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Editorial

PALLIATIVE CARE SERVICE IN BANGLADESH – FIRST STEP OF 'MILES TO GO'

'The last part of life has an importance out of all proportion to its length': Dame Cicely Saunders

Like it did nearly 20 years ago to establish Intensive Care services in the country, the anesthetist community seems to be listening to the 'ringing of the human bell' somewhat more clearly. They are showing their keen interest to initiate an Organized Palliative Care (OPC) service in Bangladesh. 'The reality has been ringing this human bell' for quite sometime all over the world! Palliative Care (PC) has been an accepted specialty of medicine and nursing for quite sometime. The approach focuses on the 'total care' of patients suffering from incurable life limiting illness. It attempts to relief suffering and improves Quality Of Life (QOL) for both patients and their families throughout an illness experience, not just at the end of life. In recent days there has been increasing recognition of this care as a public health issue. All that this editorial intends to do is to raise certain issues and concerns from the beginners of palliative care service in Bangladesh.

The need for Palliative Care: Globally of the 58 million people dying annually (45 million in developing countries and 13 million in developed countries) it is estimated that at least 60% (35 million) have an advanced illness and would benefit from palliative care. Taking cancer as an example, two thirds (seven million) of the ten million new patients each year are not cured and die within one year of their diagnosis. Global cancer rates will increase by fifty percent and their will be 15 million new cases in 2020 and 24 million new cancer cases per year by 2050.Fifty percent of worlds new cancer cases are now occurring in developing countries where only ten percent of the global resources allocated for health care services are being spent. PC probably remains the only realistic and affordable care for these countries. Further to add, with at least two family members involved in each patient's care, PC could improve the QOL of more than 100 million people worldwide annually.

In Bangladesh, there is no reliable data regarding incidence of people suffering from incurable diseases. In one much quoted crude estimate, there are one million cancer cases at any point of time and every year there are one hundred and eighty five thousand to two hundred and twenty thousand new cases. Most of these patients present themselves to the doctors when the disease is far advanced. Inadequate screening service, limited access to diagnostic facilities, few cancer specialist, ignorance and poverty along with existing socioeconomic condition ultimately suggests that more and more patients will be requiring end of life care. Adding other incurable disease burden requiring long term care (LTC) suggests an enormous need of OPC in the community.

Palliative care for all: Although PC services may start in one or more health care organizations that will become the centers of PC excellence, it is always important to keep in mind the vision that the process to implement this care within a country is striving to integrate it into all levels of the society – right from the community level upward and from the PC experts in the health care system downward. The problems to be faced in implementing this services are unique to a particular country. It is not only medical but also socioeconomic, cultural and ethical. Each society must determine the best way to care for its dying persons in accordance with its own culture and resources. At each step in the process to integrate PC in the country, there should be fundamental immediate, intermediate and long term outcomes that can be monitored by those facilitating the process.

One may be tempted to wonder that 'Why the anesthetists!' it should not come as a surprise if the history and practice of modern anesthesia is reviewed. It is so closely related to relief or attempt to relief pain & sufferings. Though the early anesthetists in the second half of the nineteenth century were concerned only with relieving pain in the face of surgery or major traumatic procedures, the modern physician anesthetists in the early 21st

century has a lot more to offer to reduce the 'total pain and the sufferings' of the persons affected with incurable diseases and their families.

Death is inevitable for all; good health care service during life for all is not inevitable for most of the people in our country. The provision of end of life care is further less so.

Given the enormous unmet needs of patients with life-limiting illnesses in the world, it is not surprising that advocates have promoted the provision of palliative care as a human right. People of Bangladesh also are also no exception. One should have a good life, no doubt, but one should also have an opportunity for a good death. Palliative Care is our human right too!

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Original Article

ROLE OF INTRATHECAL MIDAZOLAM ADDED TO LOW DOSE HYPERBARIC BUPIVACAINE IN SUB-ARACHNOID BLOCK FOR CAESAREAN SECTION

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ABSTRACT:

Background: Antinociceptive effect and safety of intrathecally-administered midazolam is well established in animals and human beings. In this randomized, prospective and case controlled study the addition of midazolam to intrathecal bupivacaine on the duration of analgesia and quality of anaesthesia was investigated. Methods: Sixty ASA I or II pregnant women scheduled for elective lower uterine caesarean section were selected for the study. The patients were randomly allocated to receive 0.5% hyperbaric bupivacaine intrathecally either alone or with 2.5 mg midazolam. The duration of analgesia, duration of motor blockade, quality of anaesthesia and haemodynamic changes were assessed.

Results: The duration of analgesia (the time interval in minutes between the intrathecal injection and the first analgesic demand by the patient), was significantly longer in the midazolam group than the control group (147min vs 112min; P<0.001). Duration of motor block was prolonged in the midazolam group as compared with the control group (152 min vs 136 min; P<0.001). The quality of anaesthesia was excellent or good throughout the surgical procedure in 90 %(n=27) of the patients in the midazolam group compared with only 27 % (n=8) patients in the control group (P<0.01). Blood pressure was significantly lower at 10-20 min in the control group compared with the midazolarn group. Heart rate, oxygen saturation and sedation levels were comparable in both groups. No neurological deficit or other significant adverse effects were recorded. Conclusion: The addition of Midazolam to low dose intrathecal hyperbaric bupivacaine significantly improves the quality of anaesthesia and prolongs the duration of analgesia without adverse effects.

Key words: Intrathecal midazolam, low dose bupivacaine, sub-arachnoid block, caesarean section

INTRODUCTION:

Sub-arachnoid block with bupivacaine is administered routinely for lower uterine caesarean section. The ensuing nerve block is sufficient to ensure the patient's well being, while motor block facilitates the surgeons work. It also provides effective pain relief in the initial post-operative period. In order to maximize post-operative analgesia, a number of adjuvants such as, opioids,[2] ketamine,[3] clonodine[4] and neostigmine[5] are often added to spinall local anaesthetics. However their use is limited because of significant adverse effects such as pruritis, urinary retention, respiratory depression, haemodynamic instability, nystagmus, nausea and vornitting.[2-5] Midazolam has been reported to have a spinally mediated antinociceptive effect.[6,7] Previous studies have shown that intrathecally administration of midazolam enhances the analgesic action of bupivacaine in the post-operative period.[8-10] This study was designed to evaluate the quality and analgesic effects of mixture of midazolam -bupivacaine as compared to bupivacaine alone in patients undergoing caesarean section.

Subjects and Methods

The study protocol was approved the ethical committee of the Department of Anaesthesia, Analgesia, and Intensive Care Medicine. After obtaining a written informed consent from the patients, Sixty ASA I or II pregnant women scheduled for elective lower uterine caesarean section was enrolled. Patients with known contra indications for regional anaesthesia and those on chronic analgesic therapy were excluded. Patients were randomly allocated to receive either 2 ml of 0.5 % hyperbaric bupivacaine plus 0.5 ml of 5 %

Dextrose in Aqua (Group-I, n=30) Or 2 ml. of 0.5 % hyperbaric bupivacaine plus 2.5 mg (0.5 ml.) preservative free midazolam. The baseline haemodynamic parameters- heart rate and blood pressure were recorded. The pregnant women were preloaded with 20ml/kg of dextrose free lactated ringers solutions over 10-15 minutes. The patients were placed in the lateral position and the dural puncture was performed at L2-3 or L3-4 interspace with a 25 G Quincke Babcock spinal needle using the midline approach. Once the free flow of CSF was established, the drug was injected slowly over 10 seconds with no barbotage. The patients in Group I (control) received 2 ml of 0.5 % hyperbaric bupivacaine plus 0.5 ml of 5 % Dextrose in Aqua, and in Group II (case) received 2 ml. of 0.5 % hyperbaric bupivacaine plus 2.5 mg (0.5 ml) preservative free midazolam. After removal of the needle, the patient was immediately placed supine with head on one pillow and a wedge placed under right hip. All patients were given oxygen through facemask at the rate of 4L/min throughout the procedure. Arterial oxygen saturation, automated non-invasive blood pressure and heart rate were recorded at 2 minutes, 5 minutes, 10 minutes, 20 minutes, 30 minutes, 1 hour and 2 hours, after the intrathecal injection, using a Datex. Ohmeda (Type-F-LMI, SN 4293211) monitor. Hypotension (Systolic < 90 mmHg or reduction of 25 % of baseline values) were treated by (a) infusion of fluid and (b) 5 mg. of i.v. Ephedrine increments.

QUALITY OF ANAESTHESIA

The quality of anaesthesia was assessed by 4-point scoring system. 0-excellent; 1-2- good; 3-4-fair and 5-poor. The quality of block was excellent or good throughout the surgical procedure in 90 %(n=27) of the patients in Group II, as compared with only 27 % (n=8) patients in the Group I(P<0,01). In 73 % of the patients in the control group the quality of block became fair or poor 10-20 min. after intrathecal injection. In Group II only 10 % (n=3) of patients showed fair quality of block and none showed poor quality. (Table-II, Figure-I).

Table-I

Demographic data

Parameter	Gr. I	Gr. II	't' value	P value
N=30	30	30		
Age in years	26.7 ± 4.48	25.7 ± 3.10	1.00	0.323
Body weight in kg.	62.6 ± 4.07	61.33 ± 4.20	1.09	0.280
Height in	153.23 ± 2.76	153.50 ± 3.76	0.30	07.50

Values are expressed in mean ± SD. Analysis was done by Students' unpaired t-test.

Table II

Quality of anaesthesia assessed by 4 point scoring system

Variables n =	Gr-I30	Gr- II30	- 2	P
Excellent	0 (00.00)	19 (619 3.33)*	27.8	<0.01
Good	8(26.66)	8(26.66)	0.0	0.0
Fair	14(46.66)	3 (10.00)	1.82	<0.5
Poor	8(26.66)	0(00.00)*	9.24	<0.01

Values are expressed as frequencies; within parenthesis are percentages over column total. Between groups analysis was done by X^2 test.

*Denotes a significant (P<0.01, CI-95%).

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The level of sensory block (loss of sharp sensation) was assessed by pinprick testing bilaterally along the mid-clavicular line. The assessment was performed at 5,10,15 and 20 minutes after intrathecal injection.

Motor block was assessed by using a 6-point modified Bromage scale (1=complete motor block, the patient could not move the limbs at all; 2=almost complete blockade, the patient is able to move feet only) 3=partial motor blockade, the patient is able to move the knees; 4=detectable weakness of hip flexion, the patient is able to raise the leg but is unable to keep it raised; 5=no detectable weakness of hip flexion; 6=no weakness at all). These measurements were performed at 5,10, and 15 min after intrathecal injection and then every 15 min after surgery for 3 hours.

QUALITY OF ANAESTHESIA

Quality of anaesthesia was assessed as excellent, good, fair and poor by the patient using the following 5-point scoring system:

Parameter	Yes	No
Nausea / Vomiting	1	0
Restlessness	1	0
Chest pain	1	0
Sedation	1	0
Shivering	1	0

The scoring system consisted of five variables. Each variable was awarded score of 0 or 1 if results were negative or positive respectively. The total score was calculated. When the patient scored 0, it was assessed as excellent. A score of 1 to 2 was assessed as good, score of 3 to 4 as fair and a score of more than 4 as poor quality.

Sedation levels were assessed every 15 minutes using a four-point scale (1=awake, 2= drowsy but responsive to verbal command, 3=drowsy but responsive to physical stimulus, 4=unresponsive to verbal or physical stimulus).

The incidence of hypotension, bradycardia (heart rate <50 beats/min), hypoaemia and excessive sedation was recorded. Patients were monitored for 24 hours for pruritis, urinary retention, dizziness and post-operative nausea and vomiting. Demographic data and haemodynamic parameters were compared using an unpaired t-test Quality of anaesthesia was analysed using the chi-square test with Yates correction. Duration of analgesia and duration of monitor blockade were compared using an unpaired t -test. P values <0.05 were considered statistically significant.

RESULTS

The studied groups were comparable in respect of age in years, weight in Kg, height in cms. And ASA physical status. The duration of surgery was also comparable among groups. (Table-I).

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Fig.-1: *Quality of Anaesthesia*

DURATION OF ANALGESIA

The duration of analgesia was assessed by the time interval in minutes between the intrathecal injection and the first analgesic demand by the patient. It was significantly longer (P<0.01) in Group II (147.0 ± 24.73 minutes) as compared with Group I (112.96t14.46 minutes). (Table-III, figure-II)

DURATION OF MOTOR BLOCKADE

The duration of motor blockade, i.e. the time from intrathecal drug aninistration until no motor weakness could be detected in minutes (MBS=6), was prolonged in the Group II (152.03±16.42 minutes) compared with Group I(136.56±16.90 minutes). It was statistically significant (P<0.05) (Table-III, Figure-II).

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Table III

Duration of analgesia and motor blockade.

Variables	Group I	Group II	't'	P-value
n=	30		30	value
Duration of analgesia	112.96±14.46	147.0±24.73	6.504	<0.001***
Duration of motor block	136.56±16.90	152.03±16.42	3.593	<0.001***

Values are expressed in mean ± SD. Analysis was done by Students' unpaired t-test. *** Denotes highly significant.

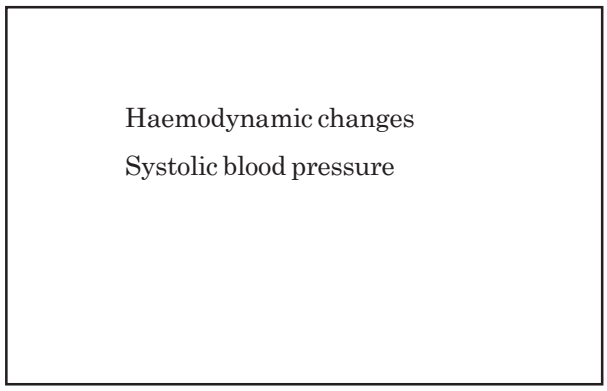

Fig.-1 : *Duration of analgesia and motor blockade.*

The systolic blood pressure in mm of Hg was significantly lower in the group- I at 10 min. (92±15 mm of Hg) and at 20 min. (97±15 mm of Hg) after administration of spinal anaesthesia as compared to group II at 10 min (103±12 mm of Hg) and at 20 min (107±10 mm of Hg) with P=0.005 and P=0.007 respectively. But was comparable at other times, as shown in Table III.

DIASTOLIC BLOOD PRESSURE

The diastolic blood pressure in mm of Hg was also significantly lower in the group I at 10 min (55±12 mm of Hg) and at 20 min (59±10 mm of Hg) after administration of spinal anaesthesia as compared to group II at 10 min (64±10 mm of Hg) and at 20 min (67±9 mm of Hg) with P=0.003 and P=0.006 respectively. But was comparable at other times, as shown in Table V and Figure 16.

Table IV

Analysis of systolic blood pressure (mm Hg)

	Basic	2 min	5 min	10 min	20 min	30 min	1 hour	2 hour
Gr – I	121±9	114±11	100±7	92±15	97±15	103±10	107±6	111±6
Gr-II	119±11	108±15	100±14	103±12	107±10	103±10	105±9	109±8
't' value	0.937	1.594	-0.079	-2.871	-2.753	0.190	0.765	0.296
P value	0.356	0.121	0.937	0.005	0.007	0.849	0.447	1.052

Values are expressed in mean ±& SD. Analysis was done by Students' unpaired t-test

Table V

Analysis of diastolic blood pressure (mm Hg)

	Basic	2 min	5 min	10 min	20 min	30 min	1 hour	2 hour
Gr – I	76±9	72+7	62±12	55±12	59±10	63±8	66±6	69±5
Gr-II	78±10	70±12	64±12	64±10	68±9	64±8	68±8	70±8
't' value	-0.705	0.446	-0.615	-3.05	-2.821	-0.609	-1.287	0.497
P value	0.483	0.656	0.540	0.0033	0.006	0.006	0.544	0.203

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The changes in heart rate (beats/min) were similar in both groups. No significant difference in sedation levels was observed in group II (1 patient had grade 3 sedation and 4 patient had grade 2 sedation) 15-30 min. after intrathecal block as compared with the group 1 (5 patient had grade 2 sedation).

The respiratory rate and oxygen saturation did not vary between the groups. 1 epi sodes of hypotension in group II and 20 episodes of hypotension in the group I were observed that required ephedrine (5-10 mg i.v.)

None of the babies born showed any signs of respiratory depression or any other abnormalities, as determined by Apgar score.

DISCUSSION

Previous studies have shown that the addition of 1-2 mg midazotam to intrathecal bupivacaine produced better post-operative analgesia than bupivacaine alone 'in patients undergoing haemorrhoidectomy (Kim and Lee 2001) and knee arthoscopy (Batra et al., 1999). However, these studies did not comment on the effect of intrathecal midazolam on the quality of sensory and motor blockade during surgery.

In a pilot study, Goodchild and Noble (1987) demonstrated that intrathecal midazolam when used alone for abdominal surgeries produces selective sensory blockade, abolishing p am of somatic, but not of visceral origin. However Crawford (Crawford et al 1993) has demonstrated an antinociceptive effect of intrathecal midazolam against visceral pain in rabbits subjected to intestinal distention. Intrathecal midazolam has also been shown to reduce the post-operative opioid consumption after caesarean section (Valentine et al). The mechanism of action of intrathecal midazolam was earlier believed to be mediated through a typical benzodiazepine CAB A-A receptor complex (Bharti et al. which could be reversed with intrathecal flumazenil or bicucullin (GABA-A antagonist).

A sedative effect of intrathecal midazolam has been reported at higher doses (Nishiyama et al., 1992). In a recent study, Batra et al (1999) showed that adding 2 mg midazolam intrathecally to bupivacaine in patients undergoing knee arthroscopy provided an enhancement and increased duration of sensory analgesia, without contributing to increased duration of recovery room stay. They also showed that 2 mg intrathecal midazolam did not cause any sedation.

Bharti et al. (2003) showed that adding 1 mg midazolam to intrathecal bupivacaine, in patients undergoing lower abdominal surgery, prolonged the duration of analgesia (99 minutes vs. 103 minutes) and improved the quality of anaesthesia, without producing any adverse effects (Sharti et al., 2003).

In a recent study, Abdelfatah et al., (2003) showed that 2 mg midazolam added to 10 mg bupivacaine intrathecally in patients undergoing knee arthroscopy, had better results than fentanyl-bupivacaine mixtures. They observed that there was no PONV, pruritus and sedation in midazolam group as seen in fentanyl- bupivacaine group (Abdelfatali et al., 2003).

In a study, Kim and Lee (2001) showed that intrathecal midazolam increases the analgesic effects of spinal blockade with bupivacaine in patients undergoing haemorrhoidectomy. They observed that addition of 1 or 2 mg midazolam to bupivacaine intrathecally prolonged the post-operative analgesic effect by approximately 2 hours and 4.5 hours respectively.

Valentine et al., (1996) conducted a study on the effects of intrathecal midazolam on post-opcrative pain in patients scheduled for elective caesarean section. They showed that midazolam at the dose of I mg can produce clinically detectable, beneficial effects on post-operative pain, however the effect was not pronounced (Valentine et al., 1996) In the present study, we found that addition of 2.5 mg midazolam to low dose (10mg) hyperbaric bupivacaine provided effective intra-operative anaesthesia and analgesia sufficient to permit intra- abdominal manipulations throughout the surgical procedure lasting about an hour. This combination also produced longer analgesia in midazolam group (147±24.7 minutes) compared to control group (112±14 minutes} and provided better intra-operative conditions than bupivacaine alone. The duration of motor blockade was also prolonged in the midazolam group (152±16 minutes) compared with control group (136.56±16.90 minutes). Our results are consistent with the other studies (Bharti et al., 2003; Abdelfatah et al., 2003; Kim and Lee 2001). Although they used lower doses of midazolam (1-2 mg) and higher doses of hyperbaric bupivacaine (15 mg). No significant

adverse effects of neurological deficit was observed in any patient receiving intrathecal midazolam.

There was no incidence of nausea, vomiting, itching, or urinary retention during follow up of these patients.

Midazolam may find place in regular clinical use as an adjunct to spinal anaesthesia.

CONCLUSION

The study concludes that the addition of 2.5 mg Midazolam to low dose (10mg) intrathecal hyperbaric bupivacaine improves the quality of anaesthesia and prolongs the duration of block and post-operative analgesia without increasing adverse effects.

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Article of Special Interest

PARAMEDIAN APPROACH FOR SUBARACHNOID BLOCKADE – A MARVELLOUS TECHNIQUE HAVING LESS ATTENTION.

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ABSTRACT:

At present central neuroaxial blockade, e.g. subarachnoid blockade (SAB) or epidural blockade (EB), especially the former one, is widely used by the clinical anaesthesiologists due to its procedural simplicity, low cost & better physiological benefits and thus reduced complications than that of general anaesthesia (GA). Subarachnoid or epidural spaces can be traversed from the posterior aspect of the body either through a midline approach (MA) or a paramedian approach (PMA). There is another approach described as 'lumbosacral puncture' or Taylor's approach, which actually is a variant of conventional paramedian approach. Theoretically, subarachnoid & epidural spaces can also be approached through the paravertebral foramen or even via an anterior intraoperative approach through the intervertebral discs[1]. The most common & popular technique is the MA. But the PMA (both conventional & Taylor's) is also a very easy & effective technique that can be practiced routinely as well as for some clearly indicated cases. The requirement for this procedure is the same as for the MA except having some ideas about the offmidline anatomy.

Keywords: Blockade, subarachnoid; approach, paramedian.

Historical background:

Dr. August Karl Gustav Bier was credited for the administration of first SAB in 1898[2].

He used 3 ml of 0.5% cocaine intrathecally. Caudal epidural was introduced in 1901 by Ferdinand Cathelin & Jean Sicard independently. Lumber epidural anaesthesia was described first in 1921 by Fiedal Pages & again in 1931 by Achille Dogliotti. At the beginning, SAB & EB had been approached via midline technique. Subsequently, PMA was described by many authors. The "lumbosacral puncture" was first described by Taylor JA in 1940 & truly is a special variant of the conventional PMA[3].

Practical Anatomy of neuroaxial blockade:

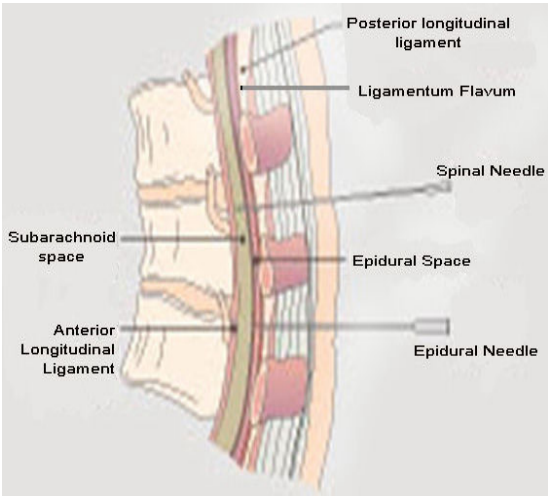

Fig.-1: *Lumbar subarachnoid & epidural spaces Adapted from Behar MJ & colleagues[4]*

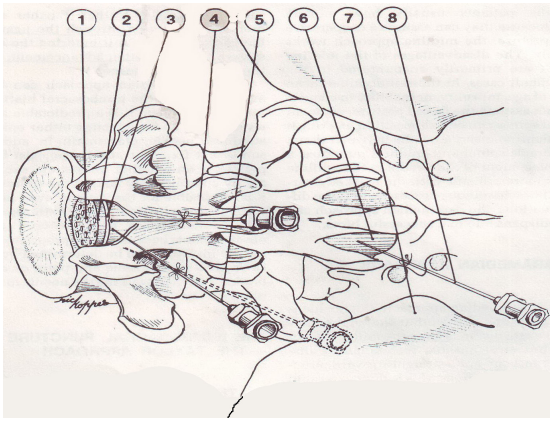

Fig-2: *Midline and Paramedian approach in Lumbar Region:*

1. cauda equina 2. duramater 3. ligamentum flavum 4. midline approach 5. paramedian approach 6. lumbosacral canal 7. posterior superior iliac spine 8. Taylor's approach. Adapted from Miller's Anesthesia.

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Fig 1 & Fig 2 shows the different structures traversed practically in lumbar SAB or EB. Structures pierced by the needle in a MA are as follows: skin, subcutaneous tissue, supraspinous ligament, interspinous ligament, ligamentum flavum, epidural space, dura mater, subdural space, arachnoid mater & subarachnoid space. In PMA, on the other hand, the structures pierced would be skin, subcutaneous tissue, paraspinal dorsal muscle mass, ligamentum flavum, epidural space, dura mater, subdural space, arachnoid mater & finally subarachnoid space. An experienced anaesthesiologist can distinguish the "feeling" of every structure whilst introducing the needle.

Technique of lumber PMA for SAB:

Straight forward puncture: a suitable interspace is chosen in the midline. A skin wheel is raised on any side 1-2 cm away from the mid line. The spinal needle is introduced just lateral to the interspinous gap & directed 10-15 degrees toward the midline. To select the angle of approach it may help to imagine the needle reaching the midline 4-6 cm below the surface. The needle is then advanced along side but lateral to the interspinous ligament in a cephalad & medial direction. The needle then traverses the paraspinal dorsal muscle mass and at the appropriate depth, it will engage the ligamentum flavum. The further advancement is first marked by an increase in the resistance followed by a loss of resistance as the epidural space is entered. Further advancement will cause the needle piercing the duramater & reaching the subarachnoid space. Thus for a SAB in PMA only two "pops" will be encountered, one for the ligamentum flavum & the other for the dura, whereas in MA four "pops" will be encountered, eg, supraspinous ligament, interspinous ligament, ligamentum flavum & dura respectively.

Refinement- The needle is introduced lateral to the superior spinous process itself & is advanced parallel to the spine until the bony end point of the lamina is reached. This provides an indication of the correct depth of the ligamentum flavum. By "walking" the needle along the lamina, in the cephaled fashion, the ligamentum flavum at the cephalic end of the lamina will be located. There is a marked change in consistency as the needle slipped off the "marble like" bone onto the "leather" like ligamentum flavum. Further advancement will place the needle into the subarachnoid space (fig 1 & fig 2).

Indications & advantages of PMA over MA:

PMA has some clean cut indications and advantages over MA. These are summarized below:

- Failure to midline approach by repeated attempts.
- Advanced degenerative joint disease.
- Severe arthritis of vertebral column.
- Kyphoscoliosis.
- Calcified spinal ligaments.
- Previous spinal surgery.
- Difficulty in flexing the spine.
- Non-cooperative patients.
- Hyperaesthetic patients.
- Vertebral interspace difficult to feel, e.g. obese or oedematous patients.
- No assistants available for positioning the patient.

Safety & Success of PMA

The PMA is as quite a safe procedure as that of MA. It can be used for single shot SAB or EB as well as continuous blockade by using spinal or epidural catheters. For SAB, finer needles (25G or 27G) can be introduced easily & conveniently. There are some study reports which show that PMA is sometimes even superior in its merits than that of MA. Leeda M, et al, showed in their study that epidural catheter insertion was significantly faster in the PMA group than that of MA group; a lower incidence of paraesthesia (not significant) in PMA group which is again more in females[5]. Rabinowitz A, et al, revealed in their study with geriatric orthopaedic patients that after the initial attempt, the PMA is associated with an increased success rate, 85% (17) in comparism to MA, 45% (9), though this is not significant clinically (P=0.02)[6]. Regarding position of the patient, sitting is the best suitable and convenient position to perform a successful PMA.

Complications and precautions of PMA

The PMA has no remarkable complications for the procedure itself. The incidence of vascular puncture is the same, 10-15% of cases or somewhat lower than that of MA which was shown by Leeda M, et al, in their study, though it was not clinically significant (P=0.03)[5] . In a case report, Barak M,

et al, reported one notable complication, retroperitoneal hemorrhage & hematoma after a PMA for SAB[7]. Precautions of PMA should be as that of a regional anaesthesia, e.g. patient assessment, informed written consent, coagulation profile etc. If it happens that PMA would be changed into GA, "Informed consent" of the patent would be required again.

DISCUSSION:

After the first introduction of SAB by Bier in 1998, its popularity waxes & wanes & at presents it is an integral part of clinical anaesthesia. Initially, MA for SAB or EB was described followed by PMA & Taylor's approach latter on. But still the MA remains the technique of choice for the main stream anaesthesiologists.

The primary reason in favour of MA is that developmentally midline is the fusion of two sides of the body & hence if a needle is introduced through this route there would be less chance of tissue injury, vascular puncture & nerve damage. Theoretically this might be true but practically PMA has the same incidence of "bloody taps" which is 10-15% for all spinal cases[8] or even less than that in MA[7]. The advantages of PMA over MA are well established; especially it requires no assistant to flex the spine. Complication attributable to PMA is the same as that of MA. Regarding technique it can be accomplished at the same ease, time & confidence as that of MA & even catheter insertion can be done significantly faster than MA[5]. Learning for the beginners is also not so difficult if he or she has some ideas about the paramedian anatomy. In spite of all these favorable points, why this technique is seldom practiced, needs investigations. It might be our long time habit, "old is gold", or lack of enthusiastic trainers and demonstrators to impress the beginners.

CONCLUSION:

The paramedian approach for SAB is really a marvellous technique which is easy to perform with the same skill as for the regional anaesthesia. It has a lot of merits & advantages over the MA. So, PMA deserves much more attention in learning, practicing, teaching & researching in clinical anaesthesiology.

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Original Article

OUTCOME OF GUILLAIN - BARRE SYNDROME IN DMCH ICU - A 5 YEARS EXPERIENCE

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ABSTRACT :

Guillain - Barre Syndrome (GBS) is the commonest peripheral neuropathy causing ventilatory failure. In this study, all the patients clinically diagnosed as a case of Guillain - Barre Syndrome (GBS) admitted in DMCH between January 2002 to December 2006, were analysed to evaluate the prognostic value and to understand the morbidity and mortality associated with ICU care. Total 406 patients were admitted in DMCH in last 5 years, of which 167 (41.13%) needed ICU care, which was about 10.01% of total ICU admission. 112 patients (67.07%) improved and leave ICU with or without some residual effects like weakness of both legs, persistent tracheostomy, malnutrition etc. and 55 patients (32.93%) were expired. The age of the subjects treated in ICU were 0-10 years 28(16.76%), 11-20 years 49 (29.34%), 21- 30 years 38 (22.75%), 31-40 years 24 (14.37%), 41-50 years 18 (10.77%) and 50 years and above 13 (7.78%). The duration of ICU stay were 0-10 days 88 (55.69%), 11-20 days 22 (13.17%), 21-30 days 12 (7.18%), 31- 40 days 6 (3.59%), 41-50 days 9 (5.38%) and > 50days 30 (17.96%). 39 patients (23.35%) needed tracheostomy. 77 patients (46.10%) needed mechanical ventilation. The median duration of mechanical ventilation was 35 days. The patients were ventilated more than 30 days usually developed ventilator - associated pneumonia and / or sepsis, malnutrition etc. Complications were uncommon if ICU stay were less than 3 weeks. Only 4 patients had history of readmission for second attack between this period. Only 7 patients were treated with immunotherapy which did not produce significant extra benefit. No patient was managed with plasma exchange (PE).

INTRODUCTION:

Guillain-Barre Syndrome (GBS) is an acute monophasic, symmetrically progressive, peripheral neuropathy, with an annual incidence 1-2 per 100,000 populations[1]. Affecting all ages, 50-60% cases follow viral illness within the preceding months, upto 10% follow vaccination or surgery[1].

Guillain - Barre Syndrome (GBS) is characterised by sudden onset of skeletal muscle weakness or paralysis typically manifests initially in the legs and spreads cephaled over the ensuing days to involve skeletal muscle of the arms, trunks and face. Bulbar involvement most frequently manifests as bilateral facial paralysis. Difficulty in swallowing due to pharyngeal muscle weakness and impaired ventilation due to intercostal muscle paralysis are the serious serious symptoms[2]. Autonomic nervous system dysfunction is a prominent finding in patient with GBS.

The diagnosis of GBS is based on clinical signs & symptoms [3], supported by CSF study & a nerve conduction velocity (NCV) test[4]. After the first clinical manifestations of the disease, the symptoms can progress over the course of hours, days or weeks. Most people reach the stage of greatest weakness within the first two weeks after symptoms appear & by the third week of the illness 90% of all patients are at their weakest[4].

There is no known cure of GBS. However there are therapies that lessen the severity of the illness & accelerate the recovery in most patients. There are also a number of ways to treat the complications of the disease. Currently high dose immunoglobulin & plasma exchange (PE) are used. Since the disease may be complicated by respiratory paralysis and / or severe autonomic instability , it is recognized as a potential neurological emergency that may require intensive care management[5]. Respiratory is the most life threatening complication of GBS & 10 - 30% patients may required mechanical ventilation[5,6]. A higher mortality has been seen in few reports published in India[7,8]. We review here the morbidity

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as well as mortality of GBS admitted in intensive care unit (ICU) during the last 5 years between Jan. 2002 to Dec. 2006.

METHODS & MATERIALS:

It was a prospective study of patients of GBS admitted in DMCH who were noted & those were reffered to Intensive care unit (ICU) were managed as per protocol described herein. Diagnosis of GBS was established clinically & supported by data from laboratory whenever available. Age, sex, precipitating events, duration of weakness, baseline symptoms & co-morbid conditions were recorded for all patients. The ultimate outcome measure was hospital survival. Duration of mechanical ventilation & ventilator associated complications (if any) were also recorded.

The patients needed mechanical ventilation were ventilated using Puritan Bennett 7200 AE, T Bird, Bear 3, Bear 33, Servo 900 ventilators. The need of tracheal intubation & mechanical ventilation was determined by serial assessment of respiratory function by clinical examination (level of overall pt. comfort, frequency & depth of breathing, use of accessory muscles, presence of paradoxical respiration, single breath count & integrity of upper airway reflexes), arterial blood gas (ABG) data & chest radiography[9]. Initially, control mode ventilation (CMV) with tidal volumes of around l0ml/kg was used. Patients were quickly shifted to synchronized intermittent mandatory ventilation (SIMV) with pressure support after stabilization. An effort was made to maintain oxygen fraction in inspired air (Fi02) at <0.5, while maintaining adequate oxygenation (p02 >60 mm Hg). Adequate nutrition, asepsis, humidification of inspired air, and regular endotracheal toileting were ensured. Chest physiotherapy was applied to prevent atelectasis. Continuous monitoring of hemodynamic & respiratory (including ABG and respiratory mechanics) variables were ensured. Patients were frequently turned in bedd to prevent bed sores. Low dose heparin were administered subcutaneously to decrease risk of venous thrombosis. Immunotherapy with intravenous immunoglobulin (IVIG) was administered wherever feasible, in a dose of 400 mg/kg daily for 5 days[10].

Tracheostomy was performed in the second week of ICU stay for patients predicted to require prolonged mechanical ventilation[11]. Weaning was accomplished by gradual reduction in the SIMV rate & level of pressure support. A T-piece trial was given & patients were extubated if they had normal bulbar reflexes and did not show any worsening (as manifested by respiratory muscle fatigue on clinical examination and/ or carbon dioxide retention on ABG analysis) during this period.

Results:

During the study period 406 patients admitted to DMCH of which 167 patients were ref. to ICU which was about 10% of total ICU admission. 112 (67.07%) patient improved & 55 (32.93%) patient expired during this period. . The age of the subjects treated in ICU were 0-10 years 28(16.76%), 11-20 years 49 (29.34%), 21- 30 years 38 (22.75%), 31-40 years 24 (14.37%),41 50 years 18 (10.77%) and 50 years and above 13 (7.78%). The duration of ICU stay were 0-10 days 88 (55.69%), 11-20 days 22 (13.17%), 21-30 days 12 (7.18%), 31- 40 days 6 (3.59%), 41-50 days 9 (5.38%)and > 50days 30 (17.96%). 39 patients (23.35%) needed tracheostomy. 77 patients (46. 10%) needed mechanical ventilation.

Table-I

ICU statistics on GBS (2002 -2006)

Year	Total admission of GBSin DMCH	Total admissionin in ICU	% of admission of GBS in ICU
2002	84	35	41.66%
2003	70	32	45.71
2004	77	42	54.54%
2005	84	29	34.52%
2006	91	29	31.84%
Total	406	167	41.13%

Table- II

ICU statistics on GBS (2002 -2006)

Year	Total admission of patients In ICU	Improved (%)	Expired (%)
2002	425	183(43.06%)	242 56.94%)
2003	345	156(45.22%)	189 (56.94%)
2004	364	179(49.18%)	185 (56.94%)
2005	239	112(45.85%)	127 (53.14%)
2006	295	101(34.24%)	194 (65.76%)
Total	1668	731(43.82%)	937 (56.18%)

Table-III

ICU statistics on GBS (2002 -2006)

Year	Total admission of patients In ICU	Total admission Of GBS Patient	% of admission
2002	425	35	8.24%
2003	345	32	9.28%
2004	364	42	11.54%
2005	239	29	12.13%
2006	295	29	9.83%
Total	1668	167	10.01%

Table-IV

ICU statistics on GBS (2002 -2006)

Year	Total admission of GBS patient	Improved cases (%)	Expired cases (%)
2002	35	21(60%)	14(40%)
2003	32	18(56,25%)	14(43.75%)
2004	42	32(76.19%)	10(23.81%)
2005	29	20(68.96%)	9(31.04%)
2006	29	21(72.41%)	8(27.59%)
Total	167	112 (67.07%)	55(32.93%)

Table-V

Age Groups of GBS Patients in ICU (2002 -2006)

Age Years	Year					Total	%
	2002	2003	2004	2005	2006		
0- 10 yrs	10	6	10	1	1	28	16.76%
11- 20 yrs	11	11	1Z	8	7	49	29.31%
21 - 30 yrs	7	3	10	6	12	38	22.75%
31 - 40 yrs	4	5	4	6	5	24	14.37% ‘
41 - 50 yrs	4	4	4	5	1	18	10.77%
51 -above	2	3	2	3	3	13	7.78%

Table -VI

Duration of stay in ICU of GBS Patients (2002 -2006)

Days	Year					Total	%
	2002	2003	2004	2005	2006		
0-10 days	21	21	20	12	14	88	55.69%
11 - 20 days	5	3	7	2	5	22	13.17%
21 -30 days	2	1	5	4	0	12	7.18%
31 - 40 days	1	1	0		3	6	3.59%
41 - 50 days	1	1	2	3	2	9	5.38%
> 50 days	5	5	8	7	5	30	17.96%

Tracheostomy needed : 39 (23.35%) patients.
Mechanical Ventilation needed : 79 (46.10%) patients.
No patient was managed with Plasma Exchange (PE).

DISCUSSION:

Patients with severe forms of Guillain - Barre Syndrome (GBS) required intensive care. Specific treatment, catheterization and devices may increase morbidity in the intensive care unit (ICU). To understand the spectrum of morbidity associated with ICU care, R.D.

Henderson, FRACP, N.D. Lawn, FRACP et. al. studied 114 patients with GBS and found major morbidity occurred in 60% patients[12] which also corresponded with our study. Respiratory complications such as pneumonia and tracheobronchitis occurred in half of the patients and were linked to mechanical ventilation. Systemic infection occurred one fifth of patients and was more frequent with increasing durationa of ICU admission. In our study all patients were managed traditionaly except 7 (seven) patients who received / immunotherapy and no patient treated with plasma exchange(PE). Richard A.C. Hughes, Antony V. Swan, Jean - Claude Raphael et. al. found in one trial with 148 participants following PE with IVIg did not produce significant extra benefit[13]. Limited evidence from three open trials in children suggested that IVIg hastens recovery compared with supportive care alone[13]. Corticosteroids were also compred with placebo or supportive treatment in six trials with altogether 587 patients, inwhich there was significantly less improvement after 4 weeks with corticosteroid than wit out. Two large trial of intravenous methyl- prednisolon with altogether 467 patients found no significant difference between corticosteroid and placebo.

In our study, direct complications of treatment and invasive procedure occurred infrequently. We found that pulmonary morbidity predominates in patients with severe GBS admitted in the ICU. Aggarwal AN, Gupta D, Lal V. et. al. found in their study 10 - 30% patient required ventilatory support[14]. in comparison to our study,46% patient needed mechanical ventilation. Complications in critically ill patients with GBS are most often not related to the basic disease. Although autonomic instability can precipitate swings in blood pressure or arrhythmias, these can usually be successfully tackled in well - equipped ICU.

Deaths resulting from GBS are nowadays uncommon, because of advances in all the aspects of intensive care. Mortality rates vary widely, ranging from 1% - 18% in most reports from West[15]. Patients requiring mechanical ventilation may have higher mortality rates[3]. Amuch higher mortality rate has been reported from some Indian centers, possibly related to less than ideal intensive care facilities due to financial constraints, like our ICU, when compared to conditions in developed countries[7,8]. In the modem era, death in GBS usually results from pneumonia, sepsis, adult respiratory syndrome, and less frequently autonomic instability or pulmonary embolism; most of these patients are on ventilatory support[14]. Old age and associated co morbidities increase the risk. Judith M Spies, Kazim A Sheikh found upto 5% of patients did not survive inspite modern intensive care facilities[16]. But in our study mortality rate was 32% of which predominantly aged patient >50 years and

patients who developed autonomic involvement. Some patient also expired within 0-1 days without proper diagnosis of GBS, which were may be some other neurological defects like encephalitis, TB meningitis or space occupying lesion (SOL).

CONCLUSION:

In conclusion, ventilatory failure in severe GBS often requires prolonged respiratory support and ICU care. Mechanical ventilation itself is not difficult in these patients with normal lung mechanics and gas exchange. Most patients have a favourable outcome. Mortality is usually related to systemic problems or complications of hospitalization, rather than the basic disease. Further research is needed to identify better treatment regimens and new therapeutic strategies.

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Case Report

CASE REPORT ON CARDIAC ARREST UNDER SPINAL ANESTHESIA IN A CASE OF CAESAREAN SECTION

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ABSTRACT:

A 33 years old multiparous woman was admitted in Dhaka National Medical Institute Hospital with the complaints of 37 weeks pregnancy and less fetal movement. She was a known case of DM & had a previous history of caesarean section. She had under gone an emergency caesarean section under spinal anesthesia. Patient developed sudden severe hypotension with respiratory distress within 3-4 minutes after the anesthetic procedure, while she was in supine position. Subsequently she developed cardiac arrest. She was managed by cardio-pulmonary resuscitation which included prompt tracheal intubation, ventilation with 100% oxygen, cardiac message & ionotropic drug. Cardiac arrest was revived. The operation was completed under general anaesthesia & was reversed uneventful. She was kept in CCU under close monitoring. The patient was discharged on her 7th postoperative day with a healthy baby and a healthy physical status.

Key words: *Cardiac arrest, Spinal anaesthesia, Supine hypotensive syndrome.*

CASE REPORT:

A 33 years old multiparous woman weighing about 70 kg & height of 147 cm was admitted in DNMIH with the complaints of 37 weeks pregnancy and less fetal movement. She was a known case of DM & a past history of LUCS five years back. She took regular antenatal check up. She was on anti-diabetic treatment & was taking Inj. Actrapid HM in a dose of 12+6+10 IU for the control of her high blood sugar. On admission her pulse rate was 84/min, B.P- 140/90 mm of Hg. She was mildly anaemic, nonicteric, nonasthmatic, obese & oedematous. Though her BP was 140/90 mm of Hg on single record & her urine albumin was trace in amount, she did not take any anti-hypertensive. As the patient complained less fetal movement, which was clinically confirmed, she had undergone an emergency caesarean section on the day following her admission. Patient was slightly distressed because of her large abdomen with short stature. She gave history of some problem during her previous caesarean section but could not explain it properly. She was preloaded with 500 ml Hartmann solution before the anaesthetic procedure. Then she was administered spinal anesthesia with 2ml 0.5% Bupivacaine HCl heavy at the level of L3-4 interspinous space in sitting position. Patient was put in supine position with a wedge under her right hip. Patient complained respiratory distress immediately after putting the patient in supine position & her B.P started to fall. We used Inj ephedrine 15-20mg gradually & try to maintain oxygenation by face mask with Bain circuit.

But the condition of the patient was deteriorated and eventually she developed apnoea with cardiac arrest. We immediately intubated the patient & ventilated with 100% oxygen & gave cardiac message. She was given Inj. Adrenalin 1mg IV immediately. Inj Oradexon 5 mg was also given. After a few seconds patient cardio-respiratory system became activated & then we maintained anesthesia with short acting muscle relaxant (suxamethonium). The surgeon was requested to proceed with the operation.

She delivered a healthy female baby weighing about 4.5 kg. The baby cried immediately after birth. Peroperatively her condition was stable, her pulse was 100-110/min, B.P-120/80 mm of Hg, chest was clear. After the operation she recovered very smoothly with no residual features of any cerebral hypoxia or anoxia. As she was tried to remove her tube, we extubated her very gently. Her blood sugar was 5.2mmol/L immediately after the surgery. After consultation with cardiologist patient was

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transferred to CCU for close monitoring. Her E.C.G showed normal cardiac activity with no sign of ischaemia. After 24 hours patient again transferred to obstetric department. As she had no complained about her physical & mental soundness, she was discharged on her 7th post operative day.

DISCUSSION:

The factors which may cause or precipitate cardiac arrest during spinal anesthesia in a case of caesarian section are of two broad heading: First, pitfalls remains in the anaesthetic procedure. Second, patho- physiological changes in obstetric patient. At first we must take informed consent from the patient after explaining the anaesthetic procedure. So, we can avoid the chance of noncardiogenic syncopal attack. We must take history of previous anaesthetic procedure[1]. In this case patient gave history of some unexplained problem.Patient must be preloaded with adequate fluid (10-20 ml/kg body wt within 30 minutes)[2]. She was preloaded inadequately. The dose of the anaesthetic drug must be adjusted according to patient height, weight & co-existing disease (HTN, DM). Drug should be injected slowly (1 ml every 5-10 seconds)[3]. The interspinous space preferably L3-L4. Then position of the table (5^{0} head down tilt) & wedge should be given under the right hip ($>15^{0}$)[4, 5].

Hansen noted that 12% of term women had severe hypotension & collapse while supine position due to compression of inferior venacava by gravid uterus, decrease venous return & right atrial pressure. Some report show severe bradycardia also. Lees & co-workers linked this supine hypotensive syndrome with vasovagal syncope. Holmes reviewed the literature from the 1930s to 1950s on maternal mortality due to caesarean section under spinal anaesthesia. Problem occurred soon after the patient was moved into supine position due to sympathetic block as well as supine hypotensive syndrome. Holmes suggested that unappreciated compression of the venacava was the likely cause, rather than other possibilities. The risk was present even without sympathetic block and patient with severe pre-operative supine hypotension died after induction of general anaesthesia[6]. So, if we could not manage the hypotension that lades to cardiac arrest.

In pregnancy huge uterine enlargement reduce functional residual capacity as well as residual volume of lungs[7]. Rapid desaturation occurs in term specially in obese pregnant woman which may cause apnoea subsequently cardiac arrest due to hypoxia. So we should manage it with proper oxygenation.

Pregnancy may complicate with some disorder like Pregnancy Induced Hypertension (PIH), Gestational Diabetes Mellitus (GDM), bronchial asthma etc. In case of PIH patient must be adequately preloaded with intravenous fluids, as because there is more chance of hypotension than a normotensive patient due to hypovolumia & antihypertensive drugs effect. Long term diabetes itself cause autonomic neuropathy which leads to decrease sensitivity or non responsiveness of alpha receptors. So, during hypotensive attack when we used ephedrine it will not work properly[8].

There was some reversible cause of cardiac arrest described as the four Hs & Ts of resuscitation[9].

Hs
- Hypoxia
- Hypovolumia
- Hypo/ Hyperkalaemia & metabolic disorder
- Hypothermia

Ts
- Tension pneumothorax
- Temponade(cardiac)
- Toxic/Therapeutic disturbance
- Thromboembolic & mechanical obstruction.

In this case, patient was short, obese, diabetic & had history of some unexplained problem during her previous anaesthetic procedure and was preloaded inadequately. So, factors in favour of this catastrophe's were overweight with large baby (4.5kg) which create a hypotensive as well as hypoxic drive when she was in supine position under spinal anesthesia. Hypotension was aggravated due to inadequate preload. Vasopressor drugs (ephedrine) did not function well because of non responsiveness of alpha receptors due to her prolonged DM. Previous unexplained factors might have some contributing cause like idiosyncrasy of local anesthetic drugs.

So, if we assess properly we can avoid this catastrophe as well as can be managed cardiac arrest if it has already happened.

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Original Article

INTRAVENOUS GRANISETRON, ONDANSETRON AND METOCLOPRAMIDE IN THE PREVENTION AND TREATMENT OF POST OPERATIVE NAUSEA AND VOMITING AFTER LAPAROSCOPIC CHOLECYSTECTOMY - A COMPARATIVE STUDY

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SUMMARY:

Postoperative nausea and vomiting are the common morbidity after general anaesthesia and surgery[1]. One of the essential goals of anaesthetic management is to prevent postoperative nausea and vomiting. The consequence of prolonged postoperative nausea and vomiting (PONV) ranges from unexpected admission of day patients with its economic implications to physical, metabolic and psychological effects on the patients which slow their recovery and reduced their confidence in future surgery and anaesthesia[2].

The present study was designed to compare the efficacy of Granisetron with that of Ondansetron and Metoclopramide in the treatment and prevention of postoperative nausea and vomiting after laparoscopic cholecystectomy. This study was also done to observe the incidence of nausea and vomiting in the postoperative period, to observe the requirement of rescue antiemetic, to find out the haemodynamic stability, saturation of arterial oxygen in these groups of subject and to detect the patients satisfaction by verbal rating scale after 24 hours of surgery.

A total number of 90 patients, sex female, age range 30-50 years undergoing laparoscopic cholecystectomy were selected. They were equally divided into three groups of 30 patients. They received a standard general anaesthesia. Group I received injection Granisetron (1mg), Group II received injection Ondansetron (8mg), Group III received injection Metoclopramide (10mg) 10 minutes before reversal of anaesthesia. Postoperative analgesia was provided with injection pethidine (1.5mg/kg/bd.wt.) intramuscularly 8 hourly.

In the recovery room occurrence of nausea and vomiting was assessed for 24 hours. The incidence of emesis free (no nausea) was significantly higher in patients who received Ganisetron (90.0%, 27/30) than in those who received Ondansetron [(66.7%, 20/30), p=0.028] or metoclopramide [(40.0%, 12/30), p= 0.000].The incidence of vomiting free was significantly higher in patients who received Granisetron (93.3%, 28/30) than in those who received Ondansetron [73.3%, 22/30), p= 0.037] or Metoclopramide [46.7%, 14/30), p= 0.000]. Granisetron was associated with greater patients' satisfaction than Ondansetron and Metoclopramide 40%, 20% and 10% of patients respectively. No need for another rescue antiemetic medication was achieved in 86.7% of patients with granisetron, 70.60% with Ondansetron and 53.3% with Metoclorpramide. The haemodynamic variables, heart rate, blood pressure, SpO_2 were recorded carefully in different time intervals. There was no significant difference among the study.

So, it can be concluded that Granisetron is more effective than Ondansetron and Metoclopramide in the prevention and treatment of postoperative nausea and vomiting after laparoscopic cholecystectomy.

INTRODUCTION:

Nausea is a subjective phenomenon of unpleasant wave like sensation experienced in the back of throat and/or the epigastrium that may or may not culminate in vomiting. Vomiting is the forceful expulsion of the contents of the stomach, duodenum or jejunum through the oral cavity. Retching is gastric and esophageal movement of vomiting without expulsion of vomitus and is also referred to

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as 'dry heaves'[3]. Nausea, vomiting and retching are among the most common postoperative complaints and can occur after general or regional anaesthesia[4].

The aetiology of PONV are complex and multi factorial and includes factors related to the characteristics of the patients, type of surgery, type of anaesthetics agents and post operative condition. It is also related to the haemodynamic instability (heart rate, blood pressure), arterial oxygen saturation, respiration, pain and sedation[3] and can expose the subject to an increased risk of pulmonary aspiration of vomitus if airway reflexes are depressed from the residual effects of anaesthetic and analgesic drugs[5].

Laparoscopic cholecystectomy is associated with a high incidence of 65% postoperative nausea and vomiting[3]. In laparoscopic cholecystectomy due to creation of pneumoperitonium has direct effect on postoperative nausea and vomiting and due to instrumental manipulation of abdominal viscera that may cause the release of humoral substances including 5-HT which may stimulate 5-HT_3 receptor in the afferent vagus nerves, triggering the emetic reflex (CTZ) chemoreceptor trigger zone located in the area postrema outside the brain barrier.

Pharmacologic approaches (antihistamines, butyrophenones, dopamine receptor antagonists) have been investigated for the prevention and treatment of PONV, but such undersirable adverse effects as excessive sedation, restlessness, dystonic reactions and extrapyramidal symptoms have been noted[3].

Granisetron, 5-HT_3 receptor antagonist, is more potent and has longer lasting effects against chemotherapy-induced emesis than ondansetron. It is effective for the prevention of PONV[6]. It has 5 to 10 times greater affinity for the 5-HT_3 receptor than ondansetron and has twice the duration of action[7]. Ondansetron, a selective 5-hydroxytryptamine (5-HT_3) receptor antagonist, is effective for the prevention of PONV (Mckenzie R et al. 1993) and for the treatment of established PONV[8]. Metoclopramide is a procainamide derivative and a benzamide prokinetic agent with dual sites of action, blocking D_2 receptors in the periphery (G.I. tract) and centrally (CTZ and area postrema. Vomiting Centre). It is effective for the treatment of postoperative nausea and vomiting[9]. It has short duration of action (1 to 2 hours) and less potent.

Postoperative nausea and vomiting are the common morbidity after general anaesthesia. So in the present study the efficacy of granisetron was compared with that of ondansetron and metoclopramide in the prevention of PONV after laparoscopic cholecystectomy. For this, the study was designed to assess the efficacy of granisetron over ondansetron and metoclopramide by observing the incidence of nausea and vomiting, requirement of rescue antiemetic in postoperative period and also to detect the patient's satisfaction by verbal rating scale after 24 hours of surgery.

MATERIALS AND METHODS:

This randomized prospective clinical study was carried out in the Department of Anaesthesiology and ICU, Dhaka Medical College Hospital, Dhaka during the period of January 2005 to December 2006.Female patients aged between 30-50 years with ASA grade I and II and scheduled for laparoscopic cholecystectomy under general anaesthesia were recruited in this study. Females with known history of hypersensivity to study drugs, gastrointestinal diseases, who had taken antiemetics within 24 hours before surgery, receiving hormonal therapy and pregnant and menstruating patients were excluded from this study.

After recruitment, patients were randomly divided into three groups, thirty patients in each group. Group-I received inj. granisetron(1mg) intravenously, Group-II received inj. ondansetron (8mg) intravenously and group-III (control group) received inj. metoclopramide(10mg) intravenously-all 10 minutes before reversal of anaesthesia. Patients data were collected in prescribed forms containing patients particulars, preoperative baseline (pulse, blood pressure-systolic and diastolic blood pressue, SPO2) parameters, preoperative and postoperative parameters including nausea, vomiting ,patients satisfaction by 4 points VRS(Verbal Rating Scale) and use of rescue antiemetics. After preoxygenation for 3-5 minutes with 100% oxygen, induction of anaesthesia was done with inj. Fentanyl (1mg/kg body weight) and inj. Thiopentone sodium (5µg/kg body wt.) and endotracheal intubation was done after giving inj. suxamethonium(1.5mg/kg body wt.).Maintenance of anaesthesia with N_2O 70%,O_2 30% and Halothane 0.5-1% with long acting nondepolarizing neuromuscular blocking agent Vecuronium(0.1mg/kg body wt.).Incremental dose of Fentanyl (0.3-0.4 micro gm/kg body wt.) was given if required.

Intraoperative fluid was maintained with Hartmann's so;ution or normal saline. Ten minutes before reversal of anaesthesia each group of patient's received intravenously. Group-I Inj. Granisetron (1mg),Group–II Inj.Ondansetron (8mg);Group-III (Control group) Inj. Metaclopramide (10mg). Time of surgery was within $1^{1}/_{2}$ hour.Residual effect of neuromuscular blocking agent was reversed by injection neostigmine (.04mg/kg/bw) and injection atropine (0.02mg/kg/b.w.) and tracheal extubation performed. Patients were monitored preoperatively and postoperatively.

In postoperative room proper hydration maintained. Analgesia maintained by injection pethidine (1.5mg/kg/bw.) given intramuscularly 8 hourly in each patient, on patient demanded injection ketorolac and (30 mg) given intramuscularly. The 24 hours study period started upon entry to the postoperative room. Patient was observed at 30 minutes, 1 hour, 2 hours, 4 hours, 8 hours, 16 hours and 24 hours after recovery. In this period haemodynamic parameters (pulse, systolic and diastolic blood pressure),arterial oxygen saturation, the number and time of nausea and vomiting and rescue antiemetic treatment were recorded.Injection antiemetic was given according to the patient needs. Patient satisfaction was recorded by 4 points verbal rating scale 24 hours after recovery.

STATISTICAL ANALYSIS

All the variables were expressed as mean ± SD. One way ANOVA and Pearson's Chi-square (X^2) test were done as the tests of significance whenever applicable to compare the mean of different groups. The statistical analysis was done by using SPSS programme. P-value <0.05 was considered as significant.

RESULTS

Observation of the present study was analyzed in the light of comparison among each subject groups. Each group having n=30. All results were expressed as mean ± SEM or in frequencies as applicable. The groups became statistically matched for age (P=0.948), weight (P=0.908). There was no significant difference among the study groups.

Table-I

Age, body weight different study groups (n=90).

Variable	Group-I (n=30)	Group-II (n=30)	Group-III (n=30)	P value
Age (years)	37.3±2.06	36.7±1.82	37.5±1.49	0.948^{ns}
Weight(kg)	53.5±1.38	54.4±1.90	54.4±1.88	0.908^{ns}

Values are expressed as Mean ± SD. (Within parenthesis are percentages over column total). Age and weight analysis done by ANOVA test. Value are regarded significant if P<0.05.

Group-I: Granisetron

Group-II: Ondansetron

Group-III: Metoclopramide

Figure in parentheses indicates ranges, ns= not significant, n= number of subjects.

Table-II

Incidence of nausea between different study groups (n=90).

Groups	n	No Nausea	Nausea
I	30	27 (90.0%)	3 (10.0%)
II	30	20 (66.7%)	10 (33.3%)
III	30	12 (40.0%)	18 (60.0%)
Total	90	59 (62.2%)	31 (34.4%)

Statistical analysis:

Groups	X^2 value	P value
I vs II	4.81	0.028^{*}
I vs III	16.48	0.000^{***}
II vs III	4.29	0.0038^{*}

The incidence of nausea in different study groups are shown in number and percentage in table-II.

The incidence of nausea was 10% in group-I, 33.3% in group-II & 60% in group-III respectively. The difference was statistically significant between group I vs group II (p= < 0.05). The difference was statistically significant between group I vs Group III (p< 0.001). And also between groups II vs. group III it was statistically significant (p< 0.05).

The incidence of no nausea in group-I 90%, group-II 66.7% and group-III 40%. Incidence of nausea group-I 10%, group-II 33.3% and group-III 60%.

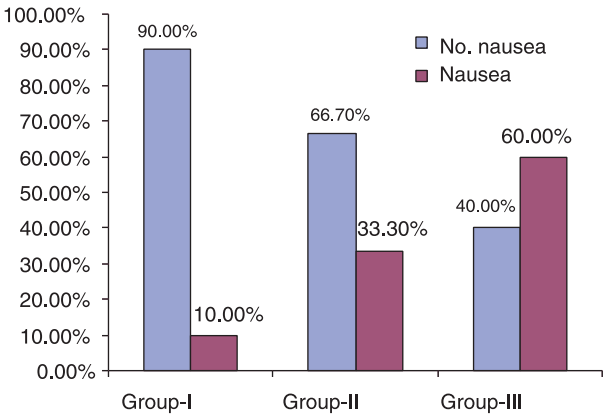

Fig. 1: *Incidence of nausea in different study group (n=90).*

Table- III

Incidence of vomiting in different study groups (n=90.

Groups	n	No. vomiting	Vomiting
I	30	28 (93.3%)	2 (6.70%)
II	30	22 (73.3%)	8 (26.7%)
III	30	14 (46.7%)	16 (53.3%)
Total	90	64 (71.1%)	26 (28.9%)

Statistical analysis:

Groups	X^2 value	P value
I (vs) II	4.32	0.037*
I (vs) III	15.56	0.000***
II (vs) III	4.44	0.0035*

The incidence of vomiting in different study groups is shown in number and percentage in table-III.

The incidence of vomiting was 6.7% in group-I, 26.6% in group-II & 53.3% in group-III respectively. The difference was statistically significant between group I vs group II (p= < 0.05). There was statistically significant difference between group I vs Group III (p< 0.001). The difference between group II vs group III was statistically significant (p< 0.05).

The incidence of no vomiting group-I 93.30%, group-II 73.30% and group-III 46.70%. Incidence of vomiting group-I 6.70%, group-II 26.70% and group-III 53.30%.

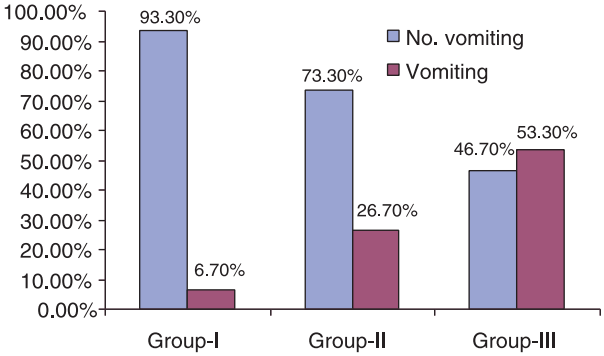

Fig. 2: *Incidence of vomiting in different study group (n=90).*

Overall patient satisfaction by verbal rating scale (VRS):

Overall patient satisfaction in 24 hours in post operative period by verbal rating scale (VRS). After 24 hours overall patient satisfaction was assessed. In group-I, 1 patients rated "not effective at all", 6 "moderate effective", 11 "effective" and 12 "excellent". In group II, 5 patients rated "not effective at all", 10 "moderately effective", 9 "effective" and 6 "excellent". In group-III, 7 patients rated "not effective at all", 13 "moderately effective", 7 "effective" and 3 "excellent".

Table-IV

Satisfactory level by four point verbal rating scale.

	Group-I(n=30)	Group-II(n=30)	Group-III(n=30)	Total (n=90)	χ^2-value	P-value
Not effective at all	1	5	7	13		
	3.3%	16.7%	23.3%	14.4%		
Moderately effective	6	10	13	29		
	20.0%	33.3%	43.3%	32.2%		
Effective	11	9	7	27	13.75	0.032s
	36.7%	30.0%	23.3%	30.0%		
Excellent	12	6	3	21		
	40.0%	20.0%	10.0%	23.3%		
Total	30	30	30	90		
	100.0%	100.0%	100.0%	100.0%		

Rescue antiemetic in different study groups

The incidence of rescue antiemetic in different study groups are shown in number and percentage in Table-V.

The incidence of rescue antiemetic was 13.3% in group-I, 30.0% in group-II & 46.7% in group-III. The different study among the groups was statistically significant ($p< 0.05$).

Heart rate (beats/min) variation in different study

The mean ± SD values of the heart rate (HR) in preoperative period were in group-I (88.0±1.6)/min, in group-II (89.1 ± 3.1)/min, in group-III (87.8 ± 1.5)/ min. The mean of heart rate was not statistically significant ($p>0.05$) (Table-VI).

The mean ± SD values of heart rate (HR) during intraoperaitve period were in group-I – (88.8±2.4)/ min, in group-II (91.8± 1.4)/min, group-III (86.9±1.8)/ min. The mean of heart rate was not statistically significant ($p>0.05$) (Table-VI).

The mean of heart rate (HR) at 30 minutes after recovery ($p>0.05$), 1 hour after recovery ($p>0.05$),2 hours after recovery ($p>0.05$), 4 hours after recovery ($p>0.05$),8 hours after recovery ($p>0.05$) ,16 hours after recovery ($p>0.05$) and 24 hours after recovery were not statistically significant ($p>0.05$) (Table-VI).

Systolic blood pressure (SBP, mmHg) in different study groups are shown in Table-VII.

The Mean ± SD values of systolic blood pressure (BP) in preoperative period were in Group-I– (119.5±3.3)/mm of Hg, in Group-II (118.0±3.9)/ mm of Hg, Group-III (121.0±3.9)/ mm of Hg. The mean of systolic blood pressure was not statistically significant ($p>0.05$) (Table-VII).

The Mean ± SD values of systolic blood pressure (BP) during intraoperative period were in Group-I– (127.0±4.8)/mm of Hg, in Group-II (135.0±2.4)/ mm of Hg, Group-III (130.0±2.2)/ mm of Hg. The mean of systolic blood pressure was not statistically significant ($p>0.05$) (Table-VII).

The Mean of systolic blood pressure (BP) at 30 minutes after recovery ($p>0.05$),1 hour after recovery ,($p>0.05$),2 hours after recovery ($p>0.05$) , 4 hours after recovery ($p>0.05$), 8 hours after recovery ($p>0.05$),16 hours after recovery ($p>0.05$) and 24 hours after recovery were not statistically significant ($p>0.05$) .

Table-V

Rescue antiemtic in different groups (n=90).

	Group-I (n=30)	Group-II (n=30)	Group-III (n=30)	Total (n=90)	χ^2-value	P-value
No	26	21	16	26		
	86.7%	70.0%	53.3%	86.7%		
Yes	4	9	14	4	7.937	0.02^s
	13.3%	30.0%	46.7%	13.3%		
Total	30	30	30	30		
	100.0%	100.0%	100.0%	100.0%		

Table-VI

Changes in heart rate in different study groups (n=90).

	Pre	Intra	30min	1hr	2hr	4hr	8hr	16hr	24hr
Group-I(n=30)	88.0 ±1.6	88.8 ±2.4	87.8 ±1.6	89.2 ±1.8	90.2 ±1.7	89.0 ±2.2	91.7 ±1.9	88.6 ±1.7	82.8 ±1.2
Group-II(n=30)	89.1 ±3.1	91.8 ±1.4	91.4 ±2.3	87.6 ±1.6	87.6 ±1.6	92.8 ±1.3	96.6 ±1.9	85.0 ±0.8	84.6 ±1.2
Group-III(n=30)	87.8 ±1.5	86.9 ±1.8	88.6 ±1.6	87.8 ±1.4	85.6 ±0.6	90.0 ±1.8	93.6 ±2.2	87.2 ±1.3	82.2 ±0.7
F-value	0.10	1.731	1.027	0.29	2.678	1.209	1.546	1.921	1.45
P-value	0.902^{ns}	0.183^{ns}	0.363^{ns}	0.748^{ns}	0.74^{ns}	0.304^{ns}	0.219^{ns}	0.153^{ns}	0.239^{ns}

Diastolic blood pressure (DBP, mmHg) in different study groups are shown in Table-VIII.

The mean ± SD values of diastolic blood pressure (BP) in preoperative period were in Group-I–(77.5±2.5)/mm of Hg, in Group-II (81.0±2.9)/ mm of Hg, Group-III (81.0±1.9)/ mm of Hg. The mean of diastolic blood pressure was not statistically significant (p>0.05) (Table-VIII),

The mean ± SD values of diastolic blood pressure (BP) during intraoperative period were in Group-I–(89.5±2.9)/mm of Hg, in Group-II (92.5±1.7)/ mm of Hg, Group-III (88.0±1.6)/mm of Hg. The mean of diastolic blood pressure was not statistically significant (p>0.05) (Table-VIII).

The mean of diastolic blood pressure (BP) at 30 minutes after recovery (p>0.05), 1 hour after recovery (p>0.05),2 hours after recovery (p>0.05) ,4 hours after recovery (p>0.05), 8 hours after recovery (p>0.05),16 hours after recovery (p>0.05) and 24 hours after recovery were not statisticallysignificant(p>0.05).

Arterial oxygen saturation (SpO_2 in %) in different study groups are shown in Table-IX.

The mean ± SD values of SpO_2 at preoperative period were in Group-I–(97.5±0.25%), in Group-II (97.0±0.28)/%, Group-III (96.6±0.33)/%. The mean of arterial oxygen saturation was not statistically significant (p>0.05) (Table-IX).

The mean ± SD values of SpO_2 were during intraoperative period were in Group-I–(98.1±0.36)/%, in Group-II (97.2±0.33)/%, Group-III (97.0±0.42)/%. The mean of arterial oxygen saturation was not statistically significant (p>0.05) (Table-IX).

The mean of SpO_2 were at 30 minutes after recovery (p>0.05) ,1 hour after recovery (p>0.05),2 hours after recovery (p>0.05),4 hours after recovery (p>0.05),8 hours after recovery (p>0.05) ,16 hours after recovery (p>0.05) and 24 hours after recovery were not statistically significant (p>0.05) .

Table-VII

Systolic Blood pressure (SBP, mmHg) variation in different study groups (n=90).

	Pre	Intra	30min	1hr	2hrs	4hrs	8hrs	16hrs	24hrs
Group-I(n=30)	119.5 ±3.3	127.0 ±4.8	119.3 ±5.5	116.5 ±3.3	120.5 ±2.9	115.0 ±6.4	126.0 ±3.2	116.5 ±3.3	116.0 ±2.8
Group-II(n=30)	118.0 ±3.9	135.0 ±2.4	124.3 ±6.0	123.0 ±2.9	122.0 ±3.1	129.3 ±6.5	134.5 ±3.9	123.0 ±2.9	120.0 ±3.3
Group-III(n=30)	121.0 ±2.3	130.0 ±2.2	138.3 ±5.4	124.0 ±1.9	122.0 ±2.2	137.3 ±6.6	134.0 ±2.9	124.0 ±1.9	117.0 ±2.2
F-value	0.22	1.47	3.016	2.19	0.10	2.970	1.98	2.19	0.55
P-value	0.804^{ns}	0.235 ^{ns}	0.056 ^{ns}	0.119 ^{ns}	0.905 ^{ns}	0.057 ^{ns}	0.144 ^{ns}	0.119 ^{ns}	0.581 ^{ns}

Table-VIII

Diastolic Blood Pressure (DBP, mmHg) variation in different groups (n=90).

	Pre	Intra	30min	1hr	2hr	4hr	8hr	16hr	24hr
Group-I(n=30)	77.5 ±2.5	89.5 ±2.9	81.0 ±2.5	78.5 ±2.5	81.0 ±24	84.0 ±1.5	86.2 ±2.4	77.5 ±2.2	77.5 ±1.7
Group-II(n=30)	81.0 ±2.9	92.5 ±1.7	80.5 ±2.7	79.0 ±1.5	76.0 ±2.1	84.5 ±1.6	87.3 ±1.0	80.0 ±2.4	79.0 ±1.9
Group-III(n=30)	81.0 ±1.9	88.0 ±1.6	89.3 ±3.4	83.0 ±1.2	83.5 ±2.4	85.7 ±1.6	88.5 ±1.7	85.0 ±2.4	79.0 ±1.3
F-value	0.66	1.10	2.979	1.82	2.830	0.297	0.427	2.618	0.27
P-value	0.517^{ns}	0.337 ^{ns}	0.056 ^{ns}	0.168 ^{ns}	0.064 ^{ns}	0.744 ^{ns}	0.654 ^{ns}	0.079 ^{ns}	0.766 ^{ns}

Table-IX

Arterial oxygen saturation (SpO_2) variation in different study groups (n=90).

	Pre	Intra	30min	1hr	2hr	4hr	8hr	16hr	24hr
Group-I(n=30)	97.5 ±0.25	98.1 ±0.36	96.2 ±0.29	96.6 ±0.24	96.6 ±0.15	95.9 ±0.23	95.0 ±0.34	96.3 ±0.12	97.2 ±0.21
Group-II(n=30)	97.0 ±0.28	97.2 ±0.33	96.3 ±0.19	96.1 ±0.15	96.3 ±0.17	95.5 ±0.21	95.0 ±0.19	96.4 ±0.09	96.7 ±0.24
Group-III(n=30)	96.6 ±0.33	97.0 ±0.42	95.7 ±0.18	96.7 ±0.17	96.4 ±0.12	95.3 ±0.12	95.3 ±0.19	95.9 ±0.23	96.5 ±0.21
F-value	2.563	2.703	2.084	2.804	1.07	2.58	0.48	2.85	2.723
P-value	0.083^{ns}	0.073 ^{ns}	0.131 ^{ns}	0.066 ^{ns}	0.346 ^{ns}	0.082 ^{ns}	0.619 ^{ns}	0.064 ^{ns}	0.071 ^{ns}

DISCUSSION

Nausea and vomiting are among the most common postoperative complaints. These are frequently the cause of great distress to patients and it is often the worst memory of their hospital stay[1]. The consequences of prolonged postoperative nausea and vomiting (PONV) range from unexpected admission of day patients, with its economic implications to physical, metabolic and psychologic effect on the patients which slow their recovery and reduce their confidence in future surgery and anaesthesia[10].

Better anaesthetic technique, identification of precipitating factors, use of new generation of antiemetics and improvement in operative techniques reduce the incidence and severity of PONV has been decreasing over the last 10 years. Despite these changes, there is still unacceptable frequency of PONV with incidences upto 85% reported in some studies[11]. Watcha and White suggest that the incidence of postoperative nausea and vomiting has remained constant for decades with 20-30% of patients suffering from these unpleasant side effects[3]. On average 30% patients suffered from PONV. In UK every year almost 20,00,000 people suffer from PONV, and about 20,000 outpatients need to be admitted following ambulatory surgery due to intractable PONV. Thus PONV is likely to create considerable extra cost for health care system.

The aetiology of PONV is complex and multi factorials. Factors associated with an increased risk of postoperative emesis include age, gender,obesity, a history of motion sickness and/or previous postoperative emesis, anxiety, menstruation, gastroparesis, pain, hypoxia, type of anaesthetic, hypotension and type and duration of the surgical procedure[12]. Patients undergoing laparoscopic surgery are at high risk for postoperative nausea and vomiting[3]. Because most of them are female and due to instrumental manipulation release of humoral substance include- 5 hydroxytryptamine (5-HT) which may stimulate 5-HT_3 receptor in the afferent vagus nerves triggering the emetic reflex chemoreceptor trigger zone and pneumoperitonium needed for laparoscopy has direct effect on postoperative nausea and vomiting.

Yoshitaka Fujii and Hiroyoshi Tanaka studied the efficacy of the selective 5-hydroxytryptamine receptor antagonist Granisetron with that of the traditional antiemetics droperidol and metoclopramide in the treatment of established PONV after laparoscopic surgery[13]. In this prospective studies, they used injection Granisetron (40ìg/kg)IV, croperidol 20ìg/kgIV or Metoclopramide (0.2mg/kg)IV on those patients who were experiencing PONV during the first 3 hours after anaesthesia and patients were observed for 24 hours after administration of studied drug.

In their study there were no significant group differences in patient's demographic or surgical characteristics. There was no significant difference in haemodynamic parameters – Pulse, B.P and saturation of arterial oxygen. The number of patients who were emesis free (no nausea, retching or vomiting) was significantly higher in patients who received granisetron (88%, 22/25), than who received droperidol (60%, 16/25, p= 0.047) or metoclopramide (55%, 14/25, p= 0.013).

By comparing with this study, our study found that heart rate difference among the groups at preoperative, intraoperative, postoperative upto 24 hours after recovery were not significant. There was no significant changes in systolic and diastolic pressure among the groups of studied patients. In the present study, there were no significant changes in arterial oxygen saturation in the patients of three study groups. The incidence of nausea in group-I 10%, in group-II 33.3% and in group-III – 60.0%. In our study, the incidence of emesis free (no nausea) was significantly higher in patients who received granisetron (90.0%, 27/30) than in those who received ondansetron (66.7%, 20/30, p=0.028) or metoclopramide (40.0%, 12/30, p= 0.000).

The incidence of vomiting in group-I (6.7%). In group-II (26.7%) and group-III (53.3%). In our study, the incidence of vomiting free was significantly higher in patients who received granisetron (93.3%, 28/30) than in those who received ondansetron (73.3%, 22/30, p= 0.037) or metoclopramide (46.7%, 14/30, p = 0.000).

Also in the study, granisetron was associated with greater patients satisfaction than ondansetron and metoclopramide 40%, 20% and 10% of patients, respectively (p= 0.032). No need for another rescue antiemetic medication was achieved in 86.7% of patients with granisetron, 70.0% with ondansetron and 53.3% with metoclopramide (p= 0.02) in this study.

In the present study, 5 patients were excluded as laparoscopic procedures could not succeed and open cholecystectomy were done. To maintain the postoperative analgesia injection pethidine (1.5mg/kg.b.wt) was given intramuscularly 8 hourly. Inj. Ketorolac (30mg) given I/M on demand.

In our study, it was a great satisfaction that though injection pethidine was given to all patients of three groups for post operative analgesia and sedation, there was no increase in frequency of nausea and vomiting episodes as its side effects, which were also probably blocked by Inj. Granisetron, Ondansetron and Metoclopramide.

Our result showed that, Injection Granisetron (1mg) administered 10 minutes before reversal of anaesthesia is more effective than Ondansetron and Metoclopramide in the prevention and treatment of postoperative nausea and vomiting after laparoscopic cholecystectomy.

CONCLUSION

The present study was particularly designed to observe the incidence of nausea and vomiting and requirement of rescue antiemetic in postoperative period and also detect the patients satisfaction by verbal rating scale after 24 hours of surgery. After completion of the study it was found that Granisetron greatly reduced the incidence of postoperative nausea and vomiting, and also the requirement of rescue antiemetic in postoperative period than Ondansetron and Metoclopramide. Patient was satisfied by using this drug. So this present randomized prospective comparative clinical study concluded that Granisetron is more effective in comparison to Ondansetron and Metoclopramide in the prevention and treatment of postoperative nausea and vomiting after laparoscopic cholecystectomy.

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Original Article

HAEMODYNAMIC CHANGES BEFORE AORTIC CANNULATION IN CABG SURGERY UNDER PROPOFOL-FENTANYL ANAESTHESIA: COMPARISON WITH OXYGEN- NITROUS- HALOTHANE TECHNIQUE

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ABSTRACT:

Patients undergoing CABG surgery have abnormal cardiovascular physiology and are commonly associated with multivessels disease, have compromised ventricular function and are often associated with other co morbid conditions. Aim of the study was to compare the peroperative hemodynamic effect in CABG surgery before aortic cannulation of two anesthetic techniques, e.g. TIVA (propofol-fentanyl) vs conventional (N_20-halothane). 40 patients scheduled for CABG surgery were allocated in double blind, randomized study. Patients were divided into two groups. In group A patients were maintained anaesthesia with TIVA (Propofol-fentanyl) technique and in group B patients conventional (N_20-halothane) technique. Hemodynamic parameters were taken at different stages in peroperative period upto the time of aortic cannulation. Hemodynamic supports were manipulated in a systematic approach. Hemodynamic status was evaluated and compared on the basis of support requirements between the groups. No significant changes of all the hemodynamic parameters were observed at induction, intubation, skin incision, sternotomy and then in maintenance phase (mean of 15 minutes interval) upto aortic cannulation in both groups.

INTRODUCTION

Anaesthesia for the patients with ischaemic heart disease has been the subject of innumerable research and review articles, beginning with an initial review of anaesthesia for myocardial revascularization[1] and recently, an extensive commentary on the epidemiology, outcome, and effects of anaesthetic agents and monitoring on care of the patient with coronary artery disease (CAD). Patients undergoing CABG surgery have abnormal cardiovascular physiology and are commonly associated with multivessels disease, have compromised ventricular function and are often associated with other co morbid conditions. The anaesthesiologist's traditional approach to anaesthesia for CABG in myocardial protection has emphasized the maintenance of haemodynamic stability (avo.ding hypotension, hypertension, and tachycardia) and the optimization of oxygen-carrying capacity (avoiding hypoxia and anemia), thus preserving the delicate balance between myocardial oxygen supply and demand.

Volatile agents or opioids, which group is better as maintenance technique and has better control over haemodynamic parameters - has been a matter of debate since the beginning of cardiac anaesthesia. Volatile agents have both some advantages and disadvantages. All the inhalational anaesthetic agents produce dose I elated negative ionotropic effect. Both halothane and N_20 have been demonstrated to depress LV contractile function[2] though this effects of N_20 is compensated to a lesser extent by its stimulation of sympathetic nervous

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system. Halothane depresses ionotropic action or ventricular performance more than those of other volatiles in animal and human studies[3,4]. Moreover, the negative inotropic and chronotropic effects are greater in patients with poor cardiac function[5-8]. Halothane and other volatiles are capable of producing vasodilatation and reduction of tiler load through direct relaxant effect on arterial smooth muscle[9] and effects on sympathetic system by decreasing preganglionic and postganglionic activity[10] and decreasing release of noradrenaline from postganglionic nerves[11]. All volatiles have negative chronotropic effect mediated through inhibitory effects on SA node. baroreceptor reflex and autonomic activity, but N_20 increase the heart rate by sympathetic stimulation. Another problem with halothane is its ability to sensitize the heart to the arrythmogenic effect of adrenaline[12], which is commonly used in cardiac anaesthesia as an ionotropic support. These are the causes why early techniques employing predominantly high concentration of halothane presented significant challenges and both surgical and anaesthetic mortality and morbidity rate were very high.

On the other hand, inhalational agents have got some advantages. Halothane decreases myocardial oxygen demand (MVO_2) and interestingly the drop in MVO_2 is associated with an appropriate decrease in coronary flow[13-14]. It also decreases platelet thrombus generation in the coronary eirculation[15]. It has also got some coronary, vasodilator effect. Besides, halothane produces good amnesia, less post operative respiratory depression than opioids but they cause post operative nausea, vomiting. Another claim against volatiles that they- are declared as a green house gas[16]. They are polluting not only operation theatre environment but also destroying the ozone layer and thus participating in global warming process.

Because of above mentioned problems, the use of high concentration of volatiles (specially halothane) in cardiac anesthesia had started reducing worldwide and opioids took its place. The utility of opioids in cardiac anaesthesia goes beyond providing potent analgesia. They help promote haemodynamic stability both in the presence and in the absence of noxious stimuli. The cardiac action of opioids and in particular, the negative effects on myocardial contractile mechanism are significantly less than those of many other intravenous and inhalational anacsthetics.

This study is aimed at determining the qualitative aspects as well as to compare haemodynamic status of these two tchniques before aortic cannulation in CABG surgery.

AIMS AND OBJECTIVES

i. To find out whether any significant haemodynamic changes produced by TIVA (propofol-fentanyl) and conventional (halothane-N_20) anaesthetic technique in CABG surgery and to obtain a better anaesthetic technique.

ii. To create awareness among the cardiac anasesthesiologists regarding which is better anaesthetic technique in CABG surgery.

MATERIALS AND METHODS

Subjects

This randomized, prospective clinical study was carried out in the Department of Anasesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Forty (40) patients, scheduled for coronary artery bypass grafting surgery were included in this study. They were divided into two groups (Group A and Group B) of twenty patients each and were randomly selected by card sampling method. Patients of group A were maintained anaesthesia with propofol-fentanyl (TIVA) and patients of group B were maintained with oxygen-nitrous-halothane (conventional).

Inclusiopn Criteria:

i. ASA and NYHA grading II of either sex (Appendix I&II).

ii. Age: 40-70 yrs.

iii. .Ejection fraction: 45% - 60%.

Exclusion criteria:

i. Patients refusal

ii. Patients with left main vessel disease.

ii. More than three vessels disease

iv. Uncontrolled hypertension

v. Prolonged history of uncontrolled diabetes Mellitus

METHODS (ANESTHETIC TECHNIQUE)

After all normal procedure up to ventilation patients of group A (TIVA) were maintained with oxygen and air 30% -50%), propofol infusion (2-6mg/kg/hr) and fentanyl infusion 0.5-1.25,μg/kg/h by infusion pump

and vecuronium 0.04mg/kg at 40 min interval. N_20 and halothane were not used. Patients of group B (conventional) were maintained with oxygen (30%-50%), N_20 (50%-70%) and halothane (.5 - 1%).Vecuronium .04μg/kg was given 40 min. interval. Fentanyl .5-lmg/kg was also given at 30min interval as incremental dose.

Heart Rate, Arterial blood Pressure (Systolic, Diastolic and Mean) Rate pressure product (RPP), central venous pressure (CVP) were taken after arterial cannulation and internal jugular venous (IJV) cannulation. Those measurements were considered as base line parameters.

Subsequently data were taken at induction, at intubation, at the time of skin incision, at the time of sternotomy, and then every 15 min. interval up to the time of aortic canulation.

Results and observation

Comparison of mean age, body weight, height, ejection fraction (%) and body surface are between TIVA and conventional group are shown in Table I. there were no significant difference among TIVA and conventional group.

Table I

Comparison of mean age, body weight, height, ejection fraction (%) and body surface are between TIVA and conventional group.

Variables	TIVA Mean ±SEM	Conventional Mean ± SEM
Age	57.7 ± 1.9	55.1 ± 1.9
Body weight	63.0 ± 1.1	59.0 ± 2.1
Height	159.8± 1,4	159.1 ± 1.7
Ejection Fraction	55.3 ± 1.1	55.7 ± 1.3
Bodysurfacearea area ararea	1.7± .02	1.6 ± .03

The mean difference of all baseline haemodynamic parameters were statistically insignificant ($p>0.05$) in unpaired t-test (Table II). There was no significant change in ST segment and no arrhythmia was found from ECG a tracing ST in airy patient of both group.

Table II

Mean baseline value of Haemodynamic parameters in TIVA and conventional group

Parameters	TIVA Mean ± SEM	Conventional Mean ± SEM
BP (Systolic)	132.4 ± 3.8	126.1 ±2.8
BP (Diastolic)	82.7 ± 2.0	82.3 ±1.8
Mean BP	99.3 ±2.4	96.9±2.0
Heart rate (BPM) Heart	78.6±1.6	81.3 ±1,9
RPP	10396.5 ± 465.5	10298.5 ± 402.0
CVP	8.9±0.2	9.5 ± 0.2

The mean difference of all haemodynamic parameters at induction were statistically insignificant ($p>0.05$) in unpaired t-test except RPP, which was significant ($p<0.05$) (Table III). There was no significant change in ST, segment and no arrhythmia was found from ECG tracing in any patient of both group.

Table III

Mean value of Haemodynamic parameters in TIVA and conventional group at induction

Parameters	TIVA Mean ±SEM	Conventional Mean ± SEM
BP (Systolic)	93.7 ±21	98.5 ± 1.3
BP(Diastolic)	66.5±2.5	64.4±1.5
Mean BP	75.6±23	75.7 ±1.3
Heart rate (bpm)	76.2 ±1.9	80.3 ±1.3
RPP	7123.±262.7	7917.1 ±190.7
CVP	8.7±0.2	9.3 ± 0.2

The mean difference of all haemodynamic parameters after 3 minutes intubation were statistically significant ($p<0.05$) in unpaired t-test except heart rate and RPP, which were insignificant ($p>0.05$) (Table IV). There was no significant change in ST segment and no arrhythmia was found from ECG tracing in any patient of both group.

Table IV

Mean value of Haeniodynamic parameters in TIVA and conventional group 3 minutes after intubatiou

Parameters	TIVA Mean ± SEM	Conventional Mean ± SEM
BP (Systolic)	120.8± 1.9	130.2-+2.1
BP(Diastolic)	81.7± 1.6	86.6±1.0
Mean BP	94.7±6.7	101.1±5,7
Heartrate (bpm)	81.3±2.6	80.0±1.5
RPP	9900. ±1945.26	10419.4±11944.
CVP	8.5±0.4	9.4±03

The mean difference of all haemodynamic parameters during skin incision were statistically significant ($p<0.05$) ii) unpaired t-test except heart rate and RPP, which was insignificant ($p>0.05$) (Table V). There was no significant change in ST segment and no arrhythmia was found from ECG tracing in any patient of both group.

Table V

Mean value of Haemodynamic parameters in TIVA and conventional group at skin incision

Parameters	TIVA Mean ± SEM	Conventional Mean ± SEM
BP (Systolic)	123.3± 1.9	131.2+1.9
BP(Diastolic)	82.5± L4	86.2 ±LO,
Mean BP	96.1±1.3	101.2 ±1.1
Heart rate (bpm)	81.8±2.3	80.2 ±1.5
RPP	10149.3±446.5	10524.9 ±264.1
CVP	8.2±0.3	9.7+0.2

The mean difference of all haemodynamic parameters during sternotomy were statistically significant ($p<0.05$) in unpaired t-test except heart rate and RPP, which were insignificant ($p>0.05$) (Table VI). There was no significant change in ST segment and no arrhythmia was found from ECG tracing in any patient of both group.

Table VI

Mean value of Haemodynamic parameters in TIVA and conventional group at the time of sternotomy

Parameters	TIVA Mean ± SEM	Conventional Mean ± SEM
BP (Systolic)	124.6+ 1.6	130.0± 1.7
BP(Diastolic)	81-9-+ 1.5	86.3±1.1
Mean BP	96.1 ±1.2	100.9±1.2
Heart rate (bPm)	82.1 ±2.7	80.7±2.2
RPP	10259.9±420.2	10471.2±321.8
CVP	8.4±0.3	9.2±0.2

Table VII

Mean value of Haemodynamic parameters in TIVA and conventional group during maintenance (upto initiation of aortic cannulation).

Parameters	TIVA Mean ± SEM	Conventional Mean ± SEM
BP (Systolic)	119.9± 2.0	115.0± 2.8
BP(Diastolic)	79.4± 2.2	76.6±2.1
Mean BP	92.9±1.9	89.4±2.2
Heart rate (bpm)_Heart	75.7±2.7	77.0±23
RPP	9121.9±415.5	88323±321.4
CVP	8.8±0.2	9.1± 0.3

The mean difference of all average haemodynamic parameters result during maintenance (upto initiation of aortic cannulation) were statistically insignificant ($p>0.05$) in unpaired t-test (Table VII). There was no significant change in ST segment and no arrhythmia was found from ECG tracing in any patient of both group , expect one patient in conventional group, who showed premature ventricular ectopics in ECG tracing which was treated with lignocainee.

DISCUSSION

In the present study the mean difference of all baseline haemodynamic parameters were statistically insignificant ($p>0.05$) in unpaired t-test. At induction the mean (±SEM) RPP was 7123.3±262.7 and 7917.1±190.7 in TIVA and conventional group respectively and the mean

difference was significantly (p>0.05) higher in conventional group compared to TIVA group. Other variables were statistically insignificant (p>0.05) at induction.

After 3 minutes intubation the mean (±SEM) systolic BP was 120.8±1.9 mmHg in TIVA group and 130.2±2.1 mmHg in conventional group. Similarly, the mean (±SEM) diastolic BP was 81.7±1.6 mmHg in TIVA group and 86.6±1.0 mmHg in conventional group. The mean(±SEM) BP was 94.7±6.7 mmHg in TIVA group and 101. 1+5.7 mmHg in conventional group. The mean(±SEM) CVP was 8.5±0.4 in TIVA group and 9.4±0.3 in conventional group. There was no significant change in ST segment and no arrhythmia was found from ECG tracing in any patient of both group. The mean difference of all haemodynamic parameters after 3 minutes intubation were significantly (p<0.05) higher in conventional group compared to TIVA group but heart rate and RPP were insignificant (p>0.05). Similar result were found during skin incision and sternotomy.

There was no significant change in the present study in ST segment and no arrhythmia was found from ECG tracing in any patient of both group except one patient in conventional group, who showed premature ventricular ectopics in ECG tracing which was treated with lignocaine. The mean difference of all average haemodynamic parameters result during maintenance (upto initiation of aortic cannulation) were statistically insignificant (p>0.05).

Regarding the haemodynamic parameters Hall RI et al. (1991) found a larger reduction in systolic blood pressure in propofol-sufentanil (156±22 to 104±20 mmHg Vs conventional group (152±26 to 124±24; p<0.05)[17].No statistical difference were detected at any other variables of haemodynamic parameters, which closely agrees with the present study where the mean systolic blood pressure was 132.4±3.8 mmHg and 93.7±2.1 mmHg at induction. Similarly Pagnin A et al._(1992) observed similar pattern of change after induction, intubatiun, skin incision and sternotomy except for a greater decrease in systolic BP, thus support the present study[18].

CONCLUSION

On the basis of present randomized prospective comparative clinical study it can be concluded that from the hemodynamic point of view there is no significant difference between propofol-fentanyl (TIVA) anaesthetic technique and nitrous-halothane (conventional) anaesthetic technique.

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Original Article

COMPARATIVE STUDY OF "HAEMODYNAMIC CHANGES BETWEEN ENDOTRACHEAL INTUBATIONS AND LMA INSERTION"

Md. Harun-Or-Rashid[1], ASM Meftahuzzaman[1], Manirul Islam[1], AKM Aktaruzzaman[2]

SUMMARY

To compare the haemodynamic changes between LMA insertion & endotracheal intubation, 60 patients were assigned randomly to one of the two groups of thirty each. They were grouped randomly by card sampling. Every patient included in the study was allowed a card preoperatively. According to the card number patients were grouped.

Group A. Airway was maintained by LMA.

Group B: Airway was maintained by ETT.

Haemodynamic parameter i.e. pulse rate, systolic blood pressure, diastolic blood pressure and presence of any dysrhythmia were monitored after 1,3,5 & 10 minutes after LMA insertion or ETT intubations. There was statistically significant changes ($P<0.05$) in pulse rate, systolic blood pressure, diastolic blood pressure and (appearance of dysrhythmia in some patients) in group ti patients whereas there was less changes in pulse rate, systolic blood pressure, diastolic blood pressure whose airway was maintained by LMA insertion (Group-A).

We conclude that LMA insertion causes less Haemodynamic changes than that of endotracheal intubation. So LMA insertion is safer than ETT intubations in some selected patients.

INTRODUCTION

Haemodynamic stability is an important aspect to the anaesthesiologist for the benefit of the patients especially during intubations, laryngeal mask insertion Laryngoscopy and endotracheal intubation can cause striking changes in Haemodynamics as result of intense stimulation of sympathetic nervous system. These changes are potentially dangerous in patients with cardiovascular or cerebrovascular disease as they may lead to per & post operative life threatening ischaemia ,infarction or cerebral haemorrhage.

To avoid these complications LMA can be used as alternative to tracheal intubations for airway management during anaesthesia for short case procedure.

Many studies has shown that there is an attenuated Haemodynamic response to insertion of LMA as compared to endotracheal tube[1,2,3].

Another study has shown that there is same haemodynamic response to insertion of LMA as compared to endotracheal tube[4].

LMA insertion is easier than endotracheal intubation. Insertion of LMA is possible with the patient's neck and head in any position and with practice the operator can insert it from the side or from in front of the patient[5]. It avoids the need of muscle relaxation and useful in managing difficult & failed intubation.

LMA can be used with either spontaneous or controlled ventilation. It is also useful in patients with airway distortionsecondary to tumour, congential problems, mandibular fracture, haematoma, burns involving the mouth & chin, poor mobility of cervical spine[6].

The use of LMA may be associated with less coughing, straining, breath holding and lower incidence of postoperative sorethroat.

LMA is reusable and can he reused up to 50 times and cost effective when used in place of disposable single use of tracheal tubes.

To establish the benefits of LMA, more specifically the haemodynamic stability with LMA, we compare the cardiovascular response to LMA insertion and endotradheal tube intubations.

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MATERIALS & METHODS:

60 (sixty) patients of both sex were selected between the ages of 15 to 50 pears having ASA physical status I & II without any respiratory or cardiovascular diseases. They were randomized by card sampling. A total of 60 cards, 30 for each group was prepared by another person who was not aware of the study. Every patient included in the study was allowed to pick a card preoperatively. According to the card number, patients were grouped in to group A (LMA insertion) & group 13 (ETT intubation). Informed consent was taken from both the groups about the procedure.

All patients were pre-medicated with 0.3 mg atropine. LMA insertion or endotracheal inhabations was done after administering the induction agent (thiopental sodium) plus suxamethonium and was maintained by 70% nitrous oxide, 30 % oxygen, 0.5 '% halothane, IV fluid, vecuronium and fentanyl 1 µg/kg body weight.

In both the groups after arrival into the operating room cardiovascular parameter ere recorded. The cardiovascular parameter such as pulse rate, systolic blood pressure, diastolic blood pressure and presence of any dysrhythmia (drop beat) were recorded before induction and 1,3,5,10 minute after LMA insertion or tracheal intubations. Blood pressure was measured by sphygmomanometer with mercury column.

The cardiovascular parameter before induction of anaesthesia was treated as control value.

RESULTS:

There was no significant difference between group A and group B in respect of age, sex and weight (Table-I).

Table-I

Demographic Data of the Present Study.

Parameter	Group A (LMA)	Group B (ETT)	P. Value
Age	26.861± 10.72	27.83 ± 7.82	0.703
Weight	46.10± 5.66	48.43± 6.03	0.531
Sex: Male	7 (23.33 %)	15 (50%)	
Female	23 (76.66%)	15 (50%)	

*Values are expressed as mean -1 SD or in frequency.

*Data are analyzed by student's 't test. Values are regarded as significant if P<0.05.

There was no significant difference in respect of heart rate (base line) between the groups and there were highly significant difference 1,3,5 &10 min. after insertion/intubations but response was less significant in group A (Table-II).

Table-II

Changes in heart rate in two studied groups.

Group/Time	Base line	I min.	3 min.	5 min.	10 min.
Group A (LMA)	85.6± 7.97	97.86± 8.18	97.6±8.17	88.66±7.79	82.66±5.88
Group B (ETT)	85.86 ±7.4	108.53±6.36	115.06±7.40	100.66±3.33	88.53±4.42
P. Value	0.890	0.000	0.000	0.000	0.000
Comment	NS	S	S	S	S

*Values are expressed as mean 1 SD.

*S= Statistically significant.

*NS= Statistically not significant.

*Data are analysed by student's 't' test. Values are regarded as significant P<0.05.

There was no significant difference between the groups in respect of base line & 10 min. (SBP) after insertion/ intubations and there were highly significant difference l, 3 & 5 min. after insertion/intubations but response was less significant in group A (Table-III)

Table-III

Changes in systolic blood pressure in two studied groups.

Group	Base line	1 min.	3 min.	5 min.	10 min.
Group A (LMA)	112.3311.72	120.16±1 7 L70	121.161±1.93	111.86+±11.00	107.66±10.06
Group B (ETT)	114.33110.14	135.13±15.05	144.16±17.37	123.00±10.05	11.83±9.23
P. Value	0.459	0.000	0.000	0.000	0.000
Comment	NS	S	S	S	NS

*Values are expressed as mean ± SD.
*S= Statistically significant.
*NS= Statistically not significant.
*Data are analysed by student's 'T test. Values are regarded as significant P<0.05.
10 min. 6E+10,06
1.83 E-9.Z3
0.000 NS
There was significant difference between the groups in respect of base line,1,3,5 & 10 min.(DBP) after insertion/ intubations but response was less significant in group A (Table-IV).

Table- IV

Changes in diastolic blood pressure in two studied groups.

Group	Base line	1 min.	3 min.	5 min.	10 min.
Group A(LMA)	72.41±8.15	81.64±7.80	82.20±9.74	75.16±8.41	70.00±6.95
Group B (ETT)	77.48±8.32	96.49±9.79	102.09±11.01	90.16±9.17	79.19±8.17
P. Value	0.081	0.000	0.000	0.000	0.000
Comment	NS	S	S	S	S

*Values are expressed as mean ± SD. *S= Statistically significant.
*Data are analysed by student's 't' test. Values are regarded as significant P<0.05.

One patient in group A & 3 patients in group B suffered from dysrhythmia after I & 3 min. of insertion & intubations. Dysrhythmia appeared in 3.33% cases in group A & 10% cases in group B. So dysrhythmia is more common in group B than that of group A. There was no statistically significant difference between the groups in respect of dysrhythmia (Table-V). Although the statistical value did not show any difference, a three fold higher incidence of dysrhythmia in ETT group seems to be significant, which may become evident in large scale study.

Table-V

Appearance in dysrhythmia (drop bcat) after 1& 3 min. of LMA insertion / ETT intubations.

Group	No. of patient	X^2	P value
Group A (LMA)	1 (333%)	1.06	NS
Group B (ETT)	3 (10%)		P>0.05

*Values are expressed as frequency. Within parenthesis are percentage over column total. *Data are analyzed by Chi-square test, Values are regared as significant if P<0.05. *NS=Statistically not significant.

The elevation of haemodynamic response between the groups were compared by student 'Y' test. Values of group A (LMA insertion) were significantly lower than that of group B (ETT group).

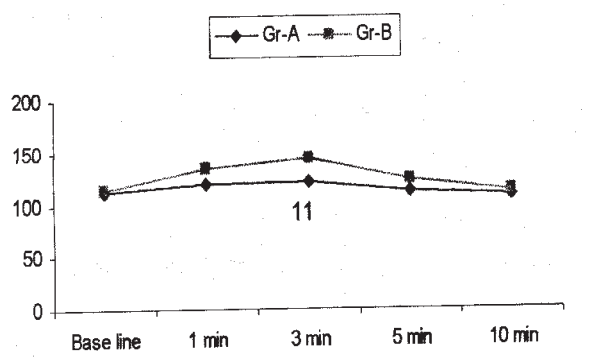

Fig.-1: *Changes of systolic blood pressure in two groups at different time period*

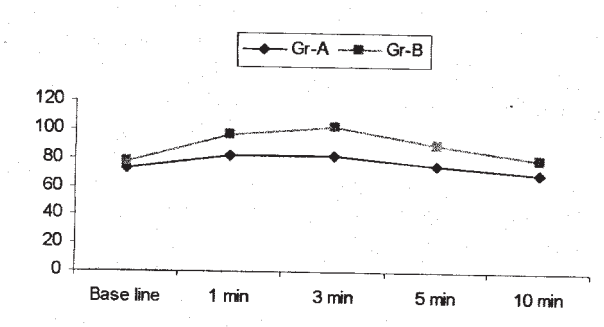

Fig.-2: *Changes of diastolic blood pressure in two groups at different times period*

DISCUSSION:

Haemodynarnic stability is an integral and essential goal of any anaesthetic management plan but haemodynamic changes during intubation especially heart disease, hypertension, increase ICP etc. are a great problem for anaesthesiologist. So anaesthesiologist always try to reduce these haemodynamic changes by applying methods and/ or drugs.

Many drugs have been suggested in modifying haemodynamic responses to laryngoscopic intubation. These include the use of premedication, variety of general anaesthetic agents, lignocane[7], narcotics, ß-blockers, calcium channel blockers, vasodilators and magnesium. Unfortunately none of these pharmacological manipulations can consistently and effectively attenuate these adverse responses, nor are they free from complications. These may prolong recovery time and may lead to cardiovascular complications.

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]. An 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 intubations (for IPPV) that LMA did significantly attenuate (P<o.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, $s_y$stolic blood pressure,diastolic blood pressure compared to Macintosch laryngoscopy in hypertensive patient[9]. 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 thropentone induction[10]. 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 infra ocular 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 ETT intubations.

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

CONCLUSION

We conclude that LMA insertion causes less changes of haemodynamic parameters when compared with that of ETT intubations. Our finding suggests that LMA can be safe and beneficial alternative to ETT for fit patients undergoing short surgical procedure.

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Original Article

RANDOMISED COMPARISON OF GENERAL ANAESTHESIA & SUBARACHNOID BLOCK FOR CAESAREAN DELIVARY IN PREGNANCIES COMPLICATED BY ECLAMPSIA

Manash Kumar Basu[1], Hasina Begum[2], Md. Abdul Karim[3], M Khalilur Rahman[4]

SUMMARY:

General anaesthesia & subaracnoid block were used randomly in women with eclampsia who required caesarian delivery to evaluate the maternal and foetal effects of the two anaesthetic methods. The haemodynamic parameters, level of consciousness of the mothers and APGAR scores of the neonates were assessed. A total 60 women with eclampsia underwent caesarean section were allocated randomly received either of the techniques. Both the techniques provided good quality anaesthesia. At arrival in OT, there was no significant difference of MAP between two groups. But following induction there developed significant difference between two groups & within the same group. There was no significant difference of neurological status between two groups within 24 hours after operation. There were significant difference of Apgar scores in 1 min. after birth & at 5 min. no significant difference were found between the two groups. Out of 30 infants of GA group II had to resuscitate with Ambu-mask ventilation & 6 babies had to sent special care unit. From SAB group 2 infants received resuscitation & one baby had to sent special care unit. In the context of Bangladesh, General anaesthesia as well as Subaracnoid block are equally acceptable for LUCS in eclamptic mothers, if steps are taken to ensure a careful approach to either method.

INTRODUCTION:

Incidence of eclampsia is still complicates a large number of pregnancies in developing countries[1] though the incidence is decreasing in the developed countries. The definitive treatment of eclampsia is delivery of the foetus & placenta[2,3]. If not all, many of the mothers suffering from eclampsia requires caesarean section under anaesthesia. For long there is little agreement concerning the optimal anaesthetic management of caesarean section in the patients with eclampsia[4]. Both spinal & epidural were avoided in women with severe pre- eclampsia & eclampsia and most investigators advocate general anaesthesia[4]. Randomised comparison of general anaesthesia & regional anaesthesia for caesarian delivery in pregnancies complicated by severe pre-eclampsia & eclampsia has been done with appreciable results[5]. But there is lack of studies on caesarean section of eclamptic patients under subaracnoid block.

In order to expand obstetric care to the remote areas of Bangladesh, subaracnoid block has gained reliability. Anaesthsiologists have also attained confidence in performing subaracnoid block on regular basis to the mothers with pregnancy induced hypertension. One study of regional anaesthesia on eclamptic mothers revealed that subaracnoid block is acceptable for caesarian delivery in those patients if steps are taken to ensure a careful approach[6].

This current control study was carried out to gain more confidence about the safety compared to general anaesthesia. The study reveals that in case of LUCS for caesarian delivery for eclamptic mothers subaracnoid block is equally acceptable as general anaesthesia. It is rather advantageous in some respects. The chief objective of this study is to evaluate the maternal & foetal outcome of eclamptic mothers who required caesarian delivery by GA or SAB and to find out whether subaracnoid is advantageous for such patients.

MATERIALS & METHODS:

Sixty women with eclampsia who required LUCS under anaesthesia in Dhaka Medical College Hospital (DMCH), Bangladesh, were randomly

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selected & studied between January 2001 to December 2001. Inclusion criteria for eclampsia included the following: convulsion, hypertension, proteinuria. Women with medical complications (including heart disease, diabetes mellitus, bronchial asthma or chronic renal disease) were excluded. Bed side whole blood coagulation test was done & whole blood sample failed to coagulate within seven minutes was taken as an exclusion criteria. women with overt bleeding were not also included. In addition to exclusion criteria, the attendants of the patient who were not willing to participate in the study were excluded from the study.

Patients were seen in the eclamptic ward as they were diagnosed & treatment started. The investigator took part in controlling convulsion & hypertension. Patients attendants were informed in details about the study. Prior permission had been taken from the hospital authority explaining the purpose & procedure of the study. Only those who gave written consent to participate were accepted. Patients were randomly assigned in two groups according to sealed envelopes to receive general anaesthesia or subaracnoid block as they had arrived at operation theatre. Mothers who were to receive general anaesthesia consisted group I & who were to receive subarachnoid block assigned as group II.

Obstetric management included magnesium sulphate for controlling seizure & intermittent Inj. Hydralazine was given IV as needed to lower the diastolic blood pressure that reached 110 mm Hg. or greater. In brief, magnesium sulphate (4 gm 50% solution IV and 6gm. IM) was administered. Hydralazine was administered IV in 5 – 10 mg boluses, as needed, at 20 minutes intervals during labour or the puerperium to reduce diastolic blood pressure. Administration of fluid containing electrolytes was limited to 60 ml/hr.

On entry to the operating room, patients were transfer to operating table. For both the groups immediate management included, left uterine tilt, & administration of 60% oxygen by clear face mask. Those who were conscious were requested to co-operate with the procedure involving anaesthesia. A Datex-Ohmeda S/5 light monitor was attached for continuous ECG monitoring along with heart rate, NIBP (Systolic, diastolic & mean) & measurement of SPO_2.

Women randomized to general anesthesia were inducted by rapid sequence induction using Inj thiopental (4-5 mg/kg), Inj. suxamethonium (1.5 mg/kg) with cricoesophageal compression until tracheal intubation was done and endotracheal tube cuff inflated. To prevent hypertension from tracheal stimulation, inj. Lignocaine (1.5 mg/kg) before starting rapid sequence induction and inj. Nitroglycerine (50-ìg boluses, maximum 200 ìg) administered intravenous immediately before intubation. Oxygen, nitrous oxide and halothane concentration were 50:50.5% respectively) Neuromuscular block was maintained with inj. Vecuronium and monitored using peripheral nerve stimulation. Inj. Pethidine 1 mg/kg as administered IV shortly after delivery. Neuromuscular blockade was reversed using neostigmine and atropine. These women were observed closely in the recovery room for next 12 hours.

For spinal anaesthesia, preloading was done with 15 ml/kg body wt. of Ringer's lactate solution was accomplished on arrival to the operating room. A 25-gauze Quincke Babcock needle was placed in subarachnoid space between 4^{th} and 5^{th} lumbar vertebral interspace. In case of restless patients incremental doses of inj. Thiopental sodium was administered to abolish the restlessness. One trained anaesthetist was available to maintain airway patent. Two ml of 0.5% heavy bupivacaine was injected as there was free flow coming through the needle. The needle was then withdrawn and the lady was immediately positioned supine with left lateral tilt. Her shoulder and neck elevated and in slight flexion to limit cephalad migration of the anaesthetic agent to the T_4 level.

Demographic data were recorded. The highest & lowest systolic and diastolic maternal blood pressure in the eclampsia ward were also recorded. Logistical data included intervals of preparation for anaesthesia & time posts of anaesthetic and surgical events. Maternal blood pressures on entry to the operating theatre were measured every 2 minutes throughout the whole period in operation theatre (preparation, Induction of anaesthesia & intraoperative period). Volume of intravenous fluid administration & urine output were recorded. Infant outcomes in relation to the type of anaesthesia included gestational age at delivery, APGAR scores & admission to special care unit.

The study was terminated after taking the measurement of Glasgow Coma Score, blood pressure (systolic, diastolic & mean arterial) & urinary out put at 24 hours. Haematocrit value was also measured at 24 hours.

The assessment of preoperative, peroperative & postoperative parameters & the tests were done by the investigator himself. The data were collected & analyzed statistically using paired and unpaired t-test as appropriate. A value of $p<0.05$ was considered to be significant.

RESULTS:

A total of 60 patients were studied. Patients of both the groups were comparable in age and body weight (Table – I). They were also comparable with regard to Glasgow coma score & gestational period (Table – II). Table V shows some of the logistics of providing these two types of anaesthesia. General anaesthesia was associated with significantly shorter arrival in OT to induction interval. But the time interval between induction to skin incision & skin incision to delivery interval were not significant.

Table III summarizes maternal BPs preoperative, postoperative & 24 hours after LUCS, in relation to type of anaesthesia used. The mean highest systolic and diastolic blood pressure before arrival into operation theatre was approximately 153/103mm of Hg which was non significant between two groups. In the recovery room & at 24 hours after LUCS there were no significant difference in average highest systolic and highest diastolic between two groups. Hypotension requiring treatment with fluid boluses & ephedrine occurred in SAB group. Total amount of fluid infusion in SAB group (1696 ± 53.38 ml) was significantly different from GA group (889 ± 9.40 ml). Preoperative & postoperative haematicrits (first postoperative day) were not significantly different between the anaesthetic groups, & none of the mothers required blood transfusion (Table-VII). Mean arterial blood pressure profiles at different key time posts were analyzed (Table-XI). At arrival in OT, there was no significant difference of MAP between two groups. Following induction there developed significant difference between two groups & within the same group. Urine flow difference was not significant between two groups preoperatively. But it significantly increased in women in both the groups. Then with no significant tendency for augmented flow in women given larger fluid volumes. Neurological status was measured with Glasgow coma score. On arrival at OT they were similar. There were also no significant difference between two groups 24 hours after operation.

Infant condition at birth measured by (APGAR) scores. There were significant difference of APGAR scores in 1 min. after birth & at 5 min. no significant difference were found between the two groups. Out of 30 infants of GA group 11 had to resuscitate with Ambu-mask ventilation & 6 babies had to send special care unit. From SAB group 2 infant received resuscitation & one baby had to send special care unit. There was no significant difference in birth weight between babies of mothers of two groups (Table-XII).

Table-I

Demographic Characteristics of eclamptic mothers of two groups

Characteristics	Group I (n -30)	Group II (n – 30)	p	Significant difference
Age(years)	21.60 ±.79	21.00 ± .77	> .10	NS
Body wt.(Kg)	50.07 ± 1.15	49.10 ± 1.28	> .10	NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. NS = not significant.

Table: II

Clinical profile of eclamptic mothers of two groups

Parameters	Group I (n -30)	Group II (n – 30)	p	Significant difference
Gestation(weeks)	36.50 ± .39	36.87 ± 0.32	> .10	NS
No. of convulsions before treatment started		6.83 ± 0.70	5.94 ± 0.61	> .10 NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. NS = not significant.

Table- III

Maternal blood pressure before, after and at 24 hours after caesarean delivery

Parameters	Group I (n -30)	Group II (n – 30)	p	significant difference
Blood pressure in eclamptic ward(mm Hg)				
Highest systolic	153.07 ± 2.99	150.67 ± 2.54	> .10	NS
Highest diastolic	106.10 ± 1.94	103.83 ± 2.24	> .10	NS
Blood pressure in recovery room(mm Hg)				
Highest systolic	144.53 ± 1.91	150.2 ± 2.73	> .10	NS
Highest diastolic	101.57 ± 1.56	98.43 ± 1.3	> .10	NS
Blood pressure at 24 hrs after LUCS(mm Hg)				
Highest systolic	132.20 ± 1.48	135.47 ± 1.77	> .10	NS
Highest diastolic	88.33 ± 0.88	86.53 ± 0.91	> .10	NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. NS = not significant.

Table- IV

Intravenous fluid volumes

	Group I (n -30)	Group II (n – 30)	p	Significant difference
Pre-inductionIV fluid (ml)	120.547 ± 9.40	683.33 ± 19.52	<.001	HS
Total IV fluid(ml)	889.16 ± 9.40	1696.67 ± 53.38	<.001	HS

Data are presented as mean ± standard error of mean
Unpaired students t-test. HS = Highly significant.

Table- V

Interval of surgical events

Interval	Group I (n -30)	Group II (n – 30)	p	Significant difference
Arrival in OTto anaesthesiainduction (min)	12.06 ± 0.70	17.37 ± 0.86	<.001	HS
Induction to skin incision (min)	6.30 ± 0.45	5.83 ± 0.33	> .10	NS
Skin incision to delivery (min)	8.37 ± 0.50	7.46 ± 0.60	> .10	NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. HS = Highly significant., NS = not significant.

Table- VI

Urine flow

Urine flow (ml/Kg/hr)	Group I (n -30)	Group II (n – 30)	p	Significant difference
Before surgery	0.90 ± 0.05	0.95 ± 0.03	>0.10	NS
During surgery	1.26 ± 0.06	1.54 ± 0.09	<0.05	HS
After surgery	1.25 ± 0.09	1.39 ± 0.05	>0.10	NS
At 24 hours after surgery	1.30 ± 0.40	1.43 ± 0.05	>0.50	NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. HS = Highly significant, NS = not significant.

Table - VII

Pre-operative and Postoperative haematocrit value

	Group I (n -30)	Group II (n – 30)	p	Significant difference
Preoperative Haematocrit (%)	34.1 ± 0.70	33.2 ± 0.41	> .10	NS
Postoperative Haematocrit on 1st Post. op. day (%)	30.1 ± 0.77	28.57 ± 0.56	> .10	NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. HS = Highly significant., NS = not significant.

Table - VIII

Pre-operative and Postoperative Conscious level

Glasgow coma score	Group I (n -30)	Group II (n – 30)	p	significant difference
GCS on arrival at OT	11.93 ± 0.28	11.96 ± 0.44	> .10	NS
GCS at 24 hrs	14.66 ± 0.14	14.73 ± 0.15	> .10	NS

Data are presented as mean ± standard error of mean
Unpaired students t-test. HS = Highly significant., NS = not significant.

Table - IX

Drugs used to manage hypotension and restlessness

	Group I (n -30)	Group II (n – 30)
Inj. Ephedrine for hypotension	0	26 (86.66%)
Inj. TPS to manage restlessness during induction of subarachnoid block	0	16 (53.33%)

Data are presented as n (%)

Table - X

Drugs used to prevent hypotension from laryngoscopy and intubation

	Group I (n = 30)	Group II (n = 30)
Inj. Glycerol Trinitrate (mg)	107 ± 4.69	0

Data are presented as mean ± standard error of mean

Table - XI

MAP at different time periods of operative procedure

Parameters	Group I(n -30)	Group II(n – 30)	p	significant difference
Arrival at OT	114.87 ± 7.50	112.6 ± 1.55	>0.10	NS
At induction	115.97 ± 1.07	109.56 ± .93	>0.10	NS
At skin incision	123.97 ± 2.00	93.27 ± 1.74	<0.001	HS
At the time of delivery	109.6 ± 1.53	85.7 ± 1.40	<0.001	HS
At skin closure	102.43 ± 1.40	88.53 ± 2.68	<0.001	HS

Data are presented as mean ± standard error of mean
Unpaired students t-test. HS = Highly significant., NS = not significant.

Table - XII

Foetal status

Parameters	Group I(n -30)	Group II(n – 30)	p	significant difference
Body weight (Kg)	2.02 ± 0.48	2.18 ± 0.09	>0.10	NS
Apgar at 1st minute	4.46 ± 0.48	6.76 ± 0.49	<0.001	HS
Apgar at 5th minute	8.7 ± 0.25	9.2 ± 0.21	>0.10	NS
Resuscitation needed	11 (36%)	2 (6%)		
Sent to special care unit	6 (20%)	1 (3%)		

Data are presented as mean ± standard error of mean, or n (%)
Unpaired students t-test. HS = Highly significant., NS = not significant.

DISCUSSION:

There was no incidence of failure of spinal anaesthesia. All anaesthetic procedures were conducted by the investigator himself. None of the women were predicted to have a difficult airway for intubation and there was no difficult intubation. None of the women suffered serious complications resulting from any of the two anaesthetic methods used specially there was no serious foetal effects from maternal circulatory changes induced in SAB. A number of potential maternal complications has described. Laryngeal oedema with difficult intubation associated with aspiration results in hypoxaemia of rapid onset resulting in serious maternal morbidity & mortality[7,8]. In addition, laryngeal oedema has resulted in respiratory arrest in the recovery room.

Maternal hypotension caused by SAB was manageable without excessive fluids and there was not a dangerou response to vasopressor when such agents were necessary. The investigators found that fall of BP was not enhanced rapidly when compared to conventional anti-hypertensive therapy with intermittent IV inj. hydralazine. Tracheal intubation did not stimulate uncontrolled maternal hypertension when BP was carefully managed immediately before induction and intubation in general anaesthesia. Not unexpectedly, the choice of anaesthetic had logistic implications because preparation time for LUCS was longer when SAB was used. It was some how surprised that none of the advantages or disadvantages cited commonly for the anaesthetic techniques used for these women with eclampsia were confirmed in the investigation. Rather spinal anaesthesia gave some advantages concerning the foetal outcome when Apgar scores were compared with babies of mothers having general anaesthesia. Laboratory tests for coagulopathy was difficult for our setting. Time of admission, urgency of caesarean section, financial ability all resulted in constraints. But absence of clinical bleeding as evidenced by gum bleeding, petechiae or haematuria when combined with negative bed side whole blood coagulation test as advocated by WHO for developing countries has given good predictive value. There was no sign or symptoms of intraspinal or extradural haematoma.

There was lack of studies of anaesthetic techniques on eclamptic mothers. So far known, no randomized trial has been to compare the commonly used techniques. But this investigation gave the understanding that regional anaesthesia is not contraindicated nor is general anaesthesia is indicated exclusively in women with eclampsia.

CONCLUSION:

Many obstetricians & some of the anaesthesiologists may consider SAB in eclamptic mothers contraindicated, because of the risk of rapid onset of severe hypotension. However the potential advantages of SAB – early induction to delivery of the infant and better Apgar score of the infant – warranted reappraisal of the technique. In our country emergency obstetric care has got the emphasis and the care giving system is extending rapidly in rural areas. Modern anaesthetic machine & all drugs of general anaesthesia availability has proven difficult. Neuroaxial block has got its footage in such situation. There is high incidence of pregnancies complicated by eclampsia in our country. SAB for LUCS in eclamptic can be an equal choice as GA.

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Original Article

BIOCHEMICAL AND HAEMODYNAMIC EFFECTS OF CRYSTALLOID SOLUTIONS ADMINISTERED DURING PERIOPERATIVE PERIOD

Debasish Banik[1], Qumrul Huda[1], Abdul Hye[2], KM lqbal[3]

SUMMARY:

Forty five (45) ASA grade I & II patients aged between 21 to 55 years, scheduled for electiv abdominal surgery (incision not exceeding 15 cm with minimal blood loss, under general anaesthesia were randomly allocated into three groups (A, and C). Patients of Group A, B and C received infusion of 5% dextrose aqua, normal saline and 5% dextrose in normal saline respectively throughout peri-operative course (upto 24 hours after operation). Each group received post operative period. Parameters recorded were mean arterial pressure (MAP), Pulse, Serum elecirolyte (Na+, K+), amount of fluid in fused and urine output during operation and postoperatively Blood samples for serum electrolyte estimation were taken just before induction, immediately before reversal and twenty four hours after surgery. A standard anaesthetic technique was followed for all groups.Percentage increase from pre-operative values were calculated for mean arterial pressure, pulse rate and serum electrolytes. The ratio between urine output and fluid infused during per- and post-operative period were calculated. There were statistically significant ($p<0.05$) difference between group A and C in per- and post-operative change in pulse rate and statistically significant difference ($p<0.05$) in post-operative output / input ratio between group A and B and highly significant ($p<0.01$) between A and C. Electrolyte containing fluids of higher osmolality caused increased diuresis in per-operative period and increased pulse rate in post-operative period. So, although there are few difference between three fluids, these didnot produce any effects(beneficial or detrimental) on the body system under normal conditions.

INTRODUCTION:

Peri-operative fluid and electrolyte administration to be daily challenge in the practice of anaesthesia. Crystalloid solutions are normally given during surgery to maintain cardiovascular stability and urine output[1]. The use of colloids during operation has been reported by Shire et al[2]. to reduce the volume by 50%. This may be considered undesirable because of the danger of renal impairment.

Now-a-days commonly used crystalloid solutions during peri-operative period in this country are 5% dextrose in aqua, normal saline and 5% dextrose in normal saline. They may have different haemodynamic effects and produce electrolyte changes,which may be different. The purpose of this study is to compare these solutions and the changes they produce whether detrimental or beneficial to the body.

Aims of study:

1. To asses the electrolyte changes with different types of fluids.
2. To evaluate the haemodynamic response to different types of fluids.

METHODS:

45 adult patients of either sex, aged between 21 to 55 years of ASA grade I & II were included in this study. they were randomly selected from elective operating list for abdominal surgery (incision not exceeding 15 cm) informed consent was obtained from each patient .

On arrival to operation theater blood pressure (systolic and diastolic pressure) pulse rate and rhythm were recorded. A I G size intravenous cannula was inserted and a sample of blood (3cc) was drawn in a dry sterile test tube for serum electrolyte (Na+, K+) estimation. Patients were randomly allocated into three groups (A, B and C). Patients belonged to group A received 5% dextrose aqua, group B received normal saline (9% NaCI) and group C received 5% dextrose in normal saline

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throughout preoperative period j intraoperative and 24 hours after reversal). Urine output measured properly collected by catheter.

Anaesthetic technique was standard. Inj. sodium thiopentone (5 mg/kg) followed by suxamethonium (1mg/kg) were given for induction of anaesthesia and endotracheal intubation. Anaesthesia was maintained by using nitrous oxide (66%), oxygen (33%), Halothane (5-1%), pancuronuin (0.06-0.08 mg/kg) and pethedine (lmg/kg). Normocapnia was maintained throughout the intraoperative period. Reversal was as usual using neostigmine (40-45 mg/kg) and atropine (20-25 μgm/kg).

Blood sample was drawn shortly before reversal and after 24 hours for serum electrolyte estimation. Serum electrolytes (sodium, potassium) were estimated by flame photometry and mean arterial pressure was worked out.

Post-operative analgesia was maintained by intramuscular pethedine (1.5 mg/kg) 6 hourly. Each group received 2 ml/kg/hr of fluid for pre-operative insensible loss (since last oral intake) which was given as initial volume and 2 ml/kg/hr of fluid for pre-operative insensible loss. Thereby estimating surgical trauma 4-8 ml/kg/hr of fluid was given.

During post-operative period 40 ml/kg/day of fluid plus losses through drains were given. Urine output was recorded every 6 hours for 24 hours after operation.

Parameters recorded (during surgery and for 24 hours after operation)

1. Pulse and blood pressure (every 10 minutes during surgery and 2 hourly in the post-operative period.)
2. Urine output (intra-operative and 6 hourly in the post- operative period.)
3. Serum electrolyte (Pre-operative, Per-operative and 24 hours after reversal).

RESULTS:

Table I gives the details of the Patients (age and weight) and duration of operation. There were no significant difference between three groups regarding age, weight and duration of operation.

Details of the parameters noted (group A, B and C) are shown in table II.

Table III gives the percentage change from pre-operative values (except fluid input and output) and table IV gives the comparison between three groups regarding their percentage change from pre-operative values.

Urine output/Fluid infused ratio (0/1) of three groups are given in table V and table VI gives the comparison of their ratios. The ratio is significant ($p<0.05$) between A and B and highly significant ($p<0.01$) between A and C.

In table IV there were no significant difference between group A and B and there were also no significant difference between group B and C. There were significant difference between group A and C at per-operative and post-operative change in pulse rate.

Table I

Age, Weight And Operative Time Distribution

	Group A (N=15)	Group B (N=15)	Group C (N=15)
Age (years)	40+ 8.37	34± 8.82	38.46± 7.11
Weight (kg)	57.33± 8.89	54.2± 9.42	51.66 ± 11.79
Duration (minutes)	69.33± 27.5	64.66± 17.36	73.33± 33

Table - II

Details of Parameters Records

	Mean Anterial Pressure (mmHg) Mean ± SD			Pulse Rate (beats / min) Moan ± SD			Fluid Output (ml)Mean±SD		Urine Output (mlMean±SD		Urine electrolytes (Mean ±SD Na+ (mmol/L) Samples			K + (mmol/L) Samples		
	Pre	Per	Post	Pre	Per	Post	Per	Post	Per	Post	1st	2nd	3rd	1st	2nd	3rd
Gr. A	100.66	99.32	86.2	95.37	97.11	89.77	670	2726.66	48.33	2386	138.6	139.66	139.66	4.41	4.8	4.77
	1062	10.19	7.86	11.57	9.78	10.5	314.98	500.30	88.87	1046.84	2.91	3.33	2.99	.68	.56	.87
Gr B	93.53	93.78	86.45	86.93	95.55	90.38	603.33	2526.66	45	1503.33	140.73	140 .51	140.31	4.58	4.28	4.65
	11.76	10.64	14.01	9.85	7.86	7.16	166.33	480.64	91.7	593.25	2.54	3.21	2.83	.72	.03	42
Gr. C	89 12	89.92	81.93	83.6	94.75	84 92	666.66	2416.66	95 33	1450.66	139	140.4	138.6	4.57	4.68	4.59
	12.96	8.81	10.09	*1.77*	8.43	9.34	24.76	395.3	173.73	743.73	2.71	2.61	2.99	.53	*56*	*.74*

Table III

Percentage of Change From Preoperative Values

	Mean Arterial Pressure		Pulse		Serum Electrolytes			
					Na+		K+	
	Per	Post	Per	Post	Per	Post	Per	Post
Gr. A	0.70 [a]	12.72[a]	3.53[b]	3.64[a]	0.78 [b]	0.76 [b]	7.05[b]	7.20 [b]
	+ 10.62	± 12.93	±13.77	± 11.08	± 1.95	± 3	± 10.43	± 20.8
Gr. B	0.61 [a]	7.6 [a]	11.3[b]	5.67[b]	0.34 [b]	0.164[a]	0.276 [b]	4.56 [b]
	+ 10.81	+ 11.25	± 9.85	± 16.36	± 2.81	± 2.69	± 13.08	± 13.08
Gr. C	1.85 [b]	7.71[a]	14.76[b]	4.76[b]	0.84 [b]	0.438 [a]	5.92[b]	7.36[b]
	±14	±11.25	±15.14	± 14.4	±2.96	±3.1	±12.25	±21.61

a = % Decrease b =% Increase

Table IV

Comparison of Percentage Change From Pre-Operative Values of Three Groups (Except Fluid)

	MAP (mmHg)		Pulse (beats/min)		Electrolytes (mmol/L)			
					Na+		K+	
	Per	Post	Per	Post	Per	Post	Per	Post
Gr. A	0.707[a]	12.72[a]	3.53[b]	3.64[a]	0.78[b]	0.76[b]	7.05[b]	7.20[b]
	± 10.62	± 12.93	± 13.77	± 11.08	±1.95	±3	± 10.43	± 20.8
Gr. B	0.61 [a]	7.6 [a]	11.3[b]	5.67[b]	0.34[b]	0.164[a]	0.276[b]	4.56 [b]
Results	± 10.81	±11.25	±9.85	± 16.36	± 2.81	± 2.69	±13.08	± 13.08
't' test	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Gr. B	0.61 [a]	7.6 [a]	11.3 [b]	5.67 [b]	0.34 [b]	0.164 [a]	0.276 [b]	4.56[b]
	± 10.81	± 11.25	± 9.85	± 16.36	± 2.81	± 2.69	± 13.08	± 13.08
Gr. C	1.85 [b]	7.71 [a]	14.76 [b]	4.76 [b]	0.84[b]	0.438 [a]	5.92 [b]	7.36 [b]
Results	± 14	± 10.5	± 15.14	± 14.4	± 2.96	± 3.1	± 12.25	± 21.61
't' test	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S	N.S
Gr. C	1.85 [b]	7.71 [a]	14.76 [b]	4.76 [6]	0.84	0.438 [a]	5.92	7.36
	±14	±10.5	± 15.14	± 14.4	±2.96	± 3.1	±12.25	±21.61
Gr. A	0.707[a]	12.72[b]	3.53[b]	3.64[b]	0.78[b]	0.76[b]	7.05[b]	7.20[b]
Results	± 10.62	± 12.93	±13.77	± 11.08	± 1.95	± 3	±10.43	± 20.8
't' test	N.S.	N.S.	S	S	N.S.	N.S.	N.S.	N.S.

a = % decrease from pre-opvalues
b =% increase from pre-op values
NS = not significant S = significant (*p<0.05)

Table V

Urine Output / Fluid Infused Ratios of Three Groups

	Per-operatives	Post-operative
Group A	0.047	0.86
	±0.076	±0.29
Group B	0.061	0.62
	±0.11	±0.25
Group C	0.126	0.57
	±0.26	±0.27

Table VI

Comparison of Urine Output / Fluid Infused Ratios of Three Groups

	Per-operatives	Post-operatives
Group A	0.047	0.86*
	±0.076	±0.29
Group B	0.061	0.62
	±0.11	±0.25
Results 't' test	NS	N.S.
Group B	0.061	0.62
	±0.11	±0.25
Group C	0.126	0.57
	±0.26	10.27
Results 't' test	N.S.	N.S.
Group C	0.126	0.57
	±0.26	±0.27
Group A	0.047	0.86**
		±0.076
Results 't' test	N.S.	N.S.

NS = not significant
S = significant (*p<0.05)
HS = highly significant (**p<0.01)

DISCUSSION

Crystalloid solutions are normally given during peri-operative period (in addition to replacement of significant blood loss) to maintain cardiovascular stability and urine output[1]. Some authorities recommend only 'Balanced salt solution such as Hartmann's solution[2-5]. But Hartmann's solution is costly and it is not rational to overload circulation with electrolytes routinely. Some recommend isotonic (5%) glucose followed by Hartmann's solution[6], whilst others recommend iso-osmotic mixture of glucose and saline[7]. Recently there has been a move to restrict the volume of infused crystalloid by use of colloids[8]. The use of colloids during operative period has been reported by Shire's and colleagues[9] to reduce the volume of fluid given during operation by 50%, but post-operative urine output also decreased by 50%. This may be considered because of the danger of renal failure. So, crystalloids are alive and well[10].

There are a few studies regarding the comparison of crystalloids during peri-operative period as far as information available. Roberts et al[11] compared Hartmann's solution (ringer lactate) with dextrose aqua and found a deficit in extra-cellular volume, as measured by radioactive sulphate of 1.9 ± 0.81 (p<.003) compared to the per-operative volume was found in the dextrose group. This is accompanied by a decrease in mean urinary sodium excretion (-57%, p<0.05). The use of Ringers lactate resulted in no change in ECV and no change in sodium excretion. As a result of these findings, it appears that post-operative sodium retention in a physiologic response to decreased ECV, which can be prevented by the administration of electrolyte containing fluids.

In this study, three crystalloids have been compared. Table III shows that in group A (5% dextrose) there is greater reduction of Mean Arterial Pressure (MAP) from pre-operative value (-12.73%), in comparison with group B (normal saline, - 7.6%) and group C (dextrose in normal saline).

The pulse rate is increased in the per-operative period in all three groups due to increased sympathetic activity and action of muscle relaxant pancuronium. It is more marked in group B (+ 11.3%) and C (+ 14.3%) than in group A(+ 3.53%). In the post-operative period pulse rate is decreased in group A(- 3.64%), but in group B it is + 5.49% and C + 4.76%, it is lower than per-operative values, but still higher than pre-operative values. There are statistically significant difference (p<0.05) between groups A and C. The most probable cause of increased pulse rate with group B and C could be due to Bainbridge reflex [12] . This reflex is initiated by expansion of ECV due to infusion of salt containing fluids. There are no rhythm disturbance in any group of patients. Sodium level is increased in group A in per-operative (0.78%) and post-operative (0.76%) period, which is due to increased secretion of aldosterone as a consequence decreased sodium load in extra cellular fluid". In group B (-0.164%) and C (-0.438%) in post-operative period there decreased levels as a result of increased sodium load. Potassium level is more or less increased in the peri-operative period in all three groups due to increased released of potassium from traumatized tissues.

There is fluid retention in the body as a response to surgery and anaesthesia. Table- V gives the output and input ratios of three groups during per and post operative periods. In per-operative period there is

least output in group A (0.047), more in group B (0.061) and highest in group C (0.128). It is due to osmolality of the type of fluid. But in post-operative period diuresis is highest in group A (0.86) lower (0.62) in group B and lowest in group C (0.57). This is due to hormone (ADH) from post-pituitary [14]. This ratio is statistically significant ($p<0.05$) between group A and B during post-operative period and highly significant ($p<0.01$) between A and C. Therefore, it is evident that increased osmolality causes anti-diuresis.

So, from above observations it is evident that there are some differences between electrolyte and non-electrolyte containing fluids and a few difference between electrolyte containing fluids. It is also found that previously healthy patients with a uneventful peri-operative course can tolerate most bizarre fluid regimens. Haemodynamic and electrolyte problems are much more common with pre-existing renal and cardio respiratory diseases.

CONCLUSION:

From this study it may be concluded that although there were few significant difference between infusion of three fluids, these did not cause any serious changes in the body systems under normal conditions. But it is advisable that haemodynamic and biochemical parameters should be within normal range during peri-operative course for safety of the patients.

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Original Article

NEEDS OF TERMINALLY ILL PATIENTS AND THEIR FAMILIES: AN EXPERIENCE WITH FIFTY THREE PATIENTS ATTENDING A NEWLY ORGANIZED PALLIATIVE CARE SERVICE IN BANGLADESH

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ABSTRACT:

Objective. To identify the needed care of the terminally ill patients and their families in Bangladesh

Design: Retrospective, descriptive cross-sectional study

Setting: Out Patient Consultation, referred admitted patients and home care visits by the same palliative care team of Bangabandhu Sheikh Mujib Medical University (BSMMU)

Participants: 53 terminally ill cancer patients registered with the palliative care service of BSMMU

Results: Age range of 22 to 80 years, mostly from middle to poor class. Most of the patients needed relief from pain, anxiety, sleeplessness and constipation along with other symptom relief. Major concern of patients was financial whereas major concern of family members was not to inform the patient of the disease status.. Preferred site of care was at home when uncertainty about the disease status was reduced.

Conclusion: even if a 'good life' is not possible for all the people of Bangladesh, 'a good death for most of the patients suffering from incurable diseases can be an affordable reality.

Key words: need, symptom assessment, palliative care, Bangladesh

BACKGROUND:

Palliative Care (PC) attempts to relieve suffering and improve the Quality Of Life (QOL) of the living and the dying [1]. PC has been defined by the World Health Organization (WHO) as 'the active total care of patients whose disease is not responsive to curative treatment'. In addition, WHO stated that "the control of pain, of other symptoms, and of psychological, social and spiritual problems is paramount" . PC affirms life, regards dying as a normal process; neither hastens nor postpones death, supports the patient and the family in living actively, and supports the family during the dying process of their family members and in bereavement [2]. This emphasis recognizes that most of the cancers in the developing world are incurable at diagnosis, if they are diagnosed at all[3]. Due to the predominantly cure based approach of modern medical science, more than 30 million people suffer unnecessarily from severe pain and other symptoms each year in the world [4]. Having recognized this, a balanced view also acknowledge that in last sixty years enough knowledge has been gained in medical science to relieve much of these sufferings in a very affordable way and thereby enabling a person's peaceful exit from life.

It has been shown that physical symptoms of patients in terminal phase of disease are associated with increased distress [5] as well as major depression[6] and anxiety[7],. Distress is, in turn, influenced by diverse psychosocial and cultural factors. The assessment of symptoms and symptom distress is, therefore, a vital aspect of clinical care, particularly in advanced and incurable illnesses for which the primary goals of care may relate to comfort and quality of life (QOL)[8] The prevalence of symptoms contribute to determining the patient's needs in terms of symptom control and therefore provision of services. Measuring symptom changes over time is used to assess whether treatments are effective. In education, clinical staff needs to know how often they are likely to encounter a symptom and what its likely causes are[9]. Symptom epidemiological data can help to direct assessments of health care need, for planning service, and to indicate how many

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services are needed. Further, symptom measurement information can direct research and audit [10].

Methodology: The study presents a total Fifty nine patients who were referred to the Palliative Care Service (PCS) of Bangabandhu Sheikh Mujib Medical University (BSMMU) by physicians of different disciplines. The PC unit is recently formed one in the country. The time period during the study was from November 2007 to May 2008. Six patients were non-cancerous complaining of symptoms from other origins and were excluded from the study. This was a retrospective cross-sectional descriptive study. Out of Fifty three patients, forty visited the out patient consultation service where as 8 patients were admitted in other units and PC consultation was sought by the respective departments. Five patients could not come to the hospital and the team went to see them at home. Relevant data were collected from the record sheets which was prepared (with some modification) following the ones used by the Institute of Palliative Medicine, (IPM), Calicut, Kerala. All efforts were given to get the maximum information during the first visit of the patients. The data sheets were completed exclusively by those doctors and nurses who successfully completed their Basic Certificate Course in IPM and now run the unit.

Results: Out of these fifty three patients, 25 were females (47.16%); where as 28 (52.83%) were male. The age of these patients ranged from 22 to 80 years with an average of 53 years. All these 53 diagnosed cases of cancers had undergone radiotherapy and /or Chemotherapy and 24 patients had undergone surgery prior to the referral. All these patients were considered to have reached in an incurable phase of the disease by their treating physicians during the referral. Socioeconomic status of these patients were categorized as 3 (5.66%) very poor, 15(28.30%) poor, 23(43.39 %) middle class, 10 (20.75%) belonged to the affluent group. These 53 patients had a total of 246 members in their families directly living with them. 39(73.58%) patients were the only earning members of their family.

27 (50.94%) patients came from Dhaka city whereas 26 (49%) came from outside Dhaka city. Out of the 26 from outside Dhaka, 4(15.38%) had their family attendants staying in hotels, 10(38.46%) had been staying with some of their relatives living in Dhaka and attendants of 12 (46.15%) patients had to stay in the hospital ward, sharing the patients' bed. The duration between the diagnosis of the disease and first consultation by the PCT was minimum 1 month to a maximum 96 months with an average of 11 months.

On the first visit, the number of complaints by the patients varied from minimum 3 to maximum 16 symptoms with an average of 7. The most frequent symptoms were pain 47(88.6%), insomnia 29(54.71%) anxiety 27 (50.94%), loss of appetite 22 (41.50%) and constipation 18(33.96%). 4 of the patients had malodorous disfiguring ulcer and 5 had colostomy done. 3 had features of chronic intestinal obstruction before death. Detail psychological assessment could not be done properly due to lack of expertise and experiences. Total number of contact for any single patient or his/ her attendants was from a single to 24 visits. Most of the telephonic contacts were not recorded. 11(20.75%) patients could not be traced later. Loss of contact with the patients happened from after one day to even after 118 days. An enquiry was made to assess how much the patient knew about his/ her diagnosis, perception and prognosis of the disease, 38 patients seemed too had known that they had cancer or that the disease was incurable. However, the exact level of their perception could not be detected due to a number of factors including the family members concern. All the accompanying family members knew about the incurable state of the disease. 47 attendant during the first visit thought that their patients did not know about the diagnosis or prognosis of the disease. None of the family members were willing to inform the exact diagnosis or prognosis of the disease to the patient during the first visit. One of the major concerns to the patients were financial issues like repaying loan, arranging treatment expenses and other living expenses of their dependents.

Follow-up records show that 13 deaths took place in the hospital whereas rest of the 29 occurred at their homes. The family members informed death to the PCT within a minimum of one hour to a maximum of seven days, mostly within twenty four hours.

Table –I

Demographic data.

Total number : (n= 53) Male: 25 Female: 28 Age range 22-80 yrs Average 53 yrs Socio-economic status Very poor 3 Poor 15 Middle class 23 Affluent class 10 Common symptoms: Pain –47 Sleeplessness-29 Anxiety-27 Loss of appetite-22 Constipation-18	Primary diagnosis : Breast 5 Oral cavity 4 Gall bladder 3 Rectum 6 Pancreases 4 Lymphoid organs 4 Urinary bladder 3 Colon 3 Prostate 1 Esophagus 3 Bone 2 Lung 4 Kidney 2, Others 8(Primary not detected)	Some observations : No of contact with single patients: Single to 24 visits Major concern of the patients : financial issue Major concern of family : Not to inform the diagnosis/ prognosis to the patient Place of death : 13 in hospital, 29 at home Earliest time PC team is informed of death : < less than an hour

Table II

Results from two multi-centre analyses done abroad of symptom prevalence of patients with progressive illness.[9]

Study, Population no and type of Sites, no of patients, & conditions if given	How symptoms are assessed	Prevalence of common symptoms
Kutner et al 2001 16 hospices n =348; 55% cancer (14 % cardiac failure, 12 % neurological, 11% respiratory, 16% others.	Memorial Symptom Assessment Scale(staff assessed) recorded in cross sectional sample of patients in care of hospice teams	Lack of energy,83% ; pain ,76% ; lack of appetite , 63%; feeling drowsy,61%; sad, 51%; short of breath,48%; agitation,48%;worrying, 43%; cough, 42%; nervous, 42%; constipation, 39%; irritability, 38%; swelling of arms and legs, 36%; difficulty sleeping, 35%; weight loss, 35%; dry mouth, 34%(plus 16 other symptoms with prevalence ranging 3-30).
Vainio et al 1996[7] hospices or palliative care services, n =1840, all cancer	Range of standardized and non-standardized measures, only 8 symptoms recorded assessed at referral to the units, in some instances by staffs and sometimes by patients	Pain, 57%; weakness, 51%; weightloss, 39%; anorexia, 30% ;constipation, 23%; nausea, 21%; dyspnoea, 19%; insomnia, 9%; confusion, 8%

Table-III

Symptoms associated with Terminal Cancer, a comparative meta analysis[5]

Symptom	Addington –Hall et al (1992) (N=203)	Vachnon et al Coyle et al (1989) (N=90)	Vachon and Fitch (1989, 1990, 1991) (N=69)	(1993) (N = 23)
In pain	55% -56%	100%	80 – 100%	88%
Decreased energy/	43%	67 -94%	70%	
Weakness/tiredness/fatigue	58%	62 – 71%	61%	
Appetite disturbances	49 – 54%	47 – 67%	52 %	
Psychological distress	50 – 56% Depression	21% anxiety feelings of Depression, anxiety Frustration	29 – 71% feelings of Depression, anxiety Frustration	61%
	32% - 43% Anxiety	20% Suicidal Ideation plus 4% Suicidal intent	61% -79% high distress on 30 item GHQ	83% high distress on 30 items GHQ
Breathing problems	61%	17%	35% -47%	26%
Nausea	19%-20%	12%	16% -49%	43%
Difficulty to walk/climb stairs	18%	54% -74%	48%	
Sleep disturbance	35% - 37%	24%	40% -54%	43%
Constipation	31-36%	30%- 42%	35%	
Confusion/ concentration	24%	27% -38%	43%	

DISCUSSION:

The symptoms of persons in the terminal phase of illness have been documented in a number of studies from different countries [5, 6, 8,9,10]. These studies show that the terminal phase of disease is associated with increased physical as well as significant psychological disturbances. Table I shows some the findings of the study done locally whereas Table II and III show a comparison of some of these studies indicating clinically challenging physical problems, poorly controlled symptoms and psychological dysfunction. These studies also noted that symptoms reported were limited to those mentioned by patients, and an assessment of particular symptoms was not made. Clearly the major symptoms reported in all these studies were similar, although the frequency of symptoms varied fairly widely. The differences presumably reflected both diagnostics differences as well as the efficacy of treatment.

In this study an almost equal proportion of male and females, probably implies that the need of comfort care is equally appreciated for both the groups by their family members. Another finding in this defined population shows that all the patients had been undergoing chemotherapy, radiotherapy and a significant number had surgery, a futile curative approach till the very end of the disease without really attending the comfort issues. This finding correlates very well with studies done elsewhere showing increasing trends in the aggressiveness of cancer care by chemotherapy and /or radiotherapy till the very end of life[11]. This study also shows that in progressive illness symptoms are common and multiple. At the same time, the studies show a wide variation in the reported prevalence of even very common symptoms in cancer. Variation in the design of prevalence studies, difficulties in assessing the presence or absence of the symptoms and difficulties in defining the type of symptoms are three important reasons of this wide variation.

For example, the prevalence of pain, probably the most common symptom varies greatly between different studies even in cancer [9, 10]. This study showing an 88% prevalence of the unnecessary sufferings of pain. But it needs to be appreciated that for proper understanding and management, pain has to be defined accurately. It may be chronic, or acute, or a combination of both, may have different patho- physiologies e.g. naturopathic or nociceptive. Pain may also have different causes, either as a direct or an indirect result of the main illness, as a side-effect of treatment, or due to another cause entirely. Depression, other quite common symptoms in some studies but has not been included in this one. It has been acknowledged that depression may be difficult to detect, professionals may fail to detect it and patients may not wish or be able to acknowledge its presence [6]. Fatigue, although now accepted as very common in progressive illness, has a long history of being overlooked because it was seen as inevitable, and professional did not ask about it and patients did volunteer information about it.

In this study attempt has been taken to look into the psychosocial and family of aspects of care. Only 20 percent of the patients belonging to the well-off group by local standard were referred to the PC service of this tertiary centre. Rest of the patients was from lower to middle class group. It needs to be further evaluated in future if homogeneity really prevails in providing PC to the community. A very pertinent finding of another local survey of 7516 new cancer patients attending the out patient consultation in 2005 reveals that more than 80% of patients were earning less than Taka 5000/ per month [12].

Most valuable observation in this study probably is the acceptance of the PC team members by the families as revealed by expressing the issues of concerns, informing the death of the patients to the PC members immediately and quite often seeking bereavement support. This is not a very usual phenomenon in this country. The team believes that clear, consistent and empathic communication with the patient and family about the natural history of the cancer and its prognosis is at the core of an effective palliative care.

More work is needed, particularly keeping in mind the different socio-economic background and family concept of developing countries to systematically examine the relationship between normal developmental milestones of families as they encounter the cancer illness experience in the family. There is strong evidence in different literatures that family members' experience considerable stress when a member is diagnosed with cancer and May even have higher level of anxiety than the patients themselves. Concerns of family's center around worries about the patients comforts emotional intensity of losing the patient and need for honest accurate information. Families may be willing to play a more active role in care decision at this stage. Family members may use different coping strategies which should be appreciated by the PC team without being judgmental. Responses to cancer illness have also been described in terms of physical and psychological health changes of family members both during the illness and in the bereavement period. A number of studies related the importance of health care providers behaviors aimed at providing high quality physical care to the cancer patients.

RECOMMENDATIONS:

Future studies are needed to compare the symptoms of similar samples of those terminally ill who are receiving palliative treatment in a variety of settings and to measure the effectiveness of the interventions strategies used. As the palliative care movement grows in this country, it has to develop into an integral part of, rather than the antithesis of comprehensive cancer care. Primary treating team can provide most of the care needed by the patients. Intractable symptoms or complex psychosocial problems can benefit from the inclusion of palliative care experts. As the disease progresses and the prognosis becomes a matter of time, collaboration with palliative care team is usually advised to best meet the many needs of the patients and the family. Palliative care can be provided using limited resources with minimal infrastructure support[13].

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Original Article

EFFECT OF LOW DOSE PROPRANONOL ON PERIOPERATIVE STRESS INDUCED HEMODYNAMIC CHANGES IN UPPER ABDOMINAL SURGERY

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SUMMARY:

Stress response is accompanied by an increased traffic in sympathetic efferent tracts resulting in potentially severe hypertension, tachycardia and is associated with post-operative morbidity. Study establishes the assumption that 'stress free' general anesthesia is necessarily advantageous. A recent study has suggested that different pre-medication may lead to an alteration in sympatho-adrenal stress response during surgery. Several agents and regimens have been devised to control this stress induced haemodynamic responses including alpha-blocker droperidol, lignocaine, low dose opioid and cervical extradural blockade.

It has been demonstrated that beta-adrenoceptor blocker, in therapeutic doses, caused only modest reduction in cardiac output while decreasing the incidence of arrhythmia and myocardial ischaemia after laryngoscopy and intubation. It is recommended that their administration to be continued until the day of surgery. Even a single dose of a beta-blocker given as a premedication decreases the incidence of episodes of myocardial ischaemia. Atenolol, a selective beta-blocker, per oral significantly reduces cardiovascular morbidity in non-cardiac surgery. Propranolol, a non-selective beta-blocker, has an added advantage of alleviating effect in anxiety. In addition, cost of propranolol is generally low and the systems required to use them according to the protocol used in this study are already in place.

This prospective study was performed to establish its effects on per-operative haemodynamic response in non-cardiac surgery.

The effect of propranolol on heart rate, systolic arterial pressure and derived value rate pressure product (RPP) on peri-operative period was significantly different from that of placebo effect. The result showed that propranolol significantly reduces heart rate, SAP & thus RPP & reduces peri-operative morbidity and mortality.

INTRODUCTION:

Nociceptive surgical stimulation is accompanied by increased hypothalamo-pituitary activity, which is generally referred to as the stress response to injury. This is manifested by a release of trophic hormones with consequent increase in cortisol, thyroxine and suppression of insulin[1.] Increased hypothalamic activity induced by nociceptive stimulation is accompanied by an increased traffic in sympathetic efferent tracts resulting in adrenergic response[2-4]. Thus it has been proposed that an abrupt increase in circulating catecholemines may be associated with potentially severe hypertension, tachycardia, which in turn may cause cardiac arrhythmias, myocardial ischemia, left ventricular dysfunction and rupture of cerebral aneurysm[5,6] in susceptible individuals[7,8].

Until 1970's the stress response was thought to be an adaptive homeostatic response to a physiological insult, enhancing resistance to stress[9]. However, there is growing evidence that stress response is actually detrimental and is associated with post-operative morbidity. It has adverse effects on several key physiological systems like cardiovascular, respiratory and gastro-intestinal. In Cardio vascular system- stress response activates sympathetic nervous system, which increases myocardial oxygen demand by increasing heart rate and arterial pressure. Activation of sympathetic nervous system may also cause coronary artery vasoconstriction,

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reducing the supply of oxygen to the myocardium, which in turn would predispose to myocardial ischemia, aggravated by hypercoagulable state postoperatively– a stress response by ADH[9].

Whilst there is general assumption that suppression of the autonomic response is advantageous. Edward et al in nineties demonstrated that in standardized clinical conditions, there was an increase in adrenaline production in patients receiving a balanced general anaesthesia as opposed to those receiving an epidural technique or a combination of both[10]. However, Wylie and Churchill-Davidson (1998) have suggested that "stress free" anaesthesia is necessarily advantageous[11].

Pre-medication is used to provide sedation and anxiolysis and to enhance the quality of induction, maintenance and recovery from anaesthesia. The ideal pre-medicant should be effective orally, with analgesic and non-emetic properties. A recent study has suggested that different pre-medication may lead to an alteration in sympatho-adrenal stress responses during surgery[3]. Several agents and regimens have been devised to control this stress induced haemodynamic responses including á-blocker droperidol[12] lignocaine[13] low dose opioid[14] and cervical extradural blockade[10, 15]. But none of these have gained widespread acceptability.

There is one technique which is described as totally effective in abolishing haemodynamic responses i.e. large dose of either – Fentanyl >50 µg/kg or morphine >2mg/kg have been shown to produce "stress free" condition in cardiac surgery[4,16], yet this is although inappropriate for routine surgical practice. Halter et al in mid seventies[17] demonstrated a consistent increase in plasma catecholemines concentration after surgical incision in-patient anaesthetized with nitrous oxide and halothane in oxygen with neuromuscular blocker vecuronium. Sigurdson et al much earlier[18] suggested that the pre-medication may alter the magnitude of the sympathoadrenal response to non-cardiac surgery.

It has been demonstrated that â-adrenoceptor blocker, in therapeutic doses, causes only modest reduction in cardiac output while decreasing the incidence of arrhythmia and myocardial ischaemia after laryngoscopy and intubation. It was recommended that its administration to be continued until the day of surgery[14,15]. Even a single dose of a â-blocker given as premedication decreases the incidence of episodes of myocardial ischaemia[5].

Ramanathan et al previously[19] used Labetolol, a non selective á and â-blocker, at a dose of 0.15mg/kg I.V followed by 0.25 to 0.3 mg/kg I.V. every 3 minute to block the haemodynamic responses to tracheal intubation. Another group Mangano et al [20] used Atenolol, a selective â-blocker, at a dose of 50 mg bid per oral significantly reduces cardiovascular morbidity in abdominal surgery.

Propranolol was the first effective beta-blocker with prolonged clinical use and experience with it extends more widely than any other member of this group. By opposing the haemodynamic response to stress, it has an 'oxygen sparing' effect and this is of benefit to patients suffering from angina of effort, its action is comparable to that of atenolol at cardiac receptor site, with an addition of extra-cardiac site.

Propranolol has been shown to exert an alleviating effect in anxiety. There are several pieces of evidence to suggest that β-blocker work through a peripheral mechanism rather than within the CNS, although propranolol is relatively lipophilic and does gain entry to the CNS and it is most effective in performance anxiety & thus stress, while other beta-blockers does not[21]. There is limited information on haemodynamic changes to propranolol produced by stress in abdominal surgery.

The cost of propranolol is generally low and it is used orally. Use of propanolol routinely in the preoperative preparation may replace the expensive preoperative cardiovascular testing. This may in turn substantially reduce the cost for cardiovascular testing.

As mentioned previously that information on haemodynamic changes to propranolol produced by stress during surgery is limited. Because of the easy availability and relative safety of propanolol, the study was undertaken to establish its effects on haemodynamic changes during surgery.

MATERIALS AND METHODS:

One hundred patients of ASA physical status admitted in hospitals for abdominal diseases had undergone operation of an average duration of 45 to 90 minutes under general anesthesia were selected for the study. Both male and female patients within age group 20-40 years were included. The protocol was approved by the Departmental Ethical

Clearance Committee of BSMMU, Shahabag, Dhaka. Informed written consent was taken from each patient.

Each patient was allowed to draw one card randomly and grouped as Group I – control (who received placebo tablet sucrol) & Group II – case (who received tablet propranolol 10 mg) as oral pre- medications at night before operation and one hour before operation of surgery. The patient and the investigator were blinded regarding the groups.

The anaesthetic procedures were explained and reassured to each patient After arrival of patient in operation theatre intravenous access was secured. Monitoring of heart rate and blood pressure were started. Pre-oxygenation was done for 3 minutes. Oxygen saturation was monitored from the beginning.

All the patients were induced with thiopentone sodium (4-5 mg/kg) and fentanyl 1 μgm/kg. During the procedure ventilation of lung was assisted or controlled with 100% oxygen. No inhalation gases like N_2O or halothane were used before intubation. Intubation was facilitated with Inj. Suxamethonium 1-1.5 mg/kg bolus. In those patients intubation took more than 40 sec were excluded from the study. Anaesthesia was maintained with 70% N_2O in O_2 and 0.5 v/v percent halothane. Muscle relaxant used was vecuronium with initial bolous dose of 0.08-0.1 mg/kg & increment with one third of bolous doses. Analgesia was maintained with incremental doses of fentanyl. At the end of the operation extubation was done with Inj Neostigmine (0.05 mg/kg) and Inj Atropine (0.02 mg/kg).

Heart rate and automated non-invasive arterial blood pressure were recorded before intubation, just after intubation, at 10 minutes interval during the operative procedure and after extubation, using a Datex Ohmeda (Helsinki, Finland) monitor. Rate pressure product (RPP) values were taken as derived values from multiplication of heart and systolic arterial blood pressure.

Data collected in a pre-designed data collection sheet were complied on a master chart. All data are plotted on sigma plot and all results are expressed as mean±SD. Data were analyzed by students unpaired 't' test and considered significant if $p<0.05$.

OBSERVATION AND RESULTS:

All the observations were presented in a tabulated form. Observed parameters were expressed as mean±SD.

The groups were homogenous as regard to age, weight, height and ASA physical status. The duration of surgery was also statistically matched with each other. The effect of placebo and propranolol on heart rate, systolic arterial pressure and rate pressure product at immediately after intubations and during pre-operative period showed significant difference than that of base line values (Table –I).

Baseline values of heart rate of the two groups were similar. Base line systolic arterial pressures (SAP) were also similar. But it was significantly different within groups. Heart rate was significantly higher in placebo group (group I) immediately after intubation and at 10, 20, 30, 40 minutes of per-operative period compared to the propranolol group (group II) (Table II).

Table -I

Age, weight and height of the study subjects

Variables	Group I	Group II	t value	p value
Age (yrs)	31.2± 9.4	33.3± 9.1	-1.104	0.272
Weight (kg)	50.2 ± 5.9	49.6 ± 6.2	0.462	0.645
Height (cm)	154.4± 3.4	155.2± 4.7	-0.729	0.468

Table-II

Changes in preoperative Heart Rate (bpm) during upper abdominal surgery

Groups	Baseline	Heart rate at time after intubations							Post
		0 min	10 min	20 min	30 min	40 min	50 min	60 min	operative
Group I	76±6	109±8	102±9	95±9	88±7	83±6	82±6	80±11	111±7
Group II	74±4	77±6	73±7	69±6	67±6	66±4	66±5	66± 6	75±6
t value	2.256	22.048	17.777	16.658	16.995	14.549	8.648	3.430	31.57
p value	0.026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.003	<0.0001

Values are expressed as mean ± SD. P value expressed as significant if $p< 0.05$ (CI-95%).

Table -III

Changes in preoperative systolic arterial pressure (mmHg) during upper abdominal surgery

Groups	Baseline	Systolic blood pressure at different time after intubations							Post-
		0 min	10 min	20 min	30 min	40 min	50 min	60 min	operative
Group I	115±7	128±6	123±6	119±7	117±7	117±6	117±6	119±5	125±5
Group II	114±7	116±7	111±10	112±9	112±8	113±5	111±5	110±2	116±8
t value	0.838	9.377	7.492	4.477	3.543	3.351	3.346	2.934	6.130
p value	0.404	<0.0001	<0.0001	0.00002	0.0006	0.0012	0.0016	0.0092	<0.0001

Values are expressed as mean ± SD. P value expressed as significant if p< 0.05 (CI-95%).

Baseline values of systolic arterial pressure (SAP) of the two groups were similar. But it was significantly different between groups. Systolic arterial pressure (SAP) values were found to be significantly higher in placebo group immediately after intubations and at 10, 20, 30, 40 minutes of per-operative period comparer to the propranolol group (Table III).

DISCUSSION:

Surgical anaesthesia is a harmless and reversible insensibility, which allows operation of considerable magnitude to be carried out hindrance to the surgeon or to detriment to the patient. Anaesthetic stages consist of sleep, analgesia and muscle relaxation, which could now be produced by separate and several medications. But yet nociceptive surgical stimulation is accompanied by increased hypothalamo- pituitary activity, which is manifested by a release of trophic hormones with consequent increase in cortisol, thyroxine & suppression of insulin[1]. Increased hypothalamic activity is accompanied by an increased traffic in sympathetic efferent tracts resulting in adrenergic responses in 1970[2,3]. In cardio-vascular system stress response activates sympathetic nervous system, which increases myocardial oxygen demand by increasing heart rate and arterial blood pressure[9].

The goal of adequate anaesthesia is to keep the patient throughout the operative procedure "stress free". Edwards et al earlier demonstrated that in standardized clinical conditions, there was an increase in adrenaline production in patients receiving a general anaesthesia as opposed to those receiving an epidural technique or a combination of both[10]. A recent study has suggested that different pre-medication may lead to an alteration in sympathoadrenal stress response during surgery[3]. Several agents and regimens have been devised to control this stress induced haemodynamic response including alpha-blocker, droperidol[12], lignocaine[13], low dose opioid[14], and cervical extradural blockade[15].

So search for an appropriate and easily available pre-medicant to make general surgical anesthesia more stress-free is going on for the last few years. It has been demonstrated that beta-adrenoceptor blocker, in low therapeutic doses, causes only modest reduction in cardiac output while decreasing the incidence of arrhythmia and myocardial ischaemia after laryngoscope and intubations[14,15]. Even a single dose of beta-blocker given as premedications decreases the incidence of myocardial ischaemia[5]. Propranolol has been shown to exert a alleviating effect in anxiety in addition to beta-blockade. Furthermore it is generally of low cost and there is convenience about its dosing and routes of administration.

The result of this trial demonstrate that in patients who are not at risk for coronary artery disease and who are undergoing non cardiac surgery, stress induced haemodynamic response can be substantially reduced by premeditation with low dose oral propranolol. In pre-operative period heart rate of group I is (76.32± 5.82) and remains slightly higher than the group II (74.02±4.24) but after surgical incision, heart rate rises sharply (109.10±8.25) in group-I where in group-II heart rate (76.6±6.37) remains close to pre-operative value. Throughout the operative period result shows a significant value irrespective of heart rate, systolic arterial pressure and simultaneously rate pressure product. Pine et al found that a concentration of propranolol of 100 ng/ml produce complete receptor blockade, where as 8 ng/ml produce a 50% blockade[22]. In our study, we are not able to measure

serum concentration of propranolol but it can be shown from the performed study that 10 mg bid oral dose can maintain much more than 8 ng/ml plasma level which is sufficient to produce therapeutic blockade. At the same time Johnson et al showed that maximum improvement in angina pectoris occurs at 64 % to 98 % beta blockade[23].

There is the rationale for using low dose propranolol pre-medication for the prevention of peri-operative risk of myocardial ischaemia. Studies conducted over the past decade have established the association between chances of preoperative myocardial ischaemia is more in untreated patients than those who gets some of any sympatholytic agents. The study, we performed here, have demonstrated an association between peri-operative ischaemia and an elevated heart rate and have suggested that mitigation of this heart rate response may reduce the incidence or severity of ischaemia. Thus, we concluded that oral pre medication with low dose propranolol, as could attenuate the heart rate response and limit the development of ischaemia, might substantially reduce longer-term cardiac complications.

CONCLUSION:

From this study it may be concluded that oral pre-medication with low dose propranolol significantly attenuates stress induced haemodynamic changes in upper abdominal surgery.

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Obituary

We are sorry to learn of Dr. Md. Mozaffar Hossain Talukdar's death on 08th April 2008 and wish to express our deepest sympathy on behalf of BSA. Dr. Talukdar was the Junior Consultant of Anaesthesiology at Kishorgonj Sadar Hospital, Mymensingh and his early passing will be deeply missed all of us.

He was born on 01 July 1957 at Dhonbari, Tangail. He was graduated from Mymensingh Medical College in 1982 and completed post graduation in DA from Bangabandhu Sheikh Mujib Medical University, Dhaka in 2000. He will be remembered not only to his dedication to his medical profession but also for his amiable character.

The members of the BSA wish to express our condolences to family members, friends and relatives of Dr. Talukdar who are experiencing grief and bereavement.