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Efficacy of general anesthesia as compared to spinal anesthesia for patients undergoing ventral abdominal hernia repair, a randomized controlled trial.

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ABSTRACT… Objective: To compare the use of general anesthesia with spinal anesthesia in patients undergoing ventral hernia repair. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Anesthesia CMC Hospital @ SMBBMU Larkana. **Period:** January 2018 to December 2019. **Material & Methods:** We included patients above the age of 18 years, who presented with initial complaint of a ventral hernia, requiring surgical intervention. The exclusion criterion was all the patients with co-morbidities like malignancy, having a BMI score of greater than 35, having known allergies to anesthetic agents, and neurologic or neuromuscular diseases. A total of n=120 patients were included in the study and randomly divided into two groups. All the data including clinical parameters, drugs administered, and relevant side effects and complications were recorded in a pre-designed proforma. **Results:** The study population was n= 120 patients, the mean age was 45.5 +/- 15.5 years, there were n= 42 (35%) males and n= 78 (65%) females. There were no statistically significant differences among the two groups in terms of patient's age, gender, blood pressures and heart rate. N= 54 (90%) of the patients belonging to the spinal anesthesia group had adequate anesthesia, the rest required administration of supplemental analgesic. None of the cases in the cohort had failure of the anesthetic technique. The postoperative visual analog scale scores at various time intervals (0, 2, 4 and 8 hours post procedure) were higher in the general anesthesia group versus spinal anesthesia group (p value of <0.05). **Conclusion:** Patients receiving spinal anesthesia had less incidence of post-operative nausea and required less analgesics, while patients receiving general anesthesia had more stable blood pressure profiles.

Key words: Anesthesia, General Anesthesia, Spinal Anesthesia, Ventral Hernia Repair.

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INTRODUCTION

A hernia is defined as a abnormal protrusion of an organ beyond its normal cavity, usually through a defect in the anatomical wall of the cavity. A ventral hernia is a defect in the abdominal wall, through which contents of the abdomen can protrude from their normal anatomical location. There are several types of primary ventral hernias that have been reported such as lumbar hernia (contents protruding through the posterior abdominal wall), spigelian hernia (aponeurotic fascia protruding) and epigastric hernia. Among the secondary hernia which are acquired defects could be incisional hernia, which often occur following a surgical procedure conducted on the abdominal cavity.[1] To correct the defect an open ventral hernia repair procedure is done under general anesthetics. However, there are certain side effects and complications associated with both the surgical intervention and the anesthesia utilized. These range from cognitive impairment and prolonged sedation to post-operative pain and nausea and vomiting.[2,3,4] To that effect anesthesiologists have often opted against the use of general anesthesia and some favor spinal anesthesia, as it has a quick onset, provides both motor and sensory block, extends the post-operative analgesia and is associated with lesser rates of complications.[5,6,7] The aim of the current study is to compare the use of general anesthesia with spinal anesthesia in patients undergoing ventral hernia repair, at a large tertiary care center

in Sindh, Pakistan.

MATERIAL & METHODS

The type of study is a randomized controlled trial conducted for a period of 2 year from January 2018 to December 2019, at CMC Hospital @ SMBBMU Larkana. The sampling technique utilized was non-probability consecutive sampling, all the patients signed an informed consent to participate and the study was approved by the hospital ethics committee (MS/GMCHS/2017/11094). We included patients above the age of 18 years, who presented to the Department of Surgery with initial complaint of a ventral hernia, requiring surgical intervention. The exclusion criterion was all the patients with co-morbidities like malignancy and organ failure, having a body mass index (BMI) score of greater than 35, having known allergies to anesthetic agents, and neurologic or neuromuscular diseases. A total of n=120 patients were included in the study and randomly divided into two groups A & B, group A included patients who received general anesthesia and group B included patients receiving spinal anesthesia. 7.5 mg Midazolam was given to all the patients 45 minutes before the procedure. A 20-gauge IV canula was used in the forearm and ringer lactate solution was infused in the operating room. Various parameters like oxygen saturation, blood pressure and pulse among others were measured for all the patients. The drug protocol is given in Table-I. In case of failure of the spinal anesthesia, patients were given general anesthesia. Ephedrine and Ringer solution was given to patients who showed signs of hypotension. Bradycardia was managed with atropine. Tramadol was given as rescue analgesia when patients reported high levels of pain with the Visual Analog Scale (VCS), which measured pain from 0 to 10, where value of 0 was considered a no pain and 10 being the worst patients experienced by the patient. All the data including clinical parameters, drugs administered, and relevant side effects and complications were recorded in a pre-designed proforma. IBM SPSS version 20.0 was used for statistical analysis, mean and standard deviations were used for continuous variables, while frequencies and percentages were utilized to analyze the categorical variables. Student t test was used to assess the two groups and a p value of less than 0.05 was determined to establish statistical significance.

RESULTS

The study population was n= 120 patients, the mean age was 45.5 +/- 15.5 years, there were n= 42 (35%) males and n= 78 (65%) females. Other patient demographics and variables are given in Table-II. There were no statistically significant differences among the two groups in terms of patient's age, gender, blood pressures and heart rate. N= 54 (90%) of the patients belonging to the spinal anesthesia group had adequate anesthesia, the rest of the patients required administration of supplemental nalbuphine (opioid analgesic) during the procedure. None of the cases in the cohort had failure of the anesthetic technique. The postoperative visual analog scale scores at various time intervals (0, 2, 4 and 8 hours post procedure) were higher in the general anesthesia group as compared to the spinal anesthesia group having a p value of <0.05 respectively. The complications encountered by the patients is given in Table-II.

DISCUSSION

It is well accepted in the anesthesiology community that both the general anesthesia and spinal anesthesia are viable methods of anesthesia for patients undergoing the ventral hernia repair surgery.[2,3,4,5,6,7] The common complications associated with the use of spinal anesthesia are hypotension, prolongation in motor recovery of the patient and urinary retention, which severely limits the population this anesthesia technique is effective for use in. Furthermore, spinal anesthesia provides adequate motor and sensory block, leads to prolongation of the post-operative analgesia and pain relief, and is a cost effective and simple technique to provide anesthesia.[4,5]

Our comparison of general anesthesia with spinal anesthesia showed that spinal anesthesia was an effective technique in our patient population as 90% of the patients had effective anesthesia and the remaining patients required an additional administration of analgesics.

Groups	Drug & Ventilation Regimen
Group A	Propofol 2 mg/kg, Succinylcholine 1 mg/kg, atracurium 25-35 mg/kg and nalbuphine 10-15 mg/kg. Mechanical ventilation performed in volume-controlled mode with flow of 1.0 liter/min having a air to O2 ratio with FiO2 of 0.4. Maintenance with atracurium 40 mg and propofol 30–50 mg The extubation was performed after reversal of neuromuscular blockade with atropine 1.0 mg and neostigmine 2.5 mg when deemed appropriate.
Group B	Spinal anesthesia performed in a sitting position with needle placement at the L2–L3 intervertebral space. A 25-gauge spinal needle was inserted via the midline approach. After noting the flow of cerebrospinal fluid (CSF), a 10 mg of bupivacaine 0.5% was given. Patients were then put in the Trendelenburg position for 10 minutes to achieve an appropriate sensory block.

Table-I. Anesthesia protocol in patients undergoing general anesthesia and spinal anesthesia.

Variables	Group A (General Anesthesia group)	Group B (Spinal Anesthesia group)	P-Value
Age in years	45 +/- 15	46 +/- 16	0.96
Gender			0.74
Male	18 (30%)	24 (40%)	
Female	42 (70%)	36 (60%)	
Body Mass Index	27.01 +/- 6.17	27.7 +/- 6.5	0.39
Time duration of procedure in mins	62 +/- 16	61 +/- 17	0.73
Clinical parameters			
Systolic pressure in mm of Hg	125 +/- 8	128 +/- 7	0.15
Diastolic pressure in mm of Hg	73 +/- 9	75 +/- 8	0.33
Mean arterial pressure in mm of Hg	91 +/- 7	92 +/- 6	0.52
Heart rate in beats per minute	74 +/- 5	72 +/- 5	0.22
Maximal decrease in systolic pressure	10 +/- 5	21 +/- 6	<0.05
Maximal decrease in heart rate	11 +/- 4	17 +/- 7	>0.05
Relative hypotension*	6 (10%)	12 (20%)	>0.05
Absolute hypotension	0	12 (20%)	>0.05
Heart rate <45 bpm	3 (5%)	12 (20%)	0.34
Postoperative nausea and vomiting	21 (35%)	3 (5%)	0.04
Pruritis	0	42 (70%)	<0.001
Time period in minutes to administration of first analgesic dose	27 +/- 11	580 +/- 139	<0.001
Location of hernia			0.35
Infra-umbilical hernia	21 (35%)	18 (30%)	
Supra-umbilical hernia	18 (30%)	24 (40%)	
Umbilical hernia	21(35%)	18 (30%)	

Table-II. Patient demographics and other variables for patients undergoing ventral hernia repair.
Decrease of systolic pressure <90 mm of Hg

However, the general anesthesia group faired better when it comes to controlling the blood pressures and hemodynamic profile of the patients as the spinal anesthesia group had complications of hypotension in 20% of the cases. This incidence of hypotension, depends on a variety of parameters such as age of the patient, type of surgical procedure, level of block and blood loss during surgery among others. Hypotension has been reported in 68% of the

patients undergoing laparoscopic hernioplasty.[17] The hypotension can be corrected with additional fluid replacement. In our study 20% of the patients had relative hypotension and 20% of the patients had absolute hypotension in the spinal anesthesia group. While clinically relevant bradycardia was observed in 20% of the cases of spinal anesthesia. This decrease is due to the neuraxial block of fibers originating from the T1 to T4 spinal cord levels, another explanation is the fall in filling volume of the right atrium.

Any surgical intervention is associated with significant post-operative pain and ventral hernia repairs are no exception, they require an adequate amount of analgesics to counter act the pain and pain relief is also linked to early recovery and reduced post-operative complications.[18] In our study the patients undergoing spinal anesthesia had better pain relief and in the initial 8 hours post procedure required less additional analgesics as compared to the general anesthesia group. The differences in post-operative pain were similar at the 12 hour and 24 hour mark post procedure in the two groups. Other studies have reported similar effectiveness of spinal anesthesia pain relief as compared to the general anesthesia. Patients of spinal anesthesia also have lowered incidence of hypoxia and thromboembolic events.[4,19] Post-operative nausea and vomiting was significantly higher in the general anesthesia group 35% versus 5% in the spinal anesthesia group. The nausea and vomiting are associated with an increased hospital stay and required treatment with antiemetic drugs such as metoclopramide. Other side effects classically associated with spinal and general anesthesia such as headache, neurological complications and urinary retention were not observed in our study population. The only limitation in our study was that it was a single center study and the study population was not large enough to generalize the results, however we did built a case for the use of spinal anesthesia and surgeons and anesthesiologists should make a fully informed decision when it comes to selecting the appropriate anesthesia technique for their patients.

CONCLUSION

Patients receiving spinal anesthesia had less incidence of post-operative nausea and required less analgesics, while patients receiving general anesthesia had more stable blood pressure profiles.

REFERENCES

1. Eriksen JR. **Pain and convalescence following laparoscopic ventral hernia repair.** Dan Med Bull. 2011; 58:B4369.
2. Korhonen AM, Valanne JV, Jokela RM, Ravaska P, Korttila KT. **A comparison of selective spinal anesthesia with hyperbaric bupivacaine and general anesthesia with desflurane for outpatient knee arthroscopy.** Anesth Analg 2004; 99:1668–73.
3. Hanning CD. **Postoperative cognitive dysfunction.** Br J Anaesth 2005; 95:82–7.
4. Gonano C, Leitgeb U, Sitzwohl C, Ihra G, Weinstablc, Kettnerc. **Spinal versus general anesthesia for orthopedic surgery: Anesthesia drug and supply costs.** Anesth Analg. 2006; 102:524–9.
5. Di Cianni S, Rossi M, Casati A, Cocco C, Fanelli G. **Spinal anesthesia: An evergreen technique.** Acta Biomed 2008; 79:9–17.
6. Cook TM, Counsell D, Wildsmith JA. **Major complications of central neuroaxial block: Report on the Third National Audit Project of the Royal College of Anaesthetists.** Br J Anaesth 2009; 102:179–90.
7. Attari MA, Mirhosseini SA, Honarmand A, Safavi MR. **Spinal anesthesia versus general anesthesia for elective lumbar spine surgery: A randomized clinical trial.** J Res Med Sci 2011; 16: 524–9.
8. Krobot R, Bacakkocman I, Premuz J. **Unilateral spinal anesthesia for varicose vein surgery: A comparison of hyperbaric bupivacaine 7.5 mg versus hyperbaric bupivacaine 5 mg+ fentanyl25 mg.** Period biol. 2009;111:293–7.
9. Black AS, Newcombe GN, Plummer JL, Mcleod DH, Martin DK. **Spinal anesthesia for ambulatory arthroscopic surgery of the knee: A comparison of low-dose prilocaine and fentanyl with bupivacaine and fentanyl.** Br J Anaesth. 2011; 106:1.
10. Kim SY, Cho JE, Hong JY, Koo BN, Kim JM, Kil HK. **Comparison of intrathecal fentanyl and sufentanil in low-dose dilute bupivacaine spinal anesthesia for transurethtral prostatectomy.** Br J Anaesth 2009; 103:750–4.

11. Korhonen AM, Valane JV, Jokela RM, Ravaska P, Kortilla K. **Intrathecal hyperbaric bupivacaine 3 mg + fentanyl 10 micro g for outpatient knee arthroscopy with tourniquet.** Acta Anaesthesiol Scand. 2003; 47:342–6.

12. Kumar S, Bajwa SJ. **Neuroaxial opioids in geriatrics: A dose reduction study of local anesthetic with addition of sufentanil in lower limb surgery for elderly patients.** Saudi J Anaesth. 2011; 5:142–9.

13. Bailey PL, Streisand JB, East KA, East TD, Isern S, Hansen TW, Posthuma EF, Rozendaal FW, Pace NL, Stanley TH. **Difference in magnitude and duration of opioid-induced respiratory depression and analgesia with fentanyl and sufentanil.** Anaesth Analg 1990; 70:8–15.

14. Borgdorff PJ, Ionescu TI, Houweling PL, Knape JT. **Large dose intrathecal sufentanil prevents the hormonal stress response during major abdominal surgeries: A comparison with intravenous sufentanil in a prospective randomized trial.** Anesth Analg. 2004; 99:1114–20.

15. Olofsson C, Nygårds EB, Bjersten AB, Hessling A. **Low dose bupivacaine with sufentanil prevents hypotention after spinal anesthesia for hip repair in elderly patients.** Acta Anaesthesiol Scand 2004; 48:1240–4.

16. Slappendel R, Weber EW, Dirksen R, Gielen MJ, Van Limbeek J. **Optimization of the dose of intrathecal morphine in total hip surgery: A dose-finding study.** Anesth Analg. 1999; 88(4):822-6.

17. Bejarano González-Serna D, Utrera A, Gallego JI, Rodríguez R, De la Portilla F, Espinosa JE, Gil M. **Laparoscopic treatment of ventral hernia under spinal anesthesia.** Cir Esp. 2006; 80:168–70.

18. Bellows CF, Berger DH. **Infiltration of suture sites with local anesthesia for management of pain following laparoscopic ventral hernia repairs: A prospective randomized trial.** JSLS. 2006; 10: 345–50.

19. Hu S, Zhang ZY, Hua YQ, Li J, Cai ZD. **A comparison of regional and general anaesthesia for total replacement of the hip or knee: A meta-analysis.** J Bone Joint Surg Br. 2009; 91(7):935-42.

20. Bhattarai B, Shrestha S, Singh J. **Comparison of ondansetron and combination of ondansetron and dexamethasone as a prophylaxis for postoperative nausea and vomiting in adults undergoing elective laparoscopic surgery.** J Emerg Trauma Shock. 2011; 4:168–72.

21. Krobot R, Premuzic J, Grbcic P, Vucelic N. **Unilateral bupivacaine-fentanyl or bupivacaine-sufentanil spinal anesthesia for arthroscopic knee surgery.** Period biol. 2011; 113:235–8.

22. Wang LZ, Zhang YF, Tang BL, Yao KZ. **Effects of intrathecal and i.v. small-dose sufentanil on the median effective dose of intrathecal bupivacaine for Caesarean section.** Br J Anaesth. 2007; 98:792–6.

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