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Editorial

Ultra-sound: A New Armament in Anesthesia

Recently ultrasound is increasingly being used in various scenario of anesthetic practice, be it in intensive care or theater or even at patient assessment. Point of care ultrasound POCUS has become an essential tool in modern patient care. Recent data has shown that non-radiologists are doing major bulk of US guided procedures.[1]

Ultrasound guidance helps to perform various invasive procedures with enhanced procedural success, decreased complications, shorter time requirement and improved satisfaction of the patient as well as the performer. Evidence in various studies supports that there is significant increase in patient safety & complications, thus actually reducing cost of the patient.[2]

Ultrasound can be used from a difficult I/V line to placement of transvenous pacemaker or central venous access. All sorts of nerve block when judiciously done can give comfort to a trauma patient or increases safety in compromised patients to a level that seems a blessing indeed. Bedside patient evaluation from emergency room to intensive care units for volume status or ascertaining collection of fluids in different cavities, or for assessment of Pulmonary edema or for a quick look into myocardium or valves or for presence of thrombus can be rewarding when sustenance of life depends on time.

But to reap all the benefits of technology, we need to train our human resources as success depends on proper training, competence and skill. Although cost of machines may be a hindrance in spreading this service nationwide, little endeavor may achieve a lot as there are ultra-sound machines in most district hospitals and most private clinics where surgery is done. Academic hospitals should extend their training facilities to all provider. For patient service all concern should work together for access to USequipment by fellow colleagues. At the end of day patient service matters and all professionals should be proud to provide enhanced services to patients who deserve it.

(JBSA 2020; 33(1): 1)

Dr. Md. Azharul Islam
Sr. Consultant and Co-ordinator
Department of Anesthesia & Pain Medicine
Apollo Hospitals, Dhaka.

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1. McGahan J, Pozniac M, et al. handheld ultra-sound: threat or opportunity? Applied radiology,2015; 44(3): 20-5
2. Patel PA, Erns FR, Gunnaarsson CL. Evaluation of hospital complication and cost associated with using USG guidance during abdominal paracentesis procedure. J. Med Econ. 2012; 15:1-7.

Original Article

Contribution of Regional anaesthesia on health economics: cost effectiveness of preemptive TAP block in Laparoscopic cholecystectomy

Salahuddin Al Azad[1], Mishuk Dutta[2], Nahida Parveen Nimmi[3], A N M Badruddoza[4], S P Mitra[5], Azharul Islam[6], Lutful Aziz[7]

[1]Registrar, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka. [2]Registrar, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka. [3]Sr. Registrar, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka. [4]Senior Consultant, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka. [5]Senior Consultant, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka. [6]Senior Consultant, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka. [7]Senior Consultant, Dept of Anaesthesia & Pain Medicine, Apollo Hospitals Dhaka

Abstract

Objective: *Regional anaesthesia can play a vital role as a supplement of general anaesthesia in laparoscopic cholecystectomy surgery. In this study we postulated that preemptive bilateral dual transversus abdominis plane (BD - TAP) block has the potential to reduce the requirement of volatile anaesthetic, muscle relaxant, postoperative opioid demand and shortening of hospital stay in laparoscopic cholecystectomy surgery, ultimately total cost.*

Method: *Total 40 patients ASA I - II undergoing laparoscopic cholecystectomy surgery were randomly assigned into two equal groups of 20 patients each. All patients received preemptive IV Paracetamol (15 mg/kg), IV Diclofenac (1 mg/kg) and BD - TAP block. Block was performed with bilateral Subcostal (medial to linea semilunaris) and lateral TAP injection with total 70 ml drug volume. Group A received a drug solution containing plain Bupivacaine 15 ml (0.1%), Lidocaine 35ml (1%), Dexamethasone 10 mg. Group B received a total 70 ml normal saline injection. Maintenance of anaesthesia was accomplished with low flow anaesthesia (0.5 - 1.0 L/min) accompanied by BIS monitoring, maintaining BIS index 45 - 55. All patients received Sevoflurane with N_2O 60%. Muscle relaxation was guided by TOF monitoring and supplemental dose was adjusted by the TOF counting. Postoperative analgesia was maintained with IM pethidine in p.r.n dose and oral paracetamol in regular doses. Total opioid requirement, muscle relaxant and volatile anaesthetic used and duration of postoperative hospital stay were recorded.*

Result: *BD - TAP block reduced the Sevoflurane requirement, group A 5.5 (± 0.05) ml/ hr and group B 6.8 (± 0.9) ml/ hr ($p < 0.05$). It also reduced the requirement of Rocuronium in comparison to control group, group A 49.5 (± 2.85) mg and in group B 58 (± 4.21) mg ($p < 0.05$). Postoperative pethidine requirement, group A 135 (± 22.9) mg and group B 375 (± 46) mg ($p < 0.05$). It also facilitated rapid hospital discharge, group A 1.16 (± 0.5) days and group B 2.03 (± 0.5) days ($p < 0.05$).*

Conclusion: *In this study it is demonstrated that preemptive (BD - TAP) block in laparoscopic cholecystectomy surgery is associated with reduced requirement of volatile anaesthetic, muscle relaxant and postoperative opioid consumption. It seems that regional anaesthesia has a big contribution in modern health economics and national health policy should consider this issue.*

(JBSA 2020; 33(1): 3-9)

Background:

Combined regional and general anaesthesia has been used in recent years for better perioperative outcome. The combined general and neuraxial anaesthesia has the potential to reduce the requirement of volatile anaesthetic agents[1] and neuromuscular blocking agents (NMBA).[2] Adequate analgesia with regional anesthesia could provide better hemodynamic stability in the perioperative period. However, epidural anesthesia is often contraindicated in patients with cardiovascular disease because of anticoagulants and/or antiplatelet agents. In addition, epidural anesthesia can easily induce

hypotension or heart rate abnormalities. Fascial plane blocks brought a new dimension in anaesthesia. It is mainly used for postoperative analgesia but the advent of new techniques can have a greater impact in the intraoperative period. These blocks have also been shown to reduce opioid use during surgery, indicating that they can reduce surgical stimulation. Not all approaches of TAP block are effective for complete dermatomal coverage of the abdomen. Subcostal TAP block medial to the linea semilunaris covers dermatome T7 to T9. Lateral TAP block covers dermatome T10 to T12. So we hypothesized that application of bilateral dual TAP block (BD - TAP) could be the answer to cover T_7 - $T_{12.}$

Reduced requirement of NMBA and opioid is very important for fast tract surgery. T. Karaman et al. demonstrated that TAP block in total abdominal hysterectomy reduced requirement of volatile anaesthetic dose in Sevoflurane - Remifentanil anaesthesia.[3] TAP block provides better postoperative pain management with reduced pain in coughing, early mobilisation and opioid consumption.[4] Støving et. al. showed that TAP block is associated with consistent and significant muscle relaxing effect of the abdominal wall.[5] Eappen et al. Proposed decreased afferent input to the brain could lessen excitatory descending modulation of the spinal cord motoneurons and suppress motor function.[18]

In this study we evaluated the effect of BD - TAP block in laparoscopic cholecystectomy surgery. We measured the intraoperative requirement of Sevoflurane in 60% N_2O, total dose of NMBA, requirement of opioid and other supplemental drugs to balanced anaesthesia and hemodynamic stability, postoperative opioid consumption and duration of hospital stay.

Materials and methods:

This is a double blind case control study performed in Apollo Hospitals Dhaka after getting approval from the hospital clinical research ethical board. Patients with significant cardiac and endocrinological, neurological diseases, or coagulation disorders, allergy to local anesthetics, technically difficult patients to perform blocks were excluded from the study. Operations that started as laparoscopy but transitioned to open surgery for a surgical reason were also excluded. Total 40 patients ASA I - II, age 20 - 60 years, BMI < 35 kg/m^2 undergoing laparoscopic cholecystectomy surgery were randomly assigned into two equal groups of 20 patients each. Simple random sampling technique was used.

All patients received preemptive IV Paracetamol (15 mg/kg) and IV Diclofenac (1 mg/kg) as part of multimodal preemptive analgesia.

BIS sensor and TOF watch electrode was attached to every patient before induction of anaesthesia.

Anaesthesia workstation with Dräger Primus Infinity empowered, Depth of anaesthesia with BIS™ Complete 2-Channel Monitor, peripheral nerve stimulator TOF - watch SX were used in this study.

All patients were induced to anaesthesia with Propofol 1 mg/kg, Fentanyl 1 μg/kg, midazolam 2 mg. No inhalation anaesthetic was used during induction. After induction of anaesthesia, peripheral nerve stimulator was calibrated. Rocuronium was administered at 0.5 mg/kg.

Endotracheal intubation was done after TOFR became 0. Maintenance muscle relaxation was maintained with supplemental increment Rocuronium at 0.15 mg/kg after appearance of second TOF count.

After intubation maintenance of anesthesia was achieved with initially FGF rate at 4 L/min, O2 40%, N20 60% and dial of Sevoflurane vaporizer set at 2 v/v%. After achieving end tidal Sevoflurane concentration 1.0 , FGF was reduced to 0.5 L/min and Sevoflurane vaporizer dial at 2.0 v/v% maintaining BIS index 45 - 55.

If BIS index < 45 then Sevoflurane vaporizer dial was set to 1.5 v/v% and if BIS index > 55, dial was set in 2.5 v/v%. Age and weight adjusted MAC of Sevoflurane to maintain BIS index 45 - 55 was noted for every patient.

During maintenance of anaesthesia all patients were mechanically ventilated to maintain PaCO2 30 - 32 mmHg. All patients were monitored with electrocardiography (ECG), peripheral oxygen saturation (SpO2), heart rate (HR), and noninvasive blood pressure (NIBP).

Regional anaesthesia procedure was conducted after endotracheal intubation by another anaesthetist who was an expert on regional

anaesthesia and blinded on the drug preparation. Patients of group A received preemptive bilateral dual transversus abdominis plane block (BD - TAP) as part of multimodal analgesic approach and group B also received BD - TAP injection but with normal saline.

BD - TAP was performed with bilateral Subcostal (medial to linea semilunaris) and lateral TAP block. Total 70 ml of drug volume was injected. Group A received drug solution containing plain Bupivacaine 15 ml (0.1%), Lidocaine 35ml (1%), Dexamethasone 10 mg.

On pneumoperitoneum if HR or mean arterial pressure (MAP) increased > 25%, supplemental Fentanyl was administered 20 μg bolus. In other occasions, if MAP raised > 25% then IV Labetalol 20 mg bolus was administered.

15 minutes before completion of surgery vaporizer setting was reduced to 0 v/v% maintaining 0.5 L/ min FGF. Following completion of suturing, the ventilator was switched to spontaneous ventilation and the system was purged with 100% oxygen at 6L/ min. Reversal drugs (Neostigmine and Glycopyrrolate) were administered after attaining at least TOF count three or more. Extubation was done after attaining TOFR > 90% and BIS index > 70.

After completion of surgery, anaesthetic machine was checked to collect the machine derived total Sevoflurane usage data. Soda lime was changed following each surgery.

After patients were shifted to PACU, a trained nurse who was experienced in pain assessment and blinded about the study group, assessed the level of analgesia 30 mins interval in PACU with numerical pain rating scale (NPRC). IM Pethidine was administered if NPRC > 4. Patients were shifted to the postoperative ward after attaining modified Aldrete score > 9.

Postoperative analgesia was maintained with IM pethidine in p.r.n dose and oral Acetaminophen in regular doses. Patients were discharged from hospital following the "Postanesthesia Discharge Scoring System (PADS) for Determining Home-Readiness" proposed by Marshall S, Chung F.

Total opioid requirement, muscle relaxant and volatile anaesthetic used and duration of postoperative hospital stay were recorded.

Statistical analysis:

SPSS software version 20.0 (Statistical Package for the Social Sciences Inc, Chicago, IL, USA) was used for statistical analysis. Distribution of variables was evaluated with the Kolmogorov-Smirnov test. Variables are expressed as mean (±) standard deviation (SD). The t-test was used to compare variables between groups if variables were normally distributed. Statistical significance level was set at $P<0.05$.

Results:

Sixty patients were enrolled in this study. There was no significant difference between the groups in terms of age, sex, BMI and duration of anaesthesia of the patients. In all patients, the layers of the abdominal wall were easily visualized and the TAP block was performed after one attempt without complications.

Demographic variables:

variables	Group A (BD - TAP)	Group B (control)	P value
Age (yrs)	43.7 (±4.16)	46.0 (±9.68)	0.25
Sex (M/F)	12/8	9/11	0.34
BMI	30.23 (±2.18)	29.09 (±2.15)	0.13
Duration of anaesthesia (min)	130.5 (± 55.77)	129 (± 27.97)	0.47

In group A patients, age and weight adjusted Sevoflurane MAC 0.6 (± 0.05) was adequate to maintain BIS index 45 - 55 compared to 0.8 (± 0.2) in the group B. So mathematically the truncal block reduced the MAC of Sevoflurane 25%.

In group A patients hourly Sevoflurane consumption was 5.5 (± 0.05) ml/hr, compared to 6.8 (± 0.9) ml/hr in the group B. Here 19.11% less Sevoflurane consumption in group A patients is statistically significant ($p < 0.05$).

In term requirement of muscle relaxant, group A required 49.5 (± 2.85) mg Rocuronium for anaesthetic duration of 130.5 (± 55.77) min where the group B required 58 (± 4.21) mg of Rocuronium for anaesthetic duration of 129 (± 27.97) min. Group A used 14.66% less Rocuronium for intraoperative neuromuscular blockade.

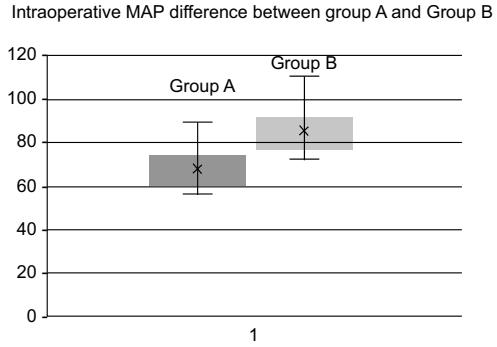
Intraoperative anaesthetic requirement:

	Group A (BD - TAP)	Group B (control)	P value
Sevoflurane MAC	0.6 (± 0.05)	0.8 (± 0.2)	0.001
Sevoflurane (ml/hr)	5.5 (± 0.9)	6.8 (± 0.9)	0.006
Rocuronium (mg)	49.5 (± 2.85)	58 (± 4.21)	0.0008
Supplemental Fentanyl (µg)	2.9 (± 0.2)	12.6 (± 1.8)	0.00003
Labetalol (mg)	1.9 (±0.6)	19.3 (±2.6)	0.00002

In intraoperative period the mean arterial blood pressure (MAP) of Group A was 67.9 (± 8.9) and group B was 85.25 (± 10.27).

In group B, total 12 patients out of 20 required supplemental 20 µg IV Fentanyl during Trocher insertion and pneumoperitoneum compared to 3 patients in group A required additional Fentanyl.

In the group B, 4 patients required IV Labetalol 40 mg and 13 patients required 20 mg. In group A, 2 patients required 20 mg IV Labetalol.



Group A (left bar) showed consistent intraoperative MAP compared to Group B (right bar). Group B required supplemental Fentanyl and Labetalol of MAP management

Postoperative management:

Group A patients required 64% less prn IM Pethidine.

Most of the Group A patients were able to be discharged from the hospital on the first postoperative day. The main issue for the control group was pain on movement and during coughing.

	Group A (BD - TAP)	Group B (control)	P value
Pethidine (mg)	135 (± 22.9)	375 (± 46)	0.00
Hospital stay (days)	1.16 (± 0.5)	2.03 (± 0.5)	0.00

Total cost was measured by calculating the amount of Sevoflurane used per hour, postoperative opioid consumption, duration of hospital stay.

Cost = S + O + D

Sevoflurane (per ml) = 64 tk

Pethidine (per ample) = 100 tk

Bed rent (per day) = 4000 tk

Group A required 4450 tk and Group B required 8835 tk.

Group B required supplemental Labetalol and Fentanyl in the perioperative period.

There was no incidence of postoperative nausea, vomiting or local anaesthetic toxicity in either group.

Discussion:

During the last decade, there has been increasing interest in using the transversus abdominis plane (TAP) block as a regional anesthetic technique for postoperative pain control after abdominal surgical procedures. In 2001, Rafi[6] described the "abdominal field block." This blind and landmark-based technique used the triangle of Petit to access the TAP. In 2007, Hebbard et al.[7] followed with a description of an ultrasound (US)–guided approach with the transducer placed in the midaxillary line to access the TAP. Several clinical trials have investigated the postoperative analgesic effects of the TAP block described by Hebbard et al, but the results are equivocal. In comparison to single injection technique, the Dual TAP block, which technically combines subcostal with lateral/posterior TAP block, provides a wider coverage for both the upper and lower abdominal walls. By anesthetizing both the upper TAP plexus (the intercostal plexus, which consists of large branch communications anterolaterally) and the lower TAP plexus (the deep circumflex iliac artery plexus), a lateral-to-medial long-needle approach can cover T_7 to T_{12}.[8,9] The bilateral dual TAP block was introduced by Borglum et al.[10]

Recent findings emphasised the two wound model after abdominal surgery. The somatic wound corresponds to the abdominal wall and parietal layer of peritoneum, the autonomic wound corresponds to the visceral layer of peritoneum and visceral component. Bilateral dual TAP (BD - TAP) blocks provide somatic analgesia of the abdominal wall (skin, muscles, and parietal

peritoneum) which is innervated by the anterior rami of T_7 - T_{12}.

Previously in many studies a variety of methods (post side injection, single site TAP block, Gallbladder bed local installation) were used to reduce the perioperative morbidity of laparoscopic cholecystectomy patients but there is no conclusive opinion on the superiority of a particular technique than others. Many studies used moderate volume (40 ml) of Bupivacaine (0.25% - 0.5%) solution in TAP block. As this fascial plane block is volume dependent, we opted high volume (70 ml) low concentration local anaesthetic solution.

Similar to previous study by T Karaman et al.[3] we found the effect of TAP block induced reduced requirement of volatile anaesthetic to maintain an adequate level of anaesthesia.

This finding supports 'Deafferentation theory'. Afferentation theory proposed that tonic sensory and muscle spindle activity maintains a state of wakefulness.[11,12]

Afferent signal from muscle has a stimulatory effect on cerebral activity. Activation of EEG in animals after increasing muscle afferent activity has shown an increase in cerebral blood flow that exceeds metabolic demand. .[13] On the other hand, temporary peripheral denervation decreases the excitability of cuneate nucleus in the brainstem[14], while acute block of tonic retinal discharges produced synchronization of the cortical EEG, which was otherwise desynchronized.[15] Forbes et al. demonstrated that neuromuscular blockade with pancuronium decreased the MAC of Halothane by 25% via abolition of muscle spindle activity and reduction of tonic afferent signaling to the brain.[17] More recent findings suggest that a spinal depressant action of isoflurane [16] or lidocaine[16] on ascending somatosensory transmission can modulate reticulo-thalamo-cortical arousal mechanisms.

Eappen et al. Proposed decreased afferent input to the brain could lessen excitatory descending modulation of the spinal cord motoneurons and suppress motor function [18]. This theory supports our finding of reduced NMBA requirements with BD - TAP block. According to previous studies (25, 26) immediate changes in central somatotopic representations occur after regional anesthesia. Acute plastic changes within primary somatosensory and motor cortices after reversible deafferentation by regional anaesthesia indicates that higher-order regions of cortex are affected.

Thus, the combination of decreased input from sensory and motor afferents seen with regional anesthesia would be a reasonable mechanism for a regional anesthetic effect and for a decreased MAC of volatile agents and reduced requirement of neuromuscular blocking agents.

In our study we used nitrous oxide. There are inconsistent opinions regarding using Nitrous oxide in laparoscopic cholecystectomy but it is effective to attenuate the visceral component of afferent stimulation. Nitrous oxide releases proenkephalin in the CNS. While single agent 66–70% nitrous oxide provides an analgesic effect similar to a whole blood concentration of remifentanil of 2 ng/ ml.[19] Nitrous oxide acts as an *N*-methyl-D-aspartate (NMDA) receptor antagonist and potentiates the activity of gamma-amino butyric acid-A ($GABA_A$) receptors and inhibits neuronal potassium channels. Thus Nitrous oxide is often referred to as a "volatile sparing agent". From a health economy perspective, it's reasonable to use Nitrous oxide in Laparoscopic cholecystectomy surgery.

As part of the "Preemptive preventive multimodal analgesia" approach we used Acetaminophen and Diclofenac sodium by infusion according to PROSPECT recommendation.[20]

Paracetamol has a central analgesic effect that is mediated through activation of descending serotonergic pathways. Debate exists about its primary site of action, which may be inhibition of prostaglandin (PG) synthesis or through an active metabolite influencing cannabinoid receptors. When administered before induction of anaesthesia, 1 g i.v. paracetamol was found to be equally successful to ketamine (0.5 mg/ kg bolus before induction, followed by 5 μg/ kg/ min).

We administered IV Diclofenac sodium (75 mg) preoperatively. It inhibits peripheral prostaglandin synthesis and more reasonable to administer it before the nociceptive stimulation.

The two main causative factors in eliciting the stress response to surgery can be summarised as follows: afferent neuronal stimulation and

circulating cytokines released in response to surgical trauma. There is evidence to show that autonomic as well as somatic afferent fibre activity is Important in triggering hormonal secretion.[21] Therefore, regional anaesthesia that fails to block completely autonomic innervation has little effect on the usual increased hypothalamo-pituitary secretion found during surgery.[22] In this regard TAP block is not effective for complete abolishment of surgical stress response.

The ratio of anesthesia cost to total treatment cost in hospitalized patients is around 5–6%, but there is still an expectation to decrease this ratio. Johnstone et al. [23] showed that by using an inexpensive medication instead of expensive ones, a 23% savings could be achieved in anesthesia expenses, but in the yearly budget of the hospital, a 23% savings in 5–6% of anesthesia is a very small amount. However, investigation of factors that result in any decrease in anesthesia costs always remains relevant in healthcare economics. In a study of the cost-effectiveness of total intravenous anesthesia versus the balanced anesthesia method, a higher cost was seen in total intravenous anesthesia.[24] In the present study, we preferred the general anesthesia method, standardized the anesthesia depth with BIS, and calculated the cost of the inhalation agents used.

Limitations of our study are that we could not evaluate the sensory block level due to the application of the block just after general anesthesia and we did not measure the blood levels of local anesthetics.

Key messages:

- Combining TAP block with general anesthesia promotes intraoperative hemodynamic stability.
- Tap block reduces intraoperative consumption of volatile agents, neuromuscular blocking agents and postoperative opioid consumption.
- TAP block could be effective in every patient undergoing abdominal surgery, not only high-risk patients.
- TAP block could be an important tool for successful day case surgery.
- Hospitals should have an organised protocol for rapid patient turn over to minimize the barriers of health economics.
- Anesthesiologists are encouraged to perform TAP block to improve the safety and quality of anesthesia in patients undergoing abdominal surgery.

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Original Article

Comparison between High and Low Rapid Shallow Breathing Indexes with Weaning of Patients in Prolonged Mechanical Ventilation

Md. Sirajul Islam[1], Md. Ali Haider[2], Uzzwal Kumar Mallick[3], Mohammad Asaduzzaman[4] Md. Gisan Hossain[5], Kazi Eshika Raka[6], Mohammad Safayat Kamal[7]

[1]Assistant professor, Department of Critical Care Medicine, National Institute of Neurosciences and Hospital. [2]Assistant Professor, Dept. of Anesthesia, Green life Medical College. [3]Registrar, Department of Critical Care Medicine National Institute of Neurosciences and Hospital. [5]Assistant Registrar, Department of Critical Care Medicine, National Institute of Neurosciences and Hospital, [6]Phase B residence, Anesthesiology, Department of Anesthesia, Pain, Palliative and Intensive Care Unit, Dhaka Medical College and Hospital. [7]Medical Officer, Department of Critical Care Medicine, National Institute of Neurosciences and Hospital, [8]Medical Officer, Department of Critical Care Medicine, National Institute of Neurosciences and Hospital.

Corresponding authors: Email:sirajulrpmc@gmail.com

Abstract

Background: *The rapid shallow breathing indexe is crucial considering the weaning of patients in prolonged mechanical ventilation.*

Objective: *The purpose of the present study was to compare the high and low rapid shallow breathing indexes with weaning of patients in prolonged mechanical ventilation.*

Methodology: *This cohort study was conducted in the Department of Anesthesia, Pain Palliative & Intensive Care Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh from January 2014 to December 2015 for a period of two (02) years. Patients of ICU on mechanical ventilation more than 48 hours with the age of 18 to 60 years were included in this study. Standard weaning criteria was considered as resolution of the primary cause of respiratory failure, state of alertness, cooperation, response to commands and Glasgow coma scale (GCS) scores ≥9. Primary and daily setting of ventilators and the decision to weaning of the patient was made by the ICU consultants. RSBI was then measured. The decision of weaning was not influenced by the RSBI. After measuring RSBI, patients was separated from mechanical ventilator and given T-piece trial (1 to 4 hours) and finally extubated as per advice of ICU consultant and observed for 48 hours. The patients were divided in two groups low RSBI ≤105 breath/min/L and high RSBI >105breath/min/L. These patients were prospectively followed up to 48 hours in ICU and HDU.*

Result: *A total of 117 patients were included in this study. The mean age was found 35.42±13.66 years with range from 18 to 60 years. The mean mechanical ventilation was found 9.6±6.4 days in low RSBI group and 8.6±4.5 days in high RSBI group (p>0.05). The association between RSBI and success in weaning of the patients was recorded. In low RSBI group 94.6% patient's sustained extubation (success) and high RSBI group 76.0% patients' sustained extubation. Success was significantly higher in patients with low RSBI group (p=0.001). The association between RSBI and weaning failure of the patients was measured. In high RSBI group failure was 6(24.0%) and success was 19(76.0%). On the other hand in low RSBI group failure was found 5(5.4%) and success was 87(94.6%) (p=0.011).*

Conclusion: *In conclusion significant association is found between high and low rapid shallow breathing indexes with weaning of patients in prolonged mechanical ventilation.*

Keywords: *Comparison; high and low; rapid shallow breathing indexes; weaning of patients; prolonged mechanical ventilation.*

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Introduction

Weaning from mechanical ventilation involves two different processes ventilator discontinuation and extubation. Weaning from mechanical ventilation is more complex than the mere manipulation of MV in an attempt to decrease support.[1] Scheinhorn et al[2] suggested that the key to successful weaning from mechanical ventilation is the reversal or significant improvement of the underlying condition that necessitated mechanical ventilation.[3] One also requires technical competence, extensive knowledge of respiratory and cardiovascular physiology and pathophysiology, their associated interactions and fluid mechanics for successful weaning timely.[4]

Often weaning can be achieved easily, but may be difficult in up to 25% of patients, especially the critically ill who have been ventilated for a prolonged period of time.[5-6] Shorter MV time can reduce complications by as much as 50%, and decrease the number of re-intubations.[7]

There are traditional criteria used in weaning of patients from mechanical ventilation which are resolution of the primary cause of respiratory failure, state of alertness, cooperation, response to commands and Glasgow coma scale (GCS) scores ≥9, tidal volume during spontaneous breathing V_T ≥5 ml/kg, PaO_2 (on FiO_2<0.4) > 60 mm of Hg, arterial pH >7.3 and positive end expiratory pressure (PEEP) 5cm of H_2O or less.[6] There are also other criteria of discontinuing mechanical ventilation such as body temperature <38°C, the patients not subjected to continuous sedation and hemodynamically stable.[5]

The rapid shallow breathing index was calculated by finding the respiratory frequency and tidal volume of the patient[7]. The physicians need to take prompt decision about weaning the patients from prolonged mechanical ventilation. Therefore, researcher planned to compare the high and low rapid shallow breathing indexes with weaning of patients in prolonged mechanical ventilation.

Methodology

This was a prospective cohort study. This study was conducted in the Department of Anesthesia, Pain Palliative & Intensive Care Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh. This study was carried out from January 2014 to December 2015 for a period of two (02) years. The samples were collected by non-purposive sampling technique. Patients of ICU on mechanical ventilation more than 48 hours with the age of 18 to 60 years were included in this study. Patients with tracheotomy, patients with spinal cord injury, self extubation or unplanned extubation, patients who expired before spontaneous breathing trial, patients shifted to another hospital before weaning and within 48 hours of weaning were excluded from this study. Ethical clearance certificate from Ethical Review Committee of Dhaka Medical College was obtained. Standard weaning criteria was considered. Single type of ventilator (eVent Medical) was used in all patients. Primary and daily setting of ventilators and the decision to weaning of the patient was made by the ICU consultants. During the weaning process, the arterial blood gases (ABG) values was checked and the patients was separated from mechanical ventilation by gradually decreasing the respiratory rate and pressure support (PS) in SIMV (synchronized intermittent mandatory ventilation) and PSV (pressure support ventilation) modes. Then spontaneous breathing trial was induced while the patient was attached to the ventilator with a low level of PS (7 cm of H_2O) and low PEEP (5 cm of H_2O or less). After one hour of spontaneous breathing trial (SBT) respiratory frequency (f) and exhaled tidal volume (EV_T) in one minute was recorded from the ventilator scales. Throughout the weaning trial, the FiO_2 setting was variable while vital signs, pulse oximetry, oxygen saturation (SPO_2) and hemodynamic status monitoring. The RSBI is expresses as breath/min/L. The decision of weaning was not influenced by the RSBI. Tracheal suction was performed as per need. After measuring RSBI, patients was separated from mechanical ventilator and given T-piece trial (1 to 4 hours) and finally extubated as per advice of ICU consultant and observed for 48 hours. If any patient was failed to T-piece trial then reconnected with mechanical ventilator and prepared the patient for further weaning. The patients were divided in two groups low RSBI ≤105 breath/min/ L and high RSBI >105breath/min/L. These patients were prospectively followed up to 48 hours in ICU and HDU. Those groups of patients who were not reintubated within 48 hours are considered as success and those who needed reintubation or expired within 48 hours was considered as failure. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 20.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The

qualitative observations were expressed by frequencies and percentages. Chi-Square test was used to analyze the categorical variables. Student Unpaired t-test was used for continuous variables such as age, RSBI etc. P value <0.05 was considered as statistically significant.

Result

A total of 117 patients were included in this study. Majority patients belonged to age 21 to 30 years which was 43(36.8%) cases and only 13(11.1%) patients belonged to age 50 to 60 years. The mean age was found 35.42±13.66 years with range from 18 to 60 years (Table I).

Table I: *Distribution of the patients according to age (n=117)*

Age Group	Frequency	Percent
18 to 20 Years	15	12.8
21 to 30 Years	43	36.8
31 to 40 Years	24	20.5
41 to 50 Years	22	18.8
51 to 60 Years	13	11.1
Total	117	100.0
Mean±SD	35.42±13.66	
Range (min-max)	18 to 60	

The duration of mechanical ventilation and rapid shallow breathing index of the patients was recorded. It was observed that majority patients had mechanical ventilation ≤7 days in low RSBI group which was 45(48.9%) cases and 15(60.0%) cases were in high RSBI group. The mean mechanical ventilation was found 9.6±6.4 days in low RSBI group and 8.6±4.5 days in high RSBI group. The mean duration of mechanical ventilation was not statistically significant between two groups (p>0.05) (Table II).

Table II *Comparison of Duration of Mechanical Ventilation and Rapid Shallow Breathing Index (n=117)*

Duration of MV (days)	Low RSBI	High RSBI	P value
≤7 Days	45(48.9%)	15(60.0%)	
8 to 14 Days	27(29.3%)	7(28.0%)	
15 to 21 Days	20(21.7%)	3(12.0%)	
Total	92(100.0%)	25(100.0%)	
Mean±SD	9.6±6.4	8.6±4.5	0.465
Range (min, max)	3 to 21	4 to 21	

P value was calculated by unpaired t-test; RSBI= rapid shallow breathing index

The association between RSBI and success in weaning of the patients was recorded. In low RSBI group 94.6% patient's sustained extubation (success) and high RSBI group 76.0% patients' sustained extubation. Success was significantly higher in patients with low RSBI group (p=0.001) (Table III).

Table III *Association between rapid shallow breathing index (RSBI) and success in weaning (n=117)*

RSBI	Success	Failure	Total	P value
Low RSBI	87(94.6%)	5(5.4%)	92(100.0%)	0.001
High RSBI	19(76.0%)	6(24.0%)	25(100.0%)	
Total	106	11	117(100.0%)	

Low RSBI (≤105 breath/min/L); High RSBI (>105 breath/min/L); the level of statistical significance was calculated by Chi square test.

The association between RSBI and weaning failure of the patients was measured. In high RSBI group (>105 breath/min/L) failure was 6(24.0%) and success was 19(76.0%). On the other hand in low RSBI group (≤105 breath/min/L) failure was found 5(5.4%) and success was 87(94.6%). Failure was significantly higher in patients with high RSBI group (p=0.011) (Table IV).

Table IV *Comparison between Rapid Shallow Breathing Indexes and Weaning Failure (n=117)*

RSBI	Failure	Success	Total	P value
High RSBI	6(24.0%)	19(76.0%)	25((100.0%)	0.011
Low RSBI	5(5.4%)	87(94.6%)	92(100.0%)	
Total	11	106	117(100.0%)	

Low RSBI (≤105 breath/min/L); High RSBI (>105 breath/min/L); Chi square test was performed to see the level of statistical significance.

Discussion

Mechanical ventilation in critically ill patients or post-surgical patients is the most important support in ICU.[8] After mechanical ventilatory support, weaning from ventilator is the main challenge in ICU. Weaning of patients from MV involves two different processes which are ventilator discontinuation and removal of the

endotracheal tube[9]. The decision regarding the removal of the endotracheal tube is crucial because both failed extubation and delay extubation associated with a lot of complications and adverse effects.

In a developing country like Bangladesh, most of the critically ill patients are not able to bear the expenses of ICU. Other hand there is no cost to measure the RSBI; it can measure just with the help of mechanical ventilator.[10] The data and result generated from the study might be helpful for weaning of patients from MV timely who will cut cost, reduce length of hospital stay and mortality and morbidity. A total of 117 patients of ICU who fulfilled the criteria of extubation after 48 hours in mechanical ventilation under Anesthesia, Pain, Palliative and Intensive Care unite of Dhaka Medical College Hospital, Dhaka, during January 2015 to September 2015 were included in this study. Patients with spinal cord injury, self extubation, unplanned extubation, or MV lasting <48 hours and patients or attendants not agreeing to participate in the study were excluded from the study. The present study findings were discussed and compared with previously published relevant studies.

In this present study it was observed that 36.8% patients were in 3rd decade and only 11.1% patient were in 6th decade. The mean age was found 35.42±13.66 years with range from 18 to 60 years. Goncalves et al[7] and Berg et al[8] showed the mean ages were 61.47±14.54 years and 70±16 years respectively. In another study Fadaii et al[9] found that the mean age was 69.4 ± 13.1 years varying from 40 to 91 years, which all are higher with the current study. Similarly, higher mean age was also observed by Bien et al[10], Patel et al[11] and Chao and Scheinhorn[12]. The higher mean ages and age ranges obtained by the above authors due to geographical variations, racial, ethnic differences, genetic causes, different lifestyles, and increased life expectancy may have significant influence of their study patients.

In this present study it was observed that more than half (53.0%) patients had MV in duration of ≤7 days. The mean duration of MV was found 10.0±6.7 days with range from 3 to 21 days. Similarly, Bien et al[10] observed the mean duration of MV was 11.0±10.0 days, which is consistent with the current study. On the other hand Fadaii et al[9] found that the mean duration of mechanical ventilation was 17 days varied from 2 to 45 days, which is higher with the current study.

The rapid shallow breathing index (RSBI) is one of the most widely investigated predictors of extubation failure. Values ≤105 cycles/min/L are considered predictive of extubation success reported by Boles et al,[13] Mokhlesi et al[14] and Vidotto et al[15]. In this current study it was observed that low RSBI (≤105 breath/min/L) was found 92(78.6%) patients and high RSBI (>105 breath/min/L) was 25(21.4%) patients. The mean RSBI was found 86.74±16.16 breath/min/L with range from 60.97 to 119 breath/min/L.

In this current study it was observed that majority 45(48.9%) patients had mechanical ventilation <7 days in low RSBI group and 15(60.0%) in high RSBI group. The mean MV was found 9.6±6.4 days in low RSBI group and 8.6±4.5 days in high RSBI group. The mean duration of MV was not statistically significant (p>0.05) between two groups. Mahoori et al[16] found 10(20.0%) patients had RSBI >105 breath/min/L and 40(80%) patients were RSBI <105 breath/min/L from mechanical ventilation. Indeed, a gradual transition is only required in less than 30% of patients receiving mechanical ventilatory support. Kuo et al[17] studies have shown that RSBI measured upon termination of SBT is a superior predictor to RSBI measured at the start of SBT in determining the likelihood of successful liberation from mechanical ventilation in critically ill patients. Although a small number of patients require prolonged ventilatory support after open cardiothoracic surgeries, growing experience in critical care settings and use of mechanical ventilation lead to favorable outcomes. Weaning is more likely to be successful if RSBI is less than 105 (breath/min/L), and this index is more valuable and more accurate for prediction than other weaning predictors.

In this study it was observed that in low RSBI group 94.6% patient's sustained extubation (success) and high RSBI group 76.0% patients' sustained extubation. Success was significantly (p<0.05) higher in patients with low RSBI group. In this series it was observed that High RSBI group (>105 breath/min/L) failure was 6(24.0%)

and success was 19(76.0%). Low RSBI group (≤105 breath/min/L) failure was found 5(5.4%) and success was 87(94.6%). Failure was significantly ($p<0.05$) higher in patients with high RSBI group. The mean RSBI was found 98.23±17.23 breath/min/L in failure group and 85.55±15.66 breath/mil/L in success group. The mean RSBI difference was significantly higher in failure group. Fadaii et al[9] showed 90.0% patients had RSBI ≤105 breath/min/L, among them 77.0.% patients had successful weaning and did not need reintubation while the remaining had unsuccessful weaning ($P<0.05$). The mean weaning index for patients with successful extubation was 66 ± 57.2 and 76.9 ± 28.1 for patients with unsuccessful extubaion, which was higher in unsuccessful extubaion but the difference was not significant between the means ($P>0.05$). Mahoori et al[16] showed the mean RSBI values were significantly different between the failure (103.5±21.9 breath/min/L) and success groups (80.4±15.3 breath/min/L, $p<0.05$). There was no significant difference regarding the values of other prediction criteria between the two groups. 10 patients had an RSBI greater than 105 (breath/min/L), within 1 hour of starting their spontaneous breathing trials. In this group three patients were successfully weaned from the ventilator. Of the 40 patients who had an RSBI less than 105 (breath/min/L), 3 patients failed weaning. 10 (20.0%) patients had failed weaning and 80.0% patients were successfully weaned from mechanical ventilation. The average RSBI values were significantly different among the failure (103.5±21.9 breath/min/L) and success groups (80.4±15.3 breath/min/L), $p<0.05$. There was no significant difference regarding the values of other prediction criteria between the two groups. Kuo et al[17] have reported that RSBI is significantly higher in patients with extubation failure (95.9 ± 20.6) and trial failure (98.0 ± 50.0) than in patients with weaning success (64.6 ± 26.3) ($p < 0.05$). The above findings are consistent with the current study.

Conclusion

In conclusion significant association is found between high and low rapid shallow breathing indexes with weaning of patients in prolonged mechanical ventilation. Therefore, it has been established that the association between RSBI and success in weaning of the patients is statistically significant.

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Original Article

Effectiveness of Transversus Abdominis Plane Block as part of a Multimodal Analgesia to Reduce Opioid Consumption among Total Abdominal Hysterectomy Patients: A Randomized Control Trial

Md. Ali Haider[1], Rabeya Begum[2], Md. Sirajul Islam[3], Md. Nurul Islam[4], Subrata Kumar Mondal[5], Md. Gishan Hossain[6], Md. Jahid Iqbal[7]

[1]Assistant professor, Department of Anaesthesiology, Green life Medical College & Hospital, [2]Professor, Department of Anaesthesiology, Green life Medical College & Hospital, [3]Assistant professor, Department of Critical Care Medicine, National Institute of Neurosciences and Hospital, [4]Assistant Professor,Department of Anesthesia, Pain, Palliative and Intensive Care Unit, Dhaka Medical College and Hospital, [5]Associate Professor,Department of Anesthesia, Pain, Palliative and Intensive Care Unit, Dhaka Medical College and Hospital, [6]Phase B residence, Anesthesiology, Department of Anesthesia, Pain, Palliative and Intensive Care Unit, Dhaka Medical College and Hospital, [7]Phase B residence, Anesthesiology, Department of Anesthesia, Pain, Palliative and Intensive Care Unit, Dhaka Medical College and Hospital.

Corresponding authors: Email:streamreza@gmail.com

Abstract

Background:*Generally patients after total abdominal hysterectomy have suffered from moderate to severe postoperative pain. Multimodal approach are using to reduce this pain.*

Objective:*The purpose of the present study was to observe the effectiveness of transversus abdominis plane block as part of amultimodal analgesia to reduce opioid consumption among total hysterectomy patients.*

Methodology:*This randomized control trial was conducted in Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine of Dhaka Medical College and Hospital, Dhaka, Bangladesh from March 2016 to September 2018 for a period two years and six months. Women planned for an elective total abdominal hysterectomy under general anesthesia were selected as study population. Participants were selected and randomly divided into two groups designed as group I and group II. Patient of both group were given general anesthesia. Group I patient received 20 ml 0.25% bupivacaine and group II patient received 20 ml normal saline as placebo. Then dressing was done. The TAP block was performed after taking all aseptic precaution in the flank palpated between the 12th rib (Costal margin) and the iliac crest. After confirmation of correct position, 20 ml 0.25% bupivacaine was given to group I patient and 20 ml normal saline was given to group II patient within the fascial layer which was confirmed by ultrasound.*

Result:*A total number of 40 patients were recruited for this study and were equally divided into two groups. Thus 20 patients were in the group I and the rest 20 patients were in group II. The mean age of group I were 53.08 ±4.25 and group II were 51.5±4.97 (p= 0.286).In this study 5(25.0%) patients had nausea in group I and 8(40.0%) in group II, 3(15%) patients had vomiting in group I and 4(20.0%) in group II (p>0.05). The mean first analgesic demand was 8.39±1.85 hours in group I and 1.59±0.21 hours in Group II (p=0.001).The mean total morphine consumption was 14.78±3.56 in group I and 26.30±5.9 in group II (p<0.05).*

Conclusion:*TAP block effectively reduced the total postoperative morphine consumption*

Keywords:*Effectiveness; transversus abdominis plane block; multimodal analgesia; opioid consumption; total abdominal hysterectomy;RCT.*

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Introduction

Multimodal analgesia is the use of a variety of analgesic drugs as well as the techniques[1]. These are working with different mechanisms of action in the peripheral or central nervous system or on both system. These includes nonsteroidal anti-inflammatory drugs, local anesthetics, peripheral nerve blocks, gabapentinoids, and alpha2 adrenergic agonists. Any combination of these therapies can help to reduce the surgical stress responses and improves patient outcomes such as pain control, patient satisfaction, time to discharge, and return to daily activities[2]. Use of combination with more than one drug acts by additive or synergistic effects and they acts at different receptors. These also decreasedopioid consumption compared with use of a single medication administered through one technique. In general, the use of local anesthetic-based regional anesthesia techniques for surgical procedures of the extremities, abdomen, and thorax is encouraged[3].

Abdominal field blocks have been used as a part of multimodal analgesia for post-operative pain control in abdominal surgery. Formerly these blocks were given blindly[4].The transversus abdominis plane (TAP) block is a technique of regionalanaesthesia that provides analgesia to the parietal peritoneum as well as theskin and muscles of the anterior abdominal wall[5]. There is afascial sheath between the internal oblique and transversus abdominis muscles and the nerves lie deep to this fascia. Ultrasound imaging assists accurate location of the transversus abdominis plane compared with a technique that relies on anatomical landmarks with acknowledged variability[6] . This present study was undertaken to observe the effectiveness of transversus abdominis plane block as part of amultimodal analgesia to reduce opioid consumption among total hysterectomy patients.

Methodology

Study Population & Settings: This was a prospective randomized control trial study. This study was conducted in Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine of Dhaka Medical College and Hospital, Dhaka, Bangladesh.This study was carried out from March 2016 to September2018 for a period two years and six months. All women booked for.l.ll.an elective total abdominal hysterectomy under general anesthesia were selected as study population. Women with the history of allergy to bupivacaine or morphine, history of opioid addiction, patients with coagulation disorders, infection at the needle insertion site or patient refuse to give informed consent to be part of the trial.

Recruitment and Enrollment: The detail of the study (purpose, methods, VAS scoring system,effects and complications of the procedure) were discussed with the patient who qualified for the trial during preoperative visit which was done the day before surgery. Then participants are selected after completing the inclusion and exclusion criteria. Finally written informed consent were taken from themif they agreed to take part in the trial.

Randomization:A total 40 participants were selected and randomly divided into two groupsdesigned as group I and group II by using fixed number sealed envelope technique. Eachgroup contains 20 patients. This grouping was made by assignedanaesthesiologist and given the code number for every patient.

Intervention: Patient of both group were given general anesthesia. A routine general anesthesia wasperformed using the standard technique. After 3 minute pre-oxygenationfentanyl 2 microgram/ kg and thiopental sodium 3 to 5 mg/kg were used forinduction. For intubation vecuronium 0.1mg/ kg was given. Anesthesia wasmaintained with halothane 0.6 MAC, N_2O 66%, O_2 33% and incremental doseof vecuronium 0.03 mg/kg when needed. After completion of operation andskin closure TAP block (with the help of USG guidance) was given to allpatient. Group I patient received 20 ml 0.25% bupivacaine and group II patientreceived 20 ml normal saline as placebo. Then dressing was done. Finally 20patient was reversed after fulfilling the reversal criteria with neostigmine 50microgram/kg & 20 microgram/kg atropine.The TAP block was performed after taking all aseptic precaution in the flankpalpated between the 12th rib (Costal margin) and the iliac crest. Theneuromuscular plane between the internal oblique muscle and the transversusabdominis muscle was identified with

ultrasound guidance. Atraumatic bluntneedle for peripheral nerve block (Sono Ned, 21G, 110mm length) was advanced by an ultrasound guided in-plane technique at the anterior axillaryline. The first "pop" sensation should be felt as the needle reaches the fascialplane between the external oblique and internal oblique muscles. A second"pop" sensation should be felt as the needle enters in the plane between internaloblique muscle and transversus abdominis muscle. The exact location of theneedle tip was confirmed via direct ultrasound visualization.After confirmation of the correct position of the needle and negative aspiration,1 to 2 ml of normal saline was injected to identify position with water dissection.After confirmation of correct position, 20 ml 0.25% bupivacaine was given togroup I patient and 20 ml normal saline was given to group II patient within the fascial layer which was confirmed by ultrasound. Study drug were prepared and labeled properly.In postoperative room all patients were receive injparacetamol 1gm IV stat and6 hourly and diclofenac sodium 50 mg P/R stat and 8 hourly. Time of firstdemand of analgesic was then recorded.To all patients ondansetron 8mg IV was given along with 1st dose of Morphine.

Follow up and Outcomes Measures: The presence and severity of painwere assessed using a visual analogue pain scale (VAS) and continued it at 2hour interval up to 24 hours and in between 2 hour whenever patient complains 21 about pain. Morphine 0.15mg/kg intramuscular were given when patient complains pain according to VAS score 6 or above 6 (rest/ Movement). Total morphine requirements were documented. Incidences of nausea & vomiting were also being recorded.

Statistical Analysis: Statistical analyses were carried out by using the Statistical Package for SocialSciences version 22.0 for Windows (SPSS Inc., Chicago, Illinois, USA).Unpaired student t-test was used for continuous variables like age, weight,morphine requirement, frequency of morphine required and first analgesicdemand. Chi-Square test was used to analyze the categorical variables like occurrence of nausea & vomiting. P values <0.05 was considered as statistically significant.

Result

A total number of 40 patients were recruited for this study and were equally divided into two groups. Thus 20 patients were in the group I and the rest 20 patients were in group II. Then TAP block with 20 ml of 0.25% bupivacaine in group I and 20 ml normal saline in group II on each side was done before surgical dressing. Monitoring of time of first analgesic demand, frequency of morphine and total morphine consumption was observed in 24 hour post-operative period. The mean age of group I were 53.08 ±4.25 and group II were 51.5±4.97 , which was statistically non-significant (p= 0.286) and mean weight (Kg) of group I patient were 57.58 ±7.21 and group II were 61.45±6.4 which was also statistically not significant (p= 0.080) (Table 1).

Table 1 *Demographic characteristic of the patients (Mean±SD)*

Variables	Group I	Group II	P value
Age (in years)	53.08±4.25	51.5±4.97	0.286
Weight (kg)	57.58±7.21	61.45±6.4	0.080

Student t test was performed to see the level of significance.

The morphine requirement in group I was 1.75±0.44 mg and group II was 2.85±0.48 mg. Here p value was 0.001 which is statistically significant (Table II).

Table 2 *Frequency of morphine requirement in different group (Mean±SD)*

Groups	Value (mg)	P value
Group I	1.75±0.44	0.001
Group II	2.85±0.48	

Student t test was performed to see the level of significance.

It was observed that 5(25.0%) patients had nausea in group I and 8(40.0%) in groupII, 3(15%) patients had vomiting in group I and 4(20.0%) in group II. The differencewas statistically not significant (p>0.05) between two groups (Table III).

Table III *Occurrence of adverse Events in different group*

Adverse Events	Group I	Group II	P value
Nausea	5(25.0%)	8(40.0%)	0.311
Vomiting	3(15.0%)	4(20.0%)	0.677

Chi square test was performed to see the level of significance.

The mean first analgesic demand was 8.39±1.85 hours in group I and 1.59±0.21 hours in Group II. The difference was statistically significant between two groups (p=0.001) (Table IV).

Table IV *Time of First Analgesic Demand after the End of Operation (Mean±SD)*

Groups	Value (Hour)	P value
Group I	8.39±1.85	0.001
Group II	1.59±0.21	

Student t test was performed to see the level of significance.

It was observed that the mean total morphine consumption was 14.78±3.56 in group Iand 26.30±5.9 in group II. The difference was statistically significant (p<0.05)between two groups. Morphine requirement was significantly high in group II patients (Table 5).

Table V: *Total Morphine Consumption in 24 hour Post-Operative Period (Mean±SD)*

Groups	Value (mg)	P value
Group I	14.78±3.56	0.001
Group II	26.30±5.9	

Discussion

Patients for elective total abdominal hysterectomy under general anaesthesia were recruited into this prospective, randomized, controlled study. TAP block was done with 20 ml of 0.25% bupivacaine in trial group and 20 ml normal saline in control group on each side as a part of multimodal analgesia to the anterior abdominal wall. This study carried out with the aim to measure and compare the post-operative opioid requirement, time to first analgesic demand and also to see the incidence of nausea & vomiting.

In this study TAP block in patients with elective total abdominal hysterectomy under general anaesthesia found that the mean time to first analgesic demand was delayed in group I than in group II. The difference was statistically significant (p<0.05) between two groups. McDonnell et al[7]used TAP block in patients undergoing colonic resection surgery involving a midline abdominal wall incision, McDonnell et al[7], Jadon et al[8],Belavy et al[9] done TAP block in patients undergoing cesarean delivery and Atim et al[10] and Carney et al[1] also have given TAP block in patients undergoing total abdominal hysterectomy. Above all studies which is similar to this study. Both of them showed that mean time to first analgesic demand were delayed.

In this current study, it was observed that occurrence of nausea and vomiting in between two group was statistically non-significant. Carney et al[1]did not find any significant difference regarding PONV. Nirajet al[11]showed that TAP block did not influence on PONV. Siddiqui et al[12]found no significant difference in post-operative nausea and vomiting between the TAP and non-TAP block group. Mrunaliniet al[13]also showed that there is no relation between TAP block with nausea and vomiting.

In this study frequency of morphine in group I patient was lower than group IIpatient which was statistically significant. There was no previous studyregarding frequency of morphine consumption. This observation maybe dueuse of continuous IV PCA device for opioid delivery in other studies.

Atimet al[10] have concluded that opioid requirement is less inultrasound-guided TAP block after TAH than superficial wound infiltration.McDonnell et al[7] showed that TAP block reduce mean IV morphinerequirements more than 70%. Prabu et al[14]showed that TAP block had significantly reduced post-operative morphine consumption at 2,4 and 6 h and also reduced the mean morphine requirement by 57%. Ra et al[15] showed that USG-TAP block could reduce the amount of opioid during operation and 24 hour post-operative period after laparoscopic

cholecystectomy. TAP block is effective as a part of a multimodal analgesia for reducing postoperative pain and opioid requirement after emergency laparotomy[13]. TAP block reduces post-operative morphine usages when compared with PCA alone which has been performed by Riset al[16] and have showed that USG guided TAP block is effectively reduced the total opioid consumption. In this study also similar observation is observed.

Conclusion

In conclusionthe transversus abdominis plane block is effective as part of a multimodal analgesia to reduce opioid consumption among total hysterectomy patients.Thus, TAP block reduces the total postoperative morphine consumption. Moreover, the adverse events are very minimum among these patients.

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Original Article

Comparative Study between Bronchial Blocker and Left Double Lumen Endotracheal Tube for One Lung Ventilation in Right Video-Assisted Thoracoscopic Surgery

Lt Col Farzana Kalam[1], Brig General Md. Pervez Altaf Hossain[2], Col Masud Ahmed[3], Lt Col Abdullah Masum[4]

[1]Classified Anaesthesiologist, CMH Dhaka Cantonment, [2]Advisor Anaesthesiologist, CMH Dhaka Cantonment [3]Classified Anaesthesiologist, CMH Dhaka Cantonment. [4]Classified Anaesthesiologist, CMH Comilla Cantonment

Address of correspondence: e-mail: kalam101020@gmail.com,

Summary:

Background: *Double lumen endotracheal tubes (DLT) and bronchial Blockers (BB) have both been used for lung isolation in video-assisted thoracic surgery (VATS) with some inherent demerits.Though not well studied is widely thought that DLT provides faster and better quality of lung collapse.*

Objective: *The aim of this study was to compare the quality of lung deflation of a left sided double lumen endotracheal tube with a broncheal blocker for one lung ventilation in video-assisted thoracic surgery.*

Materials methods: *A total forty adult patients have been assigned to either DLT or BB group who undergoing VATS procedure for mediastenal mass surgery. Correct placement of airway was confirmed by fiber optic bronchoscopy. The variables assessed were: 1. Time required for correct placement of device, 2. Time taken for lung collapse, 3. Quality of Lung collapse, 4. Number of times of airway mal-positioned, 5. Changes of blood pressure and heart rate at baseline (T_1) and immediate before (T_2) and after (T_3) intubation and one minute after (T_4) intubation, 6. Number of patients with hypoxemia (Spo_2 <90%) during one lung ventilation, and7.Post-operative complication like hoarseness of voice, sore throat and lung infection.*

Result: *The time required to place the device in correct position was similar between two groups. Time taken for right lung collapse in DLT was faster than BB group, DLT (2.46 ± 0.85) BB (4.76 ± 0.61) P (< 0.05). HR was similar and comparable at T_1, T_2,T_4 between groups &was significantly high at T_3 in DLT (88.24 ± 7.42) than BB group (78.56 ± 9.06) and p value (=0.00007) was significant. Mean arterial pressure (MAP) were comparable between groups at T_1, T_2, T_4, but at T_3 was higher in DLT (99.36 ± 9.62) than BB (92.15+6.47) and the result was statistically significant (P= 0.0084).*

Conclusion: *Result showed that BB could be a better and effective alternative of DLT in VATS Procedure considering a longer time to achieve complete lung collapse with minimum hemodynamic changes and with minimum post-operative complication.*

Key words: *One lung ventilation (OLV), Vedio-assisted thoracoscopic surgery (VATS), Double lumen tube (DLT), Bronchial blocker (BB).*

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Introduction

Video assisted thoracic surgery (VATS) is a minimally invasive, popular technique increasingly used in thoracic surgery which requires one lung ventilation (OLV). A key to successful VATS surgery is maximizing intra thoracic visualization by optimizing the quality of lung isolation and deflation within the relatively closed thoracic cavity.

Double lumen endotracheal tube (DLT) has generally been considered the gold standard for lung isolation.[1,2] Its large lumen facilitates the

sucktioning of blood or secretions from bronchi and switch from two lung to OLV can be achieved easily and reliably. However mal positioning of tube can occur and for its rigidness and wide diameter insertion of DLT can cause preoperative complications like pronounced intubation reflex, tracheobronchial rupture, hematoma formation in larynx trachea & bronchus, traumatic laryngitis or arytenoids dislocation.[1-5] In comparison the bronchial blocker (BB) is inserted through a single lumen endotracheal tube previously placed into trachea. Due to less friction during placement to the trachea bronchus larynx there is minimum hemodynamic alteration with the patients when BB is being used. This is a single blinded randomized prospective clinical trial for OLV by comparing the use of left sided DLT and BB to evaluate the ease of use effectively, haemodynamic alterations as well as post-operative complications.

Methods:

This prospective single blinded study was done after getting clearance from ethical committee of Combined Military Hospital Dhaka Cantonment. Forty patients who were scheduled for removal of mediastenal mass under VATS procedure between the periods of January 2017 to December 2018 were approached for the study. The patients were aged between 25-65 years old and of American Society of Anesthesiologist (ASA) physical status ^{2}-Ø. After obtaining informed written consent and prior to induction of anesthesia all patient were assigned to have their airway managed by either a left sided DLT or a BB according to a randomize trial. Patients with anticipated or with previous difficult intubation, severe obstructive pulmonary disease, pleural and/or interstitial pathology, history of psychological or neurologic function impairment and FEV, <50% of predicted value were excluded from the study.

Prior to induction all patients were attached to all standard monitors required for VATS & OLV.Anesthesia was induced with midazolam (0.05 mg/kg), propofol (1.5 mg/kg), fentanyl (1-2 mgm/kg), norcurone (0.1 mg/kg). After the onset of muscle relaxation single lumen endotracheal tube (SLT) or double lumen tube (DLT) was inserted under direct laryngoscope and then the tube was connected to ventilator. In the DLT group, the patients were intubated using a left sided DLT of an appropriate size (32-35 for women and 35-37 for men).

The DLT was positioned using a fiber optic bronchoscope at an appropriate depth so that bronchial cuff remain to the left main bronchus and the port for right bronchus remain fitted to the opening of right bronchus just above carina. The BB was also positioned through the lumen of regular endobroncheal tube (size 7.5-8 mm for female and 8-8.5 mm for male) using a flexible bronchoscope such that the cuff was just with in the right main bronchus. The balloon of the BB was inflated with 5-8 ml of air to obtain total broncheal blockade.

After confirming correct placement of DLT or BB all patients were turned into left lateral position. The bronchial cuff of DLT or balloon of BB was deflated prior and during patient positioning. After proper positioning both the DLT and BB were rechecked for correct placement. After proper positioning and surgical drapping OLV were started, for DLT group the right channel was clamped and opened into the air and for the BB group the lung was deflated prior to inflating the balloon of the blocker by turning the ventilator off and opening the breathing circuit. No further maneuvers were performed to facilitate lung collapse.

During OLV, ventilator setting was adjusted to keep peak airway pressure bellow 25 cm H_2O, lower tidal volume (5-7 ml/kg), higher respiratory rate (18-22 breaths/min). All ventilator parameters were adjusted to maintain the $ETCO_2$ level between 35-45 mm of Hg. Anaesthesia was maintained with halothane 0.2-0.6% muscle relaxation was maintained by incremental dose of norcurone and analgesia was maintained by continuous epidural anagesia by 0.25 % Bupivacaine plane 1-2 ml/hour and Fentanyl 2.5 micro gm/hour through epidural catheter, titrated according to the hemodynamic response of the patient.

After completion of surgery all patients were extubated and shifted to post anaesthesia case unit (PACU). Post-operative analgesia was maintained by thoracic epidural route. All demographic parameters information, findings, events were compiled in a preformed data sheet and analyzed by appropriate test using SPSS version 22 & P-value <0.05 was considered significant.

Results:

Total forty patients were selected for the study and randomly assigned to the DLT on BB group. There were no significant differences in patient characteristics and operation characteristics between groups (p>0.05) as Table-I.

Hemodynamic values are listed in table 2 and 3 (HR and MAP). Blood pressure were measured and recorded during induction and after intubation. Final results are obtained and compared from MAP of different times T1, T2, T3 and T4 between groups so do heart rates. Results showing that average HR decreases than base line (T1) after induction (T2) in both the groups and came near to base line one min after intubation (T4)& the p value is not significant at T1, T2, T4 (P>0.05). Just after intubation at T3 in both the groups HR increases from base line T1, T2 but in DLT at T3 HR increases more than BB group and the difference is statically significant (P<0.05) (Tale-II). MAP was also increased significantly In both the groups at T3 than T1, T2 & T4 and the differences between the groups at T3 was also significant (P<0.05) but not significant at T1, T2 or T4 (Table-III)

Time required for correct placement of device shown in Table-4 and the difference was not significant between DLT and BB groups (2.81+

Table-I. *Patientdemography and operation characteristics:*

Variables	DLT (n=20)	BB (n=20)
Mean Age (Years)	52.16 ± 7.51	55.42 ± 6.28
Sex (M/F)	16/4	14/6
ASA grading (I/II/III)	4/12/4	3/13/3
Duration of surgery (min)	134.59 ± 32.38	145.84 ± 26.12
Duration of anaesthesia (min)	170.34 ± 29.16	178.41 ± 30.72

Values are presented as mean ± SD. Analysis was done by Student's 't' test.

Table-II. *Haemodynamic parameters during induction of Anaesthesia-HR (Beats/min):*

Variables	DLT (n=20) Mean ± SD	BB (n=20) Mean ± SD	P value
T_1	76.23 ± 8.52	78.52 ± 6.19	>0.05
T_2	72.16 ± 6.71	73.18 ± 8.29	>0.05
T_3	88.24 ± 7.42	78.56 ± 9.06	<0.05
T_4	74.34 ± 7.84	77.26 ± 6.73	>0.05

Values are presented as mean ± SD. Analysis was done by Student's 't' test. Not significant p>0.05 (among two groups). Significant p<0.05 (among two groups).

Table-III. Haemodynamicparameters during induction of anaesthesia-MAP (mm of Hg):

Variables	DLT (n=20)Mean ± SD	BB (n=20)Mean ± SD	P value
T_1	96.12 ± 8.43	93.24 ± 7.82	>0.05
T_2	90.42 ± 10.35	86.68 ± 8.59	>0.05
T_3	99.36 ± 9.62	92.15 ± 6.47	<0.05
T_4	93.29 ± 8.08	92.04 ± 9.78	>0.05

Values are presented as mean ± SD. Analysis was done by Student's 't' test. Not significant p>0.05 (among two groups). Significant p<0.05 (among two groups).

Table-IV. *Effects of one lung ventilation with perioperative incidence:*

Variables	DLT (n=20) Mean ± SD	BB (n=20) Mean ± SD	P value
Time for placement of device in correct position (min)	3.72 ± 1.84	3.84 ± 1.41	>0.05
Time for right lung collapse (min)	2.46 ± 0.85	4.76 ± 0.61	<0.05
Quality of lung Collapse			
Total –	17	18	>0.05
Partial-	0	02	>0.05
No collapse-	0	0	>0.05
Number of patients with device malposition	4 (20%)	5 (20%)	>0.05
Number of patients with hypoxemia	2 (10%)	1 (5%)	>0.05

Values are presented as mean ± SD. Analysis was done by Student's 't' test + chi square test. Not significant p>0.05 (among two groups). Significant p<0.05 (among two groups).

0.74in DLT, 2.96+ 0.87 in BB, p>0.05). Time for right lung collapse (Table-4) in BB group (4.76+0.61) was significantly longer than DLT group (2.46+0.85) and the deference between groups is statically significant (P<0.05). The quality of lung collapse, duration of OLV, number of device malposition and hypoxemia were comparable between groups (Table-IV).

Post-operative complication has shown in Table-V, among forty patients only 05 (25%) patients from DLT hassuffered from hoarseness of voice in post-operative period and the statistical deference between groups are significant (P=0.0183). Only one patient from DLT group hassuffered from post-operativesore throat and none from BB group has shownthis complications. No patient from either group has suffered from lung infection and result is insignificant (Table-V).

Table-V. *Post-operative complications:*

Variables	DLT	BB	P value
Hoarseness of voice	05	0	p= 0.018
Sore throat	01	0	p= 0.312
Lung infection	0	0	-

Values are presented as mean ± SD. Analysis was done by chi squared test. p value not significant p>0.05 (among two groups), significant p<0.05 (among two groups).

Discussion:

Form this study the data demonstrated that the use of BB could achieve similar quality of lung collapse compared with DLT for OLV in VATS procedure. While the use of BB is associated withlonger time required to induce right lung collapse, but with a reduced incidence of horseness of voice and sore throat with in first 48 hours after surgery. These results contrast with those of Bussiereset al[6], they found considerablyfaster lung collapse using BB. However their study cohort wasdifferent from those of the current study.

DLTs generally have been considered the gold standard for lung isolation and are proved by many to offer more rapid and better quality of lung collapse for its wide diameter.[7,8]

Archibald[9] first introduced BB into clinical practice in 1935. The results from one meta-analysis study showed that DLTs were more effective than BB for lung isolation but were associated with a significantly greater incidence of airway injury and post operative hoarseness.[10] However, Bauer et al[11] did not advocate the routine use of BB as a method for providing OLV during thoracoscopy. The possible reason is for it's difficulties in placement with requirement of prolong time than do DLT in correct position. Then the author selected cases scheduled for esophageal tumour surgery undergoing VATs procedure and all of them received OLV. Therefore in this study time required for correct placement of DLTs and

BB are similar Safety as well as efficacy is a prime consideration to put different device for lung isolation. Airway injury such as haematoma of the vocal cords, may cause sore throat and horsenessof voice as long as two weeks post operatively.[12] Bronchialedema was also a reported complication after using DLT.[12,13] Per operative difficulties like mal positioning of device is not very uncommon which can result in hypoxemia and may cause complete airway obstruction leading to even discontinuation of surgery whileproblem is managed.[14]

In this study we found that incidence of device displacement and desaturationcomparing both the device is similar butpost operative complication like horseness and sore throat with in 48 hrs after surgery can be reduced using BB. Therefore it is important to select devices for OLV keeping in mind patients safety and for ease of anaesthesiologist and surgeons involved in the procedure.

DLTs have a larger diameter than the regular endo tracheal tube and must be inserted into a major bronchus. The carina and inner wall of trachea are stimulated and induce more severe cardio vascular response than from regular intubation.[5] Consisted with previous studies[5,15] the current result showed that intubation with DLT could significantly increase blood pressure and heart rate, however this phenomenon did not happened in BB group. The use of BB for OLV could have beneficiary effect for those patients with severe cardiovascular disease who require OLV for surgery with a reduced adverse cardiovascular events.

There were some limitations of the study, firstly the method of assessing lung collapse by using surgeons rating scale, which was not completely objective. Secondly the study population was restricted to patients presenting good lung recoil as patients with potentially altered lung recoil were excluded from the study. Patients with pulmonary pathology associated with bad recoil correspond to a population in which the BB couldusedbut rarely with optimum result.

Conclusion:

The result of this study showed that despite requiring a longer period to achieve lung collapse the use of BB can reduce the risk & magnitude of exaggerated haemodynamic responses. BB can also reduce the incidence of post-operative sore throat &horseness of voice which magnifies the advantages of VATS procedure over DLTs.

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Original Article

Fentanyl - Based Cardiac Anesthesia Provides Higher Recovery Compared with Morphine in Elective CABG Surgery Patients

Hasan AMK[1], Ahmed Niaz[2], Ahmed S[3], Haider MZ[4], Kabir MAAM[5], Nine SMAZ[6], Khan A[7], Hasan MS[8]

[1-5]Registrar- Cardiothoracic Anaesthesia and critical care, Apollo Hospitals, Dhaka; [2]S.Consultant & Co-Ordinator- Cardiothoracic Anaesthesia and critical care, Apollo Hospitals, Dhaka; [3,4]Senior Consultant, Cardiothoracic and vascular surgery, Apollo Hospitals, Dhaka; [6]Specialist- Cardiothoracic and vascular surgery, Apollo Hospitals, Dhaka; [7]S. Medical Officer-CTVS, Apollo Hospitals, Dhaka [8]Assistant Professor, Dept. of Anaesthesia, Rangpur Medical College.

***Correspondence:** Dr. A. M. Kamrul Hasan. email: dramkamrulhasan@gmail.com*

Abstract:

***Background :** High-dose opioid anesthesia during cardiac surgery has been the mainstay of cardiac anesthesia for decades due to its ability to preserve hemodynamic stability and attenuate hormonal and metabolic response to surgical stress. The hypothesis of this study is that the use of fentanyl as part of a balanced anesthetic would lead to improved patient health status and recovery during the first 3 days after cardiac surgery with CPB compared with morphine. Quality of recovery was assessed using the QoR-40 questionnaire administered preoperatively and daily on postoperative days 1–3. Hemodynamic variables, duration of tracheal intubation, organ morbidities, intensive care unit (ICU) and hospital length of stay were evaluated.*

***Methods:** This comparative randomized double blind study was conducted in the department of cardiothoracic vascular anaesthesia and critical care of Apollo Hospitals,Dhaka on 100 patients undergoing elective CABG. Study period was (January-July), 2019. The study was approved by the institutional review board, and informed consent was obtained from all subjects. One hundred patients presenting for elective CABG surgery, between the ages of 18 and 79, were enrolled in the study. Exclusion criteria included (1) concurrent valvular surgery or the presence of valvular disease, (2) reoperative procedures, (3) unstable angina or elevated cardiac enzymes within 48 hours of surgery, (4) morphine or fentanyl allergy, (5) the need for an intra-aortic balloon pump or inotropic agents preoperatively, (6) psychiatric or central nervous system disturbances precluding completion of the QoR-40.*

***Results:** Compared with patients given morphine, those receiving fentanyl had higher global QoR-40 scores on postoperative days 1 (174.8 vs 162.5, P 0.001), 2 (175 vs 166.1, P 0.001), and 3 (178.1 vs 167.3, P 0.001). Differences between the groups were observed in the QoR-40 dimensions of emotional state, physical comfort, and pain . Postoperative visual analog scale pain scores, use of pain medication in the ICU and surgical ward, and postoperative febrile reactions were reduced significantly in the fentanyl group . No differences between the groups were noted in duration of tracheal intubation,ICU and hospital length of stay, or postoperativecomplications.*

***Conclusion:** Continuous intravenous infusions of fentanyl have been used to provide intraoperative analgesia also give good-to-excellent postoperative analgesia furthermore early extubation and the quality of postoperative recovery in cardiac surgical patients can be enhanced when fentanyl is used as part of a balanced anesthetic.*

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Introduction:

High-dose opioid anesthesia during cardiac surgery has been the mainstay of cardiac anesthesia for decades due to its ability to preserve hemodynamic stability and attenuate hormonal and metabolic response to surgical stress.[1]

The inclusion of an opioid as a component of a balanced anesthetic technique provides hemodynamic stability, decreases volatile anesthetic requirements,and improves postoperative analgesia.[2,3] Large morphine doses were generally abandoned after the introduction of fentanyl because its use in high doses (50–100 μg/kg) was associated with less hypotension during induction of anesthesia.

Because major complications after cardiac surgery are relatively infrequent, investigators have increasingly sought methods to improve the quality of recovery[4]. A 40-item quality of recovery score (QoR-40) has been developed and validated in patients after anesthesia and surgery.[5-7] In cardiac surgical patients, a low QoR-40 score is predictive of postoperative complications, increased hospital length of stay, and poor quality-of-life.[7] It has been noted that theQoR-40 is a suitable tool to assess the effect of clinical interventions on postoperative recovery.[6,7]We further observed that these subjects had less pain, required fewer postoperative analgesics, and exhibited a more positive mood response in the intensive care unit (ICU) compared with those receiving morphine.

The hypothesis of this study is that the use of fentanyl as part of a balanced anesthetic would lead to improved patient health status and recovery during the first 3 days after cardiac surgery with CPB compared with morphine.

Methods:

This comparative randomized double blind study was conducted in the department of cardiothoracic vascular anaesthesia and critical care of Apollo Hospitals,Dhaka on 100 patients undergoing elective CABG.Study period was (January-July),2019. The study was approved by the institutional review board, and informed consent was obtained from all subjects. One hundred patients presenting for elective CABG surgery, between the ages of 18 and 79, were enrolled in the study. Exclusion criteria included (1) concurrent valvular surgery or the presence of valvular disease, (2) reoperative procedures, (3) unstable angina or elevated cardiac enzymes within 48 hours of surgery, (4) morphine or fentanyl allergy, (5) the need for an intra-aortic balloon pump or inotropic agents preoperatively, (6) psychiatric or central nervous system disturbances precluding completion of the QoR-40.

Patients were allocated to the morphine group or the fentanyl group .

The anesthetic technique was standardized. Anti-hypertensive and anti-anginal medications were continued until the morning of surgery. Pre-anaesthesia medication consisted of oral 1 mg of clonazepam at bed time on the night prior to surgery and midazolam 7.5mg approximately 2 hours prior to anaesthesia and surgery.

After arrival to the anaesthetic room.patients were administered oxygen (O2) by nasal canula and monitoring of ECG (5 lead) with automated ST segment analysis (Marquette Solar 5000, GE Medical System, Milwaukee, USA) and pulse oximetry was initiated. A 18-G intravenous cannula was inserted in the dorsum of right hand and an 20-G; 45 mm intra-arterial cannula was introduced into the right radial artery for monitoring of the arterial pressure and obtaining arterial blood for analysis.A trichannel 7fr central venous catheter was introduced into right internal jugular vein for measurement of central venous pressure and drug infusion. General anaesthesia was induced, while patients breathed 100% O2 by facemask, using a combination of fentanyl (4-5) μg/kg, midazolam 100 μg/kg . Endotracheal intubation was performed after administration of pancuronium bromide 0.15 mg/ kg and mechanical ventilation was initiated. Low-flow technique (fresh gas flow of 3 L/min) using anaesthesia machine (Aestiva/5,7900 Datex Ohmeda, Madison, MI, USA) to achieve end-tidal carbon-dioxide tensions of 32 ± 3 mm Hg was used. Haemodynamic parameters were maintained within 20% of the basal values with adrenaline,dopamine, phenylephrine, and glyceryltrinitrate, as required. Intraoperative hypothermia was prevented by the use of warm airflow at 400 (Bair Hugger warming unit, model

505, Augustine Medical Inc, Eden Prairie, MN, USA), warming blanket (Hemotherm, Cincinnati Sub Zero, Cincinnato, Ohio, USA), warm intravenous fluids. Filling pressures and fluid balance was maintained using normal saline 0.9% . Total amount of midazolam administered during entire procedure was restricted to 10mg . Inhalational anesthetic isoflurane given as required.

Patients were preoperatively randomized into 2 groups consisting of 50 patients in each group. Perioperative analgesia was supplemented with the use of fentanyl or morphine infusion after anaesthetic induction in the operating room. Patients in morphine group (1 mg/mL) with an infusion rate of 0.05 mg/kg/h .Another group patients were given fentanyl (10 µg/mL) with an infusion rate of 1 µg/kg/h .

Hemodynamic data were recorded immediately before and after induction of anesthesia, during internal mammary artery dissection, 15 minutes after separation from CPB, at chest closure, on arrival to the ICU, and 12 and 24 hours after baseline measurements (post-induction). Hemodynamic data included heart rate, mean arterial pressure, central venous pressure.

Result:

Table I. *Patient characteristics of the study patients*

	Fentanyl (n=50)	Morphine (n=50)	P value
Male	40 (80%)	42 (84%)	[a]0.603[ns]
Age (years)	64.9±9.9	61.1±10.1	[b]0.060[ns]
Weight (kg)	76.3±11.6	79.1±15.4	[b]0.307[ns]
Height (cm)	172.0±10.3	171.9±9.8	[b]0.960[ns]
Ejection fraction	0.51±0.11	0.53±0.12	[b]0.387[ns]
ASA physical status	2.8±0.6	2.9±0.5	[b]0.368[ns]
Smoker	5 (10%)	7 (14%)	[a]0.538[ns]
Myocardial infarction	10 (20%)	12 (24%)	[a]0.629[ns]
Congestive heart failure	4 (8%)	2 (4%)	[a]0.400[ns]
Atrial fibrillation	5 (10%)	3 (6%)	[a]0.461[ns]
Hypertension	40 (80%)	31 (62%)	[a]0.047[s]
COPD/emphysema/asthma	9 (18%)	10 (20%)	[a]0.799[ns]
Sleep apnea	3 (6%)	12 (24%)	[a]0.011[s]
Liver disease	1 (2%)	0 (0%)	[a]0.315[ns]
Renal insufficiency	1 (2%)	4 (8%)	[a]0.169[ns]
Thyroid disease	2 (4%)	3 (6%)	[a]0.646[ns]
Diabetes	30 (60%)	28 (56%)	[a]0.823[ns]
Cerebrovascular accident	0 (0%)	2 (4%)	[a]0.153[ns]
Transient ischemic attack	4 (8%)	3 (6%)	[a]0.695[ns]
Peripheral vascular disease	1 (2%)	2 (4%)	[a]0.558[ns]
Medications			
â-blockers	40 (80%)	38 (76%)	[a]0.629[ns]
ACE inhibitors	19 (38%)	23 (46%)	[a]0.418[ns]
Insulin	5 (10%)	12 (24%)	[a]0.062[ns]
Statins	35 (70%)	42 (84%)	[a]0.096[ns]

s= significant, ns= not significant

[a]P value reached from chi square test

[b]P value reached from unpaired t-test

Forty (80%) patients were hypertension in Fentanyl group and 31(62%) in Morphine group. Three (6%) patients were sleep apnea in Fentanyl group and 12(24%) in Morphine group. The difference were statistically significant ($p<0.05$) but other patient characteristics were not statistically significant ($p>0.05$) between two groups.

Table II *Hemodynamic data of the study patients*

	Fentanyl (n=50)	Morphine (n=50)	P value
Heart rate (bpm)			
Preinduction	70.4±11.2	73.8±14.3	0.189^{ns}
30-min postinduction	64.8±10.9	62.0±12.1	0.227^{ns}
15-min post-CPB	81.8±11.0	80.9±10.6	0.678^{ns}
30-min post-CPB	82.0±11.8	82.4±10.5	0.858^{ns}
ICU admission	83.2±13.9	83.0±10.2	0.935^{ns}
ICU 4 h	82.7±11.1	81.8±11.4	0.690^{ns}
ICU 8 h	81.2±11.3	83.0±12.2	0.446^{ns}
Mean arterial pressure (mmHg)			
Preinduction	91.2±12.1	93.7±12.8	0.318^{ns}
30-min postinduction	75.1±13.0	73.2±9.9	0.413^{ns}
15-min post-CPB	70.1±8.6	70.4±9.2	0.867^{ns}
30-min post-CPB	72.0±8.8	74.3±10.3	0.233^{ns}
ICU admission	71.2±10.9	74.0±11.1	0.206^{ns}
ICU 4 h	72.8±9.8	73.4±10.9	0.773^{ns}
ICU 8 h	74.1±9.9	75.5±9.7	0.477^{ns}
Central venous pressure (mmHg)			
30-min postinduction	11.4±4.3	11.5±4.1	0.906^{ns}
15-min post-CPB	11.7±5.0	11.9±4.4	0.832^{ns}
30-min post-CPB	10.6±4.2	12.6±4.6	0.025^{s}
ICU admission	9.3±4.1	9.8±4.4	0.558^{ns}
ICU 4 h	8.9±3.9	9.0±4.0	0.899^{ns}
ICU 8 h	8.4±4.1	8.6±3.9	0.803^{ns}

s= significant, ns= not significant

P value reached from unpaired t-test

At 30-min post-CPB, mean central venous pressure was found 10.6±4.2 mmHg in Fentanyl group and 12.6±4.6 mmHg in Morphine group which was statistically significant ($p<0.05$) but other hemodynamic data were not statistically significant ($p>0.05$) between two groups.

Table III. Pain, sedation, and postoperative opioid consumption of the study patients

		Fentanyl (n=50)	Morphine (n=50)	P value
VAS score	Preoperative	0.0±0.0	0.0±0.0	-
	Postoperative Day 1	1.9±0.6	3.2±1.1	0.001[s]
	Postoperative Day 2	2.0±0.5	3.8±0.9	0.001[s]
	Postoperative Day 3	2.2±0.8	3.5±0.8	0.001[s]
Sedation score	Preoperative	0.5±0.1	0.5±0.1	1.00[ns]
	Postoperative Day 1	0.6±0.2	0.6±0.1	1.00[ns]
	Postoperative Day 2	0.8±0.4	0.7±0.2	0.117[ns]
	Postoperative Day 3	0.9±0.3	0.8±0.2	0.053[ns]
Inj.Tramadolhydrochloride	Postoperative Day 1	144.1±27.3	157.0±37.1	0.051[ns]
(mg/24 hours)	Postoperative Day 2	154.6±28.3	207.9±30.4	0.001[s]
	Postoperative Day 3	172.4±22.6	238.1±39.0	0.001[s]
Inj. Paracetamol	Postoperative Day 1	1.7±0.5	1.9±0.6	0.073[ns]
(gm/24 hours)	Postoperative Day 2	2.0±0.6	2.8±0.8	0.001[s]
	Postoperative Day 3	2.9±1.0	3.6±1.1	0.001[s]

s= significant, ns= not significant. P value reached from unpaired t-test

VAS score on postoperative Days 1 (1.9 vs 3.2, *P*= 0.001), Day 2 (2.0 vs 3.8, *P* = 0.001) and Day 3 (2.2 vs 3.5, *P*= 0.001) were higher in morphine than fentanyl group. Tramadol hydrochloride on postoperative Day 2 (154.6 vs 207.9, *P*= 0.001) and postoperative Day 3 (172.4 vs 238.1, *P*= 0.001) were higher in morphine than fentanyl group. Paracetamol dose on postoperative Day 2 (2.0 vs 2.8, *P* = 0.001) and Day 3 (2.9 vs 3.6, *P*= 0.001) were higher in morphine than fentanyl group.

Table IV. *Quality of Recovery (QoR)-40 Dimensions and Global Score*

		Fentanyl (n=50)	Morphine (n=50)	P value
Emotional state	Preoperative	40.9±8.6	38.2±12.4	0.209[ns]
	Postoperative Day 1	42.2±10.9	35.9±13.1	0.010[s]
	Postoperative Day 2	40.8±9.2	36.6±12.6	0.059[ns]
	Postoperative Day 3	40.1±10.6	38.2±12.9	0.243[ns]
Physical comfort	Preoperative	58.6±8.7	55.2±9.3	0.062[ns]
	Postoperative Day 1	52.0±11.0	46.3±10.9	0.011[s]
	Postoperative Day 2	51.4±11.2	46.0±11.1	0.017[s]
	Postoperative Day 3	51.6±11.1	47.0±12.0	0.049[s]
Psychological support	Preoperative	35.2±5.1	34.9±5.4	0.776[ns]
	Postoperative Day 1	34.8±5.8	34.3±6.2	0.678[ns]
	Postoperative Day 2	35.3±5.0	32.4±7.0	0.019[s]
	Postoperative Day 3	35.2±5.3	32.5±6.8	0.029[s]
Physical independence	Preoperative	25.6±10.3	25.0±9.7	0.764[ns]
	Postoperative Day 1	18.4±11.0	14.7±10.1	0.082[ns]
	Postoperative Day 2	19.8±10.8	18.6±10.5	0.574[ns]
	Postoperative Day 3	20.7±11.1	19.0±10.8	0.440[ns]
Pain	Preoperative	28.7±3.1	28.9±2.4	0.369[ns]
	Postoperative Day 1	29.4±2.8	28.6±2.7	0.149[ns]
	Postoperative Day 2	29.6±2.5	27.5±3.0	0.001[s]
	Postoperative Day 3	29.7±2.2	27.3±2.9	0.001[s]
Global QoR-40	Preoperative	188.3±11.2	184.2±11.0	0.067[ns]
	Postoperative Day 1	174.8±11.9	162.5±11.2	0.001[s]
	Postoperative Day 2	175.0±11.3	166.1±12.5	0.001[s]
	Postoperative Day 3	178.1±11.1	167.3±12.3	0.001[s]

s= significant, ns= not significant. P value reached from unpaired t-test

Table V. *Intensive Care Unit and Final Recovery Variables*

	Fentanyl (n=50)	Morphine (n=50)	P value
Temperature >38°C	5 (10%)	14 (28.0%)	[a]0.022[s]
Duration of tracheal intubation (h)	9.8±3.3	10.6±3.2	[b]0.221[ns]
Tracheal intubation (>12 h)	10 (20.0%)	11 (22.0%)	[a]0.806[ns]
ICU length of stay (h)	46.7±6.4	50.8±7.1	[b]0.124[ns]
ICU length of stay (>72 h)	4 (8.0%)	5 (10.0%)	[a]0.727[ns]

s= significant, ns= not significant
[a]P value reached from chi square test
[b]P value reached from unpaired t-test

Temperature >38°C was found (10.0% vs 28.0%, *P*= 0.022) was higher in morphine than fentanyl group.

Emotional state on postoperative Days 1 (42.2 vs 35.9, *P*= 0.010) was higher in fentanyl than morphine. Physical comfort on postoperative Days 1 (52.0 vs 46.3, *P*= 0.011), Day 2 (51.4 vs 46.0, *P* = 0.017) and Day 3 (51.6 vs 47.0, *P*= 0.049) were higher in fentanyl than morphine. Psychological support on postoperative Day 2 (35.3 vs 32.4, *P* = 0.019) and Day 3 (35.2 vs 32.5, *P*= 0.029) were higher in fentanyl than morphine. Pain on postoperative Day 2 (29.6 vs 27.5, *P* = 0.001) and Day 3 (29.7 vs 27.3, *P*= 0.001) were higher in fentanyl than morphine. Global QoR-40 scores on postoperative Days 1 (174.8 vs 162.5, *P*= 0.001), Day 2 (175.0 vs 166.1 *P* = 0.001) and Day 3 (178.1 vs 167.3, *P*= 0.001) were higher in the subjects receiving fentanyl compared with patients given morphine.

Discussion:

Pain relief is an important priority for anaesthesiologist, particularly in post operative patients suffering from severe pain. Using analgesics such as narcotics is a routine measure to alleviate pain of such patients. In cardiac surgical patients, routine and standard administration of morphine may not lead to significant pain relief. Yet, higher doses may lead to adverse events. Therefore, it seems a good idea to consider other analgesics like fentanyl in such patients.

In this study observed that forty (80%) patients were hypertension in Fentanyl group and 31(62%) in Morphine group. Three (6%) patients were sleep apnea in Fentanyl group and 12(24%) in Morphine group. The difference were statistically significant (p<0.05) but other patient characteristics were not statistically significant (p>0.05) between two groups. Murphy et al.[8] study reported patient characteristics were similar between the groups, except for a higher incidence of sleep apnea in the fentanyl group.

In this study showed at 30-min post-CPB, mean central venous pressure was found 10.6±4.2 mmHg in Fentanyl group and 12.6±4.6 mmHg in Morphine group. Which was statistically significant (p<0.05) but other hemodynamic data were not statistically significant (p>0.05) between two groups.

In this study observed VAS score on postoperative Days 1 (1.9 vs 3.2, *P*= 0.001), Day 2 (2.0 vs 3.8, *P* = 0.001) and Day 3 (2.2 vs 3.5, *P*= 0.001) were higher in morphine than fentanyl group. Tramadol hydrochloride on postoperative Day 2 (154.6 vs 207.9, *P*= 0.001) and postoperative Day 3 (172.4 vs 238.1, *P*= 0.001) were higher in morphine than fentanyl group. Paracetamol injectable dose on postoperative Day 2 (2.0 vs 2.8, *P* = 0.001) and Day 3 (2.9 vs 3.6, *P*= 0.001) were higher in morphine than fentanyl group. Furyk et al.[9] compared inhalational fentanyl versus IV morphine in pediatric patients suspected of having broken limbs in emergency department in Australia. They revealed that there were no significant differences between the two groups regarding decrease in pain scores, vital signs or side effects. Galinski et al. [10] compared the analgesic effectiveness of fentanyl versus morphine, In their study about 62% patients in

the morphine group and 76% in the fentanyl group reported satisfactory pain management. Side effects showed no significant difference between the two groups. The authors concluded that fentanyl had comparable effects to morphine and they suggested to use fentanyl in acute severe pain in pre-hospital setting.

In this study observed emotional state on postoperative Days 1 (42.2 vs 35.9, *P*= 0.010) was higher in fentanyl than morphine. Physical comfort on postoperative Days 1 (52.0 vs 46.3, *P*= 0.011), Day 2 (51.4 vs 46.0, *P* = 0.017) and Day 3 (51.6 vs 47.0, *P*= 0.049) were higher in fentanyl than morphine. Psychological support on postoperative Day 2 (35.3 vs 32.4, *P* = 0.019) and Day 3 (35.2 vs 32.5, *P*= 0.029) were higher in fentanyl than morphine. Pain on postoperative Day 2 (29.6 vs 27.5, *P* = 0.001) and Day 3 (29.7 vs 27.3, *P*= 0.001) were higher in fentanyl than morphine. Global QoR-40 scores on postoperative Days 1 (174.8 vs 162.5, *P*= 0.001), Day 2 (175.0 vs 166.1 *P* = 0.001) and Day 3 (178.1 vs 167.3, *P*= 0.001) were higher in the subjects receiving fentanyl compared with patients given morphine. Murphy et al.[8] reported QoR-40 scores in both groups decreased maximally on Day 1 and improved gradually during postoperative days 2 and 3. However, global QoR-40 scores on postoperative days 1 (173 vs 160, *P*= 0.0001), 2 (174 vs 164, *P*= 0.0001), and 3 (177 vs 167, *P* = 0.001) were higher in the subjects receiving morphine compared with patients given fentanyl. QoR-40 scores in the dimensions of emotional state (*P* = 0.01– 0.0001), physical comfort (*P* < 0.001-0.0001), and pain (*P* < 0.001– 0.0001) were higher in the morphine group on postoperative days 1 through 3. No differences between the groups were noted in the dimensions of psychological support and physical independence.

In this study observed that temperature >38°C was found (10.0% vs 28.0%, *P*= 0.022) was higher in morphine than fentanyl group.

Kanowitz et al.[11] performed a retrospective analysis of over 2,000 patients who had been given fentanyl for analgesia by out-of-hospital personnel.16 They reported a rate of post-fentanyl vital sign abnormalities of only 0.6%, with no deaths or hospitalizations. While this study lacked a control group, it did show a statistically significant reduction in pain score after fentanyl administration, reducing the reported pain level from severe to mild. A study by Nielsen et al[12]. of fentanyl administered by Danish advanced emergency medical technicians showed an overall adverse event rate of 5%, of which only two cases (0.4%) were serious and only one required naloxone.

Conclusion:

Continuous intravenous infusions of fentanyl have been used to provide intraoperative analgesia also give good-to-excellent postoperative analgesia, neutralizes the effects of ambulation or coughing on the quality of analgesia in patients after sternotomy, and improves postoperative pulmonary function compared with morphine. Early extubation and the quality of postoperative recovery in cardiac surgical patients can be enhanced when fentanyl is used as part of a balanced anesthetic.

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Original Article

Comparison of Granisetron and Dexamethasone in management of post operative nausea and vomiting (PONV) in laparoscopic gynaecological surgery

Kawser Begum[1], Rezwanur Rahman[2], AKM Habibullah[3], Md. Younus Ali[4], Kamal Ibrahim[5], Debabrata Banik[6]

[1]Classified specialist in an Anesthesiology, CMH,Dhaka. [2]Medical officer, Department of anesthsia, analgesia & intensive care medicine, Bangabandhu sheikh Mujib Medical university, [3]Consultant, Department of anesthesia, analgesia & intensive care medicine, BSMMU, [4]Assistant professor(anaesthesiology), Burn and Plastic surgery Unit, Department of anesthesia, analgesia, palliative & intensive care medicine, DMCH, Dhaka.[5] Professor, Department of anaesthesiology,Bangladesh Medical college,Dhaka. [6]Professor, Department of anesthesia,analgesia &intensive care medicine, BSMMU, Dhaka

Corresponding Author: Major Dr. Kawser Begum, classified specialist in an Anesthesiology, CMH, Dhaka.

Abstract:

Background: *Postoperative nausea and vomiting (PONV) is a common problem. It is more common in laparoscopic surgery than in open surgery and following laparoscopic gynaecological surgery. PONV causes patient discomfort and can prolong the time of hospital discharge.It causes potential hospital burden and loss of unanticipated working time both for the patients and doctors. Management of this problem based on prevention rather than treatment. Various antiemetic drugs including steroids are effective in the prevention of PONV but which one is better still now a debateable one. On the basis of this fact there were numerous research, articles, analysis and publication work done all over the world.*

Objectives: *Comparison of granisetron and dexamethasone to detect which one is better in management of PONV after laparoscopic surgery.*

Method: *The patient were selected after ethical committee approval. After informed written consent we have selected 100 ASA- I & II patients undergoing general anaesthesia for laparoscopic gynaecological surgery in a prospective double blind randomized study. Patients who had received opoids, NSAIDS, steroids or antiemetic agent before previous 4 weeks or who has known hypersensitivity to granisetron or dexamethasone. Patients were divided as group-A (granisetron) and Group-B(dexamethasone). 50 patient were member of each group. Every patient got study drug during induction. Group-A got granisetron and group-B got dexamethasone for prevention of PONV. There were no differences in background factors or factors related to anaesthesia, analgesics consumption, pain or side effects between groups. The data collected in a fixed protocol form from the patient consented for the study. After collection of data were coded, edited, compiled and entered into computer system for analysis. The result will help to guide the anaesthesiologists practicing in the third world countries like Bangladesh in the management of PONV.*

Results: *The current study showed the intravenous injection of 8 mg dexamethasone, or 3 mg Granisetron have similar effects on PONV prophylaxis in laparoscopic gynaecological surgery. These results of the current study indicated that Dexamethasone is a suitable substitute for Granisetron.*

Conclusion: *Dexamethasone and Granisetron are comparable in management of PONV. These drugs injection before anesthesia induction have similar effects on nausea and vomiting prophylaxis after laparoscopic gynaecological surgery. Prophylactic use of dexamethasone should be routine to prevent PONV because dexamethasone is cost effective than granisetron.*

Keywords*: PONV, dexamethason, granisetron, laparoscopy, nausea.*

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Introduction:

Postoperative nausea and/or vomiting (PONV) is an unpleasant experience that afflicts 20–30%of surgical patients after general anaesthesia.[1] It is often unusually distressing to patients which give rise to worst memory of their hospital stay.[2] PONV decreases patient comfort and satisfaction and rarely, may cause dehydration and electrolyte

imbalances, aspiration of gastric contents, oesophageal rupture, suture dehiscence, and bleeding.[3] PONV and its resulting complications are costly for the healthcare sector worldwide, with several hundred million dollars spent annually in the USA alone---.[4] A number of patient-specific, anaesthesia-related, and surgery-related risk factors have been associated with higher incidences of PONV.[5] At present, the overall incidence of PONV after general anaesthesia has been estimated to range from 25% to 30%.[6] The incidence of intractable nausea and vomiting has been reported to be 0.18%.[7] Intractable PONV can increase medical costs by increasing nursing care time, and delaying discharge from the postanesthesia care unit or leading to unanticipated hospital admission.Among ambulatory surgery patients, PONV alone or combined with pain is the most common anaesthetic reason for delayed discharge and unanticipated hospital admission. Postoperative nausea was reported to continue on average for 1.7 days and vomiting for 0.7 days among outpatients suffering from the symptoms.[8]

The administration of antiemetic drugs reduces the incidence specially judicial use of multiple emetics.[9] Various anti emetic drugs, including anti histamins (e.g. hydroxyzine), butyrophenone (e.g.droperidol) and gastrokinetic agents (e.g.metoclopramide) have been used to reduce the incidence of PONV, but some of the older anti emetics are associated with undesirable side effects.[10]

Dexamethasone has been found to have a prophylactic effect on PONV in patients undergoing abdominal hysterectomy[11]. Granisetron, a selective 5-HT3 receptor antagonist, has been successfully used for preventing PONV in middle ear surgery under general anaesthesia.[12] Granisetron antagonizes 5-HT3 receptors in sites associated with antiemetic activity. Granisetron has many advantages, but is more expensive than dexamethasone.[13] If dexamethasone is as effective as granisetron, it may be a good cost-effective alternative. We have an intention to compare the prophylactic antiemetic efficacy of granisetron and dexamethasone for preventing PONV in women undergoing elective laparoscopic gynaecological surgery.

Methods:

After ethical committee approval 100 patients aged 20-70 who were candidates for laparoscopic gynaecological surgery were included in the study. Informed consent was obtained from patients before enrollment. The patients were in ASA-1 or ASA-II class in physical condition according to the American Society of Anesthesiology classification. Exclusion criteria included pregnancy, body mass index (BMI) higher than 30, existence of underlying diseases, and opium, or steroid consumption during the week before the operation. The patients were allocated, by computer-generated random numbers, into two groups. The random allocation sequence was concealed in sealed opaque envelopes until a group was assigned. Fifteen minutes before anesthesia induction, 3 mg Granisetron was injected intravenously to group A and 8 mg Dexamethasone to group B patients. All patients underwent general anesthesia with the same medications for induction, Thiopental sodium 5 mg/kg, Fentanyl 1.5 ìg/kg and Atracurium 0.5 mg/kg for facilitation of tracheal intubation, during anesthesia patients were monitored by electocardiography, pulse oximetry, non-invasive blood pressure . Anaesthesia maintenance in both groups was achieved by Isoflurane 1.2% and after 30 minutes from induction of anesthesia incremental doses of 10 ìg fentanyl was administered every 15 minutes.

During laparoscopy, intra-abdominal pressure was maintained at 12 mmHg. At the end of operation CO_2 was carefully evacuated by manual compression of the abdomen with open trocars. Post-operative nausea and vomiting was assessed at three time intervals (0-6 hours, 6-12 hours, and 12-24 hours after consciousness).

10 mg of Metoclopramide was injected in case of PONV existence. SPSS software version 16 was employed to analyze data. In order to compare quantitative and qualitative data between the two groups Chi-square test and Fisher's exact test if required for frequencies less than Five. Was utilized for the qualitative variables and Student's t-test for quantitative variables. In cases of non adherence, and non-parametric, equivalent assessment was employed. The level of significance was $P < 0.05$.

Results:

Maintaining the inclusion criteria100 patients were enrolled into the study, out of which 50 patients were placed in Granisetron group (Group-A) and 50 patients in Dexamethasone group (Group-B).There was also no significant difference in operation characteristics between the two groups.

i.Age incidence :

Table I. *Age incidence*

Age in yrs	20-30	31-40	41-50	51-60	61-70	Mean age yrs
Granisetron group(n=50)	4	14	18	12	02	41.2
Dexamethasone group (n=50)	5	10	21	13	01	43.6

Mean age of granisetron group 41.2 years**.** Mean age of dexamethasone group 43.6 years. Data analysis indicated no significant difference in mean age between the two groups (p value 0.322).

ii .Duration of anaesthesia during surgery:

Table II. *Duration of anaesthesia*

Time in mins	<60	61-90	90-120	Mean time
Granisetron group (n=50)	4	20	26	95.23
Dexamethasone group (n=50)	2	25	23	93.22

Mean general anaesthesia time of granisetron group was 95.23 minutes .

Meangeneral anaesthesia time of dexamethasone group was 93.22 minutes.

There is no significant differernce in between two groups(p value 0.439). Alon E et al.[14] study showed that mean anaesthesia time was 93 minutes which correlates with our study.

iii. Duration of laparoscopic genaecological surgery:

Table III. *Duration of surgery*

Time in mins	<45	46-75	76-105	Mean time
Granisetron group (n=50)	3	21	26	72.11
Dexamethasone group(n=50)	1	27	22	70.21

Mean surgery time of granisetron group was 72.11 minutes. Mean surgery time of dexamethasone group 70.21 minutes.There is no significant difference (p value 0.438) . In KK Karmaker et al[15] study showed that 71.50 minutes of mean surgery time which is correlates with our study.

iv. Socioeconomic condition of the participant patients:

Table-IV. *Socioeconomic Condition*

	A. Granisetron group (n=50)	B. Dexamethasone group (n=50)	P value
Upper Class	23	21	0.438
Middle Class	25	26	0.228
Lower Class	02	03	0.628

Here middle class patients are higher in both groups.In granisetron group 25 and dexamethasone group 26(p value 0.431).Upper class patient in granisetron group was 23 and dexamethasone group was 21(p value 0.228). Lower class patients are less in number in both groups was 02 & 03. It(p value 0.660) is Probably due to costly hospital policy.

There was no significant difference in between two groups.

v. History of motion sickness and headache:

Table V. *Motion Sickness and headache*

	Granisetron group(n=50)	Dexamethasone group (n=50)	P value
Motion sickness	13	10	0.447
Headache	06	04	0.543

Motion sickness of Granisetron group was 13 and Dexamethasone group 10(P value o.447) where as headache was 06 and 10 (p value 0.543).There was no significant difference in between two groups.

vi. According to types of surgery:

Table VI. *Types of surgery*

	A. Granisetron group(n=50)	B. Dexamethasone group(n=50)	P value
Hysterectomy	10	09	0.234
Adnexectomy	15	18	0.362
Diagnostic laparoscopy	17	16	0.223
Myomectomy	08	07	0.248

Hysterectomy of group A 10 & group B 09(p value 0.234).

Adnexectomy of group A 15 &group B 18(p value 0.362).

Diagnostic laparoscopy group A 17 & group B16(p value 0.223).

Myomectomy group A group 08 & group B 07(p value 0.248)

There was no significant difference in between two groups.

vii. Intervention outcome:

Table-VII. *Intervention outcome*

	Granisetron group (n=50)	Dexamethasone group (n=50)	p-value
Nausea	6	7	0.587
Vomiting	4	3	0.750
Metoclopramide use	4	3	0.750
Side effects	2	1	0.614

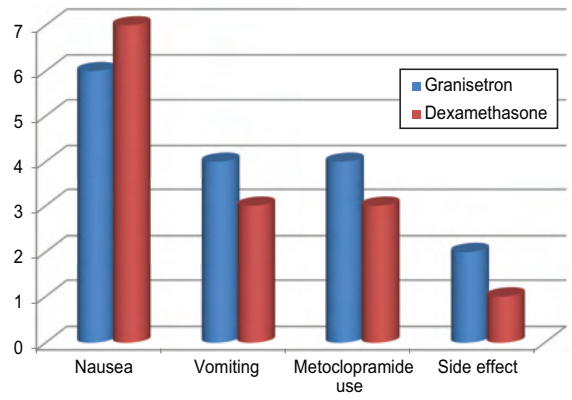

Figure-1 *Bar chart of intervention outcome measure*

In the first 24 hours after operation, 6 patients in Granisetron group and 7 patients in dexamethasone group experienced nausea(p value 0.587)and 4 patients had vomiting in granisetron group and on the other hand in Dexamethasone group 3 patients experienced vomiting (p value 0.750). Data analysis indicated there is no difference in nausea and vomiting prevalence in between two groups.

viii. Anxiety experienced by patients :

Table-VIII. *Grade of anxiety*

Anxiety grade	Granisetron (n=50)	Dexamethasone (n=50)	P value
0	13	16	0.342
1	17	14	0.324
2	11	12	0.224
3	09	08	0.240

Anxiety level was graded as 0-3 . 0 stands for minimum and 3 stands for maximum experiences of anxiety.13 patients of granisetron group and 16 of Dexamethasone group experiences no anxiety(p value 0.342).17 of granisetron group and 14 of dexamethasone group experiences mild form of anxiety(p value 0.324).Moderate form experienced 11 of granisetron group and 12 of dexamethasone group(p value 0.224).9 of granisetron group and 8 of dexamethasone group experienced severe form of anxiety(p value 0.240).

ix. Previous history of PONV:

Table IX. *Previous history of PONV*

Group –A. Granisetron(n=50)	Dexamethasone Group-B. (n=50)	P value
03	02	0.660

Experience of previous history of PONV was 03 patients in granisetron group and 02 patients in dexamethasone group(p value 0.660).

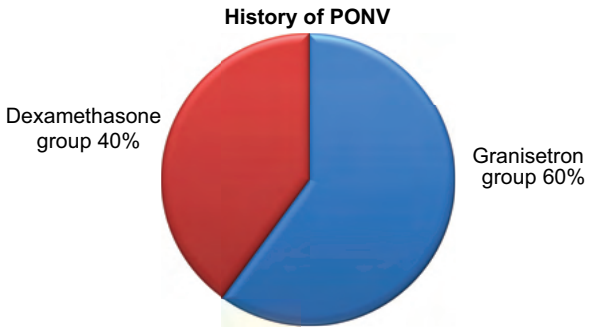

Figure-2 Pie chart of previous PONV

x. Level of patient satisfaction :

Table-X *Level of patient satisfaction:*

Level	Granisetron group(n=50)	Dexamethasone group (n=50)	P value
0	5	4	0.410
1	7	8	0.468
2	24	25	0.338
3	14	13	0.308

Here minimum level of patient satisfaction graded as 0 and maximum level of satisfaction graded as 3.Minimum satisfaction expressed by 5 patients in granisetron group.,4 patients in dexamethasone group(p value 0.410),mild satisfied 7 patients in granisetron group,8 patients in dexamethasone group(p value 0.468),moderately satisfied 24 patients in granisetron group and 25 patients in dexamethasone group(p value 0.338).Complete satisfied 14 patients in granisetron group and 13 on dexamethasone group(p value 0.308).

There is no significant difference in between two groups.

Discussion:

Nausea and vomiting are common and frequent complications following surgery and anaesthesia. Most of the incidence of nausea and vomiting occur during the first two hours of recovery from anaesthesia. The etiology of postoperative nausea and vomiting is multi-factorial. Many factor associated with anaesthesia and surgery may contribute to nausea and vomiting. In the present study concern factors are type of anaesthesia, female patient and gynecological surgery. Incidence of nausea and vomiting is two to three times more in female due to changing endocrine environment which sensitize the brain stem emetic mechanism. During elective gynaecological surgery, general anaesthesia as well as some traction of vagal innervated gut may play role in triggering emesis. The reported overall incidence of nausea and vomiting after gynecological surgery is 75%.[16]

The anti emetics are now mainstay of therapy to prevent PONV. Now currently being widely used for treatment in our country are prochlorperazine, metoclopramide and promethazine and many study have done with these drugs. But these drugs have varying effectiveness and there use is limited because of delayed recovery, sedation and sometimes distressing side effect of extra pyramidal symptoms.

Granisetron is a newer drug and limited studies have done with this drug in our country. So we have chosen granisetron and dexamethasone for prevention of PONV in laparoscopic gynaecological surgery to compare these drugs about their efficacy and side effects during operations and 24 hours post operative period.

Maintaining the inclusion criteria100 patients were enrolled into the study, out of which 50 patients were placed in Granisetron group (Group-A) and 50 patients in Dexamethasone group

(Group-B).There was also no significant difference in operation characteristics between the two groups.

Pain as well as commonly used analgesic pethidine may cause nausea and vomiting. For this reason postoperative control of pain we used ketorolac tromethamine and diclofenac as required instead of pethidine. The study confirmed the previous study regarding the safety of the patient as side effects were mild.

Our study showed that there is no significant difference in age, BMI, History of motion sickness, socioeconomic condition,type of surgery, mean anaesthesia time, mean surgery time among the study patients.

The current study showed the intravenous injection of 8 mg Dexamethasone, or 3 mg Granisetron have similar effects on PONV prophylaxis in laparoscopic gynaecological surgery

These results of the current study indicated that Dexamethasone is a suitable substitute for Granisetron.

Dr. Dipasri Bhattacharia and dr. Arnab Banarjee showed that granisetron effectively reduces PONV in day case laparoscopic gynaecological surgery.[17]

Fukami *et al.*[18] showed that Dexamethasone injection before laparoscopic cholecystectomy leads to significant reduction of nausea, vomiting and post-operative pain. Fukami's study was a clinical trial performed on 80 patients . In another clinical trial performed by Binachin *et al.* Dexamethasone had significant effect on PONV reduction after laparoscopic cholecystectomy but it had no effect on pain reduction and admission duration . In similar studies which were performed by Feo *et al* and Bisgard *et al.*[19] Dexamethasone effect on PONV reduction after laparoscopic cholecystectomy were confirmed. Karanicolas et al meta-analysis showed that dexamethasone leads to PONV reduction in comparison with placebo after laparoscopic cholecystectomy. They showed that injection of 8 mg Dexamethason is more effective than 3 mg Granisetron or 4 mg Ondansetron in PONV prophylaxis but the differences were not statistically significant. Erhan *et al.*[20] evaluated Dexamethasone, Granisetron and Ondansetron effects on PONV after laparoscopic cholecystectomy in comparison with placebo. They showed that injection of 8 mg Dexamethason is more effective than 3 mg Granisetron or 4 mg Ondansetron in PONV prophylaxis but the differences were not statistically significant Dexamethason mechanisms in PONV prophylaxis are not known well. Elhakim *et al.* [21]·expressed that Dexamethasone can act as a serotonin receptor inhibitor in gastrointestinal tract. Another study showed that Dexamethasone leads to reduction of parasympathetic impulses to the brain by decreasing tissue inflammation around surgery site.[22]

Conclusion:

Dexamethasone and Granisetron are comparable in management of PONV. These drugs injection before anesthesia induction have similar effects on nausea and vomiting prophylaxis after laparoscopic gynaecological surgery. Prophylactic use of dexamethasone should be routine to prevent PONV bcause dexamethasone is cost effective than granisetron. Increased incidence of either postoperative nausea or vomiting distressed the patients and was associated with decreased patient satisfaction. So dexamethasone should be use in management of PONV.

Limitations of this study:

This study was not without a limitations and followings were the limitations of this study:

1. This study was conducted in two centre hospital only and may not reflect the actual situation of the country.
2. This study was done within a short period of time.
3. The sample size was small;This is the drawback of the study and a larger sample size can give a better conclusion.
4. There were several limitations to this study. First, because of ethical concerns, the placebo control group was kept out. Second, patients were observed for only 24 h postoperatively because most patients who underwent laparoscopic gynaecological surgery without complications were discharged a day after operation.
5. The patients with underlying diseases were excluded, so the results of the study should not be generalized to other patients with severe underlying diseases. Further studies should consider these limitations.

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Case Report

Anesthetic management of an emergency caesarian delivery in a 61 year 8 month old Primigravid patient with 33+ wks pregnancy (IVF, twin) with Diabetes Mellitus with Hypertension with Hypothyroidism and Mild aortic stenosis

Wahiuddin Mahmood[1], SM Ali[2], Md Quamrul Islam[3], Debasish Das[4], Basudeb Das[5], Tasmia Khan[6]

[1]Professor and Head of the department of anesthesiology, Square hospital Ltd, Dhaka, [2]Consultant, Department of Anesthsiology.[3]. Consultant, Department of Anesthsiology.[4] Associate Consultant, Department of anesthesiology.[5] Specialist,Department of Anesthesiology. [6]Specialist, Department of anesthesiology.

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

Abstract:

Physiologic changes of pregnancy uniquely influence anesthesia for caesarian delivery. Aging is also an universal and progressive physiological phenomenon clinically characterized by degenerative changes in both the structure and the functional capacity of organs and tissues. For an anesthesiologist the case becomes more challenging when the patient has multiple comorbidities such as Diabetes Mellitus, Hypertension, Hypothyroidism and Mild Aortic stenosis. We report an emergency caesarian delivery in the case of a 61 year 8 month old woman who was diagnosed as 33+wks Pregnancy (IVF, TWIN) with DM (Insulin) with Hypothyroidism on medication with Hypertension on medication with Mild aortic stenosis. Emergency caesarian delivery of this patient was necessary due to oligohydramnios with labor pain and fetal distress. The delivery was successfully performed under SAB and patient recovered without any complication.

Keywords: *Cesarean section, Regional anesthesia, Pregnancy.*

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Introduction:

Administration of anaesthesia for obstetric and non-obstetric surgery during pregnancy has always been a challenge to the attending anaesthesiologists. Data from developing nations is lacking, but statistics from the developed world reveals that 1-2% of all obstetric patients present for emergency non-obstetric surgery once in their lifetime. Numerous diseases and their complications during pregnancy can cause hospitalization of a pregnant female,[1] which may require surgical intervention.The risk of surgery is not much different from the general population, but anaesthetic management is extremely challenging during this period. Safety of both the mother and the foetus *in utero* is the prime objective while delivering anaesthesia services during these emergency surgical procedures[2].In spite of new advancements in clinical arena and technology, anaesthesiologists have to face numerous challenging tasks in delivering safe anaesthesia services. Besides socio-cultural barriers, clinical challenges, which include advanced maternal age, obesity, comorbidities, including diabetes, severe anaemia, cardiac diseases, etc., all produce a huge uphill task for anaesthesiologists.[3]

Complete knowledge of various physiological aspects related to pregnancy and the

pharmacological profile of various drugs is mandatory to conduct safe anaesthesia. Both regional and general anaesthesia (GA) are associated with potential complications, some of which may be rare but can be fatal or permanently disabling.[4] The precautions during surgical procedures revolve around prevention of four 'H,' that is, hypotension, hypoxemia, hypovolaemia and hypothermia. Keeping in mind the altered physiology of the mother and giving due consideration to the functional integrity of uterine blood flow

Case Report:

A patient Primi,61 year 8 month old with 33+ wks pregnancy(IVF, twin) with Diabetes Mellitus with Hypertension with Hypothyroidism and Mild aortic stenosis came for regular anti natal checkup gynaecology and obstetrics department of square hospital. She had complain of a painful swelling on her back,which was diagnosed as an infected carbuncle for which she was referred to general surgery department, she was later admitted and operated (incision and drainage) by the surgery department (date)few days after that presented with the complains of less fetal movement and labor pain .Obstetricians visited the patient and they decided for emergency caesarian section. On pre anaesthetic checkup, patients vitals were Blood pressure: 140/80mmHg, Pulse:90, Temperature:98.4 CVS:S1, S2audible, Lungs: Clear, Airway examination: Mallampati 2.On

Investigations: CBC:Hb%:10.6gm/dl,WBC:12.7, Platelet:165, ECG:Within Normal Limit, ECHOCARDIOGRAPHY: Ejection Fraction 55%,Concentric LVH, Dialated Left Atrium, Moderate degenerative mitral regurgitation, AV 1.8cmPatient took food two hours back, so there was chance of aspiration, so high risk consent was taken. And arrangement of ICU bed was done.One unit PRBC was kept ready by grouping and cross matching with donor. Non Particulate antacid and Metoclopramide was given.

In the operation theatre Patients Heart Rate:70 b/min, Blood pressure 177/80 mmhg, Spo2:100% in room air. A 18g canullae was inserted in the left hand .During operation following monitoring was done, Blood pressure, pulse rate,ECG,Urine output.Sub Arachnoid block was given in sitting position,IN the L4-L5 space in the midline, with 25 g quincke needle.0.5% Bupivacaine Heavy 2.3ml and .25mcg fentanyl was given.Choice of fluid was Hartman solution. Then patient was put in supine positions and a wedge was given under the right buttock. Then we gave two litre oxygen per minute through nasal prongs. After giving the subarachnoid block, assessment was done for the anesthesia and block was adequate .Surgery was started at pm. First baby was born at 3.50 pm, second baby was born 3.51 pm. Then 100 IU Carbetocin was given through I/V route for uterine contractions. Then first baby cried after birth, however the second baby needed CPR .Both babies were shifted to nicu for management due to low birth weight and prematurity.

Around the end of the surgery , the patient started to get restless and she complained of thirst. Then we did RBS and found it to be 2.5 mmol/l. Then we gave 25% 50 ml glucose. After giving glucose we again did RBS after 10 minutes it was found to be 13.5 mmol/l. Then operation was compleated and patient was shifted to postoperative ward. In postoperative ward she was monitored overnight. Postoperative period was uneventful.The next morning the patient was shifted to cabin.

Discussion:

IVF: In vitro fertilisation (IVF) is a process of fertilisation where an egg is combined with sperm outside the body, in vitro ("in glass"). The process involves monitoring and stimulating a woman's ovulatory process, removing an ovum or ova (egg or eggs) from the woman's ovaries and letting sperm fertilise them in a liquid in a laboratory. After the fertilised egg (zygote) undergoes embryo culture for 2–6 days, it is implanted in the same or another woman's uterus, with the intention of establishing a successful pregnancy. Major risk of IVF includes Multiple births: The major complication of IVF is the risk of multiple births.[5] This is directly related to the practice of transferring multiple embryos at embryo transfer. Spread of infectious disease:[6]By sperm washing, the risk that a chronic disease in the male providing the sperm would infect the female or offspring can be brought to negligible levels. Ectopic pregnancy may also occur if a fertilised egg develops outside the uterus, usually in the fallopian tubes and requires immediate destruction of the fetus Birth defects: A review in

2013 came to the result that infants resulting from IVF (with or without ICSI) have a relative risk of birth defects .[7]Studies show that there is an increased risk of venous thrombosis or pulmonary embolism during the first trimester of IVF.Also and elderly patient has many comorbidities which poses as a challenge to the treating anesthesiologist. This patient had Hypertension for last 20 years, thus subsequently she developed cardiomegaly. For her hypertension she was taking Tab Methyldopa, Tab Labeta. Also Diabetes Mellitus for last 15 years. She takes insulin Inj. Novorapid 24+22+26,Inj Levemir 0+0+26 subcutaneously to control her blood sugar. The patient was also hypothyroid for last 10 years and she takes Tab Thyrox(150mcg).All these comorbidity poses a challenge to the anaesthesiologist. We tried to optimize these conditions as much as possible. We took measures such as consultation with senior consultant of anaesthesia. We arraged 1 unit PRBC. Wewitheld the midday dose of insulin. Counseling of the patient's Husband and family was done regarding the risk.And also arrangement of an ICU bed was done.

After through preoperative evaluation and optimization of the patient. Surgery was done under Sub Arachniod block in L4 -L5 space in sitting position. The peroperative period was relatively uneventful. There was n event of hypoglycemia which was promptly managed with vigilant monitor and proper treatment.

Conclusion:

Surgery in an elderly patient poses challenge to the anaesthesiologist. When the patient has multiple comorbidities this stiuation is further aggeravated. LUCS in an elderly patient of 61 years 8 months is the record in Bangladesh of LUCS in highest maternal age, which was managed uneventfully due to presence of all the latest monitoring techniques and presence of skilled anaesthesiologist.

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