



COMPARISON BETWEEN GENERAL AND SPINAL ANESTHESIA IN INGUINAL HERNIA REPAIR IN CLINICAL UNIVERSITY HOSPITAL "ST. NAUM OHRIDSKI" - SKOPJE

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ABSTRACT

Most often recommended treatment for inguinal hernia diagnosed patients is surgery. Generally, the surgical treatment includes several components: opening the subcutaneous fat by incision of the abdominal wall, mobilization of cord structures, dissection of weakened tissue and closure of inguinal canal with application of sterile synthetic mesh patch used to repair and decrease the tension in the weakened area of the abdominal wall after mobilization of hernia. Usually, the patient is given general or local anesthesia. General anesthesia is defined as controlled unconsciousness resulted from administration of one or more anesthetics followed by loss of protective reflexes and also known as medically induced coma. The administration of local anesthetics leads to reversible loss of sensation of separate part of the body achieved by blockade of nerve conductivity. Postoperative complications can occur in both types of anesthesia. The aim of this research is comparison between general and spinal anesthesia in inguinal hernia repair in Clinical University Hospital "St. Naum Ohridski" in Skopje, for the period from September to November 2014. Patients with diagnosed inguinal hernia were selected from surgical department and divided into two groups: patients treated with local anesthesia and patients treated with spinal anesthesia. The study group included 186 patients, 132 male and 54 female patients, generally diagnosed with direct hernia located on one side. Obtained results were based on comparison of adverse reactions detected in general anesthesia treated patients (94) and patients who undergo operation with spinal anesthesia (92). The incidence of postoperative complications was significantly higher in patients undergoing general anesthesia compared with patients treated with spinal anesthesia. The most common observed postoperative complications included: urinary retention, headache, nausea and vomiting, significantly more pronounced in smoker patients. According to the obtained results in this research, spinal anesthesia is recommended as first choice for treatment of inguinal hernia in patients.

INTRODUCTION

Hernia is defined as protrusion of organs or fatty tissue, usually portion of intestines through a weakened

muscle tissue of abdominal wall, enriched with blood vessels and nerves [1,2,3]. Most common type of hernia is inguinal hernia, which is 10 time more common in man than in women, and usually occurs while lifting or moving heavy objects, coughing, excessive sneezing or in condition of general weakness [4-9]. The hernia sac passes through inguinal canal in spermatic cord up to scrotum.

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The content of hernia sac can cause significant scrotal enlargement [10-15]. The inguinal hernia in women is associated with passage of hernia sac through weakened inguinal canal where round ligament of the uterus passes, attaches the pubic bone and is positioned to labia major [16-19].

Localized pain is major symptom in the initial phase of inguinal hernia, which may radiate to the scrotum, while in later phase of the disease formed hernia sac is not associated with pain [20,21].

Diagnose of hernia is simple and usually requires examination from qualified health care provider, including family history, physical examination and also with imaging tests preferentially abdominal x ray, computed tomography and abdominal ultrasound [22]. Patients usually compliant of lump in the groin region associated with feeling of fullness and pain. The pain is more expressed when coughing and lifting and usually disappears when lying down.

Method of choice for inguinal hernia repair is surgical treatment. Generally, the surgical treatment includes several components: opening the subcutaneous fat by incision of the abdominal wall, mobilization of cord structures, dissection of weakened tissue and closure of inguinal canal with application of sterile synthetic mesh patch used to repair and decrease the tension in the weakened area of the abdominal wall after mobilization of hernia [23,24]. Usually, the patient is given general or local anesthesia. General anesthesia is defined as controlled unconsciousness resulted from administration of one or more anesthetics followed by loss of protective reflexes and also known as medically induced coma. The administration of local anesthetics leads to reversible loss of sensation of separate part of the body achieved by blockade of nerve conductivity. Postoperative complications can occur in both types of anesthesia [25,26]. General anesthesia is most commonly used for hernioplasty, usually because surgeon feels more comfortable when patient is under full anesthesia. However, spinal anesthesia is associated with lower incidence of postoperative complications and shorter stay in operating room. Also, another advantage of application of spinal anesthesia is conscious patient during the treatment who can cough to produce abdominal pressure if required to examine the safety of repair [27-30].

MATERIALS AND METHODS

The present cohort study used data from Clinical University Hospital "St. Naum Ohridski". The group involved 186 patients, 94 treated with general anesthesia and 92 with spinal anesthesia, undergoing low risk surgery hernioplasty. The authors identified consultations with surgeons who performed the intervention in period of 2 months, from September to November 2014. The final study population included generally adult patients, classified as ASA I and ASA II patients, without history of renal and cardiovascular diseases.

All patients from study group were submitted to non-invasive blood pressure monitoring, peripheral pulse oximetry and electrocardiography. Data were extracted and organized according to following characteristics: age, physiologic changes during perioperative period, postoperative pain and duration of hospitalization. Collected data were evaluated with social, epidemiological and descriptive method using statistical analysis. Obtained results are presented as numerical results and in tabular form.

RESULTS AND DISCUSSION

All patients were premedicated with intramuscular diazepam 0.1mg/kg. Preoperative, in all patients was inserted 20 gauge cannula for administration of 0.9% sodium chloride in dose of 10ml/kg.

Anesthesia was induced with application of thiopental sodium in dose of 5mg/kg and succinylcholine 2mg/kg administrated intravenously. Patients were intubated with tracheal tubes with appropriate size for adult men and women. Vital parameters were measured at a 5 minute interval. After successful induction, anesthesia was maintained with nitrous oxide 33:66 and pancuronium bromide 0.1mg/kg. Therefore, doses were repeated every 30 minutes. The intraoperative pain was managed with intravenous application of fentanyl 5 µg.kg⁻¹. Combination of neostigmine 0.05m/kg and atropine 1mg administrated intravenously was used to reverse the residual neuromuscular block at the end of the surgery. After extubating, patients received oxygen and were transferred to post-anesthesia recovery room.

Study group of 94 patients with administered spinal anesthesia were set in lying position and under full aseptic technique. Therefore, a subarachnoid puncture was done between L4 and L5 interspace, using 25G Quincke type spinal needle, followed with administration of 0.5% isobaric bupivacaine 3ml and 20 µg fentanyl in lateral decubitus. The compensation of oxygen was achieved by a tightly fitting face mask, while the sedation was generated with intravenous administration of 0.04ml/kg midazolam. Intraoperative monitoring consisted of non-invasive blood pressure monitoring, ECG and pulse oximetry.

Table 1 presents the number of patients undergoing hernia repair surgery, from September to November 2014.

Results are also graphically presented on Figure 1.

According to presented data from Table 1 and Figure 1, the number of patients operated with spinal anesthesia in November is increased compared with patients treated with spinal anesthesia in September. This is related to the lower incidence of postoperative complications in patients treated with spinal anesthesia compared with patients operated with general anesthesia.

Data in Table 2 presents the most common postoperative complications in operated patients with spinal and general anesthesia. The classification of



observed patients is based on gender and whether they are smokers or non-smokers.

From presented data, can be noticed that the number of male patients undergoing hernia repair is significantly higher compared with female patients which is related to the actual data from literature that hernia most commonly occur in male patients than in female patients.

Postoperative complications are more likely to occur in smoker patients than in non-smokers, as presented in the table. Cardiopulmonary complications were with lower incidence in both groups, usually tachycardia (26.6% vs. 6.6%, $p<0.001$) and hypertension (33.3% vs. 6.6%, $p<0.001$), more often manifested in patients treated with general anesthesia.

The frequency of nausea in patients treated with general anesthesia is higher than in patients treated with spinal anesthesia in recovery room (GA: 23.3%, SA: 6.6%

$p=0.015$) and consequently the number of used antiemetic medications is higher in patients undergoing general anesthesia (GA: 26.6%, SA: 10% $p=0.025$). The need for pain relief medication is more pronounced in patients operated with general anesthesia compared with patients undergoing surgery with spinal anesthesia (GA: 73.3%, SA: 26.6% $p<0.001$).

Intraoperative and postoperative occurrence of tachycardia and hypertension were significantly higher in patients treated with general anesthesia. However, surgeon satisfaction was more pronounced in group of patients operated with general anesthesia ($p<0.05$). 24 hours after the operation, the need for pain relief medication, nausea and urinary retention were approximately equal in both study groups, while vomiting was represented in higher incidence in patients operated with general anesthesia.

Table 1. Number of patients undergoing hernia repair surgery, treated with general and spinal anesthesia in Clinical University Hospital "St. Naum Ohridski" in Skopje, for the period from September to November 2014

Months	General Anesthesia	Spinal Anesthesia
September	30 (55%)	25 (45%)
October	35 (51%)	33 (49%)
November	29 (46%)	34 (54%)
Total	94 (51%)	92 (49%)

Table 2. Most common postoperative complications in patients treated with general and spinal anesthesia

Anesthesia	Gender		Male			Female		
			Smoker	Non-smoker	Total	Smoker	Non-smoker	Total
General	Total		22 (43%)	30(57%)	52	12(44%)	15(56%)	27
	Complications	Hypotension	10(77%)	3(23%)	13	5(71%)	2(29%)	7
		Nausea, vomiting	9 (69%)	4(31%)	13	6(60%)	4(40%)	10
		Headache	3(50%)	3(50%)	6	1(10%)	9(90%)	10
Spinal	Total		40(59%)	28(41%)	68	18(44%)	23(54%)	41
	Complications	Hypotension	19(73%)	7(27%)	26	9(64%)	5(36%)	14
		Nausea, Vomiting	5(83%)	1(17%)	6	3(60%)	2(40%)	5
		Headache	9(82%)	2(18%)	11	5(83%)	1(17%)	6

CONCLUSION

Postoperative complications are more pronounced in smoker patients compared with non-smokers. Cardiopulmonary complications were with lower incidence, represented as tachycardia and hypertension, more often manifested in study group treated with general anesthesia. In the recovery room, nausea and vomiting were more frequent in patients undergoing surgery with

general anesthesia, and also the need for pain relief medications is higher compared with group operated with spinal anesthesia. Spinal anesthesia has emerged as a method of choice for hernioplasty because of its safety, effectiveness, the lower incidence of postoperative complications and also because of the reduced need for pain relief medication and antiemetic drugs.



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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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