologists as valued consultants outside the operation theatre.

Prevention of Postoperative Pain

In addition to humanitarian reasons for improving acute postoperative pain treatment, there is now convincing evidence that unrelieved acute pain may result in harmful physiological and psychological effects. These adverse effects may result in significant morbidity and mortality[15] .Evidence of shortened hospital stay, decreased morbidity and mortality and increased patient satisfaction have been reported in association with effective relief of pain. Thus adequate and appropriate management of postoperative pain is a demand of time.

Recent editorials and reviews have emphasized the importance of preventing pain as a more effective treatment of postoperative pain and for prevention of persistent pain syndromes[17]. In a recent editorial, Armitage encouraged anaesthesiologist to make changes in thought and terminology so that pain management is preemptive rather than retrospective. He suggests abolishing the use of the term pain relief in the context of postoperative analgesia and recommends that analgesia techniques should targeted at prevention of pain rather then relief of pain[18].

The Need For a New Approach for The Treatment of Postoperative Pain

For the treatment of postoperative pain the conventional of prescribing intermittent doses of

analgesics in response to patients demand is often in effective[19]. Breakthrough pain is accepted as normal by many patients, doctors and nurses after surgical procedures[20]. This strategy is now beginning to be recognized as constituting sub-optimal management and more resources are being devoted to acute pain services, including the development of continuous epidural analgesics administration and patient controlled analgesia (PCA). One strategy for preventing abnormal sensitivity postoperatively could be to prevent or minimize the activation of central neurons by the barrage of afferent activity necessarily evoked during surgery by a preintraoperative treatment. This led to the concept of preemptive analgesia.

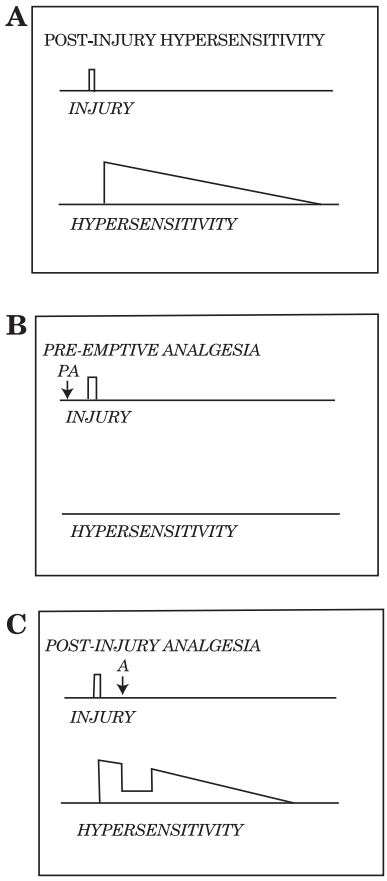

Fig 1 *Models of preemptive analgesia*

Models of Pre-emptive Analgesia

[A simple model of the rationale behind single treatment pre-emptive analgesia. Injury triggers central sensitization, leading to a prolonged hypersensitivity state. A pre-emptive analgesia (PA) prevents the induction of central sensitization pre-empting the post injury hypersensitivity. Post injury analgesia (A) has a much diminished effect on established state of hyperexcitability.]

Figure-1 illustrates a simple model of post injury hypersensitivity. A transient injury initiates central sensitization as a result of excitability increases triggered in spinal neurons by the nociceptors activated by the injurious stimulus. This leads to a hypersensitivity state that outlasts the duration of the injury. Preemptive treatment, i.e., regional local anesthetics at the site of the injury, will prevent the establishment of the hypersensitivity by blocking the sensory input that induces the central sensitization. Post injury regional anesthesia will have a reduced effect because the central sensitization has already been established. This sort of analysis has provided the theoretical basis for a number of recent clinical trials that have investigated the efficacy of particular preemptive treatments for managing postoperative pain.

Pre-emptive analgesia treating postoperative pain:

Preemptive treatment could be directed at the periphery, at inputs along sensory axons and at central neurons by non-steroidal anti-inflammatory drugs (NSAIDs), local anaesthetics and opioids either alone or in combination. The underlying principle is that therapeutic intervention is made in advance of the pain rather than in reaction to it.

Pre-emptive analgesia is an antinociceptive treatment that prevents establishment of altered central processing of afferent input from sites of injury[21]. The most important conditions for establishment of effective pre-emptive analgesia are the establishment of an effective level of antinociception before injury and the continuation of this effective analgesic level well into the post injury period to prevent central sensitization during the inflammatory phase. Surgery offers the most promising setting for preemptive analgesia because the timing of noxious stimuli is known[22].

Preemptive analgesia may damp down the development of both immediate and long term pain following surgery and adequate psychological preparation can improve coping abilities. The delivery of opioid analgesics can be improved using patient control analgesia (PCA)[23]. The result of

the use of preemptive analgesia with different research workers is not always consistent, often conflicting even negative and contrary results were obtained. The concept of pre-emptive analgesia was formulated by Crile at the beginning of previous century on the basis of clinical observation[24]. Later revival of this idea was associated with a series of animal studies started by Woolf[25,26].

Richmond-CE, in a randomized double blind study, they compared the effect of parenteral morphine when given before or after TAH in 60 patients. 10 mg of morphine were given I.M. 1 hour before operation, intravenously at induction of anaesthesia, intravenously at closure of the peritoneum (Iv, Post). They concluded that preemptive analgesia with intravenous morphine by preventing the establishment of central sensitization during surgery, reduces postoperative pain, analgesic requirements and secondary hyperagesia[27].

Elhakim et al. were no significant differences between pre and postoperative lidocaine groups in pain scores during the observation period but use of preoperative lidocaine tended to be associated with a more rapid return to calm wakefulness.

Dahl-V; et al wanted to see the preemptive effect of pre-incisional versus post incisional infiltration of local anaesthetics on children undergoing hernioplasty. The results they published said- pre incisional group needed significantly less halothane during the procedure compared with the post incisional group ($p<0.05$). The pre incisional group also had a tendency towards faster awakening after the end of anaesthesia and a significantly lower OPS pain score 30 mins. after the operation ($p<0.03$). They concluded that perioperative infiltration with a local anaesthetic in children undergoing hernioplasty results in a smooth recovery with little need for opioids postoperatively.

Wong-CS; et al in 1997 showed that Epidural Ketamine plus morphine with lidocaine before surgical incision produced better pain relief and patient satisfaction than when after incision[28].

Fisher et al. a in prospective double blind randomized study on new regimen of preemptive analgesia for inguinal hernia repair; evaluation of postoperative pain consequently concluded that, this regimen of preemptive analgesia is an effective method of reducing postoperative pain and analgesic consumption after inguinal hernia repair.

Thus we see although promising in experimental studies of post traumatic pain, the concept of preemptive analgesia is still controversial in a clinical setting. Some advocate extending the preemptive treatment well into postoperative period using balanced, multimodal analgesia which may prolong the initial advantage conferred by the preoperative blockade and possibly interfere with the development of long lasting pain.

The traditional management of postoperative pain comprises a standard dose of an opioid to be given on demand by a nurse when the patient's pain threshold has been exceeded, this leads to poor control of postoperative pain. So it is crucial to emphasize the importance of giving analgesics pre-emptively 'by the clock' instead of waiting for the patient to complain of pain.

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