

**CONTENTS**

1	<b>NERVE STIMULATOR GUIDED SUPRASCAPULAR BLOCK IN ADHESIVE CAPSULITIS: A NOVEL TECHNIQUE</b> <i>Shailendra Singh Chauhan</i>	2194
2	<b>COMPARATIVE EVALUATION OF ATTENUATION OF POST- EXTUBATION HYPERDYNAMIC RESPONSES WITH SINGLE DOSE DEXMEDETOMIDINE OR ESMOLOL : A DOUBLE BLIND, RANDOMIZED, CONTROLLED TRIAL</b> <i>Vansh Priya, P. S Malviya, L.S Mishra</i>	2199
3	<b>EASE OF FIBROPTIC INTUBATION WITH TWO DIFFERENT CONCENTRATION OF PROPOFOL AND KETAMINE</b> <i>Rajiv Gautam, B.K. Raw, L.S. Mishra, Gaurav Misra</i>	2206
4	<b>CO-AMOXICLAV PROPHYLAXIS IN LSCS CAUSING ANAPHYLAXIS AND INTRAUTERINE FETAL DEATH</b> <i>Prasoon Gupta, Ranvinder Kaur, Lalita Chaudhary, Aruna Jain</i>	2210
5	<b>A STUDY TO EVALUATE THE EFFICACY OF PROSEAL LARYNGEAL MASK AIRWAY AND LARYNGEAL TUBE SUCTION IN PATIENTS FOR SURGERY UNDER GENERAL ANAESTHESIA WITH CONTROLLED VENTILATION</b> <i>Maninder Kaur, Ruchi Gupta, Kuljit Singh Aujla, Chiteshwar Walia, Lakshmi Mahajan, Nayyaamat K Sandhu</i>	2215
6	<b>A COMPARATIVE STUDY OF THE EFFECTS OF EPIDURAL BUPIVACAINE AND BUPIVACAINE – FENTANYL MIXTURE IN LOWER ABDOMINAL SURGERY</b> <i>Geeta Karki, Lalit Singh, S Moied Ahmed</i>	2225
7	<b>GUIDELINES TO CONTRIBUTORS</b>	2236

# ASIAN ARCHIVES OF ANAESTHESIOLOGY AND RESUSCITATION

OFFICE BEARERS FOR 2010-2013  
EDITORIAL BOARD

## Editor-in-chief

Dir. Prof. U.C. Verma

## Founder Member

(Late) Prof. W.E. Sporel  
(Late) Prof. N.P. Singh  
(Late) Prof. S.D. Gupta

## Co-Editors

Dir. Prof. Baljit Singh  
Dir. Prof. R.S. Rautela  
Dr. Manpreet Singh

## Executive Director

Dr. Yashwant Singh

## MEMBERS (FOREIGN)

- |   |  |  |
|---|--|--|
| 1. <b>Dr. T.C.K. Brown</b><br>Dept. of Anaesthesia<br>Royal Childrens' Hospital<br>Melbourne 3502 (Australia) | 2. <b>Dr. Rashid M. Khan</b><br>Sr. Consultant,<br>Khoula Hospital, Muscat<br>OMAN | 3. <b>Dr. Michael J.A. Parr</b><br>MBBS, MRCP, FRCA, FANZCA<br>Specialist in Intensive Care,<br>Liverpool Hospital.<br>Lecturer in Intensive Care,<br>Anaesth and Emergency Medicine<br>Intensive & Critical Care Medicine |
|---|--|--|

- |  |                                     |
|--|-------------------------------------|
| 1. Prof. (Dir.) Rajiv Chawla, New Delhi    | 11. Prof. Shahjahan Bano, Aligarh   |
| 2. Prof. (Dir.) Deepak K. Tempe, New Delhi | 12. Dr. Lalit Maini, New Delhi      |
| 3. Dr. S.C. Parakh, Hyderabad              | 13. Prof. A.M. Hashia, Solan        |
| 4. Dr. Pramod Kumar, Jam Nagar             | 14. Prof. Mridula Pawar, New Delhi  |
| 5. Prof. Dilip Pawar, New Delhi            | 15. Dr. Sunila Sharma, New Delhi    |
| 6. Dr. V.P. Kumar, New Delhi               | 16. Prof. S.M. Ahmad, Aligarh       |
| 7. Dr. S.C. Manchanda, New Delhi           | 17. Dr. Dheeraj Kapoor, Chandigarh  |
| 8. Dr. (Col.) S.K. Chadha, New Delhi       | 18. Prof. Lakesh Anand, Chandigarh  |
| 9. Prof. L.D. Mishra, Varanasi             | 19. Dr. Deepak Thapa, Chandigarh    |
| 10. Prof. H.C. Chandola, Allahabad         | 20. Prof. S.K. Malhotra, Chandigarh |

Correspond : Asian Archives of Anaesthesiology and Resuscitation, Office Address : Room No. 306- 309,  
Department of Anaesthesia, 3rd Floor, BL Taneja Block, MAMC and LN Hospital, New Delhi  
Mobile No.: 9868378740, 9871741419, 9868399699, 9646121503 E-mail: aaarjournal@gmail.com

(ii)



## National Association of Critical Care Medicine (India)

(Affiliated to the world Federation of Societies of Intensive & Critical Care Medicine)



President - Dir. Prof. U.C. Verma  
Vice President - Dir. Prof. Baljit Singh  
G. Secretary - Dr. Manpreet Singh  
Jt. Secretary - Dir. Prof. R.S. Rautela  
Treasurer - Dr. Yashwant Singh

Office Address:  
306- 309, DEPARTMENT OF  
ANAESTHESIA 3RD FLOOR,  
BL TANEJA BLOCK  
MAMC and LN HOSPITAL,  
NEW DELHI, INDIA  
naccm2007@gmail.com  
www.aarnaccm.com

## LIFE MEMBERSHIP FORM

Photograph

Dear Sir

I wish to become a member of National Association of Critical Care Medicine and my particulars are as follows

Name (Capital Letters) .....

Date of Birth .....

Under Graduation ..... (University/College) .....

Post Graduation ..... (University/College) .....

Official Address .....

Correspondence Address .....

Ph. No. (R)..... Mobile..... email.....

Permanent Address: .....

I am enclosing here with bank draft/cheque\* for Rs. 2500/- (Two thousand five hundred only) towards my Registration for Life Membership of National Association of Critical Care Medicine.

I would abide by the constitution of National Association of Critical Care Medicine

\* Rs. 155/- to be added if payment is through outstation cheque.

Cheque/Draft should be sent in favour of National Association of Critical Care Medicine, payable at New Delhi

Cheque/Cash..... Cheque No ..... Date ..... Amount .....

Dated..... Signature.....

Please send all the correspondence at the above mentioned address for which I would acknowledge the receipt.

National Association of Critical Care Medicine, Registered Society under Act XXI of 1860 Regd. No. 10874 Affiliated with World Federation of Societies of Intensive & Critical Care Medicine.

Exempted from Income Tax under Section 35 of Income Tax Act 1961 vide letter No. 1231 (F.N. DG/IT/E/ND/-81/35 (i), (22)/90/-IT (E) of 26-10-94 from Dept. of Revenue, Min. of Finance, Govt. of India (1.4.93-31.396)

(iii)

# NERVE STIMULATOR GUIDED SUPRASCAPULAR BLOCK IN ADHESIVE CAPSULITIS: A NOVEL TECHNIQUE

Shailendra Singh Chauhan

Adhesive capsulitis, also known as 'Frozen Shoulder' is characterized by spontaneous onset of gradually progressive shoulder pain and restriction of active and passive glenohumeral movement in all planes.<sup>1,2</sup> The current consensus definition of American Shoulder and Elbow Surgeons is " a condition of uncertain etiology characterized by significant restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder"<sup>3</sup> Relieving pain and restoring of normal shoulder function are the common aims of various methods used in the treatment of adhesive capsulitis.<sup>4-7</sup> To achieve this goal, therapeutic exercises are the most important part of the treatment program. The most important factor preventing active exercise is pain. Suprascapular nerve block is effective for the management of shoulder pain resulting from adhesive capsulitis.<sup>8-10</sup> There are various techniques to block suprascapular nerve.<sup>11</sup> These techniques either depend on costly instruments or are blind & technically difficult. This technique is simple & effectively blocks suprascapular nerve as the drug is injected at the point nearest to the nerve guided by motor nerve stimulator.

## EPIDEMIOLOGY & CLASSIFICATION

It is a common condition affecting around 2% to 5% of general population.<sup>5</sup> It most commonly affects women aged between 40 & 60 years often

presenting bilaterally. It has not been reported to have any predilection with race.

Adhesive capsulitis is usually classified as primary or secondary. It is called Primary if no findings on history or examination explain the onset of disease, may be related to hormonal or immunologic changes. Secondary develops due to stiffness & immobility caused by some trauma or surgery.

The present study was conducted to evaluate clinical efficacy of nerve stimulator guided suprascapular nerve block techniques in patients with adhesive capsulitis.

## MATERIAL & METHODS

Eighty patients [male: female/55:25], in age group [40 -65 years] suffering from adhesive capsulitis were studied over a period of one year. All these patients received supra-scapular nerve block via above mentioned technique. The patients who had pain & stiffness in shoulders [one or both] for at least 4 weeks, aggravated by movements, who had restricted active & passive range of movements [ROM] at gleno-humeral joint, who had sleep disturbance with increased pain when sleeping on the affected site, were included. The patients with no history of recent trauma & no previous injection in the involved shoulder, no history of allergy to local anaesthetics & steroids,

---

**Shailendra Singh Chauhan**

MD, Pain physician

Consultant Anaesthesiology & Pain Medicine, Jabalpur Pain & Spine Clinic, JABALPUR

who had radiologically ruled out secondary adhesive capsulitis and who had all directions of ROM less than 40% of the normal. The patients who had other causes of pain like arthritis, bony or neurological disorders, had uncontrolled cases of DM and suspected infective pathology, were excluded from the study. The following parameters were evaluated i.e pain assessed by visual analogue scale before the block, at 10 minutes, at 1 week & at 1 month after it for pain. The ROM was assessed by goniometer before the block, at 10 minutes, at 1 week & at 1 month after it.

The time to perform block and time for onset of block was noted. The physiotherapy was started from the same day. The student t-test was used to detect the differences from baseline. A P-value <0.05 was considered significant.

#### TECHNIQUE

**Preparation of block:** Following material was required as per our protocol: Supra scapular nerve block required a sterile tray, Nerve locator [motor], Stimuplex insulated needle 5cm long 22G, 10 ml syringe, marking pen, vial bupivacaine 20ml, 0.5% plain, inj Depomedrol 40mg, ECG electrode.

**Positioning of patient:** Patient in sitting position with both the hands resting on thigh.

#### Superficial Landmarks (figure 1)



Figure 1

Mark the acromian process on the affected side & the medial end of spine of scapula. Draw a line between the two points & divide it in three equal parts. Draw a 2cm line perpendicular in cephalad direction from the junction of medial 1/3 & lateral 2/3 of the straight line. Draw a line 2cm long parallel to the straight line in lateral direction. Mark this point as the entry point of the needle.

#### Direction of needle (Figure 2)

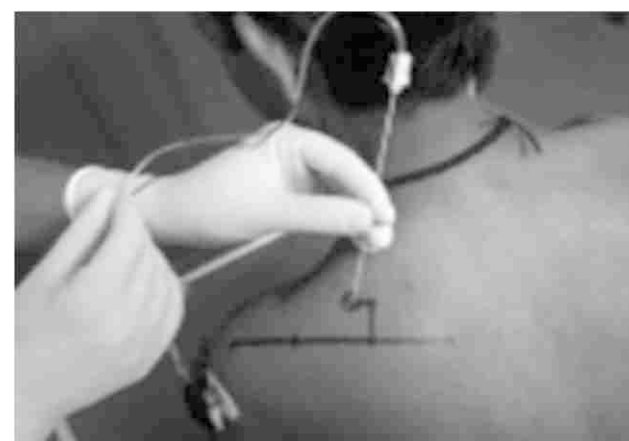


Figure 2

After infiltration [superficial only] of the entry point with 2% Lidocaine plain, 5cm 22G Stimuplex needle is directed perpendicular to all planes with a lateral angle of 20-30 degrees. Normally the nerve is stimulated at an average distance of 3-5cm.

#### End point of nerve stimulation

External rotation of arm & abduction of shoulder at 0.5mA, 1 HZ stimulation was considered as the end point.

#### Drug delivery

At this point after negative aspiration of blood 10 ml 0.5% bupivacaine plain mixed with 40 mg Depomedrol was injected.

#### OBSERVATION & RESULT

1. VAS score: Mean VAS values are given in following table (table 1)

	BASELINE	AT 10 MINUTE	AT 1 WEEK	AT 1 MONTH
VAS score	84.3+-12.8	1.2+-8.4	2.5+-8.0	2.2+-7.8

There was significant decrease in mean VAS score after the block & the difference was statistically significant {p<.05}.

2. Range of Movements (table 2)

Mean active & passive ROM values in all planes are given in following table 2

	Baseline	At 10 minutes	At 1 week	At 1 month
Glenohumeral Abduction				
Passive	<60	>75	>75	>75
Active	<60	>75	>75	>75
Scapulothoracic Abduction				
Passive	<45	>60	>60	>60
Active	<45	>60	>60	>60
Total Abduction				
Passive	<100	>125	>125	>125
Active	<75	>125	>125	>125
Flexion				
Passive	<125	>150	>150	>150
Active	<125	>150	>150	>150
Extension				
Passive	<45	>60	>60	>60
Active	<30	>45	>45	>45
Internal Rotation				
Passive	<45	>60	>60	>60
Active	<30	>45	>45	>45
External Rotation				
Passive	<45	>75	>75	>75
Active	<30	>60	>60	>60

There was significant increase in range of movements after the block & the difference was statistically significant { $p < .05$ }. Average onset of time of block was 8.5 minutes & range was from 6 to 10 minutes.

Average time taken to perform block was 6.2 minutes. No significant adverse effects were noted

## DISCUSSION

Shoulder pain and restriction of glenohumeral movements are the main clinical findings in adhesive capsulitis. Considering the functional disability, the most important components of the treatment are pain relief and therapeutic exercises for early mobilization.<sup>12</sup>

A simple and effective regional nerve block method for shoulder pain is the suprascapular nerve block. Nerve locator guided technique was chosen for more accuracy, easy availability & presence of motor fibres innervating supraspinatus & infraspinatus muscle in suprascapular nerve.

The most appropriate site is around the suprascapular notch, in which the nerve can also be located easily. That decided the entry point of needle insertion.

Various suprascapular nerve block techniques have been described by several investigators.<sup>9-14</sup> This type of approach is easy, delivers drug in near vicinity of nerve hence more effective than other blind techniques and decreases the risk of pneumothorax.

## CONCLUSION

This new motor nerve locator guided technique enables more accurate placement of needle tip near nerve thus a more successful nerve block as compared to classical blind technique. Other

techniques which provide comparable results are either costly or are not widely available. This technique is very effective, less time consuming and easy to use.

To determine the minimum effective dosage for the nerve block, more comparative studies are needed. Proven effective in adhesive capsulitis in the present study, we believe the motor nerve locator guided technique can also be used in appropriate cases of shoulder pain caused by pathologies other than adhesive capsulitis.

## REFERENCES

1. Reeves B. The natural history of frozen shoulder syndrome. *Scand J Rheumatol.* 1975;4:193–196
2. Rizk TE, Pinals RS. Frozen shoulder. *Semin Arthritis Rheum.* 1982;11:440–452
3. Zuckerman et al. Definition and classification of frozen shoulder: a consensus approach. *J Shoulder Elbow Surg* 1994;3:S72
4. Hill JJ. Manipulation in the treatment of frozen shoulder. *Orthopaedics* 1988;11:1255-60
5. Murnaghan JP. Adhesive capsulitis of shoulder: Current concepts and treatment. *Orthopaedics* 1988;11:153-8
6. Rizk TE. Adhesive capsulitis [frozen shoulder]: A new approach to its management. *Arch Phys Med Rehabil* 1983;64:29-33
7. Older MWJ. Distention arthrography of the shoulder joint. *Can J Surg* 1976;19:203-7
8. Bonica JJ, Buckley FP. Regional analgesia with local anesthetics. In: Bonica JJ editors. *The management of pain.* Philadelphia: : Lea & Febiger; 1990;p. 1883–1966
9. Brown DE, James DC, Roy S. Pain relief by suprascapular nerve block in gleno-humeral arthritis. *Scand J Rheumatol.* 1988; 17:411–415
10. Dahan TH, Fortin L, Pelletier M, Petit M, Vadeboncoeur R, Suissa S. Double blind randomized clinical trial examining the efficacy of bupivacaine suprascapular nerve blocks in frozen shoulder. *J Rheumatol.* 2000;27:1464–1469
11. Gado K, Emery P. Modified suprascapular nerve block with bupivacaine alone effectively controls chronic shoulder pain in patients with rheumatoid arthritis. *Ann Rheum Dis.* 1993;52:215–218
12. Wolf JM. Influence of comorbidity on self assessment instruments scores of patients with idiopathic adhesive capsulitis. *J Bone Joint Surg Am* 2002;84:1167-73
13. Parris WC. Suprascapular nerve block: a safer technique. *Anesthesiology.* 1990; 72:580–581
14. Bulgen DY, Binder AI, Hazleman BL, Dutton J, Roberts S. Frozen shoulder: prospective clinical study with an evaluation of three treatment regimens. *Ann Rheum Dis.* 1984;43:353–360

# COMPARATIVE EVALUATION OF ATTENUATION OF POST- EXTUBATION HYPERDYNAMIC RESPONSES WITH SINGLE DOSE DEXMEDETOMIDINE OR ESMOLOL : A DOUBLE BLIND, RANDOMIZED, CONTROLLED TRIAL.

Vansh Priya<sup>1</sup>, P. S Malviya<sup>2</sup>, L.S Mishra<sup>3</sup>

Extubation is fraught with its own set of potential complications<sup>1</sup> which amongst many includes marked hyperdynamic responses which might have deleterious impact on cardio pulmonary status of the patient. This study compared the efficacy of dexmedetomidine with esmolol in attenuating post extubation hyperdynamic responses in patients undergoing laparoscopic cholecystectomy under general anaesthesia.

patients belonging to I–II, of either sex, between 18 years and 60 years, scheduled for elective laparoscopic cholecystectomy under general anaesthesia, were included. The study was conducted in a randomized prospective double –blinded manner. The patients were divided into three groups of 32 each using opaque sealed envelope method. In GROUP-C, one ml of normal saline was injected as an i.v bolus dose 5 minutes prior to extubation. In GROUP-D, Dexmedetomidine in an i.v bolus dose of 0.5 mcg/kg<sup>5,6</sup> given slowly over 10 minute, prior to extubation. In GROUP-E, Esmolol in an i.v bolus dose of 0.5 mg/kg<sup>9</sup>

given slowly over a period of one minute, 5 minutes prior to reversal and extubation.

Group D and Group E both showed control of H.R, S.B.P, D.B.P, M.A.P and was statistically significant when compared with Group C (p<0.01). Group D showed sustained decline in H.R, S.B.P, D.B.P, M.A.P when compared with their pre-extubation values and this attenuation was better when compared with Group E and this was statistically significant (p< 0.01). Group E also showed adequate control of H.R, S.B.P, D.B.P, M.A.P when compared with their respective pre-extubation values.

Dexmedetomidine and esmolol were effective in controlling rise of pulse and blood pressure during extubation phase, however dexmedetomidine stands better due to its additional analgesic, sedative and anti-emetic actions.

**KEY WORDS :** Extubation, laparoscopic cholecystectomy, dexmedetomidine, esmolol

1. Vansh Priya (Junior Resident), Deptt. of Anaesthesia, M.L.N Medical college, Allahabad
2. Prof. P. S MALVIYA M.D, Professor, Deptt. of Anaesthesia, M.L.N Medical college, Allahabad
3. Prof. L.S MISHRA M.D, Professor & Head, Deptt. of Anaesthesia, M.L.N Medical College, Allahabad

**Corresponding Author :** Dr. Vansh Priya  
P-29 Pushpayan, Nehru Enclave, Gomti Nagar, Lucknow. Mobile no. 09559022156.  
Email id- vanshkh@gmail.com

## INTRODUCTION

Extubation is fraught with its own set of potential complications<sup>1</sup> which amongst many includes marked hyperdynamic responses which might have deleterious impact on cardio pulmonary status of the patient.

We used cases of “laparoscopic cholecystectomy” as a stepping stone to extrapolate the findings of our study during extubation phase to much more specialized surgeries like neurosurgery and cardiac surgery wherein post extubation hyperdynamic responses may prove deleterious for “at risk” patients and may have adverse impact on the outcome of anaesthesia.

Several ways such as extubation of the trachea with the patient in a deep plane of anaesthesia achieved by inhalational anesthetic agents, opioids have been used to attenuate these hemodynamic responses to tracheal extubation. But these ways may lead to depression of the respiratory and cardiovascular system or difficulty in maintaining the upper airway further complicating the situation. This is where the introduction of dexmedetomidine<sup>2</sup> has stepped in to plug this gap in attenuating post-extubation hyperdynamic responses, bringing about sedation and analgesia without causing respiratory depression. Dexmedetomidine, an alpha<sub>2</sub> adrenergic receptor agonist introduced in 1999, attenuates the stress response to anaesthesia and surgery but also causes sedation and analgesia without causing respiratory depression.

Esmolol hydrochloride<sup>3</sup> is a cardio selective adrenergic receptor blocker which has been in use, rather extensively for rapid control of ventricular rate in patients with atrial fibrillation, atrial flutter in perioperative, post-operative or

other emergent circumstances where short term control of ventricular rate with a short acting agent is desirable.

This study compared the efficacy of dexmedetomidine with esmolol in attenuating post extubation hyperdynamic responses in patients undergoing laparoscopic cholecystectomy under general anaesthesia.

## METHODS

This study was conducted after approval from the hospital ethics committee. Ninety Six patients belonging to American Society Of Anaesthesiologists physical status I or II, of either sex, between 18 years and 60 years, scheduled for elective laparoscopic cholecystectomy under general anaesthesia, were included after obtaining written informed consent from the patients. Patients with cardiopulmonary illness, metabolic disorders, nervous system disorders, having hypersensitivity reactions to any of the drugs under study, bleeding diathesis, receiving any drug for hypertension and/or ischemic heart diseases, with impaired hepatic and renal function were excluded from the study.

The study was conducted in a randomized prospective double –blinded manner. The patients were divided into three groups of 32 each using opaque sealed envelope method.

Heart rate (H.R), Systolic blood pressure (S.B.P), Diastolic blood pressure (D.B.P), Mean arterial pressure (M.A.P), peripheral oxygen saturation (spo<sub>2</sub>) were measured on arrival of patient in the operating room.

Inj. Glycopyrrolate 0.2 m.g i.v was given 15 minutes before induction. Anaesthesia was induced with i.v injections of propofol 1-2 mg/kg and succinyl choline 1-1.5 mg/kg and

tracheal intubation was performed. Patient was maintained on soda lime breathing circuit. Anaesthesia was maintained with 66:33 (N<sub>2</sub>O:O<sub>2</sub>) ventilation & isoflurane (0.5%-1%). Adequate skeletal muscle relaxation was maintained with loading dose of vecuronium (0.04-0.06 mg/kg) followed by intermittent i.v boluses of 0.01 mg/kg as and when required. If hemodynamic values changed by more than 15% from baseline, anaesthetic concentration of isoflurane was readjusted.

Isoflurane was stopped 10 minutes prior to the end of surgery. In GROUP-C, one ml of normal saline was injected as an i.v bolus dose 5 minutes prior to extubation. In GROUP-D, Dexmedetomidine in an i.v bolus dose of 0.5 mcg/kg<sup>5,6</sup> given slowly over 10 minutes, prior to extubation. In GROUP-E, Esmolol in an i.v bolus dose of 0.5 mg/kg<sup>9</sup> given slowly over a period of one minute, 5 minutes prior to reversal and extubation. Residual neuromuscular block was antagonized with neostigmine 0.05 mg/kg and glycopyrolate 0.2 mg. S.B.P, D.B.P, M.A.P, H.R, SPO<sub>2</sub> were measured prior to administration of drugs under study and then at 1, 5, 10, 15, 20 minutes after extubation.

Patients were observed at 30 minutes<sup>10</sup> after extubation for post operative nausea, vomiting, analgesia and sedation.

Degree of postoperative pain was recorded on visual analog scale (VAS). Sedation score was evaluated postoperatively and maximum at any time was recorded using Ramsay sedation scale.

Requirement of rescue analgesic and antiemetics was noted for the first 30 minutes after extubation.

Statistical analysis was performed using Microsoft excel 2007 and online statistical

calculation website. Chi-square test, Tukey HSD and student t-test<sup>11</sup> (unpaired and one way ANOVA) were used where appropriate, to test the significance of data. Data are being presented as mean ± S.D. A 'p' value of <0.05 was considered significant.

## RESULTS

In total, 96 patients were initially randomized into three study who eventually completed the study successfully. These patients were managed under conventional general anaesthesia.

The demographics, baseline haemodynamics and pulmonary functions were comparable between the study groups. There was no significant difference in the duration of surgery, I.V fluid infused and estimated blood loss between the groups.

The control group (Group C) showed post-extubation elevation in H.R, S.B.P, D.B.P, M.A.P when compared with their respective pre-extubation values at various time intervals under observation. The control group showed a control in the parameters under study at 15 minutes post-extubation.

Group D and Group E both showed control of H.R, S.B.P, D.B.P, M.A.P and was statistically significant when compared with Group C (p<0.01).

Group D showed sustained decline in H.R, S.B.P, D.B.P, M.A.P when compared with their pre-extubation values and this attenuation was better when compared with Group E and this was statistically significant (p<0.01).

Group E also showed adequate control of H.R, S.B.P, D.B.P, M.A.P when compared with their respective pre-extubation values.

In Group D, 5 patients (15.64%) had episode of vomiting, 4 patients (12.5%) complained of

pain and 28 patients (87.5%) were sedated when observed at 30 minutes in post operative period.

In comparison to Group D, Group E and Group C showed increased incidence of vomiting and pain and reduced incidence of patients being sedated and this was statistically significant (p<0.01)

No statistically significant differences were found in the incidence of pain, vomiting and sedation between Group C and Group E (p >0.05).

## DISCUSSION

We have studied the effects of Dexmedetomidine & Esmolol, agents with known sympatholytic effects. We therefore, before embarking upon our study had anticipated a certain degree of control over post-extubation rise in blood pressure and heart rate. To our expectation both the drugs produced results along the expected line although in varying fashion. Since Dexmedetomidine has more of central effects than esmolol, it produced other beneficial effects like sedation and analgesia.

Numerous drugs and their combinations have been tried in the past and studies have highlighted the use of these drugs in varying doses for suppression of stress responses but not without significant incidence of quite a few side-effects, especially with higher doses of opioids.

The analgesic, sedation, anxiolytic, sympatholytic and blunting of exaggerated haemodynamic responses by administration of dexmedetomidine are being extensively studied and are mainly mediated by the activation of alpha-2 receptors located in the post-synaptic terminals in the central nervous

system (CNS), which causes decreased neuronal activity and augmentation of the vagal activity. The role of alpha-2 agonists in regulating the autonomic and cardiovascular responses whereby they inhibit release of catecholamines (norepinephrine) from the sympathetic nerve terminals by augmentation of a vasoconstrictive effect.

Esmolol, a cardio selective beta blocker with distribution half-life of 2 minutes and a short duration of action due to rapid clearance (clearance half-life = 9 minutes). The rapid metabolism of esmolol by RBC'S esterases allows its beta-blocking activity to be lowered rapidly by changing the rate of infusion and obtaining rapid reversibility of effect in the minutes following interruption of the infusion.

The esmolol dose is therefore manageable and individual adjustments can be made in function of a patient's clinical status. Such properties mean that esmolol is indicated for short-term treatment of hypertension and tachycardia during the perioperative period and in clinical situations that require easy unblocking of beta receptors.

In the present study rather than using dexmedetomidine in conventional loading dose of 1 mcg/kg over a period of ten minutes we have used it in a dose of 0.5 mcg/kg over a period of ten minutes prior to extubation and noted obtundation of post extubation haemodynamic responses. As far as esmolol is concerned, in our study we have restricted ourselves in using it in a bolus dose of 0.5 mg/kg which was not followed by its infusion. Various studies have used dexmedetomidine in doses ranging from 0.1 to 10 mcg/kg/hr with not so much conclusive data but associated with a significant incidence of bradycardia and hypotension in higher doses. We used dexmedetomidine in a dose of 0.5 mcg/kg

over a period of 10 minutes prior to extubation and observed obtundation of post extubation hyperdynamic responses as evident by sustained decline in H.R, S.B.P, D.B.P, M.A.P when compared with their respective pre-extubation values. Studies using dexmedetomidine have commonly reported cardiac side effects like bradycardia, sinus pause, which is mainly due to sympatholytic effect as well as preservation of baroreflex mechanisms. But none of the patients in our study had such an incidence, which could have warranted the use of atropine possibly due to the usage of low dose of dexmedetomidine given in the form of slow i.v infusion over a period of ten minutes.

Esmolol on the other hand attenuated post-extubation hyperdynamic responses if not obtunding them altogether.

However, to substantiate the cardiovascular safety of such drugs, such a small study of ours is not sufficient and larger meta-analytical studies are required. The rapid speed of infusion also determines, to a large extent, the higher incidence of side effects such as apnoea and irregular ventilation, and occurs due to increased central sedation rather than

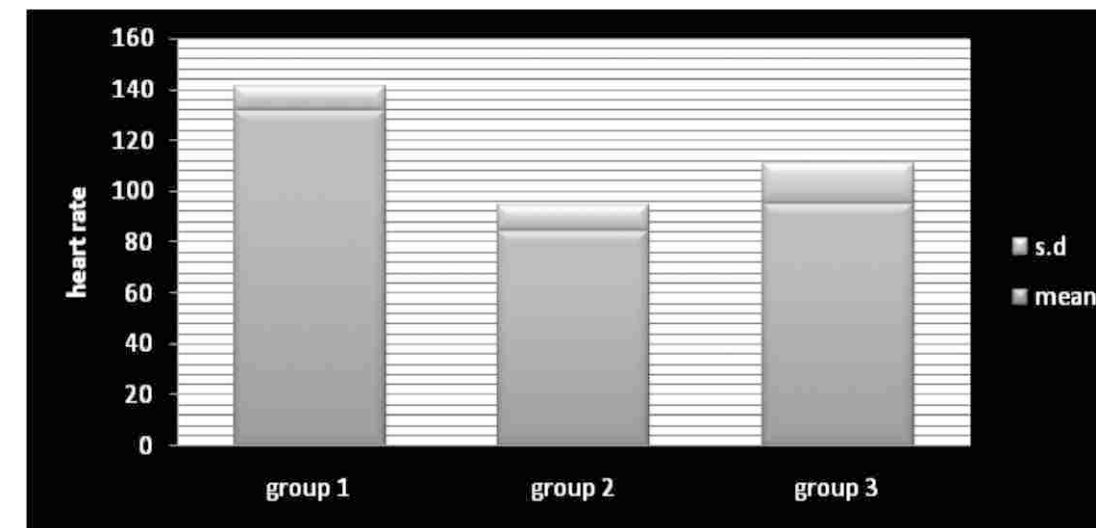
direct respiratory depressant effect. On the contrary it is demonstrated that a lower dose of dexmedetomidine decreases the risk of apnoea and is considered a better alternative in critical patients in whom narcotics can cause severe respiratory depression.

Dexmedetomidine enables a smooth transition from the time of administration of reversal to the post-extubation phase by suppressing the CNS sympathetic activity, leading to a high quality of extubation, as was observed in the majority of our patients in Group D.

There were certain limitations as the present study was carried out in a surgical procedure of short duration and on a smaller number of patients. More studies are required to establish the effects of a single dose of dexmedetomidine in surgeries of longer duration. Moreover, the effect was seen in ASA I/II patients, but the usefulness will be of immense help in high-risk cardiac and neuro-surgical patients who we could not study because we did not have an advanced cardiac and neurosurgery set-up at our institute. The use of bi-spectral index system would have been ideal in drawing the conclusions.

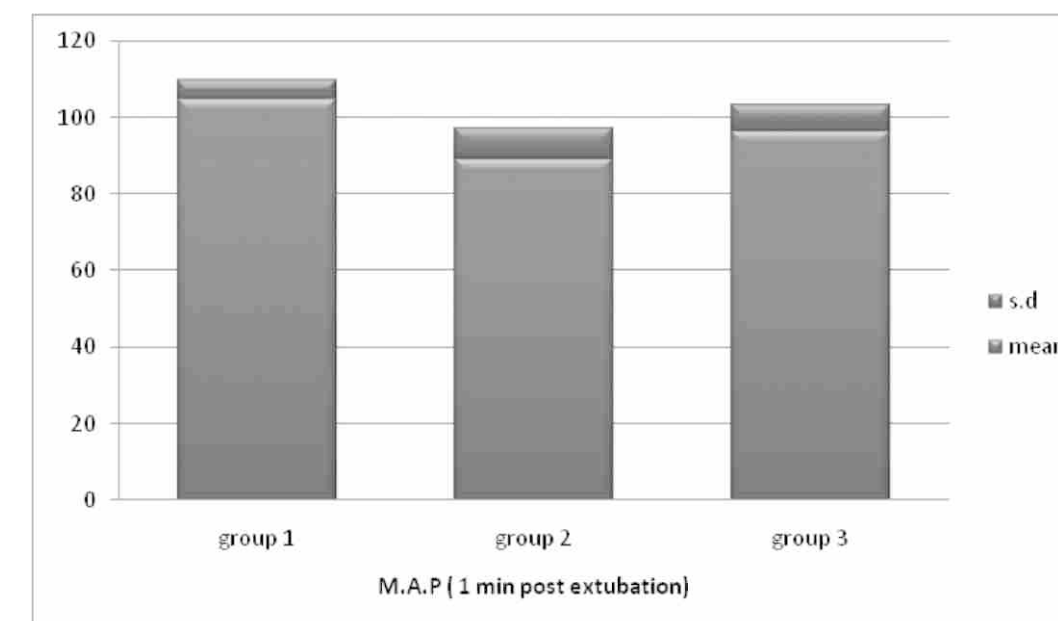
TABLE I : COMPARISON OF H. RATE AT TIME (T1) - one minute post- extubation

N= 32	GROUP -I	GROUP-II	GROUP -III
MEAN± SD	132±9. 6	84. 6± 10. 1	95 ± 15. 9
RANGE	98-148	68-115	52-122



HR = heart rate, SD = standard deviation

N= 32	GROUP -I	GROUP-II	GROUP -III
MEAN± SD	114±5. 31	90. 3±9. 51	101±11. 6
RANGE	107-126	66-110	78-132



MAP= mean arterial pressure, SD = standard deviation



## CONCLUSION

Both the drugs, dexmedetomidine and esmolol were effective in controlling rise of pulse and blood pressure during extubation phase, however dexmedetomidine stands better due to its additional analgesic, sedative and anti-emetic actions.

## REFERENCES

1. Rosenblatt William H, Sukhupragarm W. Airway management. In :Barash Paul G In Clinical Anesthesia 6<sup>th</sup>ed. WK/LW&W 2009; 6:769.
2. Gertler R, Brown HC, Mitchell DH, Silvius EN. Dexmedetomidine : a novel sedative - analgesic agent. Proc (Bayluniv. Med centr. ) 2001; 14:13-21
3. Quon CY, Gorczynski RJ. Pharmacodynamics and onset of action of esmolol in anesthetized dogs. JPharmacol ExpTher. 1986; 237;:912-8.
4. Wiest DB, Haney JS. Clinical pharmacokinetics and therapeutic efficacy of esmolol. Clin Pharmacokinet. 2012; 51:347-56.
5. Turan, C., Turan, G., Ozgultekin, A., Dýncer, E., Yuksel, G. The effects of two different doses of dexmedetomidine on extubation: 9AP3-5. European Journal of Anaesthesiology:2007 - Volume 24 - Issue - p 114
6. Turan G, Ozgultekin A, Turan C, Dincer E, YukseIG. Advantageous effects of dexmedetomidine on haemodynamic and recovery responses during extubation for intracranial surgery. Eur J Anaesthesiol. 2008; 25:816-20.
7. D. Jain, R. Khan, M. Maroof. The effect of dexmedetomidine on stress response to extubation. IJA. 2009 VOL. 21
8. Aksu R, Akin A, Biçer C, Esmoğlu A, MD, Zeynep Tosun, MD, Adem Boyacı, MD. Comparison of the effects of dexmedetomidine versus fentanyl on airway reflexes and hemodynamic responses to tracheal extubation during rhinoplasty: A double-blind, randomized, controlled study. Current therapeutic research. 2009; 70:209-220.
9. Fuhrman TM, Ewell CL, Pippin WD, Weaver JM. Comparison of the efficacy of esmolol and alfentanil to attenuate the hemodynamic responses to emergence and extubation. J Clin Anesth. 1992; 4(6):444-7
10. Bilotta F, Lam AM, Doronzio A, Cuzzone V, Delfini R, Rosa G. Esmolol blunts postoperative hemodynamic changes after propofol-remifentanyl total intravenous fast-track neuroanesthesia for intracranial surgery. J Clin Anesth. 2008; 20(6):426-30.
11. Wang YQ, Guo QL, Xie D. Effect of different doses of esmolol on cardiovascular responses to tracheal Xue Bao. 2003; 28(3):259-62.

## EASE OF FIBROPTIC INTUBATION WITH TWO DIFFERENT CONCENTRATION OF PROPOFOL AND KETAMINE

Rajiv Gautam<sup>1</sup>, B.K. Raw<sup>2</sup>, L.S. Mishra<sup>3</sup>, Gaurav Misra<sup>4</sup>

### ABSTRACT

Fibreoptic intubation is an integral part of caring for patients in whom airway access is expected to be difficult. The purpose of our study was to compare the intubating conditions and hemodynamic response during fibreoptic intubation with two different concentrations of propofol and ketamine, ratio (1:1) in group 1 and (1:2) in group 2, used for optimization of fibreoptic intubation. Intubating conditions were scored on 1-3 grade based on coughing, swallowing, patient movement, laryngospasm, and ease of intubation. The level of sedation was determined by Ramsay Sedation Scale, grading from 1-6, with a target to achieve a score of 5 (patient exhibits sluggish response to light glabellar tap or loud auditory stimulus). Significantly, intubating conditions were better in group 1 and hemodynamic variation were less. The group 2 patients showed significant increase in pulse rate, blood pressure, excessive secretions and intubating conditions were inferior as compared to other group. We conclude acceptable intubating conditions with use of propofol and ketamine (1:1) and it may be used for fibreoptic intubation in difficult airway situations .

**Key words:** Fibreoptic intubation, propofol, ketamine

### INTRODUCTION

Fibreoptic intubation is an integral part of caring for patients in whom airway access is expected to be difficult and direct laryngoscopy is deemed difficult or unsafe. The techniques vary, depending on whether nasal or oral approach is used and patient is awake or anaesthetized. The goals of procedural sedation are to provide an adequate level of sedation to make the procedure tolerable, while minimizing pain and anxiety, maximizing amnesia, minimizing adverse drug related events and maintaining stable cardiovascular and respiratory status.

### METHOD

The study population included 70 premedicated adult patients aged 18-60 years, ASA I-II undergoing fibreoptic intubation. Exclusion criteria included patient's refusal, hypersensitivity to any study medication, patient having any cardio-respiratory illness or coagulopathy. Hospital Ethical Committee approval and informed written consent was obtained. A large

1.MD, Assistant Professor, Dept of Anaesthesiology, M.L.N. Medical College, Allahabad, India, 2.MD, Assistant Professor, Dept of Anaesthesiology, M.L.N. Medical College, Allahabad, India, 3.MD, Professor, M.L.N. Medical College, Allahabad, India, 4.Post graduate Student, M.L.N. Medical College, Allahabad, India.

**AFFILIATION:** Department of Anaesthesiology and Critical Care, M.L.N. Medical College, Allahabad, U.P, India .

**Corresponding Author:** Dr .Rajiv Gautam, 106 B/4A Galla Bazar Teliyarganj, Allahabad  
Mob. No. 08756043432. E-mail-discovery0099@gmail.com

bore intravenous canula was inserted for drug and continuous fluid administration. All the patients were premedicated with inj. glycopyrrolate 0.2 mg intramuscularly, 30 min prior to induction of anaesthesia. All the patients received inj. midazolam 1 mg intravenously (IV), alongwith vasoconstrictor nose drops before commencement of the procedure and 10% xylocaine spray in oral cavity. The patients were randomly assigned to one of the two groups, using a "slips of paper in a box" technique.

**Group 1:** A propofol/ketamine admixture was prepared by an assistant who was not involved in clinical management of study patients. According to a prestudy randomization schedule of study group assignment, a ketofol (1:1): propofol 8.33 mg/ml, ketamine 8.33 mg/ml by mixing 5 ml propofol 1% (10 mg/ml) with 1 ml ketamine (50 mg/ml) in Group 1.

**Group 2:** In group 2, Ketofol (1:2) : propofol 7.14 mg/ml, ketamine 14.28 mg/ml by mixing 5 ml propofol 1% (10mg/ml) with 2 ml ketamine (50 mg/ml) was given for sedation.

A bolus dose was given as 2mg/kg followed by a maintenance dose. The level of sedation was assessed at 1-3 minutes intervals , and the maintenance dose was adjusted to achieve Ramsay Sedation Scale of 5 before starting the procedure.

During the procedure patients were kept on

oxygen nasal prongs with Oxygen flow at 5 l/minute. All the patients were monitored with NIBP, electrocardiography (ECG), pulse oximetry (SpO<sub>2</sub>), heart rate (HR), and end tidal carbon dioxide (EtCO<sub>2</sub>), measured every 3 minutes. The measurement started before commencement of the intravenous line (IV) line and continued 5 minutes after successful intubation. The patients were also assessed for apnoea, which was defined as the loss of respiratory efforts for more than 20 seconds or fall of SpO<sub>2</sub> below 95%. Complaints of pain/discomfort were treated by an incremental increase in the study drug dose. Other adverse events including necessity for airway intervention, hypotension, hypoxia, myoclonus, seizure, rash, dysphoric emergence phenomenon (agitation,hallucination), vomiting were also noted.

The study drug was discontinued after successful intubation with reinforced endotracheal tube of appropriate size, and the total drug requirements were noted. The fiberoptic intubation was attempted by an experienced anaesthesiologist. Once intubation was complete and the endotracheal tube secured, general anaesthesia was administered and surgery was allowed to proceed.

Statistical analysis was performed using Microsoft Excel 2007 and statistical software plug in. Chi-square test and student t- test were used where appropriate to test the significance of data. A 'p' value of <0.05 was considered significant.

1: Demographic profile

	Group 1	Group 2	P value
Number of patients (n)	35	35	>0.05
Male: Female	14:21	15:20	>0.05
Age in years	38±9.35	38.17±7.60	>0.05
Weight (kg)	54.85±7.90	55.71±5.95	>0.05

Table 2: Scoring criteria for intubating conditions and score of patients

	Grades	Coughing			Swallowing			Movement			Laryngospasm			Ease of intubation		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Group 1	No	33	2	0	34	1	0	33	2	0	35	0	0	34	1	0
	1%	94.3	5.7	0	97.1	2.9	0	94.3	5.7	0	100	0	0	97.1	2.8	0
Group 2	No	29	6	0	32	3	0	27	8	0	35	0	0	28	7	0
	1%	82.9	17.1	0	91.4	8.6	0	77.1	22.9	0	100	0	0	80	20	0

Coughing 1-nil, 2-mild, 3-severe  
Swallowing 1-nil, 2-mild, 3-severe

Movement 1-nil, 2-mild, 3-severe

Laryngospasm 1-nil, 2-mild, 3-severe

Ease of intubation 1-easy, 2-difficult, 3-impossible

**RESULTS**

The two groups were similar regarding demographic profile (Table 1). There were no intergroup difference between baseline hemodynamic measurement and SpO<sub>2</sub> value. Intubation was successful in all the patients in group 1 and also in group 2.

Score obtained for each variable of intubating conditions alongwith the number of patients is shown in table 2. In group 1 the overall incidence of coughing, swallowing, patient movement was remarkably less as compared to group 2. There was no incidence of laaryngospasm in any of the group during the procedure. The overall ease of intubation was judged on a 3 point scale. The

intubation was easy in 34 of the patients in group 1, with difficulty only in 1 patient, whereas intubation was difficult in 7 patients in group 2 due to coughing, patient movement and excess secretion as compared to group 1.

Haemodynamic variables were comparable initially in both groups. There was a significant rise in blood pressure and pulse rate in group 2 after the start of the procedure, but no significant alteration in group 1. The SpO<sub>2</sub> values showed no significant difference between both the groups, during the procedure.

Discussion: Awake fibreoptic intubation is a technique used in patients with difficult airway. Controlled sedation and analgesia are paramount

to this technique, but deep sedation can result in loss of airway with severe consequences. Ovassapian<sup>1</sup> concluded that conscious sedation is desirable to make this procedure tolerable.

Our primary outcome measures were the endoscopy and intubation scores which quantified the patient tolerance of endoscopy and intubation: both were significantly improved with propofol and ketamine in the ratio 1:1.

The stability and safety of intravenous propofol/ketamine combination (ketofol) in a single syringe is already established and found to be physically compatible and chemically stable<sup>2</sup>. The sedative effects of propofol and ketamine have been found to be additive for anaesthesia induction<sup>3</sup>. The addition of low dose ketamine to propofol have been found to preserve MAP without prolonging recovery or incidence of adverse events<sup>4</sup>. The coadministration of propofol and low dose ketamine provides better LMA insertion conditions and during fiberoptic bronchoscopy as compared to fentanyl-propofol/propofol/alfentanil-propofol<sup>5,6</sup>. This combination also provides effective level of sedation with stable hemodynamics in pediatric patients undergoing upper gastrointestinal endoscopy<sup>7</sup>. William EV, Andolfatto G<sup>8</sup> had similar results showing ketofol (1:1), to be safe and effective for procedural sedation and analgesia, for painful procedures in the emergency department.

In conclusion our study has shown that addition of ketamine to propofol (1:1) provides better hemodynamics, acceptable intubating conditions, patients were more cooperative and comfortable when compared to the combination of propofol and ketamine(1:2)

## REFERENCES

1. Ovassapian A. Fiberoptic Endoscopy and the Difficult Airway, 2<sup>nd</sup> Edn. New York:

Lippincott-Raven, 1996.

2. Donnelly RF, Willman E, Andolfatto G. Stability of ketamine-propofol mixture for procedural sedation and analgesia in the Emergency Department. *Can J Hosp Pharm* 2008;61(6):426-430.
3. Hui TW, Short TG, Hong W, Suen T, Gin T, Plummer J. additive interactions between propofol and ketamine when used for anesthesia induction in female patients. *Anaesthesiology* 1995;82:641-48.
4. Akin A, Esmoğlu A, Guler G, et al. propofol and propofol-ketamine in pediatric patients undergoing cardiac catheterization. *Pediatr Cardiol.*2005;26:553-557.
5. Goh PK, Chiu CL, Wang CY et al. Randomized double-blind comparison of ketamine-propofol, fentanyl-propofol and propofol saline on hemodynamics and laryngeal mask airway insertion conditions. *Anaesth Intensive Care.* 2005;33:223-8
6. Hwang J, Jeon Y, Park H, et al. Comparison of alfentanil and ketamine in combination with propofol for patient-controlled sedation during fiberoptic bronchoscopy. *Acta Anaesth Scand.*2005;49:1334-1338.
7. Tosun Z, Aksu R, Guler G, et al. propofol-ketamine Vs propofol-fentanyl for sedation during pediatric upper gastrointestinal endoscopy. *Paediatr Anaesth.*2007;17:983-8.
8. William EV, Andolfatto G. A prospective evaluation of ketofol for procedural sedation and analgesia in the emergency department. *Ann Emerg Med.* 2007;49:23-30.

## CO-AMOXICLAV PROPHYLAXIS IN LSCS CAUSING ANAPHYLAXIS AND INTRAUTERINE FETAL DEATH

Prasoon Gupta<sup>1</sup>, Ranvinder Kaur<sup>2</sup>, Lalita Chaudhary<sup>3</sup>, Aruna Jain<sup>4</sup>

### ABSTRACT

Anaphylaxis is an uncommon event during pregnancy but if it does arise, it has a serious implication for both the mother and fetus. We are reporting a case of level 5/level 6 anaphylactic reaction to Co-amoxiclav (Amoxicillin and Clavulanic acid) which occurred in a term parturient in spite of a negative intra-dermal skin testing which ultimately led to intrauterine fetal death. In the post operative period, the mother required hemodynamic support and progressed to DIC. Aggressive and timely management spared the mother from serious morbidity. This case highlights that life threatening anaphylactic reaction can occur at any time during pregnancy and that all staff in a maternal unit should be prepared to promptly recognize and treat this condition.

**Key-words:** Anaphylaxis, ADR (adverse drug reaction), Pregnancy, Co-amoxiclav

### INTRODUCTION

Anaphylaxis is life threatening systemic allergic reaction which may present as "primary vascular

collapse without antecedent respiratory difficulty". This quotation from Austen's, describes exactly the presentation of our case.<sup>1</sup> We carried out the causality, severity and preventability of ADR as per Naranjo scale<sup>2</sup>, Hartwig scale<sup>3</sup> and Modified Schumock and Thornton scales<sup>4</sup> (Figure 1).

### CASE HISTORY

A 32 year primigravida with precious pregnancy was prepared for elective LSCS. In ward patient was tested for sensitivity to co-amoxiclav by intra-dermal skin testing, yielded negative result. Her pre-anaesthetic examination was insignificant. While the patient was prepared to be shifted to OT she was administered prophylactic dose of co-amoxiclav. Around 10-15 minutes after giving antibiotic, she started complaining of nausea and shivering with rashes and flushing. Her pulse was 125/min and BP was 80/60 mm of Hg. She was administered Inj adrenaline (1:10000)1ml i.v, Inj hydrocortisone 100 mg i.v & Inj chlorpheniramine 25mg i.v. Cardiotocograph revealed drop in fetal heart rate. She was immediately rushed to the emergency OT.

Patient was preoxygenated; inj ketamine 75mg and inj succinylcholine 75mg was given for

1. Prasoon Gupta, M.B.B.S, M.D, Senior Resident
2. Ranvinder Kaur, M.B.B.S, M.D, Associate Professor
3. Lalita Chaudhary, M.B.B.S, M.D, Professor
4. Aruna Jain, M.B.B.S, M.D, Dir Professor & Head

**Department-**department of Anaesthesiology & Critical Care

**Institute-**lady Hardinge Medical College & Smt. Sucheta Kriplani Hospital, New Delhi-110001, India

**Corresponding Author-** Dr. Prasoon Gupta

A-119, Raj Park, S.p Road, Nangloi, New Delhi-110086

Mob-9891571699, E Mail- dr.prasoon\_gupta@yahoo.com

intubation. Anaesthesia was maintained with O<sub>2</sub>+N<sub>2</sub>O (50:50), intermittent isoflurane and rocuronium. Inj fentanyl 50 µg given after delivery. Baby revealed absent heart sounds and respiration & finally declared dead. At the end of the surgery patient was reversed but soon she developed rising pulse rate, 150 beats /min and BP dropped to 80/50mm of Hg. Therefore, i.v fluids were made fast and Inj dopamine @5 µg/kg/min was started. She was shifted to the I.C.U where BP showed a falling trend. Dopamine infusion was slowly increased to 10µg/kg/min and dobutamine was added @5µg/kg/min. Blood samples for tryptase levels at 2, 4 and 24hours after I.C.U admission, were found to be raised (2hours - 140nmol/lit, at 4hours - 200nmol/lit and at 24hours - 15nmol/lit, normal value is <13.5nmol/lit). On day 2, the patient's BP began to stabilize and dopamine infusion was gradually reduced and dobutamine stopped. Clinically patient started to ooze from operated wound. Her biochemical investigations showed Hb-6.4gm%, TLC-30000/mm<sup>3</sup>, Platelet count 40000/mm<sup>3</sup>, LFT deranged, Blood urea-79 mg/dl, Serum creatinine-2.0 and INR-1.9. D-dimer was positive in 1:2 dilutions.

The temporal association of onset of symptoms to administration of co-amoxiclav and increased levels of serum tryptase confirmed that it was anaphylactic reaction and triggering agent was co-amoxiclav. Provisional diagnosis of anaphylactic shock with DIC was made. She was administered 6 units whole blood, 16 units FFP and 14 unit platelets over 96 hours. Patient's clinical, haematological and biochemical parameters began to improve. She was extubated on 5<sup>th</sup> day and subsequently discharged on 7<sup>th</sup> day.

### DISCUSSION

The lifetime prevalence of anaphylaxis in the general population is estimated as 0.05 to 2%.<sup>5</sup> Data regarding the prevalence among pregnant women is limited. Prevalence is estimated as 2.7

cases per 100,000 deliveries (0.002 to 0.004%) in women near or at the time of delivery in hospitals in Texas.<sup>6</sup>

Anaphylaxis is an uncommon event during pregnancy that can have serious implications for both mother and fetus. In obstetric population, hypotension with anaphylaxis has been associated with poor fetal outcome because asphyxia from maternal hypotension. Immune mediators are unlikely to harm the fetus, because IgE does not cross the placenta and also the maternal decidua catalyze deamination of histamine and related mediators.

One of the strategies employed to determine the predisposing factor for developing drug induced anaphylaxis is administration of test dose of the drug. In our patient although the test dose of co-amoxiclav was negative, patient developed anaphylaxis. A similar report has been cited earlier.<sup>7</sup>

The management of anaphylaxis in the pregnancy is essentially same as non pregnant state.<sup>8</sup> It consists of maternal resuscitation and close monitoring of the fetal status; with preparation for immediate delivery of fetus, if compromised. Treatment depends on the severity of the reaction and consists of fluid resuscitation, oxygen, epinephrine, H<sub>1</sub> and H<sub>2</sub> blockers, bronchodilators and corticosteroids.

The use of epinephrine in the obstetric population has raised concerns of decreasing utero-placental perfusion and worsening of fetal distress.<sup>9</sup> It has been suggested that vasoconstriction caused by epinephrine further compromise uterine blood flow during anaphylaxis and that ephedrine (25-50 mg) may be preferable because it improves cardiac output while sparing uterine blood flow. Furthermore, patients with anaphylaxis are prone to cardiac arrhythmias if intravenous epinephrine is used. Despite this fact, epinephrine has greater efficacy and efficiency in this situation and remains the

gold standard for treatment of anaphylaxis in the pregnancy. Epinephrine is used as 5-10 µg iv bolus (0.2µg/kg of 1:10000 solution) for hypotension and at 0.1-0.5mg iv doses in presence of cardiovascular collapse. Airway support with 100%O<sub>2</sub> increase oxygen delivery. Fluid replacement will compensate for peripheral vasodilatation. H<sub>1</sub> blocker (diphenhydramine), H<sub>2</sub> blockers (ranitidine), bronchodilators (albuterol and ipratropium nebulizers) and corticosteroid (hydrocortisone) should be given. Corticosteroids can decrease the airway swelling and prompt recurrence of symptoms. Epinephrine infusion (0.05-0.1 µg/kg/min in 1:10000) may be necessary to maintain blood pressure.<sup>10</sup>

In our case, the causality assessment revealed the ADR to be "probable" attributed to co-amoxiclav. The severity of ADR was found to be "Level 5/ Level 6" as the patient suffered intrauterine fetal death and required intensive medical care and the ADR was found to be "not preventable".

Amniotic fluid embolism may have same presentation with raised tryptase level. But it generally develops during delivery or immediate post partum period, diagnosed by finding fetal tissue in maternal blood at autopsy and mostly a diagnosis of exclusion.

FIGURE-1  
NARANJO ADR PROBABILITY SCALE

1. Are there previous conclusive reports on this reaction? Yes (+1) No (0) Don't know (0)
2. Did the adverse event appear after the suspected drug was administered? Yes (+2) No (-1) Don't know (0)
3. Did the adverse reaction improve when the drug was discontinued, or a specific antagonist was administered? Yes (+1) No (0) Don't know (0)
4. Did the adverse reaction reappear when the drug was re-administered? Yes (+2) No (-1) Don't know (0)
5. Are there alternative causes (other than the drug) that could on their own have caused the reaction? Yes (-1) No (+2) Don't know (0)
6. Did the reaction reappear when a placebo was given? Yes (-1) No (+1) Don't know (0)
7. Was the drug detected in the blood (or other fluids) in concentrations known to be toxic? Yes (+1) No (0) Don't know (0)
8. Was the reaction more severe when the dose increased, or less severe when dose was decreased? Yes (+1) No (0) Don't know (0)
9. Did the patient have a similar reaction to the same or similar drug in any previous exposure? Yes (+1) No (0) Don't know (0)
10. Was the adverse event confirmed by any objective evidence? Yes (+1) No (0) Don't know (0)
<b>Interpretation - &gt;9 = highly probable, 5-8 = probable, 1-4 = possible, 0 = doubtful</b>

To the best of our knowledge, this is first report of anaphylaxis to co-amoxiclav in pregnancy despite a negative skin testing. Since anaphylaxis

can occur with any drug, all members in maternal unit should be trained to identify and manage this emergency.

Hartwig Severity Assessment Scale

Level 1	An ADR occurred but required no change in treatment with the suspected drug.
Level 2	The ADR required that treatment with the suspected drug be held, discontinued, or otherwise changed. No antidote or other treatment requirement was required. No increase in length of stay (LOS)
Level 3	The ADR required that treatment with the suspected drug be held, discontinued, or otherwise changed. AND/OR An Antidote or other treatment was required. No increase in length of stay (LOS)
Level 4	Any level 3 ADR which increases length of stay by at least 1 day OR The ADR was the reason for the admission
Level 5	Any level 4 ADR which requires intensive medical care
Level 6	The adverse reaction caused permanent harm to the patient
Level 7	The adverse reaction either directly or indirectly led to the death of the patient

Modified Schumock and Thornton scales

Criteria for determining preventability of an ADR- answering yes to one or more implies ADR is preventable
1. Was there a history of allergy or previous reactions to the drug?
2. Was the drug involved inappropriate for the patient's clinical condition?
3. Was the dose, route or frequency of administration inappropriate for the patient's age, weight or disease state?
4. Was required therapeutic drug monitoring or other necessary laboratory tests not performed?
5. Was a drug interaction involved in ADR?
6. Was poor compliance involved in the ADR?
7. Was a toxic serum drug concentration (or laboratory monitoring test ) documented?

REFERENCES

- |   |   |
|---|---|
| <p>1 Austen KF. Systemic anaphylaxis in the human being. N Engl J Med 1974;291:661-664.</p> <p>2 Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I, Roberts EA et al. A method for estimating the probability of adverse drug reactions. Clin Pharmacol Ther 1981;30:239-245.</p> | <p>3 Hartwig SC, Siegel J, Schneider PJ. Preventability and severity assessment in reporting adverse drug reactions. Am J Hosp Pharm 1992; 49:2229-2232.</p> <p>4 Schumock GT, Thornton JP. Focussing on the preventability of adverse drug reactions. Hosp Pharm 1992; 27:538.</p> <p>5 Clark S, Camargo CA Jr. Epidemiology of anaphylaxis. Immunol Allergy Clin North Am 2007;27:145</p> |
|---|---|

- |  |   |
|--|---|
| <p>6 Mulla ZD, Ebrahim MS, Gonzalez JL. Anaphylaxis in the obstetric patient: analysis of a statewide hospital discharge database. Ann Allergy Asthma Immunol 2010;104:55</p> <p>7 Palaian S, Kishore PV, Mishra P. Co-Amoxiclav: A common antibiotic with an uncommon presentation of anaphylaxis - A rare case report. Pharmacologyonline1:6-10(2007)</p> <p>8 Heinly TH, Lieberman P. Anaphylaxis in Pregnancy. Immunol Aller Clin N Am 2000; Vol 20 No 4:831-838</p> | <p>9 Chaudhuri K, Gonzales J, Jesurun CA, Ambat MT, Mandal- Chaudhari S. Anaphylactic shock in pregnancy : a case study and review of the literature. Int J Obstet Anesth 2008 Oct;17(4):350-357</p> <p>10 Gei Alfredo F, Pacheco Luis D, Vanhook James, Hankins Gary D. The use of continuous infusion of epinephrine for anaphylactic shock during labour. Obst Gynaecol 2003;102:1332-1335</p> |
|--|---|

# A STUDY TO EVALUATE THE EFFICACY OF PROSEAL LARYNGEAL MASK AIRWAY AND LARYNGEAL TUBE SUCTION IN PATIENTS FOR SURGERY UNDER GENERAL ANAESTHESIA WITH CONTROLLED VENTILATION

Maninder Kaur<sup>1</sup>, Ruchi Gupta<sup>2</sup>, Kuljit Singh Auja<sup>3</sup>, Chiteshwar Walia<sup>4</sup>, Lakshmi Mahajan<sup>5</sup>, Nayyaamat K Sandhu<sup>6</sup>

## ABSTRACT

**Introduction:** Proseal Laryngeal Mask Airway (PLMA) and Laryngeal Tube Suction (LTS) are two supraglottic airway devices with provision of gastric drainage. We compared their efficacy under general anaesthesia with controlled ventilation. **Material & Methods:** 30 patients in each group A & B had either PLMA or LTS inserted. Primary outcome variables were insertion time, hands free anaesthesia and airway manipulations. Secondary outcome variables were assessment for hemodynamic & ventilatory parameters and incidence of complications. **Results:** Both groups were comparable for demographic data, ease of insertion and number of attempts. Evaluation of primary outcome parameters showed shorter mean insertion time,

no airway manipulations and better hands-free anaesthesia in group A (PLMA) versus group B (LTS) ( $p < 0.05$ ). The secondary outcome criteria of hemodynamic parameters were comparable between groups. The ventilatory variables (TV, EtCO<sub>2</sub>, peak airway pressures) were better in group A patients versus group B ( $p < 0.05$ ). There were increased cuff pressures ( $p < 0.05$ ), higher incidence of sore throat ( $p < 0.05$ ) and trauma ( $p > 0.05$ ) in group B. No patient aspirated in either group. **Conclusion:** The PLMA & LTS were comparable devices for airway management but PLMA usage provided superior ventilatory parameters and hands-free anaesthesia with no incidence of sore throat in patients versus LTS. **Keywords:** proseal laryngeal mask airway, laryngeal tube, airway manipulations, ventilatory parameters.

1. **MANINDER KAUR** : Junior Resident 3<sup>rd</sup> year, Department of Anaesthesia and Critical Care, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar
2. **RUCHI GUPTA** : MD, DNB, Professor and Head, Department of Anaesthesia and Critical Care, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar
3. **KULJIT SINGH AUJLA** : MD, Professor, Department of Anaesthesia and Critical Care, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar
4. **CHITESHWAR WALIA** : MD, Associate Professor, Department of Anaesthesia and Critical Care, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar
5. **LAKSHMI MAHAJAN** : MD, Assistant Professor, Department of Anaesthesia and Critical Care, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar
6. **NAYYAAMAT K SANDHU** : Junior Resident 3<sup>rd</sup> year, Department of Anaesthesia and Critical Care, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar

**Correspondence Address** – DR. MANINDER KAUR, 2, Roop Nagar, Garha Road, Jalandhar-144022. Punjab. Telephone No.: 09464632003. Email- riarmk@yahoo.co.in

## INTRODUCTION

Proseal Laryngeal Mask Airway (PLMA) and Laryngeal Tube-S (LTS) are two supraglottic devices which have become standard of care in cannot-intubate cannot-ventilate situations and advanced cardiac life support. Because of the gastric drainage tube, they are gaining popularity in a variety of surgeries, even when regurgitation can be a problem. Various studies have been conducted to compare these devices. While several studies have found the two devices comparable<sup>1-4</sup> others found one superior to the other<sup>5,6</sup>.

We conducted a prospective randomized study to evaluate the efficacy of the two devices. Primary outcome variable was hands-free anaesthesia. Secondary outcomes included assessment for insertion time, requirement of airway manipulations, hemodynamic & ventilatory parameters and the incidence of complications.

## MATERIAL & METHODS

Sixty ASA I and II patients aged 18-60 yrs of either sex scheduled for elective surgery under general anaesthesia with controlled ventilation were included in the study. They were randomly assigned (by computerized random number generation) to have either PLMA (group A; n=30) or LTS (group B; n=30) inserted. The sample size chosen was sufficient for this study based on previous literature taking into consideration drop-out rates. Ethical committee approval and written informed consent was obtained. Exclusion criteria were: morbid obesity with BMI  $\geq 40$ , pregnant patients, patients with active gastro-esophageal reflux, esophageal pathology, pulmonary pathology, ENT procedures, intraperitoneal surgical procedures, glottic or subglottic airway obstruction, mouth opening  $< 20$  mm and ASA physical status III, IV & V.

Anaesthetic management was standardized by

the following protocol: Premedication was given with intramuscular inj. glycopyrrolate 5-10mcg/kg & Inj. pentazocine 0.5mg/kg 45 min prior to surgery. After baseline vital sign monitoring in the operating room, the patient was preoxygenated for 3 minutes with 100% oxygen. Anaesthesia was induced with Inj. Propofol (2-3mg/kg) IV and Inj. succinylcholine (1-2mg/kg) IV.

Such device was inserted as per manufacturer's recommendations. Additionally, the following procedures were performed.

After deflation of the LTS cuff, a water-soluble lubricant was applied. Placing the patient in sniffing position, jaw thrust was used to assist airway placement in all cases. Following placement of the tip of LTS against the hard palate behind the upper incisors, the device was advanced in the centre of the mouth until resistance was felt. If no resistance was felt, the LTS was positioned with the second bold line on the tube between the upper and lower incisors. Using a cuff inflator (VBM, Germany), the cuff was inflated to an intracuff pressure of  $\leq 60$  cm H<sub>2</sub>O. The size was decided as per patient's height, "i.e.  $< 155$  cm - size 3; 155-180 cm - size 4."<sup>7</sup>

The PLMA was inserted using the introducer technique in all cases by applying water soluble lubricant and jaw thrust. Size 3 PLMA was used for females and size 4 for males.<sup>8</sup> The cuff was inflated using the same VBM cuff inflator as LTS upto intracuff pressure of  $\leq 60$  cm H<sub>2</sub>O.<sup>5</sup>

Patient evaluation was done on basis of primary and secondary outcome variables. Insertion time (time from jaw relaxation upto connection with anaesthetic circuit & checking of adequate ventilation) & number of insertion attempts were recorded. Assessment of ease of insertion was graded – easy, moderately difficult, difficult and impossible.

Adequacy of ventilation was assessed by

observing the movements of chest wall, minimum air leak in the neck, oxygen saturation, carbon dioxide concentration (square wave EtCO<sub>2</sub> graph) and ventilatory parameters (TV, EtCO<sub>2</sub>, peak airway pressures, cuff pressures). Above parameters along with pulse rate, blood pressure and respiratory rate (hand ventilation) were recorded. A well lubricated gastric tube (14 Fr G or 16Fr G) was passed in all patients. Anaesthesia was maintained using O<sub>2</sub>:N<sub>2</sub>O = 40:60, halothane-1 MAC and vecuronium- 0.08 mg/kg bolus & 0.02 mg/kg top-up as required by TOF monitoring. Positive low pressure ventilation was done. Intraoperatively, any airway obstruction, inadequate seal with large gas leak was managed by increasing the volume of air in the cuff or manipulation of patient's airway "i.e. chin lift, jaw thrust, turning the head, repositioning the airway device." These manipulations were graded as:

**Excellent** - Hands free anaesthesia-if no manipulation required.

**Good**-If these manipulations were required only initially.

**Fair**-If subsequent intraoperative manipulation required.

**Poor**-Manipulation required throughout the surgical procedure.

An inability to insert the device in 3 attempts, maintain oxygen saturation or raised carbon dioxide levels even after manipulation at any time during surgery and failure to pass a gastric tube was termed as failed insertion. This was followed by endotracheal intubation with an appropriate size tube. Reversal was given using inj. neostigmine (0.05mg/kg) IV and inj. glycopyrrolate (5-10mcg/kg) IV after completion of surgery. The device was removed when patient started obeying commands. After device removal, any blood was noted. Device tip & gastric pH was determined using pH paper & compared. If they

coincided, it was presumed that aspiration had occurred, patient observed for at least 72 hours postoperatively. Management on the lines of aspiration was done; taking a chest X-Ray, administration of intravenous antibiotics, steroids & bronchodilators. Any other complications occurring during insertion, maintenance, emergence or immediately postoperatively were recorded & treated. Before leaving the recovery room, any damage to oral structures was noted and patient observed for at least 24 hrs postoperatively.

An **Airway Assessment** of device was classified - **Excellent** - Easy insertion, no coughing/bucking, no additional airway manipulations required, device passed at 1<sup>st</sup> attempt.

**Good** - Moderately difficult insertion, coughing/bucking, for <30sec, slight airway manipulation required, up to 2 attempts required.

**Fair** - Difficult insertion, excessive coughing/bucking, significant airway manipulation, >2 attempts required.

**Poor** - Inability to insert the device, presence of laryngospasm or coughing, airway obstruction.

For judging the efficacy, if ≥ 3 criteria's were met, patient was considered in that particular grade; if <3 criteria's were met- patient was considered in a lower grade of classification.

The power of 0.99 and α error of 0.05 was calculated with primary analysis of power being done for hands free anaesthesia. Statistical analysis was done with student t-test for parametric data and Chi-square test for non-parametric data. Intragroup comparison was performed with paired t-test and intergroup with student t-test.

## RESULTS

Both groups were comparable with respect to

demographic data (age, sex, weight, type and duration of surgery) (Table 1). Evaluation of primary outcome showed significantly better hands free anaesthesia in group A (PLMA), as compared to group B (LTS) (p<0.05).

The secondary outcome criteria for efficacy in terms of hemodynamic parameters were comparable between the groups. Group A (PLMA) showed significantly shorter mean insertion time and no airway manipulations as compared to group B (LTS) (p<0.05) (Table 2). There were significantly lower expiratory tidal volumes and

higher peak airway pressures upto 75 minutes and higher EtCO<sub>2</sub> levels upto 45 minutes of device insertion with group B versus group A (p<0.05) (Figures 1, 2 & 3). There was higher incidence of sore throat (p<0.05) and trauma (p>0.05) in group B versus group A (Figure 5). The higher incidence of these complications correlated to the significantly higher cuff pressures seen with LTS as compared to PLMA (Figure 4). The device tip and gastric fluid pH were never same, thus indicating that there was no incidence of possible aspiration in any patient with either device.

Table 1

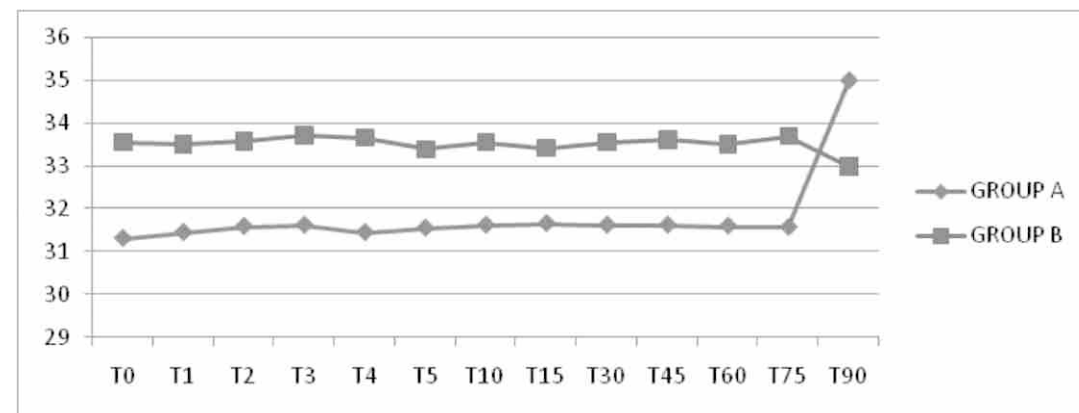
	Group A(PLMA); Group B(LTS)		
	n=29)	n=30)	p value
Age (years)	40.66 ± 14.598	43.9 ± 13.683	0.377
Weight (kg)	57.48 ± 8.572	61.10 ± 7.849	0.096
Height (cms)	155.31 ± 6.268	153.23 ± 6.135	0.204
Sex - male\ female	4\25	4\26	0.959
Duration of surgery (mins)	62.07 ± 19.66	58.17 ± 19.05	0.442
Dose of propofol (mg)	118.28 ± 16.49	123.67 ± 16.29	0.212

Table 2

	Group A(PLMA); Group B(LTS)		
	n=29)	n=30)	p value
Insertion time (sec)	13.98 ± 2.35	19.4 ± 3.33	<b>0.000</b>
Airway manipulations -			
Cuff inflation & Chin lift/jaw thrust	0	1	
Chin lift/jaw thrust	0	5	<b>0.04</b>
Hands free anesthesia- Ex\G\F\I\P	29\0\0\0	24\6\0\0	<b>0.011</b>
Airway assessment – Ex\G\F\I\P	28\1\0\0	27\3\0\0	0.317
Ease of insertion – E\MoD\DI	28\1\0\1	28\2\0\0	0.574
Number of attempts – 1\2\3	28\1\0	28\2\0	0.574

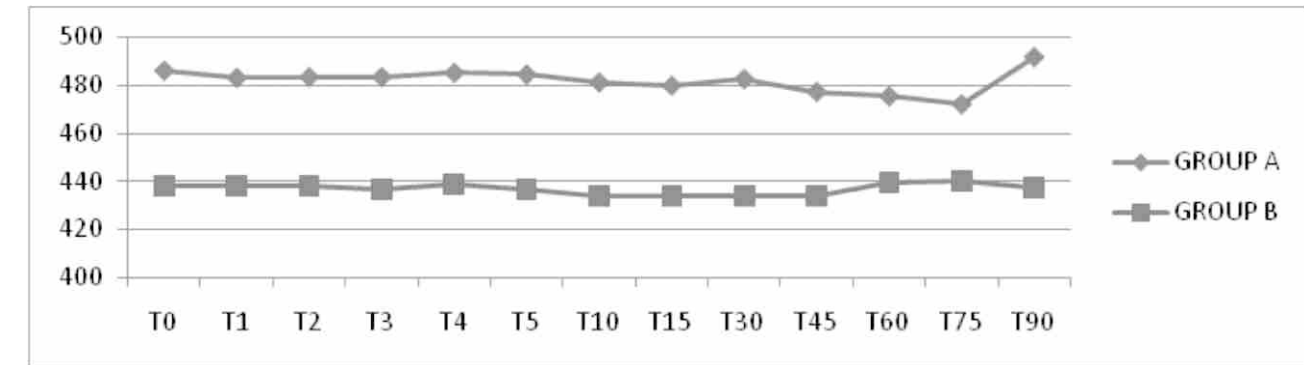
Ex-excellent, G-good, F-fair, P-poor;  
E- easy, MoD-moderately difficult, D-difficult, I-impossible

Figure 1: End tidal carbon dioxide in percentage



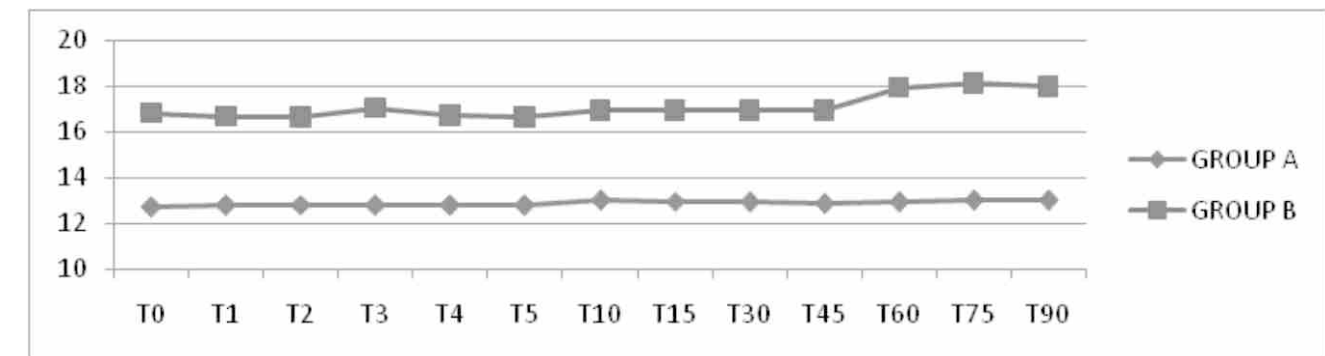
Group A- PLMA, Group B- LTS; T- time intervals in minutes

Figure 2: Expiratory tidal volume in ml



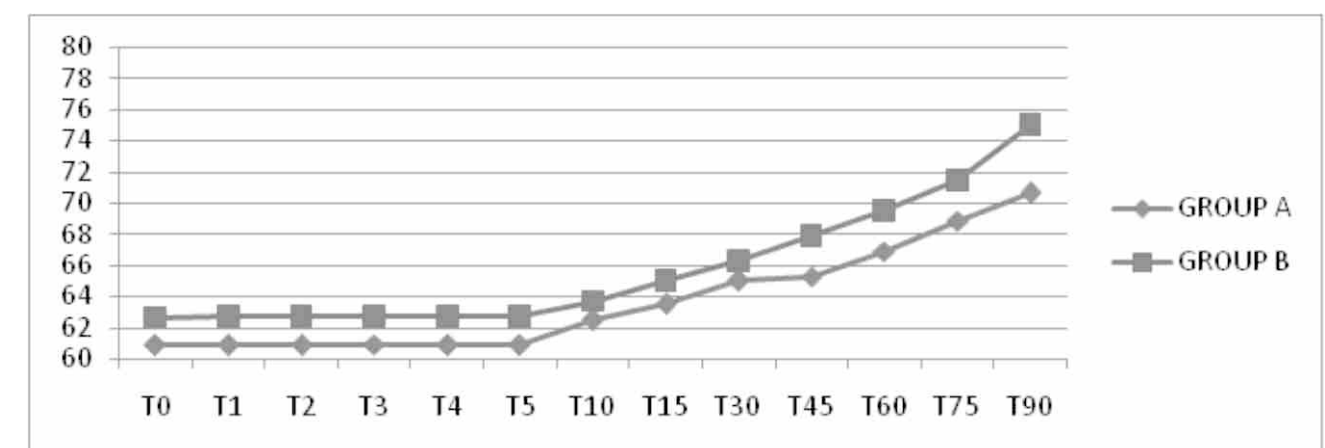
Group A- PLMA, Group B- LTS; T- time intervals in minutes

Figure 3: Peak airway pressures in cm of H2O



Group A- PLMA, Group B- LTS; T- time intervals in minutes

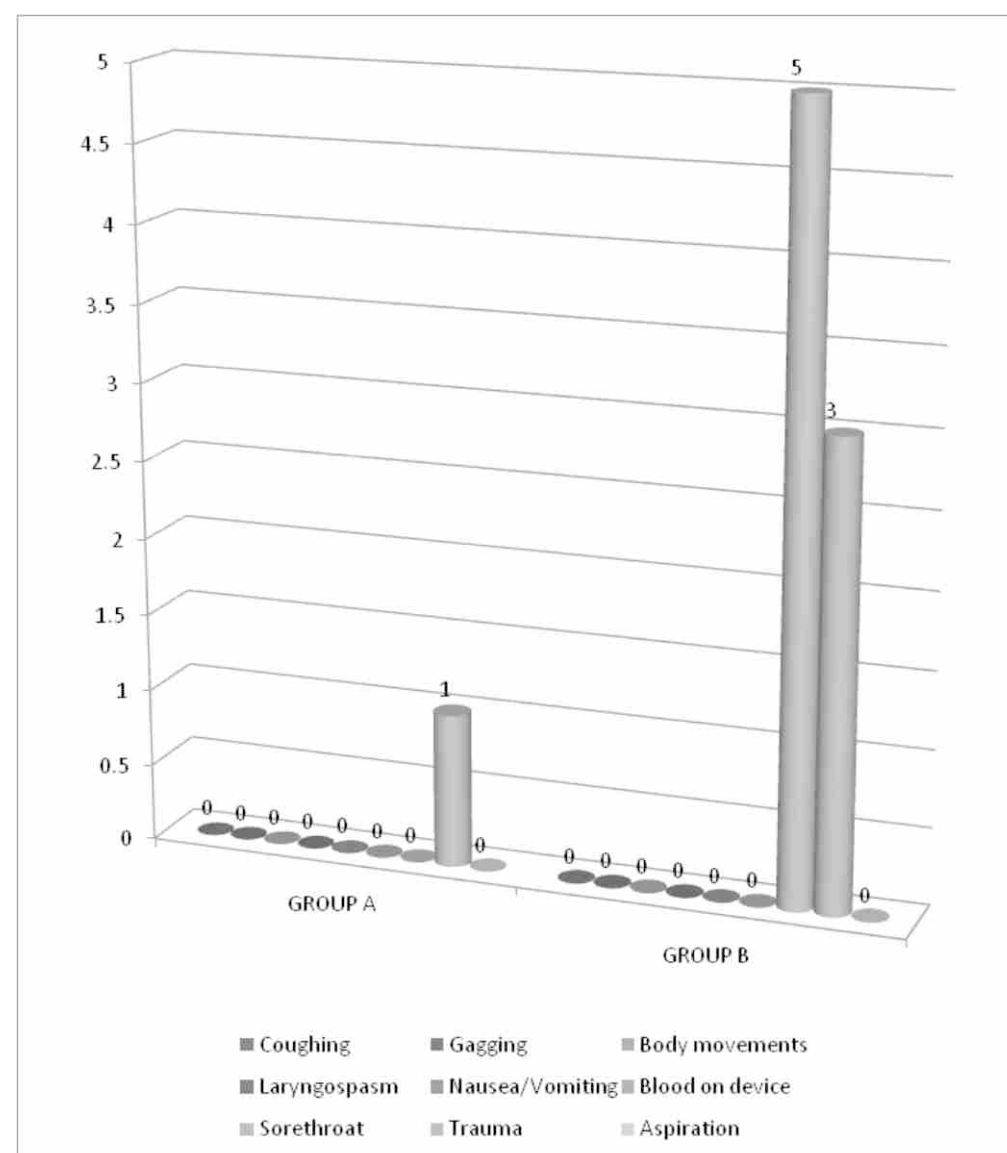
Figure 4: Cuff pressures in cm of H2O



Group A- PLMA, Group B- LTS; T- time intervals in minutes



Figure 5: Complications



Group A- PLMA, Group B- LTS

## DISCUSSION

The primary outcome variable of our study was hands free anaesthesia which was significantly better in group A (PLMA). The secondary outcome variables of our study were the assessment for insertion time, airway manipulations, hemodynamic & ventilatory parameters and the incidence of complications.

We found that the PLMA insertion was superior to LTS as it provided a shorter insertion time ( $p=0.000$ ). The shorter insertion time can depend upon various factors like use of introducer<sup>1,9</sup> and user experience<sup>4</sup>. Insertion of the PLMA with an introducer was easier and faster since it provided a preformed shape for negotiation of soft tissue, occupied less space than the finger, directed the

cuff around the oropharyngeal inlet and facilitated full depth of insertion.<sup>9</sup> Whereas with LTS, this resistance had to be negotiated solely by the advancing tip and the large oropharyngeal cuff could cause airway obstruction and delay in insertion.<sup>10</sup>

Similarly, airway manipulations and hands-free anaesthesia which go hand in, hand depend upon final position of device in situ, height of the patient and length of the neck. Our study showed significantly less insertion time and manipulations in group A compared to group B ( $p<0.05$ ). This could be because of the fact that the PLMA rested over the laryngeal inlet, whereas the distal end of LTS plugged the esophageal opening. Use of fiberoptic laryngoscope to confirm the position helps in reducing manipulations<sup>1,5,6</sup>, although not performed in this study.

Ease of insertion and number of attempts were comparable in both groups. There was one failure in the group A (PLMA) where endotracheal tube was inserted leading to exclusion of the case from statistical analysis. In this case, intubation was also possible only after two attempts by an expert, possibly signifying altered airway anatomy.

The better hemodynamic stability being one of the considerations for use of LMA vis-à-vis endotracheal tube<sup>5</sup>, but when we compared PLMA in relation to LTS, our results were similar.

As far as the ventilatory parameters such as expiratory tidal volumes, EtCO<sub>2</sub> levels & peak airway pressures were concerned; in contrast to previous observations by Cartensen et al<sup>11</sup> (2003), Klaver et al<sup>4</sup> (2007) and Cattano et al<sup>6</sup> (2012), we found PLMA performed better than LTS ( $p<0.05$ ); probably due to ventilatory inadequacy and smaller ventilation ports of LTS. However, the oxygen saturation and respiratory rate were comparable in the two groups. Consistent with our finding, Gaitini LA et al (2004) also found statistically significantly higher  $P_{peak}$

pressures with LTS versus PLMA (PLMA-  $19.4 \pm 6$  cm H<sub>2</sub>O, LTS-  $27.5 \pm 3$  cm H<sub>2</sub>O).<sup>1</sup> Cook et al had quoted that the initial success with the devices did not guarantee optimal ventilation under surgical conditions and the reliability of the PLMA was greater than the LTS.<sup>2</sup>

There was a highly significant rise in cuff pressure with time in both groups from baseline, but LTS always had significantly higher cuff pressures versus PLMA. Various complications had been quoted in the literature with PLMA and LTS usage.<sup>1,2,4,12-16</sup> In our study, the major side effect we encountered was sore throat in group B, which correlated well to significantly increased cuff pressures with the group.<sup>3,11,14</sup> The correlation between cuff pressures and sore throat have been reported by various studies [7-,19] and our study substantiated their results. They attributed it to be due to diffusion of nitrous oxide into the cuff and higher volumes required to inflate its two cuffs of LTS which matched the anatomical region where the cuff pressure of LTS exerted its effect (pharynx and hypopharynx). They have also reported poor relationship between intracuff pressure and pressure exerted on pharynx in case of PLMA versus LTS. The incidence of trauma was lower with group A versus group B ( $p>0.05$ ). The other complication being increased chances of aspiration, was not seen in our cases but Gaitini et al reported one such case due to malposition of PLMA.

## LIMITATIONS

Our study had a few limitations. Firstly, we did not confirm the position of the devices with use of a fiberscope and hence were unable to comment whether the difference in the insertion conditions and ventilatory parameters were due to malposition or any other reason. Secondly, we did not measure and compare the neck size of the patients, and thus, could not rule out a difference in the same to be the reason for variation in insertion and ventilation with the two devices in

our study. Thirdly, N<sub>2</sub>O was used in our study; in case air/oxygen was used, probably the cuff pressures would have been lower.

#### CONCLUSION

We conclude that both PLMA and LTS proved similar in airway management & hemodynamic parameters. However, PLMA was superior to LTS with respect to insertion time, airway manipulations and ventilatory parameters. Also, the incidence of complications was significantly lower with PLMA usage.

#### CONFLICTS OF INTEREST

The author(s) declare(s) that there is no conflict of interests regarding the publication of this article.

#### REFERENCES

1. Gaitini LA, Vaida SJ, Somri M, Yanovski B, Ben-David B, Hagberg CA. A randomized controlled trial comparing the proseal laryngeal mask airway with the laryngeal tube suction in mechanically ventilated patients. *Anesthesiology*. 2004;101(2):316-20.
2. Cook TM, Cranshaw J. Randomized crossover comparison of proseal laryngeal mask airway with laryngeal tube sonda during anaesthesia with controlled ventilation. *British Journal of Anaesthesia*. 2005;95(2):261-6.
3. Esa K, Azarinah I, Muhammad M, Helmi M A, Jaafar M Z. A comparison between laryngeal tube suction II airway and proseal laryngeal mask airway in laparoscopic surgery. *Medical Journal of Malaysia*. 2011;66(3):182-6.
4. Klaver N S, Kuizenga K, Ballast A, Fidler V. A comparison of clinical use of the laryngeal tube S and the proseal laryngeal mask airway by first-month anaesthesia residents in anaesthetized patients. *Anaesthesia*. 2007;62:723-7.

5. Bein B, Carstensen S, Gleim M, Claus L, Tonner PH, Steinfath M et al. A comparison of the proseal laryngeal mask airway, the laryngeal tube S and the oesophageal-tracheal combitube during routine surgical procedures. *European Journal of Anaesthesiology*. 2005;22(5):341-6.
6. Cattano D, Ferrario L, Patel C, Normand K, Seitan C, Hagberg CA. Laryngeal tube suction-D, combitube and proseal laryngeal mask airway: randomized clinical trial. *Journal of Anesthesiology and Clinical Science [Internet]*. 2012 [cited 2012 Aug 8];1:1-8. Available from: <http://www.hoajonline.com/jacs/2049-9752/1/8>.
7. VBM GmbH. Laryngeal tube sonda instructions. Sulz. Germany; 2000
8. Intavent Ltd. Laryngeal mask airway proseal instruction manual. Maidenhead, UK; 2002.
9. Brimacombe J, Keller C. The proseal laryngeal mask airway. A randomized crossover study with the standard laryngeal mask airway in paralyzed, anesthetized patients. *Anesthesiology*. 2000 Jul;93(1):104-9.
10. Khan SA, Khan RM, Siddiqui MMH. A better method of laryngeal tube insertion. *Anaesthesia*. 2003;58:614-5.
11. Carstensen S, Bein B, Claus L, Steinfath M, Dorges V. Proseal laryngeal mask airway and laryngeal tube S - modified airway devices for lung ventilation and gastric drainage. *Anesthesiology*. 2003;99:1257-61.
12. Gaitini LA., Vaida SJ, Somri M, Ben-David B, Hagberg C A. A randomized controlled trial comparing the proseal laryngeal mask airway with the sonda laryngeal tube in mechanically ventilated patients. *Anesthesiology*. 2002;96:1319-22.

13. Zand F, Amini A, Sadeghi SE, Gureishi M, Choledri A. A comparison of the laryngeal tube-S and proseal laryngeal mask during outpatient surgical procedures. *European Journal of Anaesthesiology*. 2007;24(10):847-51.
14. Roth H, Genzwuerker HV, Rothhaas A, Finteis T, Schmeck J. The proseal laryngeal mask airway and the laryngeal tube suction for ventilation in gynecological patients undergoing laparoscopic surgery. *European Journal of Anaesthesiology*. 2005;22(2):117-22.
15. Genzwuerker HV, Altmayer S, Hinkelbein J, Gernoth C, Viergutz T, Ocker H. Prospective randomized comparison of the new laryngeal tube suction LTS II and the LMA-proseal for elective surgical interventions. *Acta Anaesthesiologica Scandinavica*. 2007;51(10):1373-7.
16. Ueno M, Suzuki A, Takahata O, Iwasaki H. Comparison of laryngeal tube suction and the proseal laryngeal mask airway in anesthetized

patients. *Masui*. 2008 Sep;57(9):1131-5. [Japanese].

17. Keller C, Brimacombe J, Benzer A. Calculated vs. measured pharyngeal mucosal pressures with the laryngeal mask airway during cuff inflation: assessment of four locations. *British Journal of Anaesthesia*. 1999;82(3):399-401.
18. Brimacombe J, Keller C, Roth W, Loekinger A. Large cuff volumes impede posterior pharyngeal mucosal perfusion with the laryngeal tube airway. *Canadian Journal of Anesthesia*. 2002;49(10):1084-7.
19. Brimacombe J, Keller C, Puhlinger F. Pharyngeal mucosal pressure and perfusion. A fiber optic evaluation of the posterior pharynx in anesthetized adult patients with a modified cuffed oropharyngeal airway. *Anesthesiology*. 1999;91:1661-5.

# A COMPARATIVE STUDY OF THE EFFECTS OF EPIDURAL BUPIVACAINE AND BUPIVACAINE – FENTANYL MIXTURE IN LOWER ABDOMINAL SURGERY

Geeta Karki<sup>1</sup>, Lalit Singh<sup>2</sup>, S Moied Ahmed<sup>3</sup>

## ABSTRACT

Combination of epidural opioids with local anaesthetics to improve the quality of epidural anaesthesia and duration of analgesia in the immediate postoperative period is a subject of extensive study. This method is very useful because addition of opioids does not cause an increase in side effects while improving the quality of analgesia. We evaluated in this prospective randomized double blind study the effect of 100 µg of fentanyl added to 20 ml of 0.5% bupivacaine plain with respect to the onset of sensory block, hemodynamic stability, quality of analgesia, mean duration of postoperative analgesia and incidence of side effects, if any. Sixty ASA I-II patients aged between 18 – 65 yrs scheduled for elective surgery under epidural anaesthesia were divided into two groups. Patients were randomly allocated to receive either 100µg fentanyl ( Group I, n = 30 ) or 2 ml of normal saline ( Group II, n= 30 ) combined with 20 ml of 0.5% bupivacaine plain. Epidural anaesthesia was given in sitting position

in L<sub>4-5</sub> space. Time of onset and highest level of sensory block was assessed using pin prick test, motor block was assessed by modified Bromage scale and quality of analgesia by VAS ( Visual analogue scale ). In group I there was faster onset of sensory block, better hemodynamic stability and quality of analgesia and longer mean duration of analgesia than group II. The incidence of side effects was higher in group I but not clinically significant.

**Key Words** : Epidural , Fentanyl , Bupivacaine , Analgesia

## INTRODUCTION

John Milton complained in 'Paradise lost', "Pain is perfect misery, the worst of all evils". The same feeling is being uttered by human beings since ages, for pain is as old as mankind, and can be even older. There are ample reasons to believe that it is inherent to life. Apart from its humanitarian aspect, there are therapeutic values of pain relief specially in post-operative period.

International Association for study of pain has defined pain as an "unpleasant sensory and emotional experience associated with actual or potential damage or described in terms of such damage".

Epidural anaesthesia is a central neuraxial block technique with many applications. Improvements in equipment, drugs and technique have made it a popular and versatile anaesthetic technique, with applications in surgery, obstetrics and pain control. Both single injection and catheter techniques can be used. Single shot epidural, without the use of a catheter, is still widely used in various settings, and is effective in providing intraoperative anaesthesia and analgesia in the immediate post-operative period. The major disadvantage of single shot epidurals is that the duration of post-operative analgesia is limited to the duration of action of the drug given and cannot be topped up. The most commonly used local anaesthetics are lignocaine 2% or bupivacaine 0.5%. The former has a faster onset but shorter duration and the latter has a slower onset and longer duration.

In clinical practice the ideal local anaesthetic should combine rapid onset and a long duration of action<sup>1</sup>. At present, no anaesthetic agent has such characteristics, but there have been numerous studies of the effects of mixtures of different anaesthetic solutions in an attempt to combine the two properties<sup>2</sup>. The effects of the association of an opioid with a local anaesthetic in extradural have been investigated little, or without control studies<sup>3</sup>. The addition of opioids to local anaesthetic solutions has gained popularity; as the opioids have a synergistic effect by acting directly on opioid receptors in the spinal cord<sup>4</sup>.

Relief of pain during surgery is the primary aim and most important component of balanced anaesthesia. Adequate pain relief in post-operative period has always been a problem. Pain is severe on the first day after surgery and

diminished over the next 24 hours and is minimal afterwards. The main aim is to ensure that the patient gets relief at the appropriate time<sup>5</sup>.

More recently, the role of extradural opioids has been investigated in enhancing the analgesic effect of local anaesthetics. Because of its rapid onset of action and lipid solubility, which theoretically reduces rostral spread in cerebrospinal fluid, fentanyl is considered to be a suitable opioid for extradural administration.

In this study, our aim was to compare epidural bupivacaine alone and bupivacaine-fentanyl mixture with respect to onset of anaesthesia, segmental spread, hemodynamic changes, duration of analgesia and incidence of side effects.

## METHODS

After approval of ethics committee a written informed consent was taken. Sixty patients of ASA grade I & II , 18 to 65 yrs of age ,of either sex, undergoing elective lower abdominal surgery under epidural anaesthesia were included in the study. The patients were randomly divided into 2 groups :Group I ( n = 30 ) received 100 µg fentanyl with 20 ml 0.5% bupivacaine plain and Group II ( n = 30 ) received 2 ml normal saline with 20 ml 0.5 % bupivacaine plain .Patients under 18 years and above 65 years , ASA physical status 3 or higher , with known hypersensitivity to opioids, contraindication for epidural anaesthesia ,any bleeding disorder ,uncontrolled diabetes, hypertension, ischemic heart disease and significant respiratory disease and those who refused for epidural were excluded from the study. After the standard monitors were placed and intravenous access was established patients were preloaded with 10 ml/kg lactated Ringer's solution. Following all aseptic precautions, 2% lignocaine was infiltrated into the space in which the anaesthetic was to be given. Epidural anaesthesia was given in sitting position in L<sub>3-4</sub>

a) Highest academic qualification and institutional affiliation

1. DNB, Assistant Professor
2. MD , Associate Professor
3. MD, Professor

b) Department

1. Department of Anaesthesia, SRMS IMS
2. Department of Pulmonary Medicine, SRMS IMS
3. Department of Anaesthesia, JN Medical College, AMU

c) Corresponding Author

Name : Dr. Geeta Karki

Address : Flat no A-21, Doctor's Residence, SRMS IMS, Bhojipura, Bareilly, UP-243202

space through midline approach with a 18 G Tuohy epidural needle. Epidural space was identified by "loss of resistance" technique. Aspiration test for CSF and blood was done. After giving a test dose of 3 ml of lignocaine with adrenaline and looking for the effect, total dose of 20 ml of Bupivacaine 0.5% was slowly given with intermittent aspiration. After adequate level of blockade was achieved, the surgery was performed under epidural anaesthesia with sedation (Injection Midazolam 1 mg i.v.). heart rate, blood pressure, Spo<sub>2</sub> respiratory rate were monitored continuously. Sensory level was assessed with pinprick and motor block with Bromage scale. Duration of analgesia was assessed by the time of appearance of pain (VAS = 4 or more) and demand for analgesic in the postoperative period. Incidence of side effects if any, like – nausea, vomiting, voiding difficulty, pruritis, backache, hypoxia etc were also recorded.

Data are presented as mean and standard deviation. The statistical analysis was performed using SPSS version 20. Analysis of demographic data was done by Chi-square test and for quantitative data paired t-test was used. A "p" value of less than 0.05 was considered statistically significant.

## RESULTS

As shown in Figure 1 and 2, there was no significant difference between the study groups regarding mean age, height, weight, sex and type of surgery ( $p > 0.05$ ).

As shown in Figure 3, in both the groups heart rate, systolic blood pressure (SBP), diastolic blood pressure (DBP) and oxygen saturation were comparable preoperatively ( $p > 0.05$ ). Figure 4 shows the time taken for sensory blockade at different dermatomal levels. The mean time taken for attaining sensory blockade to T6 level in the fentanyl group was  $12.71 \pm 2.29$

minutes which was faster than the mean time taken for onset of sensory blockade in the control group which was  $20.33 \pm 1.87$  minutes. Table 1 shows the changes in heart rate. It was seen that upto 45 minutes post-induction, mean heart rate in study group was significantly higher as compared to control group. Although the mean value of HR in study group was higher as compared to control group at 60 and 90 minutes too, but the difference was not significant statistically (Figure 4). Table 2 (Figure 5) shows the changes in systolic blood pressure (SBP) in the two groups. Statistically significant differences between two groups was seen from 10 minutes post induction till 45 minutes post induction with study group showing significantly higher SBP as compared to control group ( $p < 0.05$ ). However, at 1 min and 5 min post induction and at 60 minutes till the end of study no significant difference between two groups was seen ( $p > 0.05$ ). Table 3 (Figure 6) shows changes in diastolic blood pressure (DBP). Statistically no significant difference between two groups was seen at 1 min, 5 min, 10 min, 45 min and 60 minutes post-induction respectively though the mean value of study group was higher at all the times. At 15 min, 20 min, 30 min and 90 min post induction, the mean value of study group was significantly higher as compared to control group ( $p < 0.05$ ). Hemodynamic stability was thus better maintained in the fentanyl group than the control group in which there was a fall in the heart rate, systolic and diastolic blood pressure. Table 4 shows the VAS score. At 0 minutes, there was no significant difference in pain score (VAS) in two groups ( $p = 0.161$ ), however from 30 minutes onwards, control group had significantly higher VAS score as compared to study group ( $p < 0.001$ ). The quality of analgesia as evident from the VAS score was better in the fentanyl group than in the control group. The mean VAS at 2 hrs postoperatively in the fentanyl group was  $2.13 \pm 1.11$  which was lower than the mean VAS in the control group which was  $5.60 \pm 1.54$ . Table 5

shows the mean time for demand of analgesia in postoperative period. The mean duration of analgesia in the postoperative period in the fentanyl group was  $8.07 \pm 1.66$  hours which was longer than the mean duration of post-operative analgesia in the control group which was  $3.82 \pm 1.07$  hours. Table 6 shows the incidence of side effects. The incidence of side effects in the study group was higher than in the control group but not clinically significant ( $p > 0.05$ ).

## DISCUSSION

Use of epidural opioids with local anaesthetics to improve the quality of anaesthesia and to prolong the duration of analgesia in the immediate postoperative period is a subject of extensive study. This method is of great use because the addition of opioids does not cause an increase in the incidence of side effects while improving the quality of analgesia. The present study was undertaken to evaluate the efficacy of adding fentanyl to epidural bupivacaine plain 0.5% for epidural anaesthesia in lower abdominal surgery. The desired level of sensory blockade for surgical anaesthesia was T-6. The mean time taken for sensory blockade upto T-6 in control group was  $20.33 \pm 1.87$  min and in study group was  $12.71 \pm 2.29$  min which is comparable to results of other studies conducted in past. Young IK Jang *et al.*<sup>6</sup> observed that mean time for sensory loss upto T-6 in control group was  $17.6 \pm 1.6$  min and in fentanyl group was  $8.1 \pm 1.1$  min.

Christelis N *et al.*<sup>7</sup> observed that time taken for sensory loss upto T-6 in fentanyl group was  $14.7 \pm 9.1$  min.

Heart rate, blood pressure and SpO<sub>2</sub> was observed every 5 min for 20 minutes, every 15 minutes for upto 1 hour and then every 30 minutes till end of surgery. At all times, the mean heart rate was higher in the study group than in control group but the difference was not statistically significant ( $p > 0.05$ ). In the study group, the systolic blood

pressure was maintained near to the baseline value, whereas in the control group there was a significant fall in systolic blood pressure at 10 minutes post induction till 45 minutes after induction ( $p < 0.05$ ). However, at the end of study (90 min) there was no significant difference between two groups ( $p > 0.05$ ). In the study group, the diastolic blood pressure was maintained near to the baseline value throughout the study period, whereas in the control group there was significant fall in diastolic blood pressure at 15 minutes post induction till 45 minutes ( $p < 0.05$ ). The above observations show that the hemodynamic stability was better maintained in the study group than in the control group which is comparable to the results of Christelis N *et al.*<sup>7</sup>, Rucci FS *et al.*<sup>3</sup> and Prakash S *et al.*<sup>8</sup> Christelis N *et al.*<sup>7</sup> observed that the patients were hemodynamically more stable in the study group than in control group. Rucci FS *et al.*<sup>3</sup> observed that the patients in fentanyl group showed fewer instances of acute hypotension than the control group. Prakash S *et al.*<sup>8</sup> observed that pulse rate and blood pressure remained stable in all patients given epidural bupivacaine with fentanyl for labour analgesia.

Post operative pain is a dynamic event which is dependent on multiple factors like the type of surgery, the psychological state of patient, sex of patient, etc. Visual Analogue Score (VAS) is an effective measure of post-operative pain. In the present study, the quality of analgesia in the postoperative period was assessed by using the Visual Analogue Scale (VAS) in the two groups.

The mean VAS at 120 minutes in the control group was  $5.60 \pm 1.54$  and in the study group was  $2.13 \pm 1.11$ . From 30 minutes to 120 minutes postoperatively, the VAS was lower in the study group than in the control group ( $p < 0.001$ ) which is suggestive of a better quality of analgesia in the study group than the control group. The observation in the present study of a better quality

of analgesia in the study group than in the control group is comparable to that of various studies conducted in the past. Tekin S *et al.*<sup>9</sup> observed that in the postoperative period after abdominal hysterectomy, the Visual Analogue Scale (VAS) scores were lower in the fentanyl group than in the control group ( $p < 0.05$ ). Helbo Hansen *et al.*<sup>10</sup> observed that quality of analgesia was improved in the fentanyl group ( $p < 0.05$ ). Halonen PM *et al.*<sup>11</sup> observed that patients in fentanyl group had significantly less pain than the control group ( $p = 0.0256$ ).

The mean time taken for analgesic demand in the control group was  $3.82 \pm 1.07$  hours and that in the

study group was  $8.07 \pm 1.66$  hours, which is comparable to the results of Helbo Hansen *et al.*<sup>10</sup>, Halonen PM *et al.*<sup>11</sup> and Cohen SE *et al.*<sup>12</sup> Helbo Hansen *et al.*<sup>10</sup> observed that the time to first supplemental analgesic request was 6 hours in the fentanyl group which was significantly prolonged than the control group ( $p < 0.05$ ). Halonen PM *et al.*<sup>11</sup> observed that the postoperative time until treatment for pain requested by the patients was longer in fentanyl group than in control group ( $p < 0.01$ ). Cohen SE *et al.*<sup>12</sup> observed that duration of analgesia was significantly prolonged after epidural fentanyl with bupivacaine ( $p < 0.05$ ).

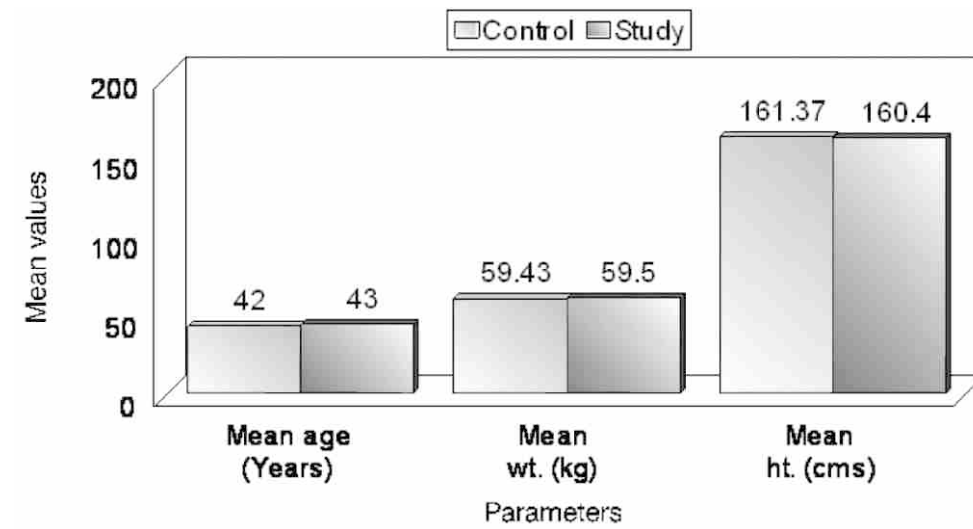


Figure 1. Comparison of demographic profile of patients

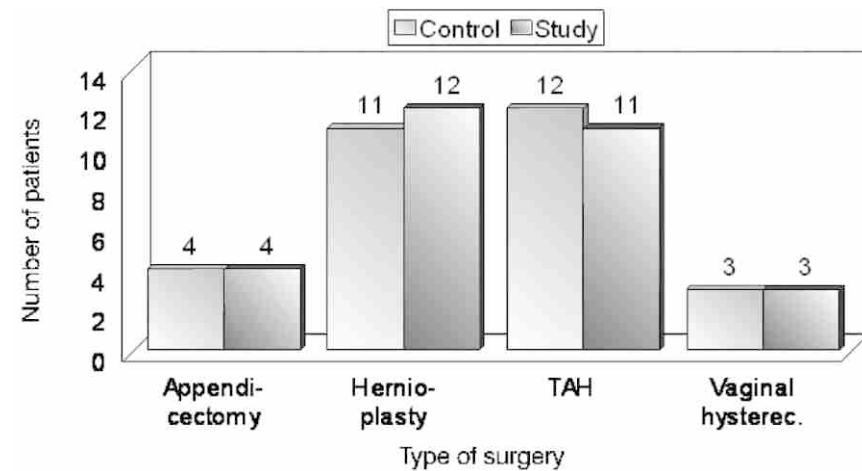


Figure 2. Comparison of the type of surgery in the two groups.

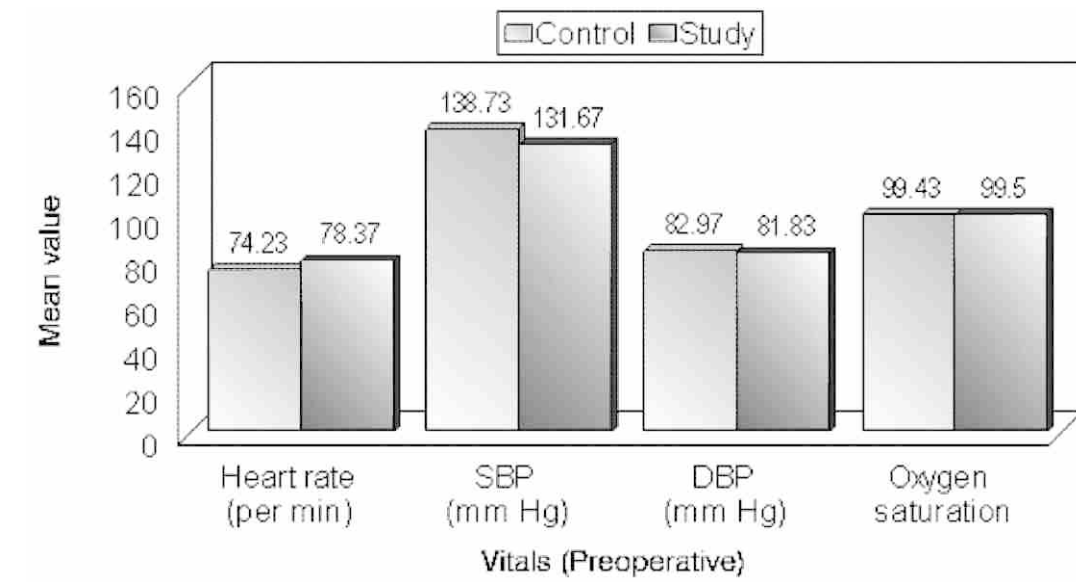


Figure 3. Baseline vitals.

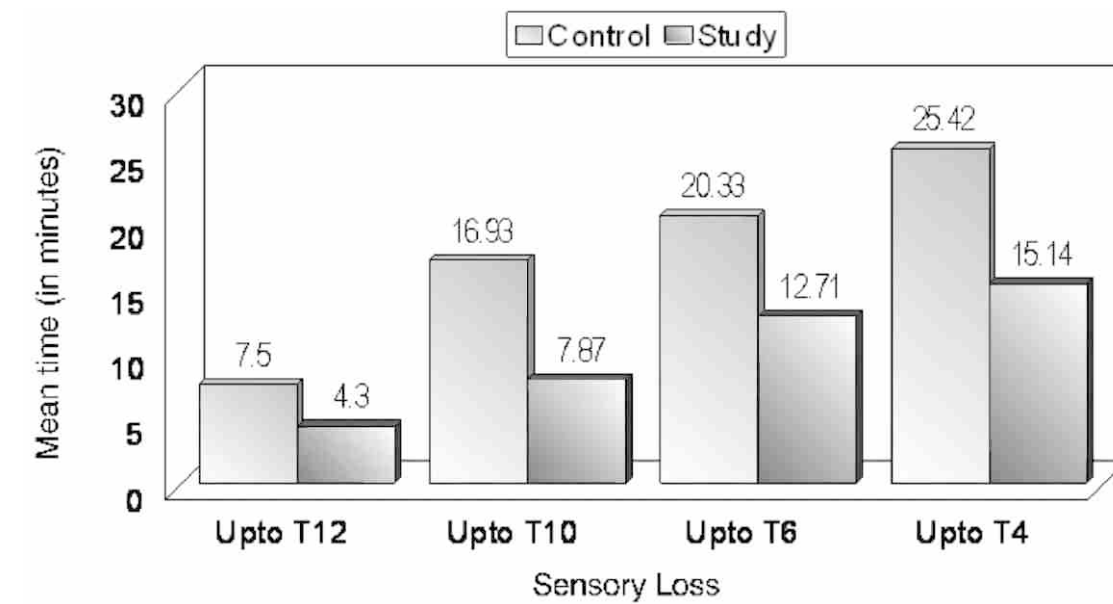


Figure 4. Time taken for sensory blockade

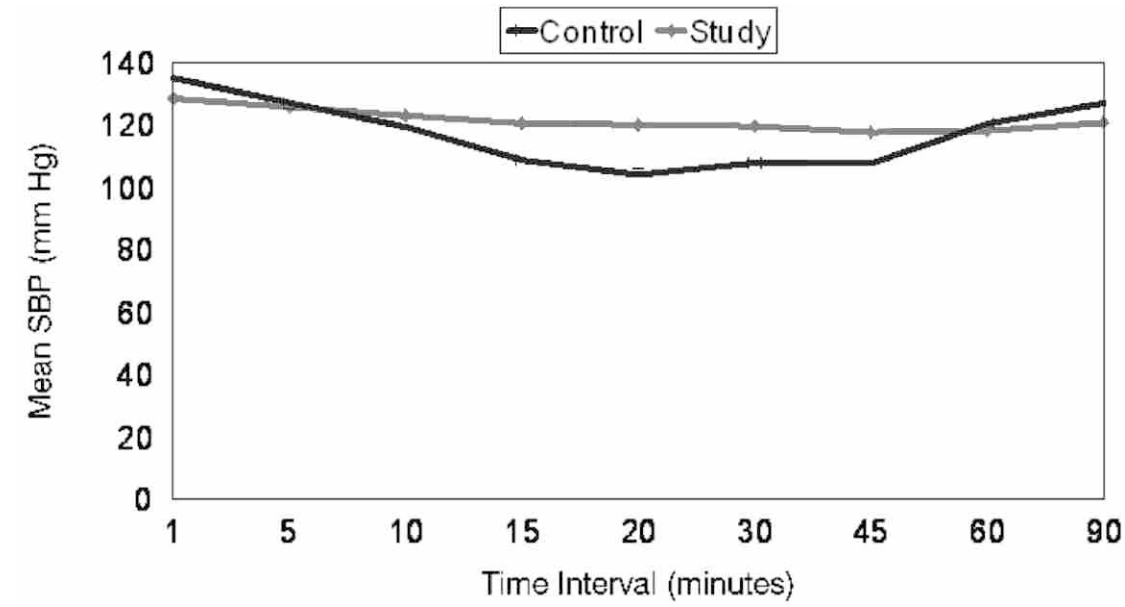


Figure 5. Comparison of SBP

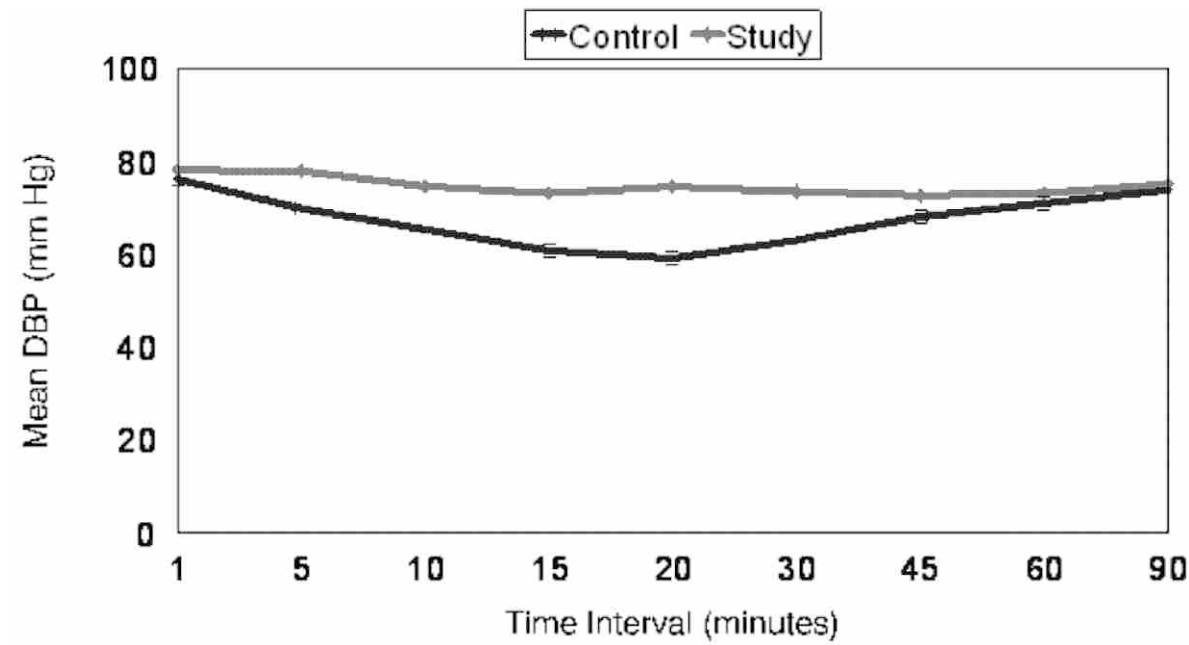


Figure 6. Comparison of DBP

Table 1: Comparison of Heart Rate in two groups at different time intervals

S.No.	Time interval	Control (n=30)	Study (n=30)	t	"p"
1.	1 min	73.20±10.42	86.53±14.29	-4.129	<0.001
2.	5 min	71.37±8.68	83.63±13.60	-4.164	<0.001
3.	10 min	68.87±8.96	80.40±12.98	-4.006	<0.001
4.	15 min	64.97±10.07	78.43±14.60	-4.158	<0.001
5.	20 min	64.00±9.04	77.27±14.43	-4.267	<0.001
6.	30 min	65.33±8.16	74.93±13.65	-3.308	0.002
7.	45 min	68.00±7.57	74.80±12.02	-2.622	0.011
8.	60 min	69.23±7.48	73.80±12.32	-1.735	0.088
9.	90 min	72.33±7.91	75.27±11.66	-1.140	0.259

Table 2: Comparison of Systolic blood pressure (SBP) in two groups at different time intervals

S.No.	Time interval	Control (n=30)	Study (n=30)	t	"p"
1.	1 min	134.87±15.25	128.40±17.84	1.509	0.137
2.	5 min	127.03±13.80	125.67±18.75	-0.611	0.543
3.	10 min	119.23±14.21	122.97±19.75	-2.799	0.007
4.	15 min	108.57±12.33	120.37±18.62	-3.020	0.004
5.	20 min	103.90±13.10	119.97±19.08	-4.506	<0.001
6.	30 min	107.63±16.68	119.50±14.56	-6.422	<0.001
7.	45 min	107.53±29.10	117.50±13.17	-4.086	<0.001
8.	60 min	120.27±12.17	118.00±12.38	-1.606	0.119
9.	90 min	126.93±10.62	120.63±11.04	-1.018	0.313

Table 3: Comparison of Diastolic blood pressure (DBP) in two groups at different time intervals

S.No.	Time interval	Mean±SD			
		Control (n=30)	Study (n=30)	t	"p"
1.	1 min	76.10±13.47	78.10±11.81	-0.611	0.543
2.	5 min	69.83±11.09	77.87±11.14	0.322	0.749
3.	10 min	65.30±10.57	74.63±13.22	-0.840	0.405
4.	15 min	60.80±7.62	73.10±12.86	-2.894	0.006
5.	20 min	59.13±6.89	74.53±11.18	-3.803	0.000
6.	30 min	63.03±8.31	73.53±11.36	-2.936	0.005
7.	45 min	68.07±9.15	72.63±10.94	-1.709	0.095
8.	60 min	70.93±7.18	73.17±9.64	0.715	0.477
9.	90 min	73.83±5.88	75.10±8.60	2.253	0.028

Table 4: Pain Score (VAS) in two groups

S.No.	Time interval	Mean±SD			
		Control (n=30)	Study (n=30)	t	"p"
1.	0 min	0.70±0.75	0.00±0.00	1.439	0.161
2.	30 min	1.67±0.76	0.00±0.00	5.114	<0.001
3.	60 min	3.33±1.03	0.60±0.81	12.042	<0.001
4.	120 min	5.60±1.54	2.13±1.11	11.417	<0.001

Table 5: Time taken for Demand of Analgesia (hr)

S.No.	Group	Mean Time	SD
1.	Control	3.82	1.07
2.	Study	8.07	1.66

t=11.787; p<0.001

Table 6 : Side Effects

S.No.	Side Effect	Control		Study		Statistical Significance	
		No.	%	No.	%	$\chi^2$	P
1.	No side effect	23	76.7	22	73.3	3.590	0.058
2.	Bradycardia	0	0	0	0	—	—
3.	Hypotension	7	23.3	0	0	7.925	0.005
4.	Nausea/Vomiting	0	0	2	6.7	2.069	0.150
5.	Pruritis	0	0	3	10	3.158	0.076
6.	Urinary retention	0	0	3	10	3.158	0.076

The incidence of side effects was higher in the study group as compared to the control group, but not statistically significant ( $p > 0.05$ ). All the seven patients showing any side effect in control group had hypotension. In the study group, 2 (6.7%) patients had nausea/vomiting and 3 (10%) patients each had pruritis and urinary retention. These observations are comparable to the results of various authors. Milon D *et al.*<sup>14</sup> reported that fentanyl never induced any significant hemodynamic variations. Pruritis and nausea occurred but were not statistically significant. P.M. Halonen<sup>11</sup> observed that mild pruritis not requiring treatment was more common in fentanyl group than the control group ( $p=0.0187$ ) but not statistically significant. Torda TA *et al.*<sup>14</sup> observed that pruritis and nausea/vomiting was observed in the fentanyl group but there was no statistical difference from the control group.

#### CONCLUSION

Single shot epidural block is a widely used technique for lower abdominal and lower limb surgeries. Its advantage is that it provides intraoperative anaesthesia and analgesia in the immediate postoperative period. The use of local anaesthetics alone for epidural block is characterized by its limited duration of action. Adding adjuvants to local anaesthetics is a widely used method to prolong the duration of analgesia. It can be concluded from the present study that addition of 100 µg fentanyl to 0.5% bupivacaine for epidural block is beneficial in terms of faster onset, hemodynamic stability, improved quality of analgesia and prolonged duration of analgesia in the immediate postoperative period without any increase in side effects.

#### REFERENCES

1. Cunnigham NL and Kaplan JA. A rapid onset, long acting regional anesthetic technique. *Anesthesiology*, 1974; 41(5): 509-11.

2. Brodsky JB and Brock-Utne JG. Mixing local anaesthetics. *Br J Anaesth.* 1978;50( 12), :1269.
3. Rucci FS, Cardamone M and Migliori P. Fentanyl and bupivacaine mixtures for extradural blockade. *Br J Anaesth.* 1985;57(3): 275-84.
4. Cousins MJ, Mather LE. Intrathecal and epidural administration of opioids. *Anesthesiology* 1984; 61(3): 276-310.
5. Jaishri Bogra, Nikhil Kothari, Chaudhary AK. Comparison between extradural bupivacaine and bupivacaine-fentanyl mixture for post-operative pain relief in abdominal surgery. *Indian J Pain* 2008; 22: 171-4.
6. Young IK Jang, You Taek Shim, Young Jin Han, Huhn Choe: The influence of fentanyl on the action of epidural bupivacaine. *Korean Journal of Anesthesiology* 1989; 3: 431-6.
7. Christelis N, Harrad J, Howell PR. A comparison of epidural ropivacaine 0.75% and bupivacaine 0.5% with fentanyl for elective caesarean section. *Int J Obstet Anesth.* 2005; 14: 212-18.
8. Prakash S, Rastogi V, Mishra LD, Jain A. Comparison of epidural bupivacaine with butorphanol or fentanyl in obstetric analgesia. *Indian J Pain* 2008; 22(3): 152-6.
9. Tekin S, Topan I, Ekici NZ, Caglar H, Erincler T. Comparison of analgesic activity of the addition of neostigmine and fentanyl to bupivacaine in post-operative epidural analgesia. *Saudi Med J* 2006; 27(8): 1199-203.
10. Helbo-Hansen HS, Bang U, Lindholm P, Klitgaard NA. Maternal effects of adding epidural fentanyl to 0.5% bupivacaine for caesarean section. *Int. J Obstet Anesth.* 1993; 2(1): 21-6.

11. Halonen PM, Paatero H, Hovorka J, Haasio J. Comparison of two fentanyl doses to improve epidural anaesthesia with 0.5% bupivacaine for caesarean section. *Acta Anaesthesiol Scand.* 1993, 37: 774-9.
12. Cohen SE, Tan S, Albright GA, Halpern J. Epidural fentanyl/bupivacaine mixtures for obstetric analgesia. *Anesthesiology* 1987, 67(3): 403-7.

13. Milon D, Bentue-Ferrer D, Noury D, et al. Epidural anesthesia using the bupivacaine-fentanyl combination for caesarean section. *Ann Fr Anesth Reanim* 1983; 2(4): 273-9.
14. Torda TA, Hann P, Mills G, Delson G and Penman D. Comparison of extradural fentanyl, bupivacaine and two fentanyl bupivacaine mixtures for pain relief after abdominal surgery. *BJA* 1995; 74(1): 35-40.

## GUIDELINES TO CONTRIBUTORS

Also can be accessed from website: [www.aaarnaccm.com](http://www.aaarnaccm.com) and you can send your manuscript on email: [aaarjournal@gmail.com](mailto:aaarjournal@gmail.com)

Asian Archives of Anaesthesiology and Resuscitation (AAAR) was started in 1971 by initiative of late Prof. W.E. Spoeral of University of Western Ontario, London. He visited JIPMER, Pondicherry in 1970-71 and helped in starting this journal. Since then, AAAR was published under able guidance of (late) Prof. N.P. Singh continuously till date.

### EDITORIAL POLICY

AAAR publishes original articles, review articles, special, articles, medical intelligence articles, case reports, technical communications editorials, book reviews and letters to the editor. All papers, after editorial scrutiny are peer reviewed by at least two referees. Acceptance is based on significance, originality and validity of the material presented.

### SUMMARY OF REQUIREMENTS

Type the manuscript double spaced, including title page, summary (abstract) and key words, text, acknowledgements, references, tables (each table complete with title and foot notes on a separate page) and legends for illustrations. Each of the above mentioned component of the manuscript should begin with a new page, maintaining the sequence. Illustrations must be of good quality, usually 1227 x 173 mm (5 x 7 in) but not larger than 203 x 254 mm (8 x 10 in). Manuscript should be submitted articles may kindly be sent only on such requests. Authors should keep out the manuscript on white bond paper preferably ISO A4 size with margins of at least 25 mm (1 in). Type or print on only one side of the paper using double spacing throughout. Number the pages consecutively in the upper right hand corner of each page beginning with the title page.

### Format, Style and Grammar

The article is expected to be written in simple and small sentences. Due care need to be exercised by all the authors towards spelling, grammar and

style of writing. The article needs to be written in 'past-participle passive voice' format.

### Title page

The title page should carry:

- A) The Title of the article which must be concise, functional and informative. It must be accurate and not be misleading. Very short and cryptic titles are to be avoided as the words in the title may be used by electronic search engines to identify and categorise the paper.
- b) Name of each author typed in capitals across the title page immediately beneath the title of the article. A line should be drawn across the title page below the name(s) of author(s) in capitals. Each author's a) highest academic qualification, institutional affiliation; b) name of department (s) and institution(s) to which the work should be attributed ; (c) name, address No. and email ID of author responsible for correspondence should be indicated.

### Authorship

All persons designated as authors should qualify for authorship. The order of authorship should be a joint decision of the co-authors. Each author should have participated sufficiently in the work to take public responsibility for the content. Authorship credit should be based only on substantial contributions to (a) conception and design or analysis and interpretation of data; and to (b) drafting the article or revising it critically for important intellectual content; and on (c) final approval of the version to be published. Conditions (a), (b) and (c) must all be met.

Any part of an article critical to its main conclusions must be the responsibility of at least one author.

Editor may ask the authors to justify the assignment of authorship.

### Summary and Key words

The second page should carry the summary



(abstract) preferably of not more than 350 words, summarizing the work systematically by disclosing context, objectives, design, setting, participants, interventions, main outcome measures, results and conclusions. The abstract should reflect the paper and describe the message succinctly and accurately. The format of the abstract may be based on the standard IMRAD structure (Introduction, Methods, Results And Discussion) of the paper below the summary, provide and identify as such, 3 to 5 key words that will assist indexers in cross indexing. Use terms from the medical subject headings (MeSH) list of Medline.

### Text

The text of observational and experimental articles is usually but not necessarily divided into sections with headings viz., Introduction, Methods, Results and Discussion (IMRAD). Other types of articles such as case reports, reviews, editorials are likely to need other formats. Nevertheless, a fundamental structure is the basis of all scientific papers.

### Introduction

Start on a new page stating clearly the question being answered in the study. To lead the reader to this point it is essential to review the relevant literature briefly. Do not include data or conclusions from the work being reported.

### Material and methods

Over all the Material and Methods should answer three fundamental questions viz: How the study was designed? How the study was carried out? How the data were analysed? Though brevity is desirable, describe the selection of the observational or experimental subjects (patients of laboratory animals, including controls) clearly justify/ explain the sample size. Identify the methods, apparatus (manufacturer's name and address in parenthesis) and procedures in sufficient detail to enable other workers to reproduce the results. Give references to established methods, including statistical methods; provide references and brief descriptions for methods that have been published but are not well-known; describe new or substantially modified methods, give reasons for

using them and evaluate their limitations. Identify precisely all drugs or chemicals used, including generic name(s), dose(s), and route(s) of administration.

### Ethics

When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2002. Indicate whether institutions or the Indian Council of Medical Research's guidelines were followed. No manuscript can be sent for publication in two journals at same time and it will be considered as ethical misconduct. The copyrights will be provided only to that journal where it is published first.

### Legal Considerations

Authors should avoid the use of names, initials and hospital numbers which might lead to recognition of a patient. A patient must not be recognizable in photographs unless written consent of the subject has been obtained. A table or illustration that has been published elsewhere should be accompanied by a statement that permission for reproduction has been obtained from the publishers.

### Statistics

Input from a statistician should be sought at the planning stage of the study. The statistical methods with enough details to enable a knowledgeable reader with access to the original data to verify the reported results, should be incorporated. Give a brief note of how you arrived at the chosen sample size of your study. Give the exact tests used to analyse the data statistically and include an appropriate reference if the test is not well known. If computer software was used, give the type and version of the software. When possible, quantify findings and present them with appropriate indicators or easurement error or uncertainty (such as 95% Confidence Intervals). Avoid sole reliance on statistical hypothesis testing such as the use of p values, which fails to convey important quantitative information.

### Results

This section has to have two essential features: there should be an overall description of the major findings of the study; and the data should be presented clearly and concisely. Present your results in logical sequence in the text, tables and illustrations. Do not repeat in the text all the data in the table or illustrations; emphasise or summarise only important observations. It is worthwhile stating briefly what you did not find, as this may stop other workers in the area undertaking unnecessary studies.

### Discussion

It is difficult not to write a long and detailed analysis of the literature that you know so well. A rough guide to the length of 'Discussion', however is that it should not be more than one third of the total length of the manuscript (IMRAD) Emphasise and summarise the new and important findings of the study and the inferences that follow from them. Discuss possible problems with the methods used. Compare your results with previous work or relate your observations to other relevant studies. Discuss the scientific and clinical implications of your findings. Do not repeat in detail data or other material given in the 'introduction' or the 'Results' section. Discuss and analyse the limitations of your study, including suggestion for future work.

### Conclusions

Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not completely supported by your data.

### Acknowledgements

They should be brief and should include reference to the source of technical help, material support and financial assistance. Individuals named must approve their inclusion in the acknowledgements, before the paper is submitted.

### References

The references of the article are the foundation on which the work of the study is built. They provide the scientific background that justifies your study, including the methods used. AAAR follows

'Vancouver style' of quoting the references as superscripts in which references are numbered consecutively in the order in which they are first mentioned in the text. Identify references in text, tables, and legends by Arabic numerals in parentheses. References cited only in tables or in legends to figure should be numbered in accordance with a sequence established by the first identification in the text of the particular table or figure. Use the style of the examples below, which are based with slight modifications on the formats used by the U S National Library of Medicine in Medline database. The titles of journals should be abbreviated according to the style used in Medline. The references must be verified by the authors(s) against the original documents. Restrict references to those that have a direct bearing on the work described, preferably less than 25 for general articles and 6 for short communications. Examples of correct forms of references are given below.

### A. Journals:

1. Standard journal article List all authors, but if number exceeds six, list only first three and add et al. Fery AM, Haynes AR, Owen KJ, Farrall M, Jack LA, Lai LY, et al. Predisposing locus for Alzheimer's disease on chromosome 21, Lancet 1989; 1: 352-5.
2. Organisation as author : The Royal Marsden Hospital Bonemarrow Transplantation Team. Failure of syngeneic bonemarrow graft without preconditioning in post- hepatitis marrow aplasia. Lancet 1977; 2: 742 4.
3. No author given : Coffee drinking and cancer of the pancreas (editorial). BMJ 1981; 283:628.

### B. Books and other Monographs

1. Personal author(s): Colson JH, Armour WJ. Sports injuries and their treatment, 2nd rev. ed. London: S. Paul, 1986.
2. Editor(s), compiler as authors : Diener HC, Wilkinson M, editors. Drug-induced headache. New York: Springer Verlag, 1988.
3. Chapters in a book: Weinstein L, Swartz MN. Pathologic properties of invading

microorganisms. In: Sodeman WA Jr, Sodeman WA, editors. Pathologic physiology: mechanisms of disease. Philadelphia: Saunders, 1974: 457-72.

### C. Other published Material

Newspaper article: Rensberger B, Specter B, CFCs may be destroyed by natural process. The Washington Post 1989 Aug. 7; Sect. A:2 (Col.5).

### D. Unpublished Material

Lillywhite HD, Donald JA. Pulmonary blood flow regulation in an aquatic snake. Science. In press or Personal Communication

### E. Internet References

Complete Website address and the location to be mentioned.

### Tables

Do not include tables in the text. Type each table, double-spaced on a separate sheet. Number tables consecutively in the order of their first citation in the text and put a brief title for each. Give each table a short abbreviated heading. Mention explanatory matter as well as explanations of all non-standard abbreviations used in the table, in footnotes and not in the heading. Identify statistical measures of variations such as standard deviation and standard error of the mean. Indicate approximate position of each table in relation to the subject matter of the text right hand margin of the appropriate page of the manuscript. If you use data from another published or unpublished source, obtain permission and acknowledge fully. Maximum tables allowed in any manuscript is as follows:

#### Maximum tables allowance

General Article (excluding abstract)	6
Case Report	2
Brief Report	4
Technical Communication	5
Review Article	10
Medical Intelligence Article	6
Special Article	6
Editorial	1
Letter to the Editor	2

### Illustrations (Figures)

Submit Figures Letters, numbers, and symbols should be clear and even throughout and of sufficient size that when reduced for publication each item will still be legible. Each figure should have a label pasted on its If a figure has been published, acknowledge the original source and submit written permission from the copyright holder to reproduce the material.

### Units of measurement

All measurements length, height, weight and volume, etc. should be reported in metric units (metre, kilogram, or litre) or their decimal multiples. Temperatures should be given in degree Celsius. Blood pressure should be given in millimetres of mercury. All haematologic and clinical chemistry measurements should be reported in the metric system in terms of the International System of Units (SI).

### Abbreviations and Symbols

Use only standard abbreviations. Avoid abbreviations in the title and abstract. The full term for which an abbreviation stands, for should precede its first use in the text unless it is a standard unit of measurement.

### Correspondence

A. Letters to the editor include brief constructive comments concerning previously published articles or brief notations of general interest. The manuscripts must be double-spaced, and a title and two copies must be provided. Letters may be submitted at [aaarjournal@gmail.com](mailto:aaarjournal@gmail.com).

B. The editor may change, delete or modify in any way all items of correspondence. Maximum Word Allowance: When submitting your manuscript, please observe the maximum word count allowed for each type of submission; and the maximum allowance for figures, tables, and references (word count should reflect text only and must be listed in the cover letter):

#### Maximum word allowance

General Article (excluding abstract) 3000 words

Case Report	800 words
Brief Report	1000 words
Technical Communication	1500 words
Review Article	4000 words
Medical Intelligence Article	3000 words
Special Article	2000 words
Editorial	1500 words
Book Review	750 words
Letter to the Editor	200 words
Abstract	350 words
Implications	50 words

### Non-textual Material Maximum Allowance

Figure and Tables No more than 3 each or a combination of 6 total. Do not duplicate data in tables and figures. References No more than 25 references per article, up to 40 references are acceptable.

### Submission of manuscripts

Manuscripts (including tables, figures, photographs, etc). accompanied by a covering letter should be signed by all the authors. The covering letter must provide an undertaking to the effect that (a) the article has not been published or submitted to or accepted for publication in any form in any other journal, (b) the authors vouch safe that the authorship of this article will not be contested by any one whose name (s) is/are not listed, (c) on acceptance the article will become copyright of AAAR (d) the sequence of the names of co-authors (e) the manuscript has been read and approved by all the authors, (f) name, address and the email ID of the corresponding author (responsible for communication). On final preparation, A letter of acceptance or otherwise, will normally be sent to the author within 3 (three) months. Articles which are not accepted cannot be sent to the author unless accompanied by adequate postage stamps.

A Completed checklist must accompany each manuscript submitted to Asian Archives of Anaesthesiology and Resuscitation.

#### Checklist for submitting the manuscript

##### General

1. Two complete sets of the manuscripts (including tables) are submitted.

2. A floppy disk or CD is submitted with two files : the complete manuscript and a separate file containing only the title page, abstract, and references.
3. Manuscript is typed double-spaced, with ample, left, justified, margins.
4. Pages are numbered consecutively, starting with the title page.

### Title Page

1. On the first page are typed the title, author name(s) and major degree(s), and affiliation(s).
2. The name, address, telephone and FAX numbers, and E-mail address of the corresponding author are to be given.
3. The manuscript title is no longer than 100 characters (letters and spaces) and does not contain any abbreviations.
4. A short title (no more than 30 characters) is provided at the bottom of the page for use as a running foot.

### Summary

\* An abstract is provided. For all kind of articles, this abstract is limited to 200-250 words.

### References

1. References correspond to the specifications of the Uniform Requirements for Manuscripts Submitted to Biomedical Journals" promulgated by the International Committee of Medical Journal Editors.
2. References are identified in the text by superscript figures, eg., Miller.
3. Each reference is cited in the text. Those appearing in tables and figures should be cited in the text where the table or figure is mentioned.
4. References are numbered consecutively in the order in which they appear in the text. (Vancouver Style)
5. Unpublished data, personal communications, submitted manuscripts, statistical programs,

papers presented at meetings, and nonpeer review publications are not listed in the bibliography.

6. The bibliography is typed doublespaced.

7. Abbreviations of Journal titles conform to those used in Index Medicus, National Library of Medicine.

#### Tables

1. Each table is typed on a separate sheet of paper with its title.

2. Tables are numbered with Arabic numerals.

3. Each table contains all necessary information in order that it may stand alone, independent of the text.

4. No table contains data that could be included in the text in several sentences.

5. Vertical lines are not used.

6. Irrelevant and extra tables must not be included

#### Figures

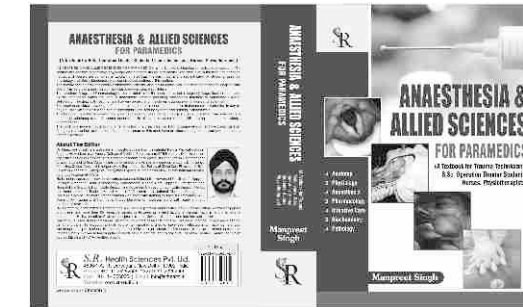
1. Each figure is cited in the text.

2. Figures have been prepared with the journal column size in mind.

3. Letters and identifying marks are clear and sharp, and the critical areas of radiographs and photomicrographs are identified.

4. Legends and explanatory material appear in the accompanying caption and not on the figure itself.

5. Legends are typed together on one page. Legends for photomicrographs include information regarding stain and magnification.



#### BOOK REVIEW

**ANAESTHESIA AND ALLIED SCIENCES FOR PARAMEDICS, 2013, first edition**

**Editor-Dr Manpreet Singh, MD, FCCP, FIMSA, FACEE, MAMS**

**Publisher : Mr Rahul Jain - SR health Sciences, (CBS Publishers, India)**

**Darya Ganj, Delhi, India**

**Phone of publisher: 09810825524**

**E-mail-rahul@srhealth.in, rahuljain09@gmail.com**

The editor of this book, Dr Manpreet Singh is involved in teaching the students of BSc Medical Technology and Operation Theatre, Trauma Technician courses, MBBS and MD (Anaesthesiology and Intensive care) at Government Medical College, Chandigarh, India.

'ANAESTHESIA AND ALLIED SCIENCES FOR PARAMEDICS' is the first book of its kind and comprises six sections. All sections are colour coded for easy identification.

Section one consists of anatomy, physiology and clinical biochemistry for paramedics. Details of all muscles, bones and joints along with their actions, nerves and vessels are compiled in a tabular form so that it can be easily learnt and recapitulated by students. Essential physiology and clinical biochemistry are concised subsections of this section.

Second section provides every detail about anaesthesia and its various sub-specialities. This section has 40 chapters i.e. from history of anaesthesia till modular operation theatre suit details. Apart from basics of anaesthesia and sub-specialities of anaesthesia, it highlights operation theatre suit, air-conditioning of Operation theatre and ICU, sterilization, pain management, dialysis room management and transportation of patients and anaesthesiologists.

Third section, 'Pharmacology in Anaesthesia' describes intricacies of all anaesthetic drugs and emergency drugs. These drugs are described in tabular forms in easy language. This section will help the students to explain the drugs that are asked in table viva during examination.

Section four covers all the anaesthesia instruments. These includes anaesthesia machine , automated external defibrillator, sutures, vaporizers and all airway management equipments. The details of instruments will be very beneficial for the students during training periods, examination, table viva and day-to-day practice.

Fifth section provides knowledge of 32 unique topics of modern anaesthetic practices that requires utmost attention. It highlights brief knowledge about clinical audit, hospital waste management, ECG, EMG, cardiopulmonary resuscitation 2010 guidelines, intensive care topics and physics in anaesthesia.

The final section 6, highlights all the scoring systems, algorithms and grading in anaesthesia. The students will be elated to read this section as they will feel comfortable to find all gradings at one place.

This book will be extremely useful to all residents of anaesthesiology and paramedics i.e MSc. Operation Theatre, BSc Medical Technology students, operation theatre technicians nurses, physiotherapists and trauma technicians. I assure that the student will not move away from this comprehensive book that will be useful in all types of examinations, skill development and knowledge augmentation.

The book is a sincere tribute to my father who had this dream for me. I am fortunate enough to have blessings from Almighty, my teachers and parents. All the contributors of this book have provided me a great support and deserve my heartfelt gratitude.

Dr Manpreet Singh (Editor)

India

Ph:09646121503

manpreetdawat@gmail.com,manpreetdawat@hotmail.com