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Email: dr.mahye@gmail.com

ADDRESS OF CORRESPONDENCE

Prof. Md. Abdur Rahman
Professor & Head
Department of Anesthesiology
Dhaka Medical Collage & Hospital , Dhaka,
Tel: 01715075059, E-mail: rahman.ra4@gmail.com

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CONTENTS

Anaesthesia for the Stroke Patients – New Challenges for Anaesthesiologist

Neurosurgical anaesthesia focuses on stroke patients undergoing craniotomy as an urgent nature with life threatening conditions. In developed countries coronary heart disease and stroke are the first and second leading cause of death respectively among adult men and women. Cardiovascular diseases killed 17.5 million people in 2012 that is 3 in every 10 deaths. Of these, 7.4 million people died of ischemic heart disease and 6.7 million from stroke. However, the burden of stroke in developing countries has been increasing significantly. Twice as many deaths from stroke occur in developing countries as in developed countries. Overall in developing countries stroke ranks second or third in disease burden. By 2020 stroke is thought to be the leading cause of death in developing countries. Deaths rates from stroke for people of <65 years have fallen by 23% in the last 10 years in developed countries but in developing country still it is remaining higher. In the last 10 years a significant increase in the life expectancy has occurred in developing countries like Bangladesh. So there is increase in the number & incidence of cerebrovascular diseases in Bangladesh. The need for emergency neuro anesthesia for the stroke patients are gradually increasing both for intracranial neurosurgical & neuroendovascular procedures. The mortality in patients requiring emergency neurosurgical procedures is still quite high.

Stroke is the third leading cause of death in Bangladesh (8.57%). Among the strokes 70-80% are ischemic & 20-30% are hemorrhagic. Ischemic strokes (thrombotic strokes and embolic strokes) are mostly managed conservatively by removing the obstruction which help to restore blood flow in the brain. Carotid endarterctomy, stenting of the cervical and intracranial vessels or decompression craniotomy are the mostly used surgical and non surgical maneuvers in the management of ischaemic stroke patients and these maneuvers may help in reducing recurrent stroke in some cases or reduce intracranial pressure due to edema. 2-5% patients needs anaesthesia support during these maneuvers.

A hemorrhagic stroke(intracerebral and subarachnoid) can be caused from hypertension, rupture of an aneurysm or vascular malformation, or as a complication of anticoagulation medications.

10-20% of hemorrhagic stroke patients usually requires surgery to relieve intracranial pressure caused by bleeding. Surgical treatment for hemorrhagic stroke caused by an aneurysm or defective blood vessel can prevent additional strokes. Surgery may be performed to seal off the defective blood vessel and redirect blood flow to other vessels that supply blood to the same region of the brain.

Recently start endovascular treatment involves inserting a long, thin, flexible tube (catheter) into a major artery, usually in the thigh, guiding it to the aneurysm or the defective blood vessel and inserting tiny platinum coils (called stents) into the blood vessel through the catheter. Stents support the blood vessel to prevent further damage and additional strokes. Both of endovascular & neurosurgical procedure need special care by anaesthesiologists. 10-30% stroke patients need admission in intensive care unit and the Anaesthesiologists have to play a vital role in the initial resuscitation, controlling of raised intracranial pressure, cardiovascular & respiratory support or post operative care.

Acute care neurosurgery covers a broad range of disorders and procedures all sharing in common an emergent or urgent nature. This type of service requires 24-7 coverage by a team, comprising of neurosurgeons and neuroanaesthesiologists. A significant proportion (80-90%) of neurosurgical emergencies were related to trauma only ten years back. Now there is change in the trends and more than 50 percent of emergency and urgent neurosurgical consultations involve a broad scope of brain and spinal disorders such as intracranial

hemorrhages (bleeding within the brain), ventriculo-peritoneal shunt, hemorrhagic in the spine, cerebral aneurysm ruptures, hemorrhagic strokes and sometime ischemic strokes. Primary intracerebral hemorrhage (ICH) accounts for 10% to 20% of strokes but carries the highest rates of mortality and morbidity of all stroke subtypes.

Most of the cerebrovascular diseases both hemorrhagic & ischemic strokes were being managed conservatively even in ten years back. But during the last few years the practices are changing and the emergency neuro surgical procedures which need special attention by anaesthesiologists are gradually increasing. This increased surgical treatment of stroke patient not only involves the anaesthesiologist tasks in the operation theatre but there is increasing need of the anaesthesiologist expert involvement in the pre-opeartive management and in the ICU. Hence management of these group of patients is a new burden and challenges for the Anaesthesiologist.

There is increase trends of burden of emergency neuroanaesthesia for stroke patient are favourable in several developed areas of the world, but there are major problem in developing country like Bangladesh both from shortage of skill manpower with adequate facility . It is very much essential to increase the number of skilled neuroanaesthetist for providing emergency and acute care neurosurgical services for stroke patient. Though there is lack of interest for providing emergency neuroanaesthesia by the anaesthesiologist due to high mortality of hemorrhagic stroke patient.

The issue need proper addressing and policy have to be made to encourage the anaesthesiologist to become a skilled neuroanaesthesiologist.

Neuroanaesthesia subspeciality is now a demand of time.

(JBSA 2014; 27(1): 1-2)

Prof. M. Abdur Rahman
Department of Anaesthesia, Pain, Palliative & Intensive Care Medicine
Dhaka Medical College
Dhaka, Bangladesh

References

1. Lewis B. Morgenstern, J. Claude Hemphill III, Craig Anderson and et all : AHA/ASA Guideline: Guidelines for the Management of Spontaneous Intracerebral Hemorrhage-A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association
2. Randell T, Niemelä M, Kyttä J, Tanskanen P, Principles of neuroanesthesia in aneurysmal subarachnoid hemorrhage: The Helsinki experience.
3. F Levi, F Lucchini, E Negri, and C La Vecchia, Trends in mortality from cardiovascular and cerebrovascular diseases in Europe and other areas of the world Heart. Aug 2002; 88(2): 119–124.
4. Morioka J, Fujii M, Kato S, Fujisawa H, Akimura T, Suzuki M, Kobayashi S; Japan Standard Stroke Registry Group (JSSR). Surgery for spontaneous intracerebral hemorrhage has greater remedial value than conservative therapy. Surg Neurol. 2006; 65: 67–72.

Original Article

TAP Block in Postoperative Analgesia, A First Time Clinical Trial In Bangladesh

Bidhan Paul[1], Debashis Banik[2], AKM Shamsul Alam[3]

[1]Junior Consultant, Zilla Sadar Hospital, Cox'sbazar, [2]Associate Professor, Department of Anesthesia, Analgesia and Intensive Care Medicine, BSMMU, Dhaka, [3]Professor, Department of Anesthesia, Chittagong Medical College and Hospital, Chittagong.

Corresponding author: E-mail: Dr. Bidhan Paul, Junior Consultant, Zilla Sadar Hospital, Cox'sbazar, Chittagong

Abstract

Background: *In perioperative care, a reliable pain management is a vital appeal. Over recent years, Transversus Abdominis Plane (TAP) block is introduced as an important component of multimodal analgesia.*

Objective: *To evaluate efficacy of TAP block in postoperative analgesia for Total Abdominal Hysterectomy (TAH) with subarachnoid block (SAB) in comparison of morphine consumption and VAS score.*

Methods: *60 patients were randomly allocated into 2 groups (TAP group-A & control group-B). Standard SAB was applied to all patients for elective TAH. Immediate after operation classical TAP block was performed through both Lumber Triangle Of Petit (LTOP) of group A patients. Both groups were placed in Post Anesthesia Care Unit (PACU), arranged a common standard postoperative analgesic regimen for all, observed periodically and documented it accordingly in pre-designed data sheet.*

Results: *TAP block prolonged the mean time of 1st required I/V morphine (TAP vs control, mean±SD 271.23±40.34 vs 195.33±22.16 min., p=0.001^{HS}). Morphine requirement was also reduced (17.4±5.4 vs 26.2±4.4 mg, p=0.001^{HS}). Pain VAS scores at rest and movement were also reduced at all time period (p≤ 0.01 to 0.001). There was no complication attributed to the TAP block.*

Conclusion: *TAP block provided considerably effective postoperative analgesia in first 24 hours after major abdominal surgery like TAH.*

Key words*: Postoperative analgesia, TAP block, LTOP, 0.25% levobupicaine, VAS score.*

(JBSA 2014; 27(1): 3-11)

Introduction

Gain and pain are more obvious in surgical procedure. Here patients may gain remedy, but pain, they pay. This pain is induced by surgical act. So, it is physician's duty to rescue the patients from surgical pain by the most possible mean. Now postoperative pain control is generally best managed by anesthesiologists, because they offer regional anesthetic techniques as well as pharmacological expertise in analgesics.

Background: Postoperative analgesia is essential to provide subjective comfort and restoration of functions like breath, cough, movement and communication effectively. From the ancient period, it was tried to do in many ways. As practiced, opioids such as morphine remain the mainstay of such regimen. However, the use of opioid only, can result significant adverse effects like nausea-vomiting, sedation, respiratory depression, constipation, etc. Only NSAID use may cause GIT upset, bronchospasm, renal impairment etc. Epidural analgesia is in use, but it demands expertise; and failure rate is significant. Other techniques like rectus abdominis sheath block, paravetebral block, ilioinguinal/ iliohypogastric block, local anesthetic infiltration etc are also tested. Yet, these have flaws as they are not easy to perform, do not give adequate analgesia, do not

produce long enough analgesic duration etc.[1] The latest trend is the practice of two or more analgesic approach simultaneously called **multimodal analgesia**. It can produce better pain control, but, reduce the individual dose of the agent and thereby low cost, low side effect and more therapeutic safety. Over recent years, Transversus Abdominis Plane (TAP) block is introduced as an important component of multimodal analgesia. **TAP** is a neurofascial plane between the Internal Oblique (IO) and Transversus Abdominis (TA) Muscle of the abdominal wall.[2] The abdominal wall sensory afferents course through the TAP. So, it is a novel approach to block these sensory nerves by injecting local anesthetic within the TAP, termed as **TAP block**.[2] It is the landmark technique of block through Lumber Triangle of Petit (**LTOP**) has been followed in this study, also called classical blind TAP block. The block has been given by the investigator himself using inj. 0.25% levobupicaine in bilateral TAP after completion of TAH in gynae O.T. Inj. morphine and ketorolac I/V has also been used as postoperative analgesics. There was a similar study[2] in Ireland, blocked by three investigators using 0.75% ropivacaine before starting TAH when patients were under general anesthesia. Their postoperative analgesia was scheduled for 48 hours with inj. Morphine via PCA, rectal acetaminophen and rectal diclofenac.

Rationale of the study: This study is devoid of general anesthesia induced hazards and residual effects. As there is residual effect of SAB, patients have not felt any pain during TAP block; rather they cooperated in identifying the site of block (LTOP). The block after operation has not bothered the surgeon to start operation. Here, a particular surgery, TAH has been chosen, as a lower abdominal major surgery gives opportunity to bilateral TAP block and maintained an equal surgical stress of the study sample. The anesthetic levobupicaine is more cardiac friendly than bupivacaine. Though ropivacaine is less cardiotoxic than bupivacaine, but not available in our country. Several randomized controlled studies have confirmed that single-shot TAP block provides analgesia up to 48hrs, decreases postoperative morphine consumption by 70-85%[1] and minimizes its adverse effects and thereby improves compliance with post operative care including communication, mobilization, breathing exercise, early feeding etc.[2] So, classical blind TAP block (study procedure) is easy to perform, technically simple, pharmacologically safe and economically cheap.

The present study was designed to evaluate the efficacy of bilateral TAP block, as part of multimodal analgesic regimen, in improved analgesia and decreased opioid consumption during 1st 24 hours after TAH under subarachnoid block (SAB) when compared with a conventional standard treatment.

Literature Review:

For scientific and clinical purposes, **pain** is defined by the International Association for the Study of Pain (IASP) as, "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." This is to be distinguished from the term **nociception** which the IASP defines as "the unconscious activity induced by a harmful stimulus applied to sense receptors."[3]

Acute pain: Elicited by injury of the body tissue and activation of nociceptive transducers at the site of local tissue damage. The local injury alters the response characteristics of nociceptors and perhaps their central connection and the autonomic nervous system in the region. In general, the state of acute pain lasts for a relatively limited time and generally remits when the underlying pathology resolves.[4] They are of 2 types- somatic (superficial and deep) and visceral (true visceral and parietal; localized and referred). Visceral pain is frequently associated with abnormal sympathetic or parasympathetic activity causing nausea, vomiting, sweating, changes in blood pressure and heart rate.[5] Postoperative pain is one of the most common forms of acute pain.

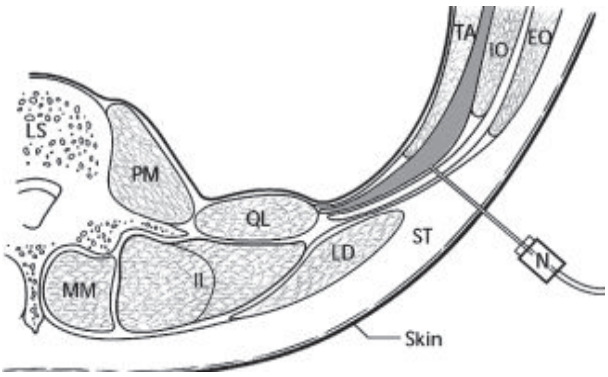
Systemic Responses to Pain: Acute pain is typically associated with a neuro- endocrine stress response that is proportional to pain intensity. Pain following abdominal and thoracic operations or trauma additionally has direct effects on respiratory function. Immobilization or bed rest due to pain in peripheral sites can also indirectly affect respiratory as well as hematological function. Moderate to severe acute pain, regardless of site, can affect nearly every organ function and may adversely influence postoperative morbidity and mortality. The latter suggests that effective

management of postoperative pain is not only humane but is a very important aspect of postoperative care.[5]

Postoperative Pain management: Postoperative analgesic modalities include oral or parenteral analgesics, peripheral nerve blocks, neuraxial blocks with local anesthetics, intraspinal opioids, as well as adjunctive techniques such as TENS and physical therapy.[5] These different modalities act on different sites to block pain: peripherally, on somatic and sympathetic nerves, at spinal cord level, and centrally. Combination of two or more modalities is the concept of multimodal analgesia, a balanced analgesia, an analogue of modern balanced anesthesia.[6]

TAP Block: The landmark technique of TAP block through LTOP was first described in 2001by Rafi as the 'one-pop technique' and was modified by McDonnell in 2007 who described a 'two pop' technique.[1]

The Lumber Triangle of Petit (LTOP) is formed posteriorly by the lateral border of the Latissimus Dorsi (LD) muscle and anteriorly by the posterior free border of the External Oblique (EO), with the iliac crest as the base (figure 1, 2). The iliac crest serves as a fixed and easily palpable landmark.



LS - lumbar spine; **LD** - latissimus dorsi; **PM**- psoas major; **QL** - quadratus lumborum; **MM** - multifidus muscle; **IL** - longissimus iliocostalis; **TA**- transversus abdominis; **IO**- internal oblique; **EO** - external oblique; **ST** - subcutaneous tissue.

Fig 1 *Line drawing of a transverse section through the abdominal wall at the level of the lumbar triangle of Petit(LTOP). The needle is inserted through the triangle, is shown in the transversus abdominis plane, and the fascial layers have separated as a result of the injection of local anesthetic.*[2]

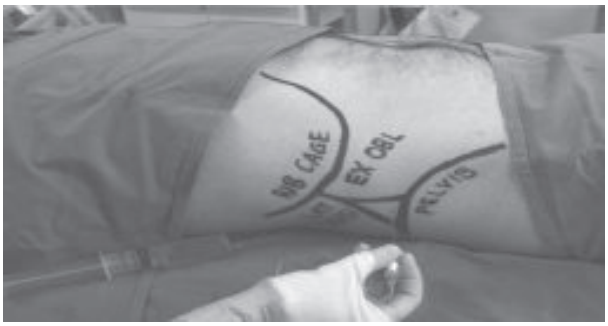


Fig.-2: *Landmark insertion of TAP block through LTOP* [7]

Innervations: The sensory supply of the skin, muscles and parietal peritoneum of the anterior abdominal wall is derived from the anterior rami of the lower six thoracic nerves and the first lumber nerve. The intercostals (T_{7-11}), sub costal (T_{12}), iliohypogastric and ilioinguinal nerves (L_1) course through the lateral abdominal wall within the TAP before they pierce the musculature to innervate the anterior abdomen. There is extensive branching of and communication between nerves within the TAP.[1] T_7 innervates at the epigastrium, T_{10} at umbilicus and L_1 at the groin. The LTOP and thereby the TAP is used to approach and block these neural afferents of the abdominal wall.

Landmark technique of TAP block: Requesting the patient to lift his head and shoulders from the supine position will contract the abdominal muscles and can assist palpation of the LTOP (Figure 2). The puncture site is just above the iliac crest and just posterior to the mid- axillary line within the triangle. A 22G or 24G blunt tipped 50mm needle is inserted perpendicular to the skin.[7] After dermal penetration, initial resistance indicates arrival of the needle tip at the EO fascia, followed by the 'two pop' sensations, one as the needle penetrates the EO fascia layer and another as it penetrates the IO fascia layer and enters the TAP (Figure 1). In recent studies the reported success rate with the landmark technique is 85% amongst experienced practitioners.[1] There has been some controversy about seeking one or two 'pops' during the landmark technique of TAP block. Use of a 'two pop' technique is generally advocated and is supported by the cadaveric and imaging studies published to date.[8]

Other techniques: Since its first description, several modifications have been introduced,

including the ultrasound-guided option. The use of ultrasonography is associated with substantially increased costs and requires trainings, particularly in ultrasonographic anatomy of the anaesthetized region.[9] Hebbard has described a slightly different technique, called the 'oblique subcostal' TAP block, which is a combination of rectus abdominis and TAP blocks under USG guide. There are several case reports in the literature where an epidural catheter was used for continuous TAP block. It is strongly recommended that catheters should be placed only under ultrasound guidance.[1]

Comparison with epidural analgesia: There is no randomized controlled trial comparing TAP block and epidural analgesia. At present, TAP block is recommended in patients undergoing abdominal surgery when epidural blockade is contraindicated or not available. Epidural analgesia has the advantage of providing analgesia for visceral and somatic pain.TAP block can provide unilateral analgesia, a potential advantage in patients undergoing non-midline abdominal incision. Furthermore, TAP block can preserve bladder and lower limb motor function, thereby assisting early mobilization after surgery. The hemodynamic instability following the cardiovascular effects of epidural block is avoided. Importantly, TAP injection can be performed in sedated and ventilated patients with less risk of neuraxial injury.[1]

Advantages: One advantage of the TAP block is the absence of major vascular or neurological structures in this area.[10] This block is easy to perform, technically simple, pharmacologically safe, economically cheap and conventional for both unilateral and bilateral approach. It mostly develops immediate analgesia and both degree and duration of analgesia increases by a single shot of injection. Single-shot TAP block provides analgesia for up to 48 hours and decreases postoperative morphine consumption by 70-80%. It preserves bladder and lower motor function.[1,7,10] There have been no reported complication to date with USG guided block.[11]

Limitations: Block failure is not uncommon in the skill development phase.[12] Generally, TAP block have so far displayed a good safety profile.[1] There is a report of liver trauma due to TAP block. In that case the block was performed before incision and liver was enlarged and extended to the right iliac crest.[13] The landmark technique relies on the 'pop' sensation, some clinicians believe, is an imprecise sign. The identification of the landmarks is more challenging in the obese hence the risk of peritoneal perforation is probably higher. Some authors argue that peritoneal perforation with a small gauge sterile needle is not likely to be significant.[7] Transient femoral nerve palsy is a potential complication because of the proximity of the TAP and the femoral nerve.[1] Moreover, there is a risk of patient`s injury (fall) if he/she is ambulated too early and the range of block involved the nerves supplying the buttock, lateral thigh or the region supplied by the femoral nerve.[9] There is always the possibility of under-reported minor complications.[1] Local anesthetic toxicity could also occur due to the large volumes required to perform this block specially if it was done bilaterally. As with any regional technique, careful aspiration will help avoid intravascular injection.[11] Anesthetists using TAP block should be aware of the possibility of visceral damage if the needle is advanced too far inadvertently. The catheter technique has the potential to result in more complications compared with single shot.[1]

Materials and Methods

This prospective, non blind, randomized, controlled trial was studied in Department of Anesthesia and Intensive Care, Chittagong Medical College Hospital and Department of Anesthesia, Analgesia and Intensive Care Medicine (AAICM), BSMMU, Dhaka from January 2010 to June 2011. Among the women undergoing routine TAH with lower transverse incision under subarachnoid block (SAB) and given informed consent for bilateral TAP block**,** 60 patients were collected during daily pre-anesthetic assessment (PAA) as first come first basis. They were of ASA I – II and BMI d" 35 kg/ m^2 and divided randomly by lottery into two equal groups A (TAP group) and B (non TAP group). Exclusion criteria were block site infection, refusal for TAP block, intolerance to opioid, H/O sensitivity to prescribed analgesic and H/O chronic back pain with daily consumption of analgesics.

Materials:

1. Equipments- Regional block needle (here, we used 20G I.V canula trocher making blunt slightly), two disposable syringes of 10c.c,

disinfectant for scrubbing the TAP blocking sites, sterile dressing etc.

2. Drugs- a) Inj. 0.25% Levobupivacaine, inj. Morphine 15mg and inj. Ketorolac 30mg b) Others- inj. Prochlorperazine 12.5mg, inj. Ondensatron 8mg, inj. Naloxone 4mg etc.
3. Relevant books, journals and internet searching for literatures.

Methods:

Study was conducted in full record with ethical principles.

Pre-anesthetic assessment (PAA) was done at the day before surgery. Sample was selected accordingly and briefed about the study and procedure, written informed consent were obtained including counseling about VAS score for post operative pain. The first page of the pre-designed data collection sheet was filled up including particulars of the patient, diagnosis etc. This page was separated from the others by putting a serial no. and made anonymity of the real data page.

At the day of surgery, a patient was received into operation theatre. Once again, she was reassured. The baseline parameters were measured and documented in data sheet, an I.V channel was opened and preload was done with the Hartman's solution of about 500ml. A standard SAB was applied to the patient with 15mg hyperbaric bupivacaine and Fentanyl 25 microgram through a Quincke's 25G spinal needle at the level of L2-3 or L3-4 intervertebral space in sitting position. Intraopeative maintaince was done with due monitoring.

After completion of TAH, inj. Ketorolac 30mg I.V was given stat and 8 hourly to both groups of patient and vital signs, VAS score etc were measured. Soon after, if there was no exclusion criteria then bilateral TAP block was performed to group A as-

1. Patient in supine position without hip or pelvic flexion.
2. The ipsilateral arm was raised above the head to accentuate the latissimus dorsi. The lateral fat pad of patient might be retracted superiorly such that the iliac crest was easily palpable in almost all cases.
3. We should found the anterior superior iliac spine and advanced above the iliac crest backwards till the lateral edge of latissimus dorsi muscle was felt. The Triangle of Petit is located anterior to this muscle. After the identification of this point, aseptic skin preparation was done accordingly.
4. Then the needle was introduced with perpendicular to the skin just above the iliac crest until the characteristic "2nd POP" was identified and entering the target place, i.e., Transversus Abdominis Plane (TAP).
5. After aspiration test, 20 ml of 0.25% levobupivacaine was injected in one side with intermittent aspiration test to prevent intravascular injection (first 2ml to test easy flow and hypersensitivity). Now the needle was withdrawn and sterile dressing was placed.
6. Same sequence was done for opposite side block.
7. Sterile dressing pad was also placed over triangle of Petit bilaterally in group B to avoid easy biasness during post operative care.

Group-B patients were managed according to protocol procedure but devoid of TAP block. All Patients were in PACU and observed at 1,2,4,6,12 and 24 postoperative hour. All observations were recorded in pre-prepared data sheet accordingly by the investigator with the help of trained PACU nurses.

When patient's VAS score was >3, she was treated with inj. morphine 2mg I/V as rescue analgesic with inj prochlorperazine 12.5 mg I/M during first dose. Subsequent doses of injection morphine were 1mg I/V for same purpose. Rescue antiemetic was offered to the patients complained of nausea and vomiting. After 24 hours dressing over the block site was checked for any sign of infection.

Methods of statistical analysis:

Relevant information was recorded in pre-designed data collection sheet and later on was compiled on master chart. The quantitative data were expressed in terms of mean (standard deviation) and comparison was done employing student's "t" test (unpaired). P value d"0.05 was considered as significant. Statistical calculation was done using statistical package for social science (SPSS) version 17.

Result

There was no significant difference between two groups in terms of their age, body weight and basal metabolic index (BMI) (Table 1). The ASA status, educational status and history of prior abdominal surgery were also identical in both groups. In all patients of group A, the triangle of Petit was located easily on palpation, the tranversus abdominis neurofascial plane was localized after one to two attempts and the block was performed without complication. The length of needle introduced for TAP block was 33- 41 mm.

In both groups the duration of TAH under SAB was of no significance of difference (p=0.617) (Table 2), but first I/V morphine requirement mean time ± SD was 271.23±40.34 (range 175-355) minutes in group A and 195.33±22.16(range 165-270) minutes in group B (Fig.3). It was of highly significance of difference (p=0.001). It was the mean time between application of SAB and use of I/V morphine loading dose when patient's VAS score for pain >3.

Postoperative mean consumption of I/V morphine was lower ($p=0.001^{HS}$) in group A than group B at all time points as 1st 6 hrs, 2nd 6hrs and last 12 hrs (Table 3). The range of total 24hrs I/V morphine requirement was 10-28mg in group A and 20-35mg in group B (not shown in graph). Pain VAS scores at rest were significantly lower (i.e. better controlled) in group A than group B. It was with highly significance of difference (p=0.001) at 1st, 2nd, 4th and 24th hr of postoperative time points but very significant (p=0.01) at 6th and 12th hr time points (Fig 4). On the contrary, VAS scores at movement were lower in same group with highly significant value of difference (p=0.001) at all postoperative time points(Fig.5).

Table I *Patient's baseline characteristics*

Characteristics	Group	Maximum	Minimum	Mean	±SD	P value
Age (yrs)	A	55	34	41.77	±5.34	0.283^{NS}
	B	52	37	43.00	±3.20	
Weigh (kg)	A	65	49	56.36	±3.76	0.601^{NS}
	B	65	47	55.83	±4.07	
BMI (kg/m^2)	A	25.70	20.80	23.46	±1.24	0.657^{NS}
	B	25.40	20.00	23.31	±1.35	

Group- A (n= 30): Case (TAP); Group- B (n= 30): Control (Non TAP)
n: number of TAH patient in each group BMI: Basal metabolic index SD: Standard deviation
P > 0.05 – Non-Significant (NS) P < 0.05 – Significant (S)
P < 0.01 – Very significant (VS) P < 0.001 – Highly significant (HS)
Test used: unpaired student's 't' test of significance of difference

Table-II *Duration needed for total abdominal hysterectomy*

Characteristics (Time in minutes)	Group A (n=30)	Group B (n=30)	P-value
Mean ± SD	97.66±12.29	99.16±10.75	0.617^{NS}
Minimum	65.0	70.0	
Maximum	125.0	120.0	

Test used: unpaired student's 't' test of significance of difference

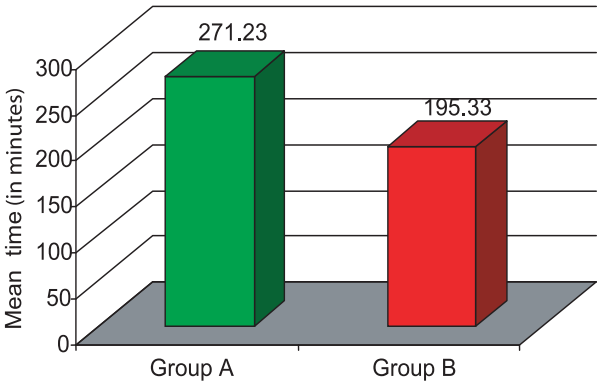


Fig 3 *First morphine requirement mean time after SAB*

Table-III *Distribution of I/V morphine consumption (mg)*

Parameters	Group	Maximum (mg)	Minimum (mg)	Mean	±SD	P value
1st 6 hours	A	15	04	8.20	±2.50	0.001HS
	B	16	08	11.0	±1.70	
2nd 6 hours	A	07	02	4.40	±1.30	0.001HS
	B	10	05	7.80	±1.30	
Last 12 hours	A	08	02	4.80	±1.60	0.001HS
	B	10	05	7.40	±1.40	

Morphine consumption in milligram
Values are Mean ± SD
Test used: unpaired student's 't' test of significance of difference

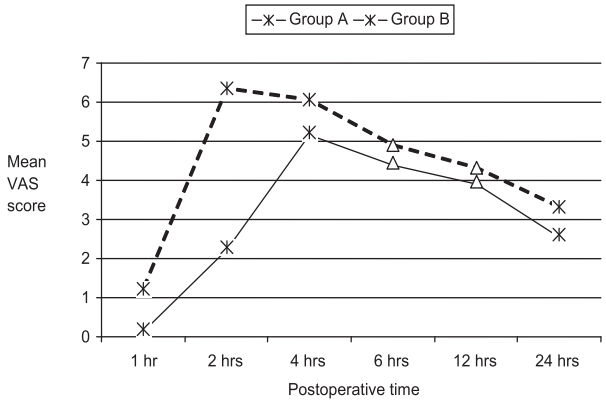


Fig 4 *Distribution of VAS score at rest*

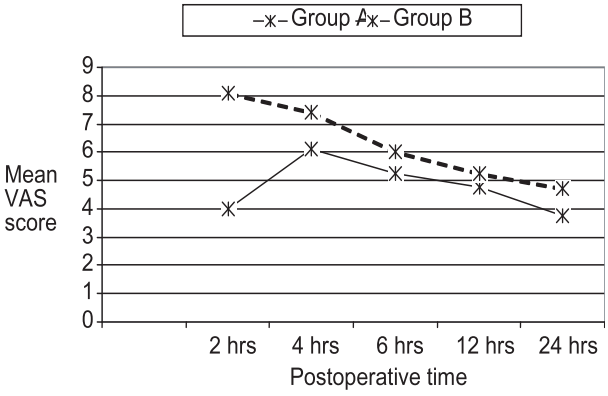


Fig 5 *Distribution of VAS score at movement*

Discussion

A multimodal approach to postoperative analgesia after TAH is rational because of the need to block nociceptive transmission from both the abdominal wall incision and from visceral sites.

The present study reveals that the mean time of first morphine requirement as rescue analgesic in TAP group is longer with high significance (273 vs 195 min, p=0.001). The study by John Carney et al[2] also showed the same significance but the real time interval was very shorter (median 45 vs 12.5 min, p < 0.001). Probably, because of their study was under G.A and there was no residual effect of SAB, like present study. So, there is additive analgesic effect of neuraxial anesthesia with TAP block in our study.

Mean I/V morphine consumption in postoperative 24 hours is about 33.6% reduced in TAP group of patients in this study. But it was reduced by 46% in the study of John Carney et al[2]. Probably, patient's body weight (about 55 vs 75 kg in the present and marked study) and the type and strength of anesthetic used (0.25% levobupivacaine vs 0.75% ropivacaine) are the important reasons for this discrepancy. On the contrary, there are evidence of morphine reduction by 70% in the study by McDonell et al for bowel surgery[14] under G.A and cesarean section[15] under SAB. Even John D Scharine[12] reported that both of his TAP block cases did not use any of the narcotic analgesic option available to them whereas maintained low pain scores (0-4).

In this study, postoperative VAS pain scores at rest and movement are reduced after TAP block at most but not same at all time points assessed (p<0.01VS to < 0.001HS). Almost the similar results were found in the study by John Carney et al[2] and John G McDonnell et al[14] (p < 0.05 to < 0.001).

This study shows no documented complication. There is no respiratory depression (resp. rate d"6/ min.) in either group. Only one patient in group A needed the highest 28mg of morphine, an outlier, might be a case of block failure.

There is better postoperative hemodynamic stability at group A (TAP group) in terms of lower pulse rate, systolic and diastolic blood pressure (non significance to highly significance of difference) due to better pain control and less stress response than group B.

The limitation of this study are of its non blindness and small sample size, though true blinding may not possible in TAP block patients. VAS (visual analogue score) pain scores should be justified by another scale at least like VRS (verbal rating scale), NRS (numerical rating scale) etc. There are seven patients in TAP group consume morphine more than double of the minimum consumption (10mg) recorded in a case of the group. It is not identified whether those cases were partial block or block failure.

Conclusion

We may conclude that, TAP block offers more significant analgesia after total abdominal hysterectomy. There is no complication detected due to TAP block. Tap block is technically easy, pharmacologically safe and economically cheap. So, it seems to hold considerable prospect as part of multimodal analgesic regimen after lower abdominal surgery like TAH, LSCS, appendectomy, prostatectomy, herniotomy etc.

Further study is suggestive of intra operative TAP block in abdominal surgery before closure of peritoneum to avoid inadvertent visceral injury, unexpected intra or extra peritoneal block and thereby almost ensure that injection of local anesthetic is within the TAP. It might be the real alternative for ultrasound guided TAP block. Use of ketorolac may be reduced or replaced by paracetamol in future studies and clinical practice. Comparison study between epidural and TAP block analgesia is a demand also. There is a large scale study of TAP block require to detect plasma concentration of local anesthetic and further establish the block safety thereby.

References

1. Zorica Jankovic.Transverses Abdominis Plane Block:The Holy Grail of Anaesthesia For (lower) Abdominal Surgery. Periodicum Biologorum,[online]2009;111:203-8 *http://www.google.com/search?q=transversus+abdominis+plane+block&hl=en&prmd=ivns&ei=wc0RTqS5GI_jrAfEtKyIBA&start=10&sa=N* (accessed 13 Feb,2010)
2. Carney J, McDonnell JG, Ochana A, Bhinder R, Laffey JG. The Transverses Abdominis Plane Block Provides Effective Postoperative Analgesia in Patients Undergoing Total Abdominal Hysterecromy. Anestha Analg,[online] 2008; 107(6): 2056-60 *http://www.anesthesia-analgesia.org/content/107/6/2056.long* (accessed 10 Jan,2010)
3. Barrett KE, Barman SM, Boitano S, Brooks HL (eds). Pain and Temperature. In: Ganong's Review of Medical Physiology, 23rd edition. New D'elhi: Tata McGraw Hill Education (Lange), 2010: 168
4. Dureja GP. Handbook of Pain Management. New Delhi: Elsevier, 2004: 310
5. Morgan GE, Mikhail MS, Murray MJ. Pain management. In: Clinical Anaesthesiology, 4th edition (international). New York: McGraw-Hill, 2006: 362-396
6. Aitkenhead AR, Rowbotham DJ, Smith G. eds. Postoperative pain. In: Textbook of Anaesthesia, 4th edition (international). Toronto: Churchill Livingstone, 2001: 553
7. Katrina Webster.The transversus abdominis plane (TAP) block: Abdominal plane regional anaesthesia. Update in Anaesthesia [online] *http://home.vicnet.net.au/~gatepain/PM006.pdf* (accessed 15 Feb,2010)
8. McDonnell J, O'Donnell B, Farrell T, Gough N, Tuite D, Power C, Laffey J. Transversus abdominis plane block: A Cadaveric and Radiological Evaluation. Regional anaesthesia and pain medicine [online] 2007; 32: 399-404 *http://www.researchgate.net/publication/5883745_Transversus_abdominis_plane_block_a_cadaveric_and_radiological_evaluation* (accessed 24 August,2010)

9. Leszek Urbanczak. Transverses Abdominis Plane Block. Resmedica Anaesthesiology Intensive Therapy, [online] 2009; 3: 133-135 http://anestezjologia.net/en/articles /item/ 10062/transversus_abdominis_plane_block (accessed 14 Feb,2010)

10. L Pillay. Transverses abdominis plane block.[online]13 march 2009:1-24 *http://anaesthetics.ukzn.ac.za/Libraries/FMM_R_B_2009/Transversus_abdominis_Plane_Block_Dr_L_Pillay.sflb.ashx* (accessed 20 April,2010)

11. Karim Mukhtar. Transverses abdominis plane (TAP) block. The Journal of NYSORA [online] 2009; 12: 28-33 http://www.nysora.com/files / uploaded/JNYSORA/Volume12/(v12p28-33)TAPBlock.pdfs (accessed 25 April,2010)

12. John D Scharine. Bilateral Transverses Abdominis Plane Nerve Block for Analgesia Following Cesarean Delivery: Report of 2 Cases. AANA Journal,[online] April 2009; 77(2): 98-102 *http://www.google.com/search?q=transversus+abdominis+plane+block&hl=en&prmd=ivns&ei=a9YRTrgmivitB-_-wJ4I&start=100&sa=N* (accessed 14 Feb,2010)

13. Farooq M, Carey M. A case of liver trauma with a blunt regional anesthesia needle while performing transversus abdominis plane block. Reg Anesth Pain Med [online] 2008; 33: 274 *http://www.ncbi.nlm.nih.gov/pubmed/18433683* (accessed 19 August,2010)

14. McDonnell JG, O'Donnell BD, Curley G, Heffernan A, Power C, Laffey JG. Analgesic efficacy of transversus abdominis plane (TAP) block after abdominal surgery: a prospective randomized controlled trial. Anesth Analg [online] 2007;104:193-7 *http://www.anesthesia-analgesia.org/content/104/1/193.full* (accessed 07 Feb,2010)

15. McDonnell JG, Curley G, Carney J, Benton A, Costello J, Maharaj CH, Laffey JG. The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a randomized controlled trial. Anesth Analg [online] 2008; 106:186–91 *http://www.anesthesia-analgesia.org/content/106/1/186.long* (accessed 20 April,2010)

Original Article

Mass Casualty in A Building Collapse: Techniques of Anaesthesia in Mass Casualty Management (Rana Plaza Collapse at Savar, Bangladesh)

Hasan Murshed[1], Atiqul Islam[2], Atiqul Hoque Sarder[3]

[1]Classified Specialist in Anaesthesia, CMH, Savar, [2]Assistant Professor, Dept. of Anaesthesiology, Dhaka Medical College, [3]Graded Specialist in Surgery, CMH, Savar, Dhaka

Corresponding author: murshed673@yahoo.com

Abstract:

Background: *Management of mass casualties in a disaster like situation needs much of discussion. Proper planning and preparation can markedly change the mortality and morbidity following these events. Similarly right use of special skill of anesthesiologists in the management of mass casualty is of immense value.*

Objectives: *This study was aimed to investigate general injury profile, pattern of operations and anesthesia performed during mass casualty management of patients treated in the department of Anesthesia and Intensive care unit of Combined Military Hospitals, Savar.*

Methods: *This study retrospectively investigated the clinical records of 155 patient's files registered by many different doctors. We used discharge diagnosis, and when available objective x-ray or CT scan used for verification of fractures.*

Results: *Among 431 patients reported to emergency and casualty department, 407 (94.431%) is admitted to hospital. Among 431 patients only 155 (35.962%) is treated in the department of Anesthesia and Intensive care. Among 155 patients of ICU, most of the injuries were blunt trauma soft tissue, rest of the injuries were fractures, head injuries, crush injuries etc, which accounts 95 (61.29%) patients. Majority of surgical procedure included wound debridment, fasciotomy, amputation and external fixation; constituted 51(33%) patients. 132(84%) surgical procedure performed under TIVA with ketamine, 22 (15%) under different regional techniques and only one patient received general anesthesia.*

Conclusion: *Bangladesh is situated in a seismically active zone; fortunately no major earthquake has striken since 1940. Accelerated urbanization and high population densities in all cities are increasing the vulnerability of Bangladesh to catastrophic number of death and injuries. Ninety percent of casualties after earthquake result directly from the collapse of buildings in urban areas. The special skills of the anesthesiologist are of tremendous value in contributing mass casualty management in ICU and operating room. Our study concludes that surgical services can be maximized with the judicious and intelligent use of ketamine and regional anesthetic technique; rather than general anesthesia. Definitely it has strong value in maximizing use of scare resource in country like Bangladesh.*

Keywords: *mass casualty, ketamine, regional anesthesia*

(JBSA 2014; 27(1): 12-16)

Introduction

Management of mass casualties in a disaster like situation needs much of discussion.[1] Proper planning and preparation can markedly change the mortality and morbidity following these events.[2] Similarly right use of special skill of anesthesiologists in the management of mass casualty is of immense value. The worst factory disaster in the country's history has occurred around 8:30am on 24th April 2013. When a nine-storied commercial building "Rana Plaza" collapsed near Savar Bus Stand on the outskirts of the capital. According to official reports 1132 killed and 2438 injured in this disaster. This study was aimed

to investigate general injury profile, pattern of operations and anesthesia given during mass casualty management of patients treated in the Department of Anesthesiology and Intensive Care unit of Combined Military Hospitals Savar.

Methods

This study was approved by our hospital authority. No informed consent was necessary as this study used existing data. This study retrospectively investigated the clinical records of 155 patients treated in the department of Anesthesiology and Intensive care unit with building collapse-related injuries during the 17 days that following 24th April 2013 "Rana Plaza Tragedy". This study retrospectively analyzed patient files registered by many different doctors. Systematically we used the discharge diagnosis, and when available we used objective x-ray or CT verification of fractures.

We used descriptive statistics to gain insight into general injury profile, pattern of operations and anesthesia given to injured patients admitted to this hospital after the building collapse.

Results

Maximum influx of injured patient were on 3rd day of incident and 100% reported patients were admitted from 4th day onward (Fig-1). Among 431 patient reported to emergency and casualty department 407 (94.431%) patient got admitted into hospital. Among 431patients only 155 (35.962%) patient had been treated in ICU (Table-I). Most of the injuries were blunt trauma and soft tissue injury followed by fractures and crush injuries (Fig-2).On the first day 16 operative procedure were performed (Table-II). Subsequently in average 22.5 operative procedures were performed daily on subsequent days. 49 major operative procedures were done under anesthesia in first 96 hour. Most of the major operative procedures were done under TIVA with Ketamine followed by regional technique; only one patient received balanced general anesthesia (Fig-3).

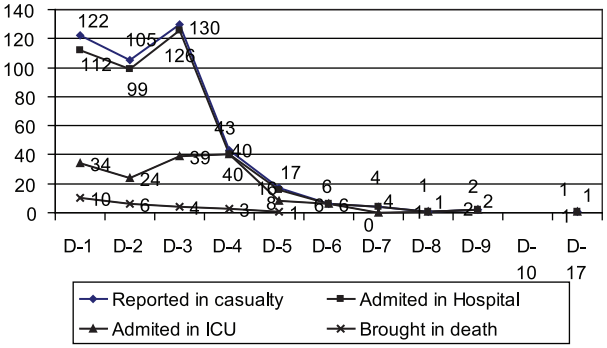


Fig 1 *Distribution of Casualty Influx at Combined Military Hospital Savar:*

Table I *Patients Influx at Emergency Department and Admission in ICU (n =155)*

Day	Reported at Emergency and casualty dept; n	Admitted in Hospital: n (%)	Brought in death: n	Treated in ICU: n (%)
1.	122	112 (91.80)	10	34 (30.35)
2.	105	99 (94.28)	06	24 (24.24)
3.	130	126 (96.92)	4	39 (30.95)
4.	43	40 (93.02)	3	40 (100)
5.	17	16 (94.11)	1	08 (50)
6.	06	06 (100)	-	06 (100)
7.	04	04 (100)	-	00
8.	01	01(100)	-	01(100)
9.	02	02(100)	-	02(100)
10 to 16	Nil	Nil	Nil	Nil
17.	01	01(100)	-	01(100)
Total	431	407 (94.43)	24	155(38.08)

Table II *Surgical Operative Procedure Done at Combined Military Hospital Savar*

Day	Operative procedure					
	Major procedure				Minor	Total
	Fasciotomy	Amputation	Wound debridment	External fixation of fracture	Dressing and/ POP	
One	1	-	6	-	9	16
Two	5	1	9	1	14	30
Three	3	1	6	-	10	20
Four	6	1	8	1	6	22
Five	-	-	2	-	-	2
Six	-	-	-	-	35	35
Seven	-	-	-	-	26	26
Total	15	3	31	2	100	151

Table III *Anesthetic Procedures Followed in Different Surgical Procedure:*

Type of Anesthesia	Major procedure				Minor	Total
	Fasciotomy	Amputation	Wound Debridment	External Fixation	Dressing/ POP	
Subarachnoid Block	3	1	1	1	-	06
Brachial plexus block	2	2	3	-	-	07
Femoral nerve block	4	-	-	-	-	04
Commn peroneal nerve block	3	-	-	-	-	03
Ankle block	2	-	-	-	-	02
General Anesthesia	-	-	1	-	-	01
TIVA with LA	1	-	26	1	104	132
Total	15	3	31	2	104	155

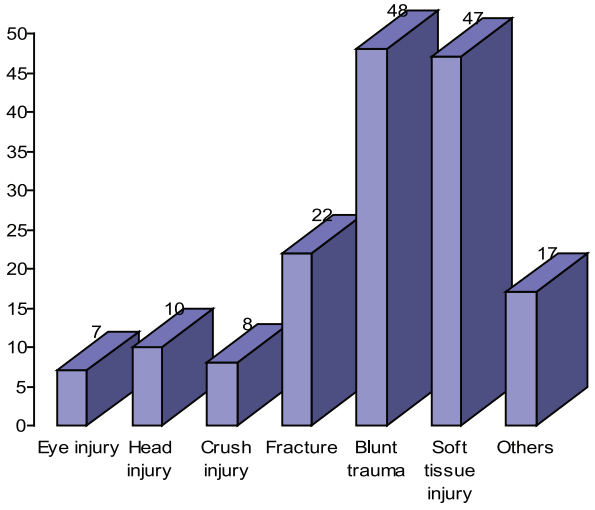


Fig 2 *Pattern of Injuries Treated in ICU at Combined Military Hospital, Savar:*

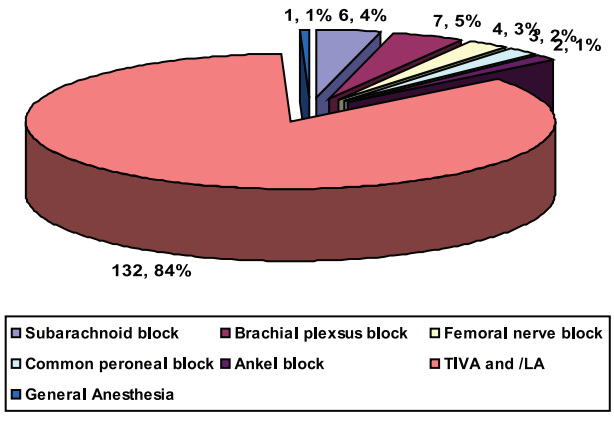


Fig 3 *Pattern of Anesthetic Procedures Followed in Different Surgical Procedure:*

Discussion

What is the burden and distribution of surgical conditions after building collapse? Study on isolated building collapse is very few. Different study showed ninety percent of casualties after earthquake result directly from the collapse of buildings in urban areas. [3] So distribution of surgical condition following earthquake is likely to simulate picture of building collapse.

There were two waves of casualties in Rana plaza tragedy. The first wave represented by the "walking wounded". These include a large number of people who have been hurt by falling objects or victims trapped by light debris and who have been promptly rescued by their family members and neighbors. First wave of casualty in any mass casualty event usually occur during first few hours of incident. Which is managed by nearby hospitals as most of them are "walking wounded"; "Rana Plaza Tragedy" is also not of this exception. Large numbers of first wave patients were treated by nearby hospitals. Our study also shows majority of patient brought to our casualty department were within first three days of incident (Fig-1). Our hospital is approximately seven kilometer from the incident place. Thus most of the casualty transported by military and civil ambulance till third day, because nearby hospital and private clinic were flooded with patients. The second wave of casualties includes those who were buried deeply under structural debris. The primary concern with the second wave was the complexity of their medical treatment and not their numbers; these casualties were rescued one-by-one. Our study shows third day onward the number of casualty were decreased but needing ICU support was 100% of reported patients (Table-I). Among casualties not all, only one fourth patients' needed ICU support, indicating large number of casualty are not critical (Table-I).

Research following the 1988 earthquake in Armenia showed that superficial injuries are accounted for the majority of the cases.[4] This was supported by findings of earlier studies also.[5,6] Sixty percent of our casualty had also blunt trauma and soft tissue injuries, which is consistent with previous study. A number of studies also emphasized the importance of crush injury and fractures following building collapse, which often represent more than half of the recorded injuries.[7, 8, 9] But only 19% of our casualty had crush injuries and fracture, which is not consistent with previous study, as because all casualty of Rana Plaza tragedy did not reported to our hospital, some reported in other nearby private hospital.

Significant number of our patient had trauma in limbs, although some patients were with altered consciousness but operative procedure could be managed by regional techniques. Especially limb fasciotomy, which under subachnouid block is impractical due to haemodynamic instability in mass casualty due to associated trauma. Most of our patient's fasciotomy done by brachial plexsus block, femoral nerve block, common peroneal nerve block, ankle block (Table- III). Thus by doing large number of faciotomy we could save good number of limbs.

In our mass casualty management we needed to limit operative intervention in specific but essential procedures. Because we had no posted orthopedic surgeon, neurosurgeon, moreover we had only one ICU ventilator. Where appropriate, most of our operative procedures for superficial and blunt trauma were done under TIVA with ketamine**.**

In 1959 for search of a safe but potent sedative agent led pharmacologists to the phencyclidines and Ketamine. Ketamine was introduced into clinical practice in 1970 during Vietnam War. With the administration of Ketamine the patient goes into a trance like state. He becomes unconscious, amnestic and deeply analgesic. His airway is remarkably preserved. Thus Ketamine is especially useful if there is no recovery ward and there is lack of trained anesthetists.[10] This drug is remarkably safe but not absolutely safe, so one has to be vigilant. It is ideal for use in emergency cases in which patients are in mild to moderate shock.[11] Ketamine also useful during minor procedures, such as in wound debridement and painful dressing. In lower doses it is useful for brief emergency procedures. [12] Eighty four percent of our patients received TIVA with ketamine for surgical procedure and recovery were uneventful (Fig-3). So ketamine remains as choice of drug in mass casualty management where it is appropriate. This strengthens the role of ketamine in any mass casualty in our country, where there is scarcity of trained anesthesiologist.

Subarachnoid block (SAB) which is usually impractical in mass casualty patients with life threatening injuries. Among regional anaesthetic techniques mostly followed in our mass casualty management were brachial plexsus block, peroneal nerve block, and ankle block etc. This allowed us to accomplish large number of surgical procedure with life threatening injuries. (Fig-3) There was only one death following surgical intervention, during 'Rana Plaza Tragedy". These highlight the importance of regional anesthetic technique that is used mostly in our mass casualty management. Unfortunately practice of different regional techniques among anesthesiologist is very less. But learning these techniques is of immense help in mass casualty patient management.

We had limitation of study also that include all head injured patient with or without associated other trauma were referred immediately to different hospital for definitive treatment.

Most of our surgical operative procedure were done under TIVA (Ketamine) and or LA, rest by regional technique. Only one patient received general anesthesia. It signifies importance of learning different regional anesthetic procedure among anesthesiologist. Thus more emphasis needed to teach on regional anesthetic techniques among trainee anesthesiologist and intensive care expert, when possible with ultrasound guided techniques, which is widely practice in developed world. Moreover surgical services can be maximized with the judicious and intelligent use of ketamine and regional anesthetic technique; rather than general anesthesia.

Conclusion

Bangladesh is situated in a seismically active zone; fortunately no major earthquake has striken since 1940. Accelerated urbanization and high population densities in all cite are increasing the vulnerability of Bangladesh to catastrophic number of death and injuries should an earthquake strike the country. Incidents of infrastructure collapse are on the rise. So prevention and preparedness program are absolute necessity of the time. The special skills of the anesthesiologist make his/her contribution to mass casualty management as well in ICU and operating room particularly valuable. Our study concludes that surgical services can be maximized with the judicious and intelligent use of ketamine and regional anesthetic technique; rather than general anesthesia. Definitely it has strong value in maximizing use of scare resource in country like Bangladesh.

References:

1. Cuny FC. Principles of disaster management. Lesson 1: Introduction. Prehospital Disaster. Med 1998; 13: 88–93.
2. Clifford G. Pain Management in Mass Casualty Incidents. ITACCS Winter 2004; 27-28.
3. Ashkenazi I, Isakovich B, Kluger Y, Alfici R, Kessel B, Better OS. Prehospital management of earthquake casualties buried under rubble. Prehosp Disast Med 2005; 20:122–133.
4. Noji EK. The Public Health Consequences of Disasters New York: Oxford University Press; 1997.
5. Glass RI, Urrutia JJ, Sibony S, Smith H, Garcia B, Rizzo L. Earthquake injuries related to housing in a guatemalan village. Science 1977; 197:638-643.
6. Bruycker M, Greco D, Lechat MF. The 1980 earthquake in Southern Italy-morbidity and mortality. Int J Epidemiol 1985; 14:113-117.
7. Kuwagata Y, Oda J, Tanaka H, et. al. Analysis of 2,702 traumatized patients in the 1995 Hanshin-Awaji earthquake. J Trauma 1997; 43:427-432.
8. Peek-Asa C, Kraus JF, Bourque LB, Vimalachandra D, Yu J, Abrams J. Fatal and hospitalized injuries resulting from the 1994 Northridge earthquake. Int J Epidemiol 1998; 27:459-465.
9. Bulut M, Fedakar R, Akkose S, Akgoz S, Ozguc H, Tokyay R. Medical experience of a university hospital in Turkey after the 1999 Marmara earthquake. Emerg Med J 2005; 22:494-498.
10. ASA: Practice guidelines for sedation and analgesia by non- anesthesiologists. A report by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Anaes 1996; 84: 459-471.
11. Bhattacharya A, Gurnani A, Sharma PK, Sethi AK: Subcutaneous infusion of ketamine and morphine for relief of postoperative pain: a double-blind comparative study. Ann Acad Med Singapore 1994; 23: 456-459.
12. Fallen MT, Welsh J. The role of ketamine in pain control. Eur J Palliation 1996; 3: 143–146.

Original Article

Separation Time of Children From Parents: A Randomized Comparison Between oral versus Atomized Intranasal Administration of Midazolam

Mohammad Obaidullah[1], Parash Chandra Sarkar[2], Manash Kumer Basu[3], Mohammad Omar Faruq[4], Sabina Yeasmeen[5], Mehtab Al-Wadud Khan[6], Rabeya Begum[7]

[1,2,3,6,7]Dept. of Anaesthesiology, SSMC Mitford hospital, [4,5]Dept. of Anesthesia, Analgesia and intensive care medicine, BSMMU, Dhaka

Address of correspondance: *e-mail :abidzarif@gmail.com*

Abstract:

Background: *Sedation has become more common for children undergoing procedures in the emergency department, dentistry, and day care surgery. A desirable sedative agent has a rapid onset with short duration of action and is effective and safe. Midazolam as a sedative agent that fulfills these criteria. However controversy surrounds regarding its route of administration, particularly with respect to its ease of administration and patient acceptance. Although the oral route of administration is the most popular among pediatric surgeons and dentists, confrontation and frustration often arise when children refuse to accept the sedative medication.*

Objectives: *To evaluate the outcome (satisfactory anxiolysis and smooth early parental separation) between oral midazolam (OM) and intranasal midazolam(INM)spray in children for conscious sedation before general anaesthesia.*

Methods: *Children aged 1 – 6 years scheduled for routine elective surgery were included to receive midazolam as premedication drug. A total of 80 children were recruited consecutively. Of them 40 were randomly assigned to either single dose of 0.5 mg/kg via oral route (OM0) or 0.5 mg/kg of body weight by intranasal spray(INM). The outcome variables were smooth separation of children from their parents at the level of conscious sedation and time to smooth separation.*

Results: *No change in sedation score was evident in first 3 minutes following midazolam administration. Then the sedation score of INM group increased sharply to assume a mean score of 2 at 9 minutes. No demonstrated change was further noted up to the end of observation. Meanwhile the sedation score of OM group began to increase steadily up to the end of observation when it assumed a mean score of 1.5. The INM group attained a good level of sedation much earlier than its OM counterpart. The mean sedation scores were significantly higher in the former group than those in the latter group. During the first 3 minutes of midazolam administration no change in anxiolysis was noted. Then the score began to increase in both the INM and OM groups, but INM group experienced a much faster increase than the OM group so that the former group reached a mean score of almost 3 and the latter group to a mean score of nearly 2 at 15 minutes interval. The levels of anxiolysis attained by the intranasal group were significantly higher compared to those attained by the oral midazolam group (table II).All but 1 children (97.5%) in the INM group were separated from their parents smoothly as opposed to 90% in the OM group ($p = 0.148$). In the INM group 12.8% of children were separated at 9 minutes, 69.2% from 10 – 12 minutes (over two-thirds) and 18% from 15 – 18 minutes. In the OM group 13.9% were separated at 15 minutes, about 39% at 18 – 21 minutes, 22.3% at 24 minutes and the rest 11.1% at 27 minutes after premedication. Overall more than 80% of the children in the INM group were separated at 9 – 12 minutes following midazolam administration when none of the children in the OM group was separated ($p < 0.001$). Complications like nasal irritation was staggeringly higher in the INM group shown on table IV.*

Conclusion: *Despite the intranasal route causes a substantial proportion of children to suffer from nasal irritation, it is the preferred route over oral route, because intranasal route induces much faster sedation and anxiolysis and helps easy and smooth separation of children from their parents.*

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Introduction:

The anaesthesiologist faces anxious child as one of the most common problems in everyday experience and one they can handle with least success[1]. A child entering the hospital often faces a new environment and surrounding and is overwhelmed by stimulation at the very moment of separation from his/her parents. This separation may be an important cause of neurotic anxiety and may persist throughout their childhood[2].Sedative preanaesthetic medication is rarely indicated for infants aged less than 6 months, as they appear relatively undisturbed when separated from their mothers. Psychologists generally agree that fear and emotional disturbance are greater in children just before they are able to talk, when they show clear signs of distress if separated from his/her mother and resists approaches from strangers. For anxiolysis and sedation, premedication regimens are recommended with different agents like benzodiazepines,ketamine and chloral hydrate[3] . Among them midazolam is found safe, efficient, less bioavailabe and widely used without delaying recovery even after ambulatory surgery[4]. Thum et al (1998) describes that midazolam well-known for its anxiolytic, euphoric, amnesic and sedative qualities.Midazolam can be administered by a variety of routes like oral, intramuscular, intravenous, rectal, sublingual and intranasal. Each route has its merits and demerits.Intra-nasal midazolam (INM) as predication in children is comparatively easier and smooth maneuver. Absorption through this route is prompt and effective bypassing the first-pass metabolism when parentaral formulation is used as injectable solution (15 mg in 3 ml)[5] . Some authors reported that the nasal route required less patient cooperation and was simple, convenient, painless and reliable alternative to oral drug administration[6] , while others reported INM to be noxious, painful and poorly tolerated[7]. Low patient tolerance was the result of the injectable solution, stabilized by storage in 3.3 pH solution, irritating the nasal mucosa with a burning sensation.

Methods:

The present study was a prospective randomized clinical trial. Patients included children ranging from 1 – 6 years of either sex with ASA grade-I or well-controlled systemic diseases such as asthma or uncomplicated diabetes (ASA grade-II) and excluded from the study were emergency operation, routine use of sedative or hypnotics in the month before study**,** enrollment in a drug study in the preceding 6 months, known hypersensitivity to benzodiazepines and upper respiratory tract infection**.** A total of 80 patients were recruited. Of them 40 were assigned to INM spray group and 40 to OM group.

For random allocation of patients into groups, there were two cards. Parents (either father or mother) of children scheduled for receiving sedation premedication were asked to draw a card blindly. If the card drawn was marked with 'INM' his or her children received intranasal midazolam spray(0.5 mg/kg) and the next patient went to OM group to receive oral midazolam(0.5 mg/kg) The sedation and anxiolytic scores before midazolam premedication were recorded. The main outcome variables were sedation and anxiolysis which were measured at every 3 minutes intervals up to 20 minutes from midazolam administration. The time to smooth separation from their parents were recorded. The side-effects produced by the two regimens were also recorded.

Haemodynamic parameters of the two groups were recorded before premedication and at every 3 minutes following midazolam administration of the drug until the child achieved a level of conscious sedation adequately enough to be smoothly separated from their parents. Sedation and anxiolytic scores were also recorded before and at every 3 minutes after midazolam administration to compare which route allows earlier and smoother separation of child from his/her parents.Data were processed and analysed using SPSS. The test statistics used to analyse the data were descriptive statistics, Chi-square ($\div^2$) Probability Test Student's t-Test. For all analytical tests, the level of significance was set at 0.05 and $p < 0.05$ was considered significant. The summarized data were presented in the form tables and charts.

Results:

Comparison of sedation score between groups

Fig.1 demonstrates the changes in sedation score following midazolam administration between groups. The mean sedation score at baseline was 1 in both the groups. No change in sedation score

was evident in first 3 minutes of observation. Then the sedation score of INM group increased sharply to assume a mean score of 2 at 9 minutes. No demonstrated change was further noted up to the end of observation. Meanwhile the sedation score of OM group began to increase steadily up to the end of observation when it assumed a mean score of 1.5.

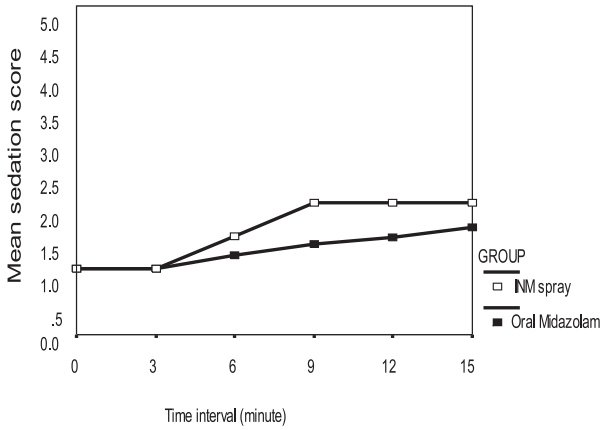

Fig 1 *Monitoring of sedation score at different time interval*

Table I *Sedation score at different time interval between groups*

Sedation score	Group		p-value
	INM (n = 40)	ON (n = 40)	
At baseline	1 ± 0	1 ± 0	Not computable
At 3 minute	1 ± 0	1 ± 0	Not computable
At 6 minute	1.5 ± 0.5	1.2 ± 0.4	0.010
At 9 minutes	2.15 ± 0.49	1.37 ± 0.49	< 0.001
At12 minutes	1.98 ± 0.22	1.68 ± 0.47	< 0.001
At 15 minutes	1.99 ± 0.40	1.90 ± 0.40	< 0.001

Data were analysed using Student's t-Test and were presented as mean ± SD.

The INM group exhibited a good level of sedation score much earlier than its OM counterpart. The mean sedation scores at 6, 9, 12 and 15 minutes of observation were significantly higher in the former group than those in the latter group ($p = 0.010$, $p < 0.001$, $p < 0.001$ and $p < 0.001$ respectively) (Table I).

Comparison of anxiolysis score at different time interval:

Fig.2 shows the comparison of changes in anxiolysis scores between groups at different time intervals. During the first 3 minutes of midazolam administration no change in anxiolysis was noted. Then the score began to increase in both the INM and OM groups, but INM group experienced a much faster increase than the OM group so that the former group reached a mean score of almost 3 and the latter group to a mean score nearly 2 at 15 minutes interval.

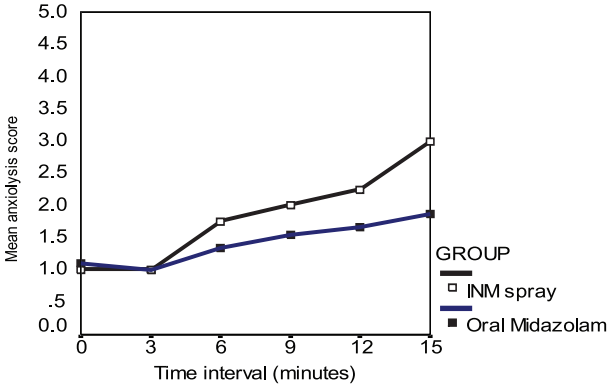

Fig 2 *Monitoring of anxiolysis score at different time interval*

Table II *Anxiolysis score at different time interval between groups*

Anxiolysis score	Group		p-value
	INM (n = 40)	OM (n = 40)	
At baseline	1.0 ± 0.0	1.1 ± 0.3	0.963
At 3 minutes	1.0 ± 0.0	1.0 ± 0.0	Not computable
At 6 minutes	1.7 ± 0.5	1.3 ± 0.5	< 0.001
At 9 minutes	2.0 ± 0.3	1.5 ± 0.7	< 0.001
At 12 minutes	2.2 ± 0.5	1.7 ± 0.7	< 0.001
At 15 minutes	3.0 ± 0.1	1.9 ± 0.7	< 0.001

Data was analysed using Student's t-Test and was presented as mean ± SD.

The levels of anxiolysis attained by the intranasal group at 6, 9, 12 and 15 minutes intervals were significantly higher compared to those attained by the oral midazolum group ($p < 0.001$ in each case) (Table II).

Smooth separation of children from their parents:

All but 1 children (97.5%) in the INM group were separated from their parents smoothly as opposed to 90% in the OM group (p = 0.148) (Fig. 3).

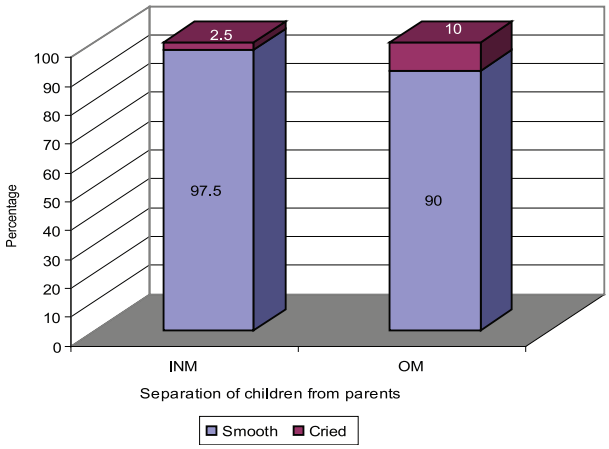

Fig 3 *Comparison of smooth separation of children between two routes*

Time to smooth separation of children from their parents:

Table III described the time to smooth separation of children from parents. In the INM group 12.8% of children were separated at 9 minutes, 69.2% from 10 – 12 minutes (over two-thirds) and 18% from 15 – 18 minutes. In the OM group 13.9% were separated at 15 minutes, about 39% at 18 – 21 minutes, 22.3% at 24 minutes and the rest 11.1% at 27 minutes after premedication. Overall more than 80% of the children in the INM group were separated at 9 – 12 minutes following midazolum administration when none of the children in the OM group was separated (p < 0.001).

Table III *Comparison of time to smooth separation of children between groups*

Time to smooth separation	Group	
	INM (n = 39)	OM (n = 36)
9 minutes	5(12.8)	0(0.0)
10 minutes	14(35.9)	0(0.0)
12 minutes	13(33.3)	0(0.0)
15 minutes	4(10.3)	5(13.9)
18 minutes	3(7.7)	7(19.4)
21 minutes	0(0.0)	7(19.4)
22 minutes	0(0.0)	5(13.9)
24 minutes	0(0.0)	8(22.3)
27 minutes	0(0.0)	4(11.1)

Complications encountered:

Complications encountered by the patients between groups showed that nasal irritation was staggeringly higher in the INM group than that in the OM group (77.5% vs. 7.5%, p < 0.001), whereas dry mouth was solely observed in OM group (35%) (p < 0.001). Additional medications needed in 3(7.5%) cases of the INM group (p = 0.120).

Table lV *Comparison of complications between groups*

Complications	Group		p-value#
	INM (n = 40)	OM (n = 40)	
Nausea/vomiting*	24(60.0)	31(77.5)	0.091
Nasal irritation*	31(77.5)	3(7.5)	< 0.001
Dry mouth*	0(0.0)	14(35.0)	< 0.001
Additional medication needed#	3(7.5)	0(0.0)	0.120

* Data were analysed using Chi-square ($\div^2$) Test;
* Data were analysed using Fisher's Exact Test.

Discussion

The results of the present study demonstrated no change in sedation score in either intranasal or oral group in first 3 minutes following midazolam premedication. From 3 minutes onwards it began to increase in both intranasal and oral groups but the increase was much faster in the former than the latter group. At 9 minutes of observation INM group assumed a mean sedation score of 2.01 ± 0.51 and OM group a mean score of 1.5 ± 0.40. Kogan et al. (1996) demonstrated that all the four non-invasive routes of midazolam administration (0.3 mg/kg in intranasal and sublingual routes and 0.5 mg in oral and rectal routes) had comparable efficacy with regard to anxiolysis (83 – 93%)[8]. The intranasal route provided a faster effect compared to the oral sublingual and rectal routes. Average sedation and anxiolysis increased with time achieving a maximum at 20 minutes in the intranasal group and at 30 minutes in the oral, sublingual and rectal group.

In the present study INM group exhibited a good level of sedation and anxiolysis scores much earlier than its OM counterpart. The levels of anxiolysis attained by the former group at 6, 9, 12, 15, and 18 minutes intervals were significantly higher

compared to those attained by the latter group. Although all children in the INM group and 36 children in the OM group were feasible to be separated smoothly from their parents after midazolam administration, the INM group augmented a significantly faster separation (over 80% within 12 minutes) as opposed to none in the OM group during the same period. In the OM group separation started at 15 minutes and continued up to 27 minutes. Fuks et al (1994) with random assignment to 0.2 mg/kg or 0.3 mg/kg of intranasal midazolum inn 30 children documented that intranasal midazolum had a rapid onset and short duration[9].

Walberg et al. (1991) demonstrated a very rapid increase in the plasma midazolam concentration to a peak of 72.2 ng/ml within 10 minutes of intranasal administration of 0.1 mg/kg of midazolam. They explained this rapid increase by the very effective mucosal absorption of the drug[10]. This explanation is strengthened by Kupietzky & Houqt (1993) who discussed the possibility that intranasal route led to the drug being absorbed in the brain and cerebrospinal fluid through cribriform plate, although the exact mechanism of intranasal absorption of medication is not fully understood[11]. The faster onset of action (sedation and anxiolysis) in the intranasal routes in these studies as well as those obtained in the present study suggest that absorption of the drug through this route is faster.

The present study demonstrated that there were no significant alterations in haedynamic variables (pulse, blood pressures, SpO_2) following midazolum administration. Although the INM group showed flactuations in the these variables up to first 18 minutes, the variation was within normal physiological range. Consistent with these findings, Connors et al (1994) found that there were no significant differences in behaviours and alteration of vital signs of patients undergoing laceration repair under nasal and oral midazolum administration[12]. Lee-Kim (2004) also did not find statistically significant differences in overall behaviour and alterations of vital signs between oral and intranasal midazolum regimens in pediatric dental patients undergoing dental procedures[13].

Though in many studies intranasal routes have been shown to be faster in providing adequate level of sedation and anxiolysis, they were mostly associated with side effects like nasal irritation and burning sensation which was observed in the present study in 77.5% of the cases. In a study, Karl et al (1992) noted that the intranasal route was associated with crying in 71% of the children due to burning sensation[14]. Naqash et al (2004) conducted a study similar to the present study and reported that 63% of the children in intranasal group cried following midazolam administration[15]. The OM route was not free of side-effects. However, the children in the OM route experienced dry-mouth (35%) cases. The nausea and vomiting was observed in both the routes; however it was more so in the OM routes. The advantage of these routes is absorption of drugs through these routes occurs directly into the central circulation, bypassing the enterohepatic circulation[16]. Intranasal drugs have been employed primarily in paediatric patients as a means of circumventing the need for injections or bitter testing of oral drugs in children especially in unwilling patients[17] . Intranasal administration of midazolam has been shown to have a higher bioavailability and shorter onset of actions than has oral route[18]. The advantages and limitations of using different administration routes for midazolum, especially with respect to the ease administration and patient acceptance, is controversial[19]. Although the oral route of administration is the most popular among pediatric dentists[20], confrontation and frustration often arise when children refuse to accept the sedative medicine. Despite efforts to disguise the often bitter taste, children occasionally spit or regurgitate the medication when administered orally[9,21]. Similar controversy existed in the literature regarding patients acceptance of intranasal midazolum (INM). Some authors have reported that the nasal route required less patient cooperation and was a simple, convenient, non-invasive, painless and reliable alternative to oral drug administration[22] In contrast other authors reported INM to be noxious, painful and poorly tolerated. Low patient tolerance was the result of injectable solution, stabilized storage in 3.3 pH solution, irritating the nasal mucosa with a burning sensation. Early approaches to the INM sedation used drops[23] but more recently use of an atomizer for intranasal administration has become more popular[24]. Griffth et al (1998) reported

improved patient tolerance to spray administration using an atomizer over using drops, but the effectiveness of sedation between these two methods of administration was reported as equal[25]. The intranasal route provided the advantage of rapid absorption into the systemic cuirculation without first-pass metabolism effecting the agent's bioavailability. Finally, if we need faster and smooth separation of children from their parents' Intranasal route could be used.

Conclusion

The intranasal route achieved satisfactory level of sedation and anxiolysis much earlier than the oral midazolum group. However, the former route is blamed to cause nasal irritation and burning sensation. Despite the intranasal route causes a substantial proportion of children to suffer from nasal irritation, it is the preferred route over oral route, because intranasal route induces much faster sedation and anxiolysis and helps easy and smooth separation of children from their parents.

References

1. Smith, RM, 'Anaesthesia for infants and children. 3rd edn.', *The CV Mosby ompany;* 1968;3:5-31.
2. Robert, M & Smith MD 'Children, hospitals and parents', *Anaesthesiology*; 1964;25(4): 461-5.
3. Weldon, BC, Watcha, MF & White PF 'Oral midazolam in children: effect of time and adjunctive therapy', *Anaesth analg* ; 1992; 75;51-5.
4. Walbergh, EJ, Wills, RJ & Eckhert, , 'Plasma concentration of midazolam in children following intranasal administration', Anaesthesiology; 1991;74:233-5.
5. Thum, P, Heine, J & Hollenhorst J, 'Midazolam given as an intranasal spray of children'*, Br. J. Anaesth* ; 1998;81:100-101.
6. Morgan, GE, Mikhail, MS & Murray, MJ, Clinical Anaesthesiology, 3rd ed. The McGrawHill Companies: 2002;3:849-74.
7. Primosch R, Bender F, 'Factors associated with administration route when using midozolum for pediatric conscious sedation', J Dent Child, 2001;68:233-8.
8. Kogan, A, Jacob, K, Rachel, E, Eidelman ,LA 'Premedication with midazolam in young children: a comparison of four routes of administration', *Paediatric Anaesthesia,* 2002;12:685-9.
9. Fuks A, Kaufan E, Ram D, Hovav S, Shapira J, 'Assessment of two doses of intranasal midazolum for sedation of young pediatric dental patients', Pediatr Dent, 1994;16:301.
10. Walbergh, EJ, Wills, RJ & Eckhert, J, 'Plasma concentration of midazolam in children following intranasal administration', Anaesthesiology; 1991;74:233-5.
11. Kupietzky A, Houqt M, 'Midazolum: A review of its use for conscious sedation in children', Pediatr Dent, 1993;15: 237-41.
12. Connors K, Terndrup KE, 'Nasal versus oral midazolum sedation of anxious children undergoing laceration repair', Ann Emerg Med 1994;24:1074-9.
13. 18.Lee-Kim SJ, Fadavi S, Panwani I, Koerber A 2004, 'Nasal versus oral midazolum sedation for pediatric dental patients', J Dent Child, vol. 71, pp. 126-30.
14. Karl, HW, Kiefer, AT, Rosenberger, JL, Larach, MG & Ruffle, JM, 'Comparison of the safety and efficacy of intranasal midazolam or sufentanl for pe-induction of anaesthesia in paediatric patients', *Anesthesiology*; 1992;76:209-15.
15. Naqash, I, Nisa, W, Zargar J & Farooqi, A, ' Midazolam premedication in children: Comparison of nasal and sublingual routes', 2004;20(2):141-5.
16. Sarkar, MA, 'Drug metabolism in the nasal mucosa', *Pharmaceutic Res*; 1992; 9:1-3.

Shakir, A, Islam, A, The effects of preoperative parental anxiety on behavioural and emotional responses to induction of anaesthesia in children [dissertation].BCPS: Dhaka. 1995.

17 .Kain, ZN & Mayes, LC, 'Anxiety in children during the perioperative period. In Bamstein, M, Genevro, J (eds): Child Development and Behavioral Pediatrics', mahwah, NJ, Lawrence Erlbaum Associates; 1999;85-103.

18. Rey, E, Delaunay, L, Pons, G, et al, 'Pharmacokinetics of midazolam in

children:Comparetive study of intranasal and intravenous administration', *Eur J Clin Pharmacol*; 1991; 41:355-7.

19. Lee-Kim SJ, Fadavi S, Panwani I, Koerber A, 'Nasal versus oral midazolum sedation for pediatric dental patients', J Dent Child, 2004; 71: 126-30.
20. Wilson S, Farrell K, Griffen A, 'Conscious sedation experiences in graduate dentistry programmes', Peditar Dent, 2001;23:307-14.
21. Leelataweedwud P, Van W, 'Adverse events and outcomes of conscious sedation for pediatric patients: study of an oral regimen', J Am Dent Assoc, 2001; 32: 1531-9.
22. Fuks A, Kaufan E, Ram D, Hovav S, Shapira J, 'Assessment of two doses of intranasal midazolum for sedation of young pediatric dental patients', Pediatr Dent, 1994; 16: 301.
23. Fishbein M, Lugo RA, Woodland J, 'Evaluation of intranasal midazolum in children undergoing oesophagogastroduodenoscopy', J Pediatr Gastroenterol Nutr, 1997; 25:261-6.
24. Ljungman G, Krueger A, Anderson S, 'Midazolum nasal spray reduces procedural anxiety in children', Pediatr, 2000; 05: 73-8.
25. Griffith N, Howel S, Mason DG, 'Intranasal midazolum for premedication of children undergoing day-case anesthesia: comparison of two delivery systems with assessment of intraobserver variability', Br J Anesthesia, 1998;81: 865-9.

Original Article

The Challenge of Multi Drug Resistant Bacteria in Intensive Care Patient Management in Bangladesh

Debabrata Banik[1], Shibani Banik[2], Montosh Kumar Mondal[3]

[1,3]Department of Anaesthesiology, Bangabandhu Sheikh Mujib Medical University, Dhaka, [2]Department of Anatomy, Dhaka National Medical College, Dhaka, Bangladesh.

Corresponding author: E-mail: banik85@gmail.com

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Introduction:
Multidrug-resistant bacteria pose a serious and rapidly emerging threat to patients in intensive care unit in developing country like Bangladesh. Incidences of multi drug resistant bacteria are markly increasing with high mortality in spite of use of wide range expensive antibiotic. In Intensive care unit "Health care associated infections (HCAIs)" are common & it is no longer a local or regional problem. With the dissemination of multi-drug resistant bacteria across the globe, the problem of HCAIs has become even grimmer. Controlling the spread of resistance requires the collaboration of several participants such as medical, vaterinary and public health communities[4-7]. The objective of this study was to determine bacterial pathogens prevalence and to assess the multidrug resistant strains to different antibiotics in the intensive care unit of Bangladesh.

Method and material:
This is retrospective study of different ICU of different group of patient for identifying the type, pattern of bacteria, bacterial resistance patterns, use of antibiotic & there result related to mortality from January 2009 to July 2013. During a those period 3320 samples of blood, tracheal suction, urine, cerebral spinal fluid, wound swab & others from 1219 ICU admitted patient were collected & send for cultural sensitivity in microbiology department. All bacteria were identified by standard microbiological methods and their antibiotic sensitivity were detected using disk diffusion method.

Result :
There is difference of pattern & frequency of bacteria & bacterial resistant in different ICU of different samples (table I & II). Positive cultural in blood 17.9% (Acinetobacter, Pseudomonas, E.coli, Kleibsiella) Tracheal aspirate 78.06% (Acinetobacter, Proteus, Pseudomonas) urine 32.30% (E.coli, Enterobacter & other 40.21% (Acinetobacter, E.coli, Pseudomonas) but some situation up to 86.25% positive cultural sensitivity. Among those multi drugs resistant bacteria is (ceftazidime, ciprofloxacin, vencomycin and tobramycin) from 9.09% to 30.50% (table III & Fig. 1). The major resistant pathogens in ICU of Bangladesh are multi drug resistant Gram negative bacteria like Acinetobacter baumannii and Pseudomonas aeruginosa, extended spectrum lactamase (ESBL) producing Klebsiella pneumoniae and Escherichia coli, methicillin resistant Staphylococcus aureus (MRSA), vancomycin resistant Enterococcus (VRE). With a different ICU setup multi drugs resistant bacteria varies up to 85.4%. Now a days effective anti micro bacterial agent in Bangladesh for ICU patient management are Colistin, Impenem, Ceftazidime, Ciprofloxacin. Overall ICU mortality is increasing from 40.48% to 57% but some situation up to 85% when infective with MDR (Fig.-1).

Table I: Demography of sample (N=3320)

Year	University ICU		Govt Hospital ICU		Private ICU	
	Total sample	Positive sample	Total sample	Positive sample	Total sample	Positive sample
2009	256	103(40.23%)	180	76(42.22%)	114	42(36.85%)
2010	280	135 (48.21%)	193	92(47.67%)	131	61(46.57%)
2011	310	99(31.93%)	214	112 (52.34%)	164	79(48.18%)
2012	322	107 (33.22)	232	126 (54.32%)	181	95(52.49%)
2013	340	126 (37.05%)	260	146 (56.16%)	203	114(56.16%)
Total	1508	570 (37.80%)	1079	552 (51.16%)	793	391(49.31%)

Table II: *Isolation of micro organism (pattern & frequency) from different sample*

Name of organism	Blood (N 723 Positive for C/S 130) (17.98%)	Tracheal (N 1053 Positive for C/S 822) (78.06%)	Urine (N 1124 Positive for C/S 363) (32.30%)	Other (N 480 Positive for C/S 193) (40.21%)
Acinetobacter	31(23.85%)	392 (47.68%)	25(6.89%)	41(21.25%)
E.coli	10(7.7%)	2(0.25%)	198 (54.55%)	33(17.1%)
Enterobacter	1(0.8%)	2(0.25%)	54 (14.88%)	3(1.56%)
Klebsiella	10(8%)	67 (8.15%)	21(5.79%)	10(0.52%)
Proteus	3(2.31%)	96(11-68%)	6(1.65%)	12(6.22%)
Pseudomonas	65(50%)	253 (30.78%)	24(6.61%)	68(35.24%)
Salmonella Typhi	10(7.70%)	0	4(1.11%)	0
Staph.aureus	5(3.85%)	3(0.37%)	8(2.20%)	19(9.85%)
Others / Streptococcus	4(3.08%)	7(0.86%)	23(6.23%)	7(3.63%)

Table III: *Culture sensitivity to anti microbial agent with different sample (Positive C/S for blood, N = 130; tracheal, N = 822; Urine, N = 363)*

Year	Sensitivity to none Positive for C/S (N)				Sensitivity to one drugs Positive for C/S (N)			Sensitivity to many drugs Positive for C/S (N)	
	Blood	Trachea	Urine	Blood	Trachea	Urine	Blood	Trachea	Urine
2009	9.09%	18.43%	25%	45.45%	29.79%	23.71%	45.45%	52.49%	51.78%
2010	12%	20%	25.71%	45%	30.18%	37.14%	40%	49.71%	47.14%
2012	13.33%	25.12%	28.23%	46.66%	34.88%	29.41%	40%	40%	42.35%
2013	18.18%	27.87%	29.13%	45.45%	35.13%	30.10%	35.16%	36.81%	39.58%
2014	20%	28.18%	30.50%	45%	33.63%	28.81%	35%	38.18%	40.67%
Total	19 (14.61%)	197 (23.96%)	101 (15.15%)	60 (45.15%)	278 (32.14%)	102(28.09%)	51(39.23%)	355 (43.18%)	159(43.80%)

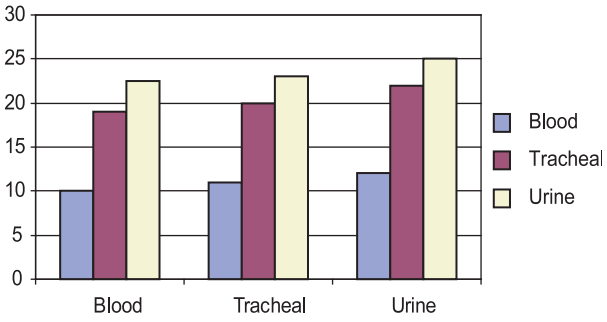

Fig 1 *Sensitivity to none anti micorbial agent for positive C/S*

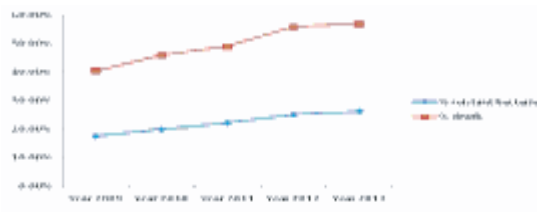

Fig 2 *Relationshi of multi drug resistant bacteria with ICU mortality*

Discussion:

In this study we find out that emergence of high frequencies multi drug resistant bacteria in ICUs setup is an important problem endangering patient safety in terms of mortality, morbidity, disability, psychosocial effects on society, and the cost of healthcare[1]. Our study result are comparable to South East Asia region like India, Thailand[2] etc. Methicillin-resistant S. aureus (MRSA) is a major problem in hospital-associated infections in almost all countries in the SEA Region. But in our study multi drug resistant Pseudomonas, Acinetobacter and Klebsiellae species have given new dimensions to the problem of hospital-associated ICU infections[3].

Conclusion:

The dissemination of MDR bacteria is not in burden of Bangladesh but across the globe, the problem of

ICU patient management has become even grimmer. Therefore, it is important to frame local & international policies and measures and take affirmative action's for prevention and reduce the burden of MDR.

References

1. MK Mondal, B R Rani, S Yeasmeen, F Haque, AKQ Huda, D Banik, Prevalence of microorganism & emergence of bacterial resistance in ICU of BSMMU, Journal of the Bangladesh Society of Anaesthesiologists, Vol-26, No-1, January 2013
2. Rajesh Bhatia and Jai P. Narain, The growing challenge of antimicrobial resistance in the South-East Asia Region - Are we losing the battle? Indian J Med Res. 2010 November; 132(5): 482-486.
3. Purva Mathur and Sarman Singh, Multidrug Resistance in Bacteria: A Serious Patient Safety Challenge for India, J Lab Physicians. 2013 Jan-Jun; 5(1): 5-10.
4. Angulo, F. J.; Nunnery J. A. and Bair, H. D. Antimicrobial resistance in Zoonotic enteric pathogens. Rev. Sci. Technol. 2004
5. Blots S, Depuydt P, Vandewoude K, De Bacquer D: measuring the impact of multidrug resistance in nosocomial infection. Curr Opin Infect Dis 2007; 20: 391-396
6. F igueiredo Costa S: Impact of antimicrobial resistance on the treatment and outcome of patients with sepsis. Shock 2008; 30: 23-29
7. Levy S. B. Factors impacting on the problems of antibiotic resistance. J. Antimicrob Chemotheraphy, 2002; 49: 25-30.

Original Article

A Comparative Randomised Clinical Study Between Nebulised Fentanyl and Intravenous Fentanyl For Post Operative Pain Relief

Lt Col Reza Ershad[1], Md Mozaffer Hossain[2], Col Mohammad Shafiqul Alam[3], AKM Asaduzzaman[4]

[1]Classified Specialist in Anaesthesiology, Combined Military Hospital, Comilla Cantonment, [2]Associate Professor, Department of Anaeshesia, Dhaka Medical College, [3]Classified specialist in Surgery (Ortho), Combined Military Hospital Dhaka, [4]Classified Specialist in Otolaryngology, Combined Military Hospital Comilla Cantonment

Corresponding author: Lt Col Reza Ershad, Classified Specialist in Anaesthesiology, Combined Military Hospital, Comilla Cantonment

Abstract

Background and Aim*: Intravenous (IV) route for fentanyl administration is very effective for post-operative pain relief, but complications such as respiratory depression, bradycardia and hypotension have limited this route. The aim of this randomised clinical trial was to compare the efficacy of nebulised fentanyl with IV fentanyl for post-operative pain relief after lower abdominal surgery. Methods:In the post-operative wards, at the time of first onset of pain(visual analogue scale- VAS score > 5) patients were randomised into two groups and either fentanyl IV 2 μg/kg or by nebulisation of solution containing 4 μg/kg fentanyl over 6-8 min in 120 patients divided into two groups of 60 each. Observation were made for pain relief by visual analogue scale score 0-10. Adverse effects such as respiratory depression, bradycardia and hypotension were also recorded. Statistical analysis was performed using Medcalc software version 12, 2012. (MedCalc Software, Ostend, Belgium). Results: In the nebulisation group, it was observed that the analgesic efficacy of fentanyl had little delayed onset (10 min vs. 5 min). Nebulisation with 4 μg/kg fentanyl produced analgesia at par to 2 μg/kg IV fentanyl with prolonged duration (90 min vs. 30 min) and with significantly less adverse effects. Conclusions:This study shows that nebulisation with 4 μg/kg fentanyl may be used as an alternative to IV 2 ìg/kg fentanyl for adequate post-operative pain relief.*

Key words*: Fentanyl, post-operative analgesia, pulmonary administration, side-effects.*

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Introduction

Adequate post operative pain relief has always been great concern for Anaesthesiologists and Surgeons.In this regard intravenous fenatanyl is very effective. However, it is often associated with complications such as respiratory depression, bradycardia and hypotension. The alternative route could be pulmonary drug delivery. Fentanyl being highly lipophilic is suitable for use through this route and pulmonary administration could be a new promising non invasive method for systemic fentanyl administration. Further it has been observed that on inhalation, fentanyl is absorbed rapidly and reaches maximum serum level approximately in 2 min. Few studies have shown significant post operative pain relief with nebulised fentanyl.[2-4] Chrubasik et al. reported that morphine nebulisation was as effective as IV morphine for pain relief after abdominal surgery.[5] Thus, the aim of this study was to compare the analgesic efficacy of nebulised fentanyl with IV fentanyl for post-operative pain relief in lower abdominal surgery.

Methods

This prospective randomised clinical trial was conducted by the Department of Anaesthesiology in collaboration with the Department of Orthopedics in the Combined Military Hospital Comilla between March 2013 to January 2014. It was approved by the Institutes Review Board and Ethical Committee. An informed written consent was taken from all the patients included in the study. 120 ASA Grade I or II patients of either gender between 20 and 40 years of age scheduled for lower abdominal surgery under regional

anaesthesia were able to comprehend assessment scales after due explanation were selected for study. Pregnant or breast feeding women, patients with morbid obesity, respiratory, hepatic and renal insufficiency, addiction or hypersensitivity to opioids were excluded from the study. Those already on chronic analgesic use and those not consenting for the study were excluded from the study. There were two study groups: IV fentanyl group A and nebulisation group B . Patients underwent 60-90 min of surgery under spinal anaesthesia with 12.5 mg Bupivacaine under sedation by iv midazolam perioperatively.

Power of study was kept 80%, level of significance 5%. Efficacy of Fentanyl was considered100% by IV route and in nebulisation group it was taken as 75%. With above consideration sample size came out 52 patients in each group by taking ratio 1:1. Assuming treatment failure rate of 15% in nebulisation group, sample size was kept at 60 . (52 + 8) in each group.On arrival of the patients in post operative ward,two paramedics alternately allocated patients included in the study into two groups (A & B).Fentanyl solution was prepared by paramedics as 4 ml for iv and 5 ml for nebulization. The quantity was 1 ml more for the nebulised group to compensate for the loss of the drug through the ventimask during nebulisation and in the upper airway.Group A received the iv fentanyl and group B received the nebulised fentanyl whenever the patient complained of pain for the first time of visual analogue scale(VAS) score > 5.

The paramedics filled up questioneries supplied to them according to the patients statements regarding pain relief. Concentration of fentanyl was kept as 2 μg/kg in iv solution in group A and 4 μg/kg in group B. Patients were nebulised by a standard ventimask having nebulisation chamber at a constant flow rate of oxygen -*10 l/min for 6- 8 min. After completion of nebulisation,* onset time of analgesia was calculated in nebulisation group. Upon further complaint of pain with VAS score >5, analgesia was provided by the second paramedic of routine posting as per unit protocol. Patients who were not relieved of pain even after 15 min from start of study, received IV ketorolac and were excluded from the study.

Patients were observed continuously and data was recorded initially at 5, 10 and 15 min then at interval of 15 min up to 1 h and at 30 min interval until completion of study. Patients were assessed for pain by VAS (0 - no pain, 10 - maximum imaginable pain), sedation by Ramsay sedation scale (RSS) (1 - anxious/restless or both; 2 - cooperative, oriented and tranquil responding to command; 3 - brisk response to stimulus; 4 – sluggish response to stimulus; 5 - no response to any stimulus). Patients were observed for nausea vomiting,(0-no symptoms; 1 –nausea,i.e.subjective unpleasant sensation with awareness of urgeness to vomit; 2- retching, i.e. spasmodic contraction of oesophagus, abdominal wall and diaphragmatic muscle without expulsion of gastric content; 3- vomitting i.e. forceful contraction of gastric content) heart rate,respiratory rate,non invasive blood pressure, oxygen saturation and pruritus.

The data obtained were statistically analysed by student t- test using Medcalc software version 12,2012. $P<0.05$ was considered to be statistically significant.

Primary objective :To assess the analgesic efficacy of nebulised fentanyl in comparison to IV fentanyl for post operative pain relieve after lower abdominal surgery.

Secondary objective: To observe the side effects of nebulised fentanyl administered to the patient.

Results

120 patients were enrolled in the study.The enrolled were randomly divided into two groups - group A and group B with 60 patients in each group. (group A received IV fentanyl and group B received nebulised fentanyl). Of the 120 patients enrolled in the study, data of 104 patients were available for analysis, 52 received nebulised fentanyl and 52 received IV fentanyl. The groups were similar in terms of demographics. The mean age of patients among all the groups were comparable and the difference not statistically significant. The distribution of males to females ranged from 40% to 60%, which had no statistical significance [Table I]. Statistically significant mean VAS change started at 5 min and continued until 15 min ($P < 0.005$) [Table II]. VAS decreased until 30 min in group A and until 90 min in group B. In group A, sedation score was maximum at 5 min. In group B, there was a slow rise in the sedation score but it was always less than in group A [Table III]. Adverse effects in group B were less compared with the group A though statistically insignificant [Table IV]. No enrolled patient had clinically significant hemodynamic instability or respiratory depression.

Table I *Demographic data of the patients*

Group	Age (Years) (Means+SD)	Weight (kg)	Male	Female	P Value
A(n=52)	37.15+10.23	55.5+2.44	32	20	NS
B(n=52)	35.81+9.15	55.56+2.14	33	19	NS

Group -A (IV fentanyl 2 µg/kg), Group B- (fentanyl nebulisation group 4 µg/kg), NS- Not significant (p>0.05): SD- Standard deviation: IV- Intravenous.

Table II *Changes in mean VAS*

Time interval (min)	Group A (n=52)	Group B (n=52)	P Value
5	5.80± 1.136	0.20± 0.632	0.002
10	1.00± 0.824	2.60± 0.632	0.001
15	0.20± 0.632	3.80± 0.632	0.001
30	0.04± 1.398	1.80± 1.136	0.07
45	3.70± 2.674	1.60± 1.414	0.04
60	NA	0.80± 0.52	-
90	NA	1.80± 2.674	-
120	NA	3.20± 2.530	-

NA – Not available; Group -A (IV fentanyl 2 µg/kg), Group B- (fentanyl nebulisation 4 µg/kg);
VAS- Visual analogue scale ;IV- Intravenous

Table III *Ramsay sedation score during study.*

Time interval (min)	Group A (n=52)	Group B (n=52)	P Value
0	3.00± 1.054	2.80± 1.032	0.965
5	5.60± 0.844	3.00± 1.054	0.001
10	5.60± 0.844	3.60± 1.032	0.001
15	4.40± 0.844	4.00± 1.032	0.001
30	4.22± 0.666	4.60± 0.966	0.310
45	4.20± 0.844	4.80± 1.032	0.01
60	4.32± 1.032	4.60± 0.632	0.069
90	4.00± 1.054	4.00± 0.966	0.074
120	2.80± 1.032	2.80± 0.966	0.054

Group -A (IV fentanyl 2 µg/kg),
Group B- (fentanyl nebulisation 4 µg/kg);
IV- Intravenous.

TableIV *Incidence of adverse effect in various groups*

Complications	Group A (n=52)		Group B (n=52)		P Value
	No	%	No	%	NS
PONV	5	9.61	1	1.92	NS
Pruritus	4	7.69	3	5.77	NS
Hypoxia	0	0	0	0	NS
Urinary retention	0	0	0	0	NS
Bradycardia	0	0	0	0	NS

PONV- Post-operative nausea and vomiting; Group -A (IV fentanyl 2 µg/kg), Group B- (fentanyl nebulisation group 4 µg/kg), NS- Not significant (p>0.05).

Discussion

The intension of this study was to compare the different clinical approaches, for patients benefit in postoperative pain relief. In this study patients who were operated by General Anaesthesia were excluded to avoid emergence delirium effect of general anaesthesia. Patients were nebulised with fentanyl post operatively at onset of pain as few studies suggested that nebulised fentanyl has a good analgesic efficacy.[2-4] Patients in the nebulisation group B were nebulised with fentanyl 4 µg/kg compared with IV fentanyl 2 µg/kg in group A considering wastage of drug in nebulisation chamber and upper airway.

In our study, onset of analgesia was delayed in the nebulisation group (10 min vs. 5 min) which correlates with the finding of the previous studies that maximum serum concentration of fentanyl was reached at 13 min after intranasal administration as compared to IV administration[6] (2-3 min), but contradicts the finding of Mather[7] who reported that inhaled fentanyl reached to therapeutic level in blood stream as quickly as IV dosing. This needs further evaluation.

Quality of analgesia evidenced by change in VAS was noted after nebulisation by 4 μg/ kg fentanyl, it was equivalent to 2 μg/kg IV fentanyl. The duration of pain relief in nebulisation group was prolonged (90 min vs. 30 min). RSS in group A reached peak at 5 min and decreased after 1 h. In nebulisation group, it increased after 10 min but was always less than iv group during study. This finding can be attributed to slow rise in peak plasma concentration by inhalational administration of fentanyl. This correlates with the finding by previous studies that maximum serum concentration of fentanyl is reached at 13 min after intranasal administration as compared to IV administration (2-3 min).[6]

No major adverse effects like respiratory depression; hypoxia or bronchospasm was observed in both groups. This correlates with the finding by Worsely[1] and Higgins[8]. Side-effects such as pruritus, nausea and vomiting were observed in both groups.

In the present study, the oxygen saturation was comparable in both groups and was statistically non significant ($P > 0.05$). We observed stable heart rate, blood pressure, respiratory rate in nebulisation group when compared with iv group. This finding can be attributed to slow rise in peak plasma concentration by inhalational administration of fentanyl. Overall, as a primary outcome of the study it revealed a delayed onset of analgesia in patients on nebulised fentanyl 4 μg/kg compared to IV fentanyl 2 micro μg/kg (10 min vs. 5 min) but the effect was prolonged (90 min vs. 30 min). The quality of analgesia with nebulised fentanyl 4 μg/kg was found equivalent to the control group of patients with IV fentanyl 2 μg/kg. As a secondary outcome, measure of the side effects of the drug were found to be minimal in the nebulised group. However, there are certain limitations of this study. As we were evaluating efficacy of nebulised fentanyl we have not evaluated total consumption of fentanyl in 24 h by nebulisation route considering it as sole analgesic. The present study included only patients who underwent lower abdominal surgery under spinal anaesthesia. However, the usefulness of inhaled fentanyl is limited as there are many situations such as head and neck surgery, patients with orofacial trauma, uncooperative and agitated patients where inhaled fentanyl administration is difficult/impossible.

Conclusions

Considering the benefit of the patients this trial gives promising results. It showed that post operatively 4 μg/kg nebulised fentanyl produces comparable pain relief to 2 μg/kg iv fentanyl for a longer duration and with minimal side effects. This study opens new horizon for further work on nebulisation of fentanyl as an alternative non-invasive method of analgesia.

References

1. Worsley MH, MacLeod AD, Brodie MJ, Asbury AJ, Clark C. Inhaled fentanyl as a method of analgesia. Anaesthesia 1990;45:449-51.
2. Bartfield JM, Flint RD, McErlean M, Broderick J. Nebulized fentanyl for relief of abdominal pain. Acad Emerg Med 2003;10:215-8.
3. Furyk JS, Grabowski WJ, Black LH. Nebulized fentanyl versus intravenous morphine in children with suspected limb fractures in the emergency department: A randomized controlled trial. Emerg Med Australas 2009; 21: 203-9.
4. Miner JR, Kletti C, Herold M, Hubbard D, Biros MH. Randomized clinical trial of nebulized fentanyl citrate versus i.v. fentanyl citrate in children presenting to the emergency department with acute pain. Acad Emerg Med 2007;14:895-8.
5. Chrubasik J, Geller E, Niv D, Zindler M. Morphine inhalation versus intravenous infusion in pain treatment after abdominal surgery. Anesth Analg 1987;66:29.
6. Kissiu I. Preemptive analgesia. Anesthesiology 2000; 93: 1138-43.
7. Mather LE, Woodhouse A, Ward ME, Farr SJ, Rubsamen RA, Eltherington LG. Pulmonary administration of aerosolised fentanyl: Pharmacokinetic analysis of systemic delivery. Br J Clin Pharmacol 1998;46:37-43.
8. Higgins MJ, Asbury AJ, Brodie MJ. Inhaled nebulised fentanyl for postoperative analgesia. Anaesthesia 1991;46:973-6.

Review Article

Medication Error in Anaesthesia – A Review

Montosh Kumar Mondal[1], Beauty Rani Roy[2], Shibani Banik[3], Debabrata Banik[4]

[1,4]Department of Anaesthesiology, Bangabandhu Sheikh Mujib Medical University, [2]Department of Gynae and Obs, OGSB Hospital, Mirpur, [3]Department of Anatomy, Dhaka National Medical College, Dhaka, Bangladesh.

Corresponding author: E-mail: montoshmondal@yahoo.com

Abstract

Medication error is a major cause of morbidity and mortality in medical profession . There is an increasing recognition that medication errors are causing a substantial global public health problem, as many result in harm to patients and increased costs to health providers.Anaesthesia is now safe and routine, yet anaesthetists are not immune from making medication errors and the consequences of their mistakes may be more serious than those of doctors in other specialties. Steps are being taken to determine the extent of the problem of medication error in anaesthesia. In this review, incidence, types, risk factors and preventive measures of the medication errors are discussed in detail.

Key words : *Medication error, adverse drug event and drug error.*

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Introduction

There is a Chinese proverb tha "error of one moment becomes the sorrow of whole life". Medication error is common in health care system and reported to be the seventh most common cause of death overall. Man, medicine and machine are the main contributory factors to it.

The management of anaesthesia has become safe with the advent of newer safe anaesthesia drugs, good quality equipment and high standards of monitoring, but the practice of poly-pharmacy, complex working conditions and involvement of multilevel medical and paramedical staff expose these areas to potentially life threatening medication error at some point of the treatment process.

Although majority of these errors are without any serious adverse outcome but some of them are associated with increased morbidity and mortality leading to prolonged hospital stay, high cost of treatment and potential for litigation[1].The press and public are unforgiving of those perceived to have harmed patients as a result of seemingly basic mistakes, inattention or carelessness, and equate such mistakes with medical negligence. More than half the public believe that suspending doctors who have committed clinical errors is an effective prevention strategy[2].

Incidence

Medication errors are common in health care system and reported to be the seventh most common cause of death overall[4]. A total of 2266 members of the Canadian Society of Anaesthesiologists were approached to find out the incidence of medication errors. Surprisingly 30% of them admitted to experience at least more than one error in their lifetime[5]. Japanese Society of Anaesthesiologists (JSA) investigated 27454 anaesthesia procedures over a period of 8 years (1999 – 2007). Out of total 233 incidences of medication error, 6.2% were clerical errors, hence they were not included in the study. Rest were either over-dose (25%), substitution error (23%) or omission error (21%)[6].A total of 89% of respondents in a survey of anaesthesiologists in New Zealand have admitted to made a drug

administration error at some stage of their career[7]. In a retrospective review of 2000 anaesthetic procedures in Australia, 144 were found to be involved in wrong drug administration[8]. In another study of 55426 cases in Norway, 63 (0.11%) cases of a drug error were found, out of which 3 cases were classified as serious[9].The Institute of Medicine (IOM) report of India highlights that 44000 - 98000 patients die each year as a result of medical errors, a large portion of these being medication related[3].

All these reports are the tip of the iceberg as many cases are not reported due to various reasons like different population variation, clinical practice variation, lack of uniformity in definition, method of reporting and collection of data, fear of blaming and defamation among colleagues etc[14].

What is a medication error?

A medication error is an 'error in the prescription, dispensing, or administration of a medication with the result that the patient fails to receive the correct drug or the indicated proper drug dosage' (National Library of Medicine Medical Subject Heading). It does not necessarily result in injury. There is wide and sometimes interchangeable use of other terms such as 'prescription error', 'drug error', 'dose error', 'adverse drug event (ADE)', 'potential ADE' and 'preventable ADE', used to define the location of the error in the pathway between pharmacy and patient more precisely or indicate that a patient has been harmed . It is often difficult to compare the results of studies on medication error research when so many different primary outcome measures are used.

The definitions of a variety of different terms used in the research and discussion of drug safety, adapted for relevance to anaesthesia and critical care. Adapted from Wheeler *et al* [10,11].

Term	Definition
Medication error	An error in the process of prescribing, dispensing, or administering a drug, whether there are adverse consequences or not.
Adverse drug event (ADE)	An injury related to the use of a drug.
Prescription error	A prescribing decision or written prescription resulting in an unintentional significant: – reduction in the probability of treatment being timely or effective *or* – increase in the risk of harm
Drug administration error	Misinterpretation of correctly written prescription, leading to: – administration of the wrong drug *and/or* – administration of the wrong dose *and/or* – administration of a drug at the wrong rate *and/or* – administration of the wrong formulation or concentration *and/or* – administration by the wrong route *and/or* – administration at the wrong time *and/or* – administration to the wrong patient.
Dose error	Administration of the wrong dose of a drug
Adverse drug reaction	Any response to a drug which is noxious and unintended that occurs in doses normally used in man

Risk factors for errors during anaesthesia

Cooper and colleagues have identified several risk factors in a critical incident analysis to study preventable mistakes[16]. Maximum errors were due to either inadequate experience (16%) or due to inadequate familiarity to equipment or device (9.3%) whereas haste and inattention or carelessness each amounted to 5.6% errors during anaesthesia.

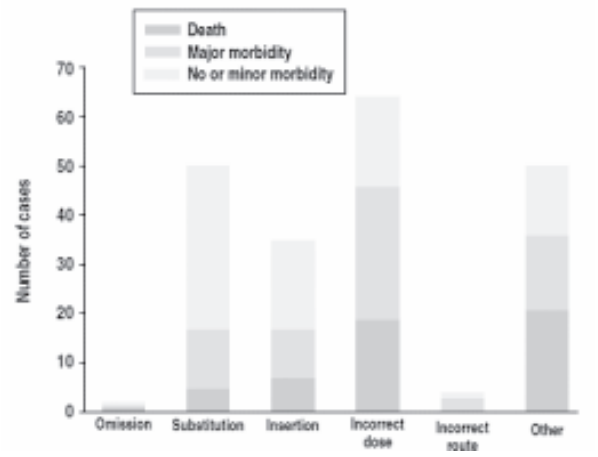
Risk factors for medication errors in anaesthesia are listed below:

- Unfamiliar settings
- New drug packaging or ampoules
- Similarly appearing ampoules are stored close together in the medication carts
- Syringes prepared by other personnel
- Handwritten labels used
- Poor lighting conditions
- Multiple medications
- Failure to label syringes
- Incorrect matching of labels on syringes/ ampoules
- Failure to read label on vial/ampoule
- Misuse of decimal points/zeroes
- Inappropriate abbreviations
- Hurry
- Fatigue
- Inattention
- Carelessness
- Lack of double checking
- False labeling,
- Lack of checking before loading,
- Performing surgery in emergency setting,
- Poor coordination between staff and Anaesthethesiologist.
- Attendant staff not adequately trained.

How Can Prescribing Go Wrong?

- Inadequate knowledge about drug indications and contraindications.
- Not considering individual patient factors, such as allergies, pregnancy, co-morbidities, other medications.
- Wrong patient, wrong dose, wrong time, wrong drug, wrong route.
- Inadequate communication (written, verbal)
- Documentation - illegible, incomplete, ambiguous
- Mathematical error when calculating dosage
- Incorrect data entry when using computerized prescribing e.g. duplication, omission, wrong number

When to suspect wrong drug administration



Number of causes of drug errors classified by the mechanism of error

in the operating room?

- Unusual response or lack of response to drug administration: pounding heart, mental status changes, apnea, muscle weakness, or visual disturbances.
- Extreme or unexpected increase or decrease in blood pressure or heart rate.
- Unexpected or persistent muscle relaxation.
- Unexpected change or lack of change, in level of consciousness.
- Incorrect ampoule found to be open in work area.

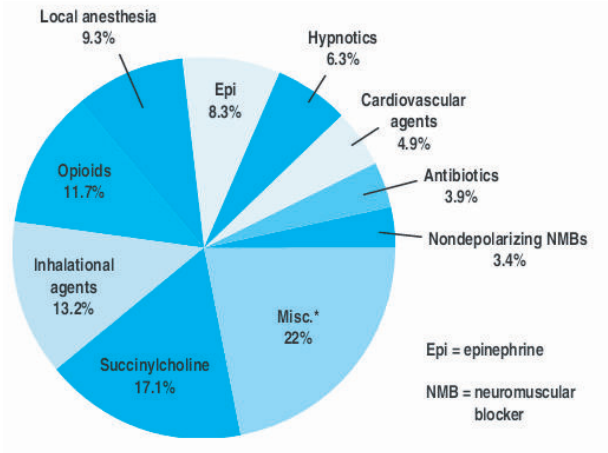
Which Patients Are Most At Risk Of Medication Error?

- Patients on multiple medications
- Patients with another condition, e.g. renal impairment, pregnancy
- Patients who cannot communicate well
- Patients who have more than one doctor
- Patients who do not take an active role in their own medication use
- Children and babies (dose calculations required)

Drugs Involved In Medication Errors

Various group of drugs involved in medication errors during practice of anaesthesia have been reported by different authors. Induction agents like pentothal sodium, ketamine, depolarizing and non-depolarizing muscle relaxants, narcotic and sedatives, anticholinergics, and local anaesthetics have been given wrongly either due to misidentification, wrong labelling, syringe swap, or exchange with another drugs because of inattention or haste. However, in majority of the cases these errors did not result in any serious harm to the patients[20,17].

In critical care units, the involvement of inotropes, narcotics, sedatives, analgesics, potassium chloride, magnesium sulphate, and anticoagulants like heparin or anti-infective agents have been identified in different studies[12,13,18,19].



Type of drugs involved in drug errorsd

Consequences of Medication Errors

There is an increasing recognition that medication errors are causing a substantial global problem as many results in harm to patients and increased cost to health care providers, and anaesthesia and critical care are no exception to this.

Medical errors are the leading cause of death in USA. A total of 44000 - 98000 Americans die every year. IOM has estimated that each year medical errors injured at least 1.5 million Americans and cost the health system more than 3.5 billion U.S. dollars. In another study approximately 7000 deaths in USA have cost more than 2 billion dollars[3].

Medical errors erode not only a patient's but also a family's confidence in health care organisations, public confidence also suffers due to these errors. The memory of errors can haunt the provider for years. Anaesthesiologists have been charged for manslaughter, homicide, etc[7].

Prevention of Medication Errors In Anaesthesia and Critical Care

Anaesthesiologists are one of the few groups of physicians who are personally responsible for drug administration. During anaesthesia most drug errors are totally or partially attributed to human error which is an inherent part of human psychology and activity; hence the occurrence of error can only be reduced and not eliminated.

Reporting and learning from medication errors should practice but accident during the period of anaesthesia is often not reported due to fear of being blamed for carelessness, forgetfulness and sometimes character weakness[21].

In general, following things should be kept in mind while working in the operation room to minimise the incidence of medication errors:

Reducing the complexity of the system to simple and linear to enhance the safety[15].Redundancy and standardisation are the basic principles in the design of a safe system[15,].Double checking of ampoules, syringes and equipment before starting the procedure[9].Simple vigilance during the handling and administration of drugs is of utmost importance.

After a systemic review, Jenson and colleagues. recommended a 12-point strategy to prevent medication errors during anaesthesia and critical care[20,21].

The label on any drug ampoule or syringe should be read carefully before the drug is drawn up or injected. Legibility and contents of labels on ampoules and syringes should be optimized according to agreed standards with respect to font, size, colour and information. Syringes should always be labelled. Formal organisation of drug drawers and work space should be used with attention to tidiness, position of ampoules and syringes, separation of look-alike drugs and removal of dangerous drugs from the operation room. Labels should be checked specifically with the help of a second person or a device like bar code reader before administration. Error during administration should be reported and reviewed.

Management of inventory should focus on minimising the risk of drug error. Look-alike packaging and presentation of the drug should be avoided where possible. Drug should be presented in prefilled syringes rather than ampoules. Drug should be drawn up and labelled by the anaesthesia provider himself/herself. Colour coding by class of drugs should be according to an agreed national or international standard. Coding of syringe according to position or size should be done.

Conclusion

Despite the best efforts, the increased use of technology and high standards of both invasive and non-invasive monitoring in anaesthesia and critical care, medication errors continue to occur even at the best centres worldwide. Simple vigilance, standardised protocol, and 'think before act' are the key factors to avoid occurrence of medication errors.

References :

1. PJ, Gift MG, Lee YP, Rothermich EA, Sill BE. Cost of medication-related problems at a university hospital. Am J Health Syst Pharm. 1995;52:2415–8.
2. Blendon RJ, DesRoches CM, Brodie M, et al. Views of practicing physicians and the public on medical errors. New England Journal of Medicine 2002; 347: 1933–40.
3. Kohn LT, Corrigan JM, Donaldson M. Washington DC: National Academy Press; 1999. To err is human: Building a safer health system.
4. T, Palmisani S, Scurlock C, Orav EJ, Bates DW. The "To Err is Human" report and the patient safety literature. Qual Saf Health Care. 2006;15:1748.
5. Orser BA, Chen RJ, Yee DA. Medication errors in anaesthetic practice, a survey of 687 practitioners. Can J Anesth. 2001;48:139–46.
6. Yamamoto M, Ishikawa S, Makita K. Medication errors in anesthesia: An 8-years retrospective-analysis at an urban university hospital. J Anesth. 2008;22:248–52.
7. Merry AF, Peck DJ. Anaesthetists, errors in drug administration and the law. N Z Med J. 1995; 108: 185–7.
8. Mackay P, Morgan C, Runciman WB, Russell WJ. The Australian Incident monitoring study. The "Wrong drug" problem in anaesthesia: An analysis of 2000 incident reports. Anaesth Intensive Care. 1993;21:596–601
9. Fasting S, Gisvold SE. Adverse drug errors in anaesthesia, and the impact of coloured syringe labels. Can J Anesth. 2000;47:1060–7.
10. Van Den Bemt PMLA, Egberts TCG, De Jong-van den Berg LTW, Brouwers JRBJ. Drug-related problems in hospitalised patients. Drug Safety 2000; 22: 321–33.
11. Allan EL, Barker KN. Fundamentals of medication error research. American Journal of Hospital Pharmacy 1990; 47: 555–71.
12. Calabrese AD, Erstad BL, Brandl K, Barletta JF, Kane SL, Sherman DS. Medication administration errors in adult patient in the ICU. Intensive Care Med. 2001;27:1592–8.
13. ld JM, Landrigan CP, Cronin JW, Kaushal R, Lockley SW, Burdick E, et al. The critical care safety study: The incidence and nature of adverse events and serious medical errors in intensive care. Crit Care Med. 2005;33:1694–700.
14. Camire E, Moyen E, Stelfox HT. Medication errors in critical care: Risk factors, prevention and disclosure. CMAJ. 2009;180:936–43.
15. Reason J. New York: Cambridge University Press; 1990. Human error.
16. Cooper L, DiGiovanni N, Schultz L, Taylor RN, Nossaman B. Human factors contributing to medication errors in anaesthesia practice. ASA. 2009:A614.
17. Bowdle TA. Drug administration errors from the ASA closed claims project. ASA Newsl. 2003; 67: 113.
18. A, Booth SA, Thompson CM, Clayton T, Eddleston J, Mackenzie S, et al. Prescription errors in UK critical care units. Anaesthesia. 2004; 59: 1193–200.
19. Calabrase AD, Erstad BL, Brandl K, Barletta JF, Kana SL, Sherna DS. Medication administration errors in adult patients in ICU. Intensive Care Med. 2001;27:1592–8. 20.ASHP guidelines on preventing medication errors in hospitals. American Journal of Hospital Pharmacy 1993; 50: 305–14.
21. World Health Organization. International Drug Monitoring: the Role of the Hospital. WHO Technical Report Series no. 425. World Health Organization 1969.

Case Report

Monitored Anaesthesia Care in An One Hundred Years Old Man in NIO&H

Rubina Yasmin[1], Kanijun Nahar Quadir[2], SM Shafiqul Alam[3]

[1]Associate Professor, Anaesthesiology, National Institute of Ophthalmology and Hospital, Dhaka (NIO&H), [2]Assistant Professor, Anaesthesiology, National Institute of Ophthalmology and Hospital, Dhaka (NIO&H), [3]Junior Consultant, Department of Anaesthesiology, Dhaka Medical College Hospital, Dhaka

Corresponding author: E-mail: rubinayasmin61@yahoo.com

Abstract:

A hundred years old man was admitted in NIO&H with the diagnosis of cataract in right eye.He was scheduled for operation under local anaesthesia, but on the O.T. table he became restless, non cooperative. So, the surgical team planned to do the operation under general anaesthesia. Necessary investigations for GA done and the patient was found nondiabetic but had anterolateral ischaemia and had cardiomegaly in X-ray chest. Our anaesthetic plan was to do the surgery under sedation with local anaesthetic block (MAC). We provided the patient monitored anaesthesia care (MAC) by giving Inj. Fentanyl, Inj.Midazolam and Inj. Propofol. The operation took twenty five minutes. Initially after the administration of drugs,his SPO_2 fell down.Oxygen given and SPO_2 increased to 99% within 90 seconds. Throughout the peroperative period patient remained haemodynamically stable. Within 10 minutes,he opened his eyes,responded to vocal command and after one hour, he was shifted from postoperative ward to general ward.

Keywords: *geriatric patient, monitored anaesthesia care*

(JBSA 2014; 27(1): 36-38)

Case Report:

A 100 years old man weighing 45kg, was admitted in National Institute of Ophthalmology and Hospital (NIO&H) with the diagnosis of cataract in right eye. The patient was scheduled for operation under local anaesthetic block. But on the O.T. table,he became restless and noncooperative. The surgical team postponed the operation and planned to do the surgery under general anaesthesia. We did the necessary investigations for general anaesthesia. Patient was found non diabetic, but had anterolateral ischaemia in ECG and cardiomegaly in chest X-ray.

Our anaesthetic plan was to do the surgery under sedation with local anaesthetic block (monitored anaesthesia care). On the OT table, patient had pulse rate 66/min, B.P.-170/90mmHg,SPO_2-98%. IV channel established and Hartmann's solution infused. When the surgical team was ready, we administered the patient Inj. Fentanyl 25μg/kg, Inj.Midazolam 2mg and Inj.Propofol 50mg(1mg/kg) intravenously. Patient was found in deep sedation. Immediately it was noticed that his SPO_2 fell down upto 85%. Guedel's airway was put in situ and oxygen administered through face mask 7-8L/min. Within 90 seconds, his SPO_2 increased to 99%. Then the surgical team gave the local anaesthetic block and after few minutes started operation. Throughout the per operative period,patient was given oxygen through nasal cannula 3L/min, his pulse rate remained 62-64/min, BP-140/90 mmHg, SPO_2 -99%. Two incremental doses (10mg) of Inj.Propofol were given in the peroperative period. The total operation time was 25 minutes. After completion of operation ,within ten minutes the patient opened his eyes, responded to vocal command. After one hour, he was shifted to general ward from postoperative ward and discharged from hospital in the next day. His operation was uneventful except oxygen desaturation for 90 seconds which occurred initially.

Discussion:

The combination of local anaesthesia with intravenous sedative and analgesic drugs is

extremely popular in the ambulatory setting in developed country. It has been suggested that upto 50% of all outpatient procedures could be performed with a Monitored anaesthesia technique(MAC) and the cost of perioperative care can be reduced upto 80% in comparison to general anaesthesia[1]

Monitored Anaeshthesia care is the term used when an anaesthesiologist monitors a patient ,receiving local anaesthesia or administers supplemental drugs to patients undergoing diagnostic or therapeutic procedures.[2] The ASA defines MAC as instances in which an anaesthesiologist has been suggested to provide specific anaesthesia services to a particular patient undergoing a planned procedure in connection with which a patient receives local anaesthesia, or in some cases, no anaesthesia at all.[3] In such a case, the anaesthesiologist is in control of the patient's vital sign and is available to administer anaesthetics and provide other medical care as appropriate. The standard of care for patients receiving MAC should be the same as for patients undergoing general or regional anaesthesia, such care includes a complete pre-operative assessment, intra operative monitoring and post operative recovery care. Vigilant monitoring is required because patients may rapidly progress from a light level of sedation to deep sedation or unconsciousness and thus maybe at risk for airway obstruction, oxygen desaturation and even aspiration.

The primary objective in providing MAC is to ensure patient comfort, safety and satisfaction during surgery. Anaesthetic drugs are administered during procedures under MAC with the goal of providing analgesia, sedation and anxiolysis and ensuring rapid recovery without side effects.Systemic analgesics are used to reduce the discomfort associated with the injection of local anaesthesia and prolonged immobilization.[4] Sedative hypnotic drugs are used to make procedures more tolerable for patients by reducing anxiety and providing a degree of intraoperative amnesia while allowing them to rest during the operation.[5] Barbiturates,benzodiazepines, Ketamine, Propofol, opioid analgesics have been used during MAC with wide variety of delivery system eg. intermittent boluses, variable rate infusion, target controlled infusion, patient controlled sedation.[6,7] The most commonly used sedation technique is a small dose of midazolam(1-2mg) or propofol (0.5-1 mg/kg) or both followed by a propofol infusion at 25 to 100μg/kg/min.[8] Avramov and White [9] described the combined use of alfentanil (0.3 to 0.4 μg/kg/min) and propofol (25-75 μg/kg/min) infusion for MAC. Propofol produces a dose related reduction in the opioid requirement (25-50%) and PONV(0-17%) compared with alfentanil alone (33%). Many other drugs like remifentanil, Ketamine,dexmetodimidine can also be used for MAC.

The advantages of MAC in comparison to general anaesthesia care are anaesthetic drugs cost can be significantly reduced, decrease in operating room exit time so enhanced turnover of cases, decreased post operative pain and sore throat leading to improved quality of recovery. Disadvantages of MAC include residual sedation, pain on injection with propofol, incidence of oxygen desaturation and greater degree of respiratory depression with remifentanil.

Monitoring patients' vital sign remains the most common method for determining the 'depth of anaesthesia' during surgery. Recent studies have suggested that the use of cerebral monitoring improves early recovery after general anaesthesia in ambulatory setting [10].

Despite the emphasis on rapid recovery after MAC, patients do not appear to be at increased risk for awareness when compared with patients receiving general anaesthesia.[11] From the perspective of the patient, the quality of recovery appears to be improved with cerebral monitoring versus traditional monitoring practices.[12]

In this case,the patient was of extreme age (100 years old), with anterolateral ischaemia and cardiomegaly. Still then his cataract surgery was done under monitored anaesthesia care. We used here the most common sedation rechnique by using Inj. Midazolam, Inj. Fentanyl and Inj. Propofol. Propofol infusion was not given as we have no syringe pump. The risk of MAC is oxygen desaturation which occurred in this patient initially, but by administering oxygen, his SPO_2 increased to 99%. Throughout the peroperative period we gave him oxygen 3L/min through nasal cannula and the patient remained haemo-dynamically stable. The operation time was also

less, only 25 minutes. His recovery was also rapid and smooth. His perioperative period was uneventful except oxygen desaturation for 90 seconds.

So, in ophthalmic surgery, in non-cooperative even in elderly patient we can give monitored anaesthesia care which can provide patient comfort,safety and satisfaction during surgery.

References:

1. Shiley SG,Lalwani K, Milczuk HA: Intravenous sedation vs.general anaesthesia for paediatric otolaryngology procedures. Arch Otolaryngol Head Neck Surgey 129:637, 2003
2. Sa Rego MM, Watcha MF, White PF: The changing role of monitored anaesthesia care in ambulatory setting. Anesth Analg 85:1020,1997
3. American Society of Anaesthesiologists: Position on Monitored Anaesthesia Care. Park RidgeIL, American Society of Anaesthesiologists , 1997; p413
4. Ramirez-Ruiz M, Smith I, White PF: Use of analgesics during propofol sedation; A comparison of Ketorolac, dezocine and fentanyl. J clint Anaesth 7:481,1995
5. Smith I: Monitored anaesthesia care : how much sedation, how much analgesia? J Clin Anesth 7:765,1996
6. Newson C, Joshi GP, Victor R,et al :Comparison of propofol administration technique for sedation during MAC, Anaesth Analg 81:486,1995
7. Ghouri AF,Taylor E, White PF: Patient controlled drug administration during local anaesthesia; A comparison of midazolam, propofol and alfentanil, J clin Anesth 4: 476-479,1992
8. White PF, Negus JB: Sedative infusion drug local and regional anaesthesia: A comparison of midazolam and propofol, J clin Anesth 3:32,1991
9. Avramov MN, White PF: Use of alfentanil and propofol for outpatient monitored anaesthesia care: Determining the optimal dosing regimen. Anesth Analg 72:616,1991
10. GanJJ, Glass PS, WIndsor A, et al: Bispectral index monitoring allows faster emergence and improved recovery from propofol,alfentanil and nitrous oxide anesthesia. Anesthesiology 87: 808,1997
11. Wennervirta J, Ranta SO, Hynynen M: Awareness and recall in outpatient anesthesia. Anesth Analg 95:72, 2002
12. Recart A,Gasanova I, White PF et al: Effect of cerebral monitoring on recovery after GA; Comparison of the auditory evoked potential and bispectral devices with standard clinical practice. Anesth Analg 97:1667, 2003

Case Report

Emergency Cesarean Delivery in a Guillain- Barre Syndrome Patient

Md. Abdur Rahman[1], Md. Mozaffer Hossain[2], Subrata Kumar Mondal[3], Atiqul Islam[3], Mohiuddin Shoman[4], Muslema Begum[4], A.K.M. Shamsul Bari [4], Mahmuda Khanom[5]

[1]Professor and Head, Dept. of Anaesthesiology , Dhaka Medical College, [2]Associate Professor, Dept. of Anaesthesiology , Dhaka Medical College, [3]Assistant Professor, Dept. of Anaesthesiology , Dhaka Medical College, [4]Junior Consultant, Dept. of Anaesthesiology , Dhaka Medical College Hospital, [5]DA Student, Dept. of Anaesthesiology, Dhaka Medical College

Corresponding author: E-mail: rahman.ra4@gmail.com

Abstract

Guillain-Barré syndrome is an acute inflammatory demyelinating polyradiculopathy characterized by progressive motor weaknes, areflexia, and ascending paralysis. Guillain-Barré syndrome is extremely rare in pregnant patients, and there are no established guidelines for delivery or safest anesthetic methods. We report an emergency Cesarean delivery in the case of a 25-year old woman who was diagnosed as Guillain-Barré syndrome at her 26 weeks gestation. Tracheostomy was performed as prolonged ventilatory support was required in the intensive care unit. The respiratory difficulty was exacerbated by the growth of the fetus, necessitating emergency Cesarean delivery. The delivery was successfully performed under general anesthesia, and the patient recovered without neurological sequelae.

Keywords: *Cesarean section, General anesthesia, Guillain-Barré syndrome, Pregnancy, Tracheostomy*

(JBSA 2014; 27(1): 39-42)

Introduction

The incidence of Guillain-Barré syndrome has been reported as 0.75 to 2 cases per 100,000 persons per year. Patients with Guillain-Barré syndrome usually have a history of upper respiratory tract infection or gastroenteritis 1 to 3 weeks prior to the onset of the disease[1]. Guillain-Barré syndrome starts with weakness of the extremities and can progress to weakness in the trunk, cervical area, facial muscles, and even respiratory muscles, causing respiratory failure in severe cases. Patients may also present with sensory symptoms, including cranial nerve deficits and autonomic nervous system dysfunction.

Guillain-Barré syndrome during pregnancy is very rare. We report a case of cesarean delivery under general anesthesia in a 25-year-old woman who was diagnosed as Guillain-Barré syndrome at her 26 weeks gestation, and who eventually required ventilation via a tracheostomy.

Case report

A 25-year-old, 155 cm, 68kg, gravida 2, para 1, pregnant woman received cesarean delivery due to failure of labor progression at 33 weeks and 6 days of pregnancy. The patient was a known case of hypothyroidism and was receiving thyroxin. She had a history of fever, back pain and weakness of lower limbs during 24th week of pregnancy and she was admitted at local hospital. At that time her USG show-single viable foetus, with cephalic presentation of 23+ wks pregnancy with good physical activities, her serum T4-161.6ng/ml,TSH-.78uIU/ml,R.B.S-4mmol/l,Hb-9gm/l,TWBC-11,800/cm^3 of blood, serum Ca^{++}-8.6mg/dl, serum electrolyte- within normal range. From there patient shifted to another hospital and was diagnosed as Guillain-Barré syndrome and she developed quadriplegia associated with mild respiratory insufficiency, maintaining SPO_2-97% with O_2 3 L/min through nasal canula, conscious oriented, afebrile, adequate intake- output and haemodynamically stable. Patient then shifted to Dhaka Medical College Hospital. She was intubated after admission and received mechanical ventilator care. Her nutrition was maintained by NG feeding. Eventually tracheostomy was done as ventilatory

Table I: *Haemodynamic condition during surgery*

Time	2.00 pm	2.15 pm	2.30 pm	2.45 pm	2.50 pm	3.05 pm
B.P(mm of Hg)	110/70	100/70	100/60	110/60	110/70	110/70
H.R(/min)	118	130	120	98	96	98

support was prolonged. Then plasma pheresis was done for 48 session in 8 days.

At 34 weeks of gestation we observed that active labour started with rupture of membrane and presence of show. Then emergency cesarean section was decided rather than instrumental vaginal delivery to be performed as foetal heart rate started to drop. Preoperative evaluation was within normal limits, except sinus tachycardia (120 beats per minute) on electrocardiogram. Without premedication the patient was transferred from ICU to the operating room with manual ventilation via tracheostomy. Standard monitoring, pulse-oxymetry and noninvasive blood pressure measurement were started.

On arrival at the operating room, the blood pressure was 110/80 mmHg, heart rate was 110 beat per minute, SpO_2 98% under gentle manual assisted ventilation with 100% oxygen. General anaesthesia was planned. She was induced with I.V. 100 mg of ketamine and 0.6mg atropine, no muscle relaxant was used and manual assisted ventilation via tracheostomy was continued with oxygen 2.5L/min, N_2O3L/min and Halothane 0.5% . The baby (Male, 2.5kg, Apgar score 8) was delivered at 15 minutes from the starting time of surgery and the placenta was extracted 3 minutes later. Oxytocin 10 unit was administered intravenously slowly and 20 unit was mixed with 1000ml Hartman's solution and Propofol infusion at the rate of 30mcg/kg/min was started. Intra operative period patient was hemodynamically stable . No muscle relaxant was administered during surgery and obstetrician was satisfied to do surgery and the delivered baby was healthy. Patient was sent to ICU with assisted manual ventilation. The motor score upon ICU arrival was 3 to 4 in all extremity, similar to that of preoperative values. Total operation time was 55 minutes and duration of anaesthesia was 75 minutes. Total infused crystalloid, estimated blood loss, and urine output were 300 ml, 250 ml and 100 ml respectively and patient was haemodynamically stable (Table-I).

In ICU, ABG was done (P^H-7.36,Pco_2-30 mm of Hg,Po_2-294 mm of Hg,HCO_3-22.5,BE -3.1)and ventilation setup was on SIMV with PSV(tidal volume 450 ml, PSV 15 cm of H_2O,breath 10/min, FiO_2 0.4) and continue ECG monitoring, and thyroid function test was done ($S.T_4$-150ng/ml, S.TSH-.74ng/ml.)

Weaning from mechanical ventilation was started on 10^{th} postoperative day (POD) and successfully done on 20^{th} POD. One month later, she was discharged and had been on outpatient department follow-up.

Discussion

Pregnant Guillain-Barré patients have a higher risk for neurological deficits, a respiratory failure rate of 35%, and a maternal mortality rate of 10 to 35%[2,3]. There is no clear evidence that termination of pregnancy can improve the outcome or facilitate the recovery of the mother, and previous studies have shown that uterine contraction is preserved and normal vaginal delivery is possible in these patients[4,5]. Thus, Guillain-Barré syndrome itself is not an indication for pregnancy termination or for cesarean delivery. Nevertheless, owing to a lack of previous studies, no guidelines for delivery and anaesthetic techniques have been established[2,3]. The appropriate mode of delivery and anaesthetic management of the parturient with Guillain-Barré syndrome depend on the patient's clinical condition at the time of delivery.

In the present case, an obstetrician judged that rupture of membrane ocured so induction of delivery or emergency cesarean delivery was essential. Louis et al. reviewed the medical records of 30 pregnant Guillain-Barré patients (from 1986 to 2002) and found that preterm deliveries occurred in eight cases (34.7%): three had spontaneous labor, and five were iatrogenic premature deliveries due to deterioration of the maternal neurological condition or preeclampsia[4]. In our case, the patient had rupture of membrane and the fetal heart rate had decreased, making premature delivery inevitable.

In patients with Guillain-Barré syndrome, both regional and general anesthesia may be performed. It has been reported that there is no superior mode of anaesthesia, as administration of both regional and general anaesthesia have each been associated with potential risks[4]. For general anaesthesia in Guillain-Barré syndrome patients, succinylcholine should be avoided because of its risk of hyperkalamia[1]. Feldman reported that a parturient with Guillain-Barré syndrome had a cardiac arrest due to hyperkalemia that occurred shortly after succinylcholine administration for general anaesthesia[6]. Non-depolarizing muscle relaxants should be administered with caution, because they may result in prolonged neuromuscular block and postoperative mechanical or assisted ventilation[7]. The TOF count should be monitored from the beginning of induction of anaesthesia to prevent overdosing of muscle relaxant. In this case no musle relaxant was used but surgeon was completely satisfied as adequate muscle relaxation was there.

There are controversies in regional anesthesia with Gullain-Barré syndrome patients. Steiner et al.[8] reported Gullain-Barré syndrome occurring one to two weeks after epidural anaesthesia in three patients who had general surgery or delivery, mentioning that epidural anaesthesia may have triggered Guillain-Barré syndrome. Wiertlewski et al.[9] reported a Guillain-Barré syndrome case, with worsening of symptoms after delivery via epidural anaesthesia. The patient did not fully recover from the motor block after epidural anaesthesia, and neurological symptoms worsened immediately after delivery. However, it would be unreasonable to generalize that regional anaesthesia causes Guillain-Barré syndrome or that it makes Guillain-Barré syndrome worsen, solely based on several previous reports. Neurologic symptoms after the surgery can be affected by many patient-related, surgery-related and anaesthesia related risk factors[10]. In addition, there is no clear evidence that epidural anesthesia causes Guillain-Barré syndrome yet. Several cases have been reported that epidural anaesthesia was successfully performed during cesarean delivery of Guillain-Barré syndrome patients, in which all patients are fully recovered after the anaesthesia[7,11,12.] Furthermore Hebl et al. reviewed the medical chart of 139 patients with a history of CNS disorder who received neuraxial anaesthesia or analgesia from 1988 to 2000, and found no case of new or worsening neurologic symptoms. It was therefore concluded that adverse events after regional anaesthesia to patients with CNS disorders are not as frequent as once thought and regional anaesthesia should not be considered an absolute contraindication in these patients[10].

Autonomic nervous system instability is another important consideration for Guillain-Barré syndrome patients in pregnancy. Because Guillain-Barré syndrome patients may present with autonomic nervous system instability[13], it is more appropriate to use directly acting adrenergic agents rather than indirectly acting sympathomimetic agents due to unpredictability of the effect[7].

The incidence of pulmonary embolism in non-pregnant Guillain-Barré syndrome patients has been reported to be between 1 to 13%[14]. Therefore prophylactic anticoagulation treatment is considered as a standard management in immobilized Guillain-Barré syndrome patients[15]. Gaber et al.[15] reported that the incidence of deep vein thrombosis was 7% and pulmonary thromboembolism was 4% despite of prophylactic anticoagulation in Guillain-Barré syndrome patients (including non-pregnant Guillain-Barré syndrome patients). Furthermore as pregnancy itself a strong risk factor for thromboembolism, early prophylactic anticoagulation should be applied and other supportive care, including physiotherapy, compressive stockings and early ambulation after delivery, is highly recommended[4].

Conclusion

In this case, cesarean delivery was successfully performed under general anaesthesia without neurological exacerbation. Hence patients should be managed aggressively with monitoring and fluid electrolyte resuscitation. Minimum doses of anaesthetic agents and drugs are recommended since myocardial depression.

Although there is no established guideline for delivery and anaesthetic technique yet, Guillain-Barré patients with pregnancy should be evaluated individually and carefully anaesthetized according to medical judgment by the anaesthesiologist.

In this case- Ketamine acts as preemptive analgesic and avoid systemic depression as patient

was hypothyroid. Propofol was used to obtund the effect of ketamine , to avoid drug cummulation and to prevent further use of Ketamine.

References

1. Kocabas S, Karaman S, Firat V, Bademkiran F. Anesthetic management of Guillain-Barre syndrome in pregnancy. J Clin Anesth. 2007;19:299–302. [PubMed]
2. Karnad DR, Guntupalli KK. Neurologic disorders in pregnancy. Crit Care Med. 2005;33(10 Suppl):S362–S371. [PubMed]
3. May SE, Caudle MR, Kleinman GE. Landry-Guillain-Barre-Strohl syndrome in pregnancy. A report of two cases. J Reprod Med. 1989;34:550–552. [PubMed]
4. Chan LY, Tsui MH, Leung TN. Guillain-Barre syndrome in pregnancy. Acta Obstet Gynecol Scand. 2004;83:319–325. [PubMed]
5. Rockel A, Wissel J, Rolfs A. Guillain-Barre syndrome in pregnancy—an indication for caesarian section? J Perinat Med. 1994;22:393–398. [PubMed]
6. Feldman JM. Cardiac arrest after succinylcholine administration in a pregnant patient recovered from Guillain-Barre syndrome. Anesthesiology. 1990; 72:942–944. [PubMed]
7. Brooks H, Christian AS, May AE. Pregnancy, anaesthesia and Guillain Barre syndrome. Anaesthesia. 2000;55:894–898. [PubMed]
8. Steiner I, Argov Z, Cahan C, Abramsky O. Guillain-Barre syndrome after epidural anesthesia: direct nerve root damage may trigger disease. Neurology. 1985;35:1473–1475. [PubMed]
9. Wiertlewski S, Magot A, Drapier S, Malinovsky JM, Pereon Y. Worsening of neurologic symptoms after epidural anesthesia for labor in a Guillain-Barre patient. Anesth Analg. 2004;98:825–827. [PubMed]
10. Hebl JR, Horlocker TT, Schroeder DR. Neuraxial anesthesia and analgesia in patients with preexisting central nervous system disorders. Anesth Analg. 2006;103:223–228. [PubMed]
11. Alici HA, Cesur M, Erdem AF, Gursac M. Repeated use of epidural anaesthesia for caesarean delivery in a patient with Guillain-Barre syndrome. Int J Obstet Anesth. 2005;14:269–270 [PubMed]