VOLUME - 12, ISSUE - 08, AUGUST - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Anaesthesiology

EFFICACY OF DEXMEDITOMIDINE OR MAGNESIUM SULPHATE AS ADJUVANT, TO EPIDURAL BUPIVACAINE IN ABDOMINAL SURGERIES

Dr Trupti D Shah	Professor of Department of Anesthesiology, Civil Hospital, BJ Medical college, Ahmedabad.
Dr Sraddha Prajapati	Senior Resident, Department of Anesthesiology, Civil Hospital, BJ Medical College, Ahmedabad.
Dr Thulasiram Saiyash*	2nd year resident doctor, Department of Anesthesiology, Civil Hospital, BJ Medical College, Ahmedabad. *Corresponding Author
Dr Deepak Sohu	2nd year resident doctor, Department of Anesthesiology, Civil Hospital, BJ Medical College, Ahmedabad.
Dr Janardhan Bandari	2nd year resident doctor, Department of Anesthesiology, Civil Hospital, BJ Medical College, Ahmedabad.

ABSTRACT Dexmedetomidine is potent and highly selective alpha-2 agonist and Magnesium Sulfate is a NMDA receptor antagonist. Studies have shown that Dexmedetomidine and Magnesium Sulfate increases the duration of epidural blocks, when combined with local anesthetics. Therefore, it is expected that such a beneficial effect of Dexmedetomidine and Magnesium Sulfate can be manifested when it is injected in combination with bupivacaine to epidural space.

KEYWORDS : Dexmedetomidine or Magnesium Sulfate as anadjuvant with bupivacaine, abdominal surgeries, Epidural space.

INTRODUCTION

Abdominal surgeries are painful, and well-planned pain management is crucial in decreasing morbidity. The main aim of postoperative analgesia is to provide patients comfort, in addition to inhibiting nociceptive impulse caused by surgical trauma and to blunt somatic as well as autonomic reflexes in response to pain. Epidural analgesia gives us a much superior post-operative pain relief in comparison with systemic drugs. Along with improved pain control, epidural analgesia also improves patient outcome by decreasing unfavourable post-operative stress.

Stable hemodynamics and the capacity to provide smooth and extended periodof post-operative analgesia are the important assets of an adjuvant in postoperative epidural analgesia. Recent studies suggest the role of magnesium sulfate and dexmedetomidine as an adjuvant to local anesthetics in epidural anesthesia. (2) The biological basis for potential antinociceptive effect of magnesium is its voltage-dependent regulation of calcium influx into the cell, and noncompetitive antagonism of Nmethyl-D-aspartate (NMDA) receptors. (1) Dexmedetomidine is agonist of alpha-2 adrenergic receptors.

AIMS AND OBJECTIVES OF THE STUDY

The primary aim of this clinical study is to evaluate the effects of epidural Dexmedetomidine or Magnesium Sulfate administered as an adjuvant to bupivacaine in two groups of patients undergoing abdominal surgeries.

This prospective, randomized, double-blind study is undertaken to compare the efficacy of Dexmedetomidine or Magnesium Sulphate as adjuvant, to epidural bupivacaine in Abdominal Surgery.

-Aim Of Study Is-

- Intraoperative hemodynamic stability
- Postoperative analgesia
- Postoperative hemodynamic stability

MATERIALS AND METHODS

60 patients who need to be operated for elective general surgery, urosurgery, Gastro intestinal surgery was randomly assigned into two groups;Group D: 30 patients given epidural analgesia using Inj. Bupivacaine 0.25% 10ml and Dexmedetomidine 0.5μ/kg (in 1 ml 0.9% Saline)

Group M: 30 patients given epidural analgesia using Inj. Bupivacaine0. 25% 10ml and Magnesium sulphate 50mg (in 1 ml 0.9% Saline)The patients who satisfied the inclusion criteria were explained about the nature of procedure, tests, advantages and side effects in an elaborate manner in his/herown language. A written informed consent was then obtained from the patients. Then they were assessed and investigated. Age, height, weight, and body mass index of the patients were noted down. Various other vital parameters like blood pressure, heart rate, respiratory rate and oxygen saturation were also noted. Explanation about the visual analogue score (VAS) was given to all patients.They were told that 0 represents "no pain" and 10 represents "worst possiblepain" on the grading scale.Painting and Draping done to the Local site. Epidural space identified. A multi-orifice, epidural catheter advanced L2-L3, L3-L4 with loss of resistance technique with 18G epidural needle. Correct placement of the epidural catheter was verified with a test dose of 2 ml epidural lignocaine 2% with adrenaline(1:20000000).subjects were randomized into Groups M,and D, by randomization using a sealed envelope technique and received medications by epidural route as follows:

Group M: Bupivacaine0.25%(10ml)+Magnesium sulfate 50mg(in 1 ml 0.9% Saline)Group D; : Bupivacaine 0.25% (10ml)+Dexmedetomidine 0.5mcg/kg(in 1 ml 0.9% Saline)

After administering the drug, parameters such as BP, pulse rate were observed. Then GA was given. Premedication of Inj. Glycopyrrolate 0.004mg/kg IV Inj.Ondansetron 0.15 mg/kg IV Inj. Fentanyl 1-2microgram/kg IV was given. Induction with Inj. Propofol 2-3mg/kg IV, Inj. Suxamethonium 2mg/kg IV was given and intubation with endotracheal tube was done. After insertion bilateral air entry was checked; cuff inflated and tube fixed. Heart rate, arterial blood pressure, arterial oxygen saturation (Spo2) by pulse oximetry,electrocardiogram as

well as end-tidal CO2 monitored continuously. Intra-operative maintenance IV fluids were given as per body weight and losses were supplemented accordingly.Patient was extubated after the procedure; shifted to PACU (Post Anesthesia Care Unit), monitors were attached and vitals of the patientwere monitored.

Patient was monitored for pain and post-operative duration of analgesia was observed . Rescue analgesia given if patient had VAS>3.We used inj. Tramadol 50mg via epidural catheter as a rescue analgesic in the postop period according to VAS score. Nausea and vomiting were treated with 0.15 mg/kg ondansetron.

Patient was monitored for other postoperative complications and were managed accordingly.

DEMOGRAPHIC PROFILE

S.No	Demographic Characteristics	D Group	M Group	p-value
1	Age in years	42.70 (±7.51)	42 (± 8.11)	0.73
2	Weight in Kgs	56.50 (±7.02)	51.87 (± 6.45)	0.01
3	Male/Female	15/15	19/11	0.30
4	ASA 2 & 3	25/5	26/4	0.72

By conventional criteria the age distribution, weight, gender and ASA PS Classification status between the D group and M group among study subjects is considered to be statistically NOT significant since p > 0.05.

Intraoperative Hemodynamic Parameters

The mean intra-operative heart rates of both the groups were compared using independent samples t test. The mean heart rates of group D were lower than in Group M. The difference was statistically significant.

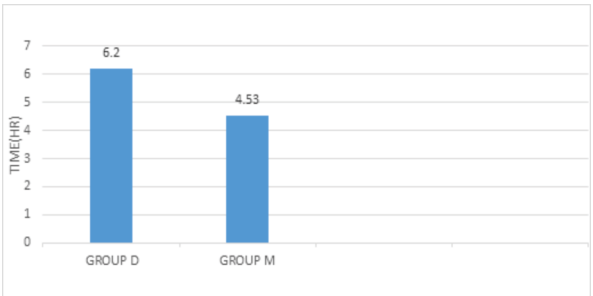
The mean intra-operative systolic BP between both the groups were compared using independent samples t test. The mean systolic blood pressure of group D was lower side than in Group M throughout the study. The difference was statistically significant.

The mean intra-operative diastolic BP between both the groups were compared. The mean diastolic blood pressure of Group D was lower than in Group M. The difference was statistically significant.

POST OPERATIVE HEMODYNAMIC PARAMETERS-

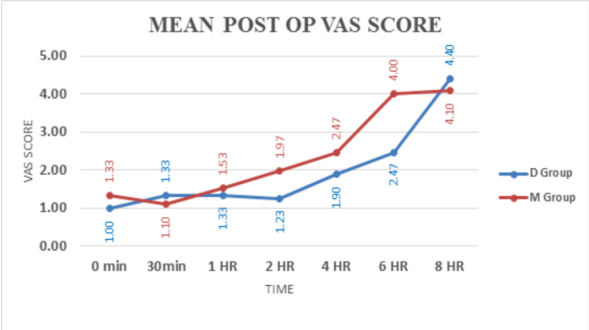
The mean heart rate of both the groups were observed throughout the post operative period. Mean post operative heart rates of Group Dwere lower than of Group M but not required any pharmacological intervention. The difference was statistically significant.The mean blood pressure of both the groups were observed throughout the post operative period. Mean post operative blood pressure of Group D was lower than of Group M but not required any pharmacological intervention. The difference was statistically significant.Mean post operative blood pressure of Group D was lower than of Group M but remain stable throughout study.

MEAN DURATION OF ANALGESIA



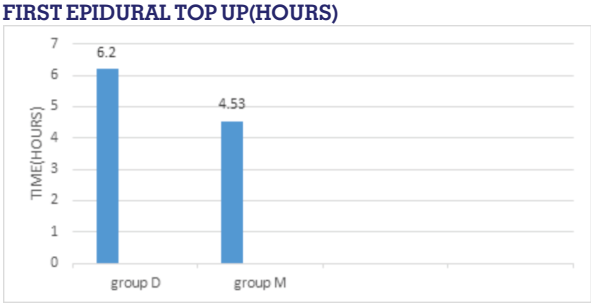
Mean duration of analgesia is higher in group D(6.25±0.66) thangroup M(4.35±0.67) with p value <0.0001 which is statistically significant.

MEAN POST OP VAS SCORE



The mean VAS scores of both the groups are compared using independent samples t test. VAS score was almost similar in both group up to 1 hour postoperatively, but than VAS score was gradually increase in group M than group D.So the mean VAS scores of Group D were significantly lesser than in group M. The difference was statistically significant since p >0.05.

FIRST EPIDURAL TOP UP(HOURS)



As duration of analgesia in group D is higher as compare to group M, time for of first
rescue analgesic requirement is also longer in group D than group M.

POST OP SEDATION GRADING AS PER RAMSAY SEDATION SCORE

Post operative Sedation score was 2.1 in group D and 2 in group M on ramsay sedation scale throughout the postoperative observation period in our study, Which is statistically not significant. No any patient required additional airway management throughout the study period.

In our study, none of patients in both groups had side effects like nausea, vomiting, dry mouth, pruritis, respiratory depression.Heart rates and systolic and diastolic blood pressures remained on the lower side but remained stable throughout the study period in group Dexmedetomidine as compare to group magnesium sulphate. Respiratory depression was not observed in either group.

DISCUSSION

The results of the our study have showed that addition of either dexmedetomidine or magnesium sulphate as an adjuvant to epidural bupivacaine increases the duration of analgesia.

Mean duration of analgesia is significantly higher in Dexmedetomidine group (6.25±0.66) as compared to Magnesium sulphate group (4.35±0.67) with P value <0.0001 which is statistically significant. The mean intra operative heart rates were significantly reduced in Group D which is statistically significant (P < 0.001)also, there was fall in mean intraoperative systolic and diastolic blood pressure in Group D which is statistically significant (P < 0.001) but remained stable throughout the study and not required any pharmacological intervention. Heart rates and systolic and

diastolic blood pressures remained on the lower side but remained stable throughout the study period in group D as compare to group M

From my study, I conclude that

1) Epidural dexmedetomidine is a better neuraxial adjuvant to bupivacaine when compared to magnesium sulphate regarding intra-operative hemodynamic stability and post-operative duration of analgesia. It provides stable cardiorespiratory parameters.

2) Epidural magnesium can also be added as an adjuvant for better pain relief & VAS score without any side effects with the concentrations used in my study. As compare to epidural dexmedetomididne, epidural magnesium sulphate is having less duration of analgesia but provide stable hemodynamics and cardiorespiratory parameters.

REFERENCES

1. Sirvinskas E LR. Use of magnasium sulphate in anaesthesiology. Medicina (Kaunas). 2002; 38(7): p. 147-150.
2. Ozalevli M CTUHGTIG. The effect of adding intrathecal magnesium ssulphate to bupivacaine-fentanyl spinal anaesthesia. Acta Anaesthesiol Scand. 2005 Nov; 49(10): p. 1514-9.
3. Parker RK CNLTSSPRBE. Epidural clonidine added to a bupivacaine infusion increases analgesic duration in labor without adverse maternal or fetal Effects. J Anesth. 2007; 21(2): p. 142-7.
4. Szumita PM BSAKWM. Sedation and analgesia in the intensive care unit: Evaluating the role of dexmedetomidine. Am J Health Syst Pharm. 2007; 64(1): p. 37-44.
5. Sule A AAGA. Dexmedetomidine as an adjunct to epidural analgesia after abdominal surgery in elderly intensive care patients: A prospective, double-blind, clinical trial. Curr Ther Res Clin Exp. 2008; 69(1).
6. Kalso EA PRRP. Spinal antinociception by dexmedetomidine, a highly selective alpha 2-adrenergic agonist. Pharmacol Toxicol. 1991; 68(2): p. 140-3.
7. Kendig JJ SMWSMM. Alpha 2-adrenoceptors inhibit a nociceptive response in neonatal rat spinal cord. Eur J Pharmacol. 1991; 192(2): p. 293-300.
8. Block BM, Liu SS, Rowlingson AJ, Cowan AR, Cowan JA, Wu CL (2003). "Efficacy of postoperative epidural analgesia: a meta- analysis". JAMA. 290 (18): 2455–63.
9. Gendall KA, Kennedy RR, Watson AJ, Frizelle FA (2007). "The effect of epidural analgesia on postoperative outcome after colorectal surgery". Colorectal Dis. 9 (7): 584–98, discussion 598–600.
10. Rigg JR, Jamrozik K, Myles PS, Silbert BS, Peyton PJ, Parsons RW, Collins KS (2002). "Epidural anaesthesia and analgesia and outcome of major surgery: a randomised trial". Lancet. 359 (9314): 1276–82
11. Wang, Yen-Feng; Wang, Shuu-Jiun (March 10, 1994). "Headache associated with low CSF pressure". MedLink
12. Conor TO. Atlas of Pain Injection Techniques. 2nd ed.
13. Miller's Anaesthesia. 8th ed.
14. Paul G. Barash BFC. Clinical Anesthesia Fundamentals.
15. Susan Smith ES. Drugs in Anaesthesia and Intensive Care. 4th ed.
16. Stoelting's Pharmacology & Physiology in Anesthetic Practice. 5th ed.
17. "A comparative study of magnesium sulfate vs dexmedetomidine as an adjunct to epidural bupivacaine" Vaibhav Shahi, Anil Kumar Verma, Apurva Agarwal, Chandra Shekhar Singh Journal of Anaesthesiology Clinical Pharmacology | October-December 2014 | Vol 30 | Issue 4 A
18. Sukhminder Jit Singh Bajwa, Vikramjit Arora, Jasbir Kaur, Amarjit Singh, S. Parmar" "Comparative evaluation of dexmedetomidine and fentanyl for epidural analgesia in lower limb orthopedic surgeries" Saudi Journal of Anaesthesia Vol. 5, Issue 4, October-December 2011