

Research Article

# Comparison Between General Anesthesia and Spinal Anesthesia in the Effect on Hemodynamic Stability in Patients Hernia Repair in Hospitals in the Iraqi City of Karbala

Adnan Abdul Adheem Kadhim<sup>1</sup> , Haider Ahmed Jalab Salem Al-Khikani<sup>2,\*</sup> ,  
Qasim Muhammad Hamza<sup>2</sup> , Yass Khudair Habib<sup>2</sup> ,  
Muhammad Mohsen Hussein<sup>2</sup> , Hassan Taqi Muhammad<sup>2</sup> 

<sup>1</sup>General Surgery Specialty, Al-Taff University College, Karbala, Iraq

<sup>2</sup>Anesthesia and Intensive Care Technology, Al-Taff University College, Karbala, Iraq

## Abstract

**Introduction:** When it comes to methods, drugs, strategies, and guidelines for selecting the best anesthesia, the primary concern of the anesthesia and critical care department staff remains selecting the anesthetic that poses the least risk to the patient's life. For individuals who repair hernias, spinal anesthesia is the most effective and common type of anesthetic. **Subjects and methods:** a current and precise analysis of the patients that visit Karbala's Al-Hassan Hospital and Al-Hussein Medical City. We separated the (100) patients who had a herniotomy into two groups based on the forms of spinal and general anesthesia (50) patients were put under spinal anesthesia and (50) patients were put under general anesthesia. Analysis was done on the patient's age, weight, blood pressure change, and pulse rate. In order to conduct meticulous follow-up before to, during, and following procedures, the study examined patients between the ages of (20) and (90) and separated them into two groups: general anesthesia (GA) and spinal anesthesia (SA). **Results:** We demonstrate that it is also more stable in SA, which is around (56%), compared to (GA), which is roughly (40%). However, blood pressure is higher in (GA), which was (32%), and in (SA), which was (24%), and lower in (GA), which was (28%), and in SA, it was (20%). As demonstrated in this study, the heart rate is more stable in (SA 56%) compared to (GA 32%), and it increases in (SA 34%), while it increases in (GA 60%). The impact of (SA) is more consistent, and the heart rate dropped by 10% in (SA) and around 8% in (GA). **Conclusions:** We discovered that spinal anesthesia was superior to general anesthesia in terms of maintaining minimum or normal heart rate and blood pressure stability.

## Keywords

General and Spinal Anesthesia, Hemodynamic Stability in Anesthesia, Hemodynamic Stability Hernia Repair in Anesthesia, Decreased Blood Pressure

\*Corresponding author: [hider.ahmed.j@gmail.com](mailto:hider.ahmed.j@gmail.com) (Haider Ahmed Jalab Salem Al-Khikani)

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## 1. Introduction

Hernia treatment approaches provide a number of difficulties, including the requirement for anesthesia during the process and postoperative analgesic medication. Open inguinal hernia surgery is performed under both spinal and general anesthesia [1]. Although less is known about the long-term consequences of chronic hypertension in children, children with hypertension are known to suffer end-organ damage and are at risk of acquiring hypertension as adults [2]. One of the main risk factors for adult kidney impairment, coronary artery disease, and stroke is hypertension. As required by the American Society of Anesthesiologists, monitoring include keeping a check on the patient's respiration, oxygenation, circulation, and temperature. Pre- and post-ductal oxygen saturation must be measured using a second pulse oximeter in addition to regular monitoring. A gradient between the pre- and post-ductal oxygen saturations might indicate an aggravation of pulmonary hypertension [3]. In order to reduce arterial blood pressure, propofol decreases myocardial contractility, preload, and systemic vascular resistance. Higher doses, cardiac problems, and extremes in age all make these effects more severe. Pain after injections and rare cases of thrombophlebitis Pain is reported by around 58% of propofol injectable users [4]. Modest to severe diastolic or systolic hypertension does not increase the risk of anesthesia, even if the blood pressure of most patients should recover to normal a few months before surgery. In the days preceding surgery, modest to moderate increases should not be acutely managed. Higher blood pressure rises are linked to increased operational risk and should be carefully controlled before surgery [5]. Since Bassini's first description of inguinal hernia surgery was published in 1887, several hernia repair techniques have been documented, such as Shouldice, Darning, Modified Bassini, Lichtenstein mesh repair, and the more recent laparoscopic approach. Due to its short recovery periods and low recurrence rates, laparoscopic and Lichtenstein mesh repairs have grown in popularity recently [6]. During general anesthesia, pulmonary aspiration of stomach contents and failed endotracheal intubation are the two primary causes of maternal morbidity and death. Intravenous ranitidine 50 mg, metoclopramide 10 mg, or both should be administered to patients with additional risk factors that raise their risk of aspiration one to two hours before general anesthesia is induced. These risk factors include symptoms of reflux, a potentially problematic airway, morbid obesity, and emergency surgery performed without a planned time of fasting. 30 to 45 minutes before induction, all patients should receive antacid prophylaxis with 30 mL of sodium citrate to prevent aspiration pneumonia. 40 mg of omeprazole taken orally as a pretreatment [7]. Propofol's main cardiovascular effect is a decrease in arterial blood pressure because it lowers preload, cardiac contractility, and systemic vascular resistance (sympathetic vasoconstrictor activity inhibition). The stimulation required for laryngoscopy and intubation frequently reverses hypotension after induction. Other factors, including large dosages, rapid injections, and

advanced age, are also associated with propofol-induced hypotension. Propofol dramatically reduces the normal arterial baroreflexes' response to hypotension [8]. When it comes to sevoflurane or isoflurane combined with (67%) nitrous oxide it was determined that comparing the two was not acceptable for inducing a single vital-capacity breath inhalation in (67) individuals [9] In (68) unplanned children ages (1-3) undergoing adenoidectomy the hemodynamic responses to halothane induction and maintenance of anesthesia were compared with those of sevoflurane [10]. The three anesthetic alternatives available for open groin hernia therapy are not available for all procedures The optimal anesthetic method needs to meet certain criteria. It ought to be as safe as possible simple and have little postoperative morbidity. It must be reasonably priced, provide a quick recovery free of side effects after surgery and be painless for the patient [11]. Clinical pharmacology research in obese patients suggests that the FFM (Fat-Free Mass) scalar may be a better choice for bolus dosing [12]. Another risk factor for myocardial damage following Noncardiac surgery is postoperative hypotension [13]. Aim of the study We developed obvious strategies to avoid this issue and eliminate all problems that lower morbidity and death because patients undergoing hernia surgery under general and spinal anesthesia were unable to establish circulatory stability.

## 2. Subjects and Methods

A total of (100) patients in this study had herniectomy operations; they were split into two equal groups of (50) each, with one group undergoing spinal anesthesia and the other general anesthesia. The patients' age, weight, blood pressure variations, and pulse rate were among the factors that were assessed. Participants were divided into two groups, one for spinal anesthesia (SA) and the other for general anesthesia (GA). Participants ranged in age from twenty to ninety. Prior to, during, and following the surgical process, we categorized a list of variables that might be seen in the operating room. The information gathered included blood pressure measurements along with related factors, such as occurrences of high or low blood pressure, fluctuations in heart rate, and mean arterial pressure (MAP), which may suggest that the patient is experiencing shock due to fluid loss or cardiac problems. It's crucial to be cautious when using inhaled anesthetics, as they can result in low blood pressure. The minimum alveolar concentration (MAC) denotes the level of inhaled anesthetic needed to inhibit movement in (50%) of individuals in reaction to a standard stimulus, like a surgical procedure. This measure enables comparisons of strength between various anesthetic drugs and acts as a benchmark for experimental assessments. Spinal anesthesia is a practical substitute for general anesthesia, effectively reducing pain during surgery by numbing the lower body, while enabling patients to stay awake during the operation. Most surgeries carried out below

the waist can be done with spinal anesthesia. An anesthetist gives a spinal anesthetic using Bupivacaine, which is known as the favored and most commonly used agent in surgical procedures. In comparison, propofol, which is the preferred medication for general anesthesia, has a significant effect on systemic blood pressure when assessed against other induction agents. This is mainly due to substantial vasodilation occurring in both the arterial and venous systems, which leads to decreases in preload and afterload. The effect on systemic blood pressure is particularly marked in older individuals, in patients with reduced intravascular fluid capacity, and after rapid administration. Additionally, the hypotensive effects are intensified by a diminished standard baroreflex response, resulting in only a slight increase in heart rate despite the vasodilation.

### 3. Results

In this research, as illustrated in the table regarding the Distribution of Patients to the Change in Blood Pressure, blood pressure appears to be more stable in spinal anesthesia (SA) at approximately (56%) compared to general anesthesia (GA) at around (40%). However, the increase in blood pressure is more pronounced in (GA), with figures of (32%) versus (24%) in (SA). Additionally, the decrease in blood pressure is also greater in (GA), recorded at (28%), while (SA) shows a decrease of (20%). These figures indicate that spinal anesthesia has a more stable effect on blood pressure than general anesthesia.

**Table 1.** Distribution of patients according to the change in Blood Pressure.

NO. OF PATIENT	INCREASE IN HR	REMAIN	DECREASE IN HR	TOTAL
GA GROUP	30	16	4	50
	60%	32%	8%	100%
SA GROUP	17	28	5	50
	34%	56%	10%	100%
TOTAL	47	44	9	100
	47%	44%	9%	100%

In this study, as shown in **Table 2**, there is more stability in heart rate, which is (56%) in (SA) but (32%) in (GA) and increase heart rate was (34%) in (SA) but (60%) in (GA), and

the percentage of decrease heart rate was (10%) in (SA) and about 8% in (GA), and the effect of (SA) is more stable.

**Table 2.** Distribution of patients according to the change in Heart rate.

TOTAL	DECREASE	REMAIN	INCREASE	NO. OF PATIENT
	IN BLOOD		IN BLOOD	
	PRESSURE		PRESSURE	
50	14	20	16	(GA) GROUP
100%	28%	40%	32%	
50	10	28	12	(SA) GROUP
100%	20%	56%	24%	
100	24	48	28	TOTAL
100%	24%	48%	28%	

### The relationship between age (GA) and Mean Arterial Pressure (GA)

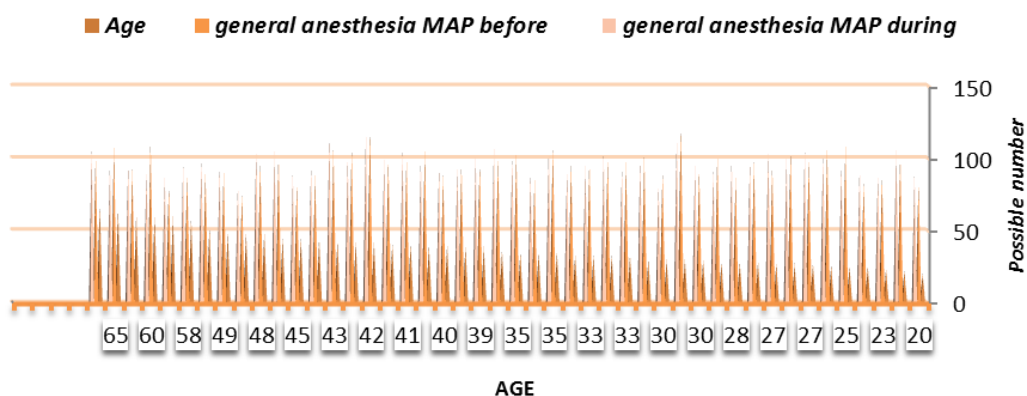


Figure 1. The relationship between age GA and Mean Arterial Pressure GA.

We also show that it is more constant in (SA 56%) than in (GA 40%). Without therapy, blood pressure rises higher in (GA 32%) than in (SA 24%); nevertheless, blood pressure falls more in (GA 28%) than in (SA 20%).

### The Relationship Mean Arterial Pressure (GA)

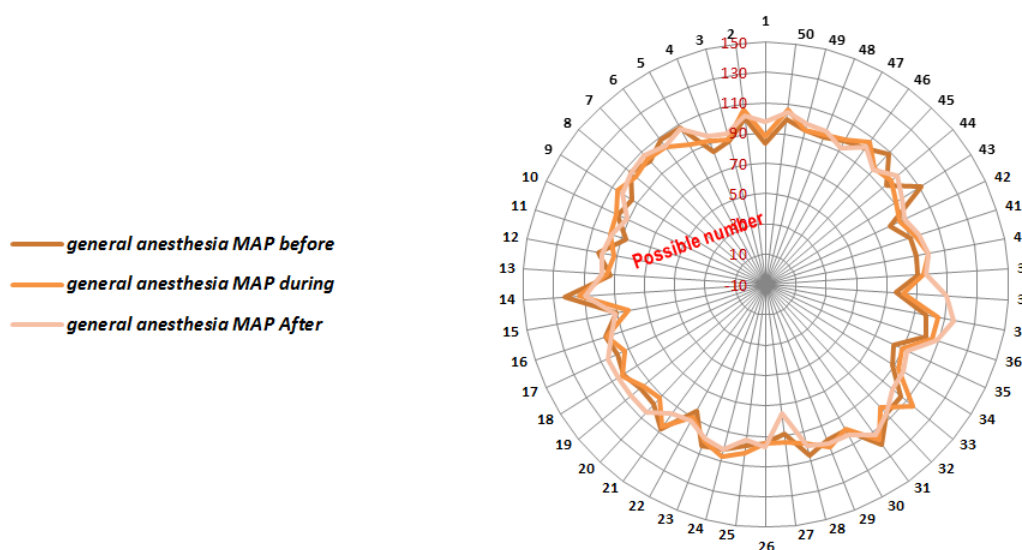


Figure 2. The Relationship Mean Arterial Pressure GA.

Blood pressure is likewise more steady in (SA 56%) than in (GA 40%), however raise blood pressure is more in (GA 32%), while fall blood pressure is also more in (GA 28%). So, based on the data and statistics presented here, spinal anesthesia is better and more stable.

## 4. Discussion

According to Courtney J. Balentine, inguinal hernia repair is the most common surgery performed in the U.S. 15% to 20% of these procedures are done with general anesthesia, while the remaining 80% are done with local anesthetic. We anticipated that the advantages of local anesthetic versus general anesthesia

for inguinal hernia surgery would increase with age [15]. According to Bay-Nielsen, regional anesthesia has the highest rates of complications, whereas local infiltration has the lowest rates of complications. The elective groin hernia repair procedure had a death rate of 0.12% within 30 days. Patients who passed away within a week after the surgery were significantly more likely to have had regional anesthetic [16]. Dear Anthony Rodgers, Neuraxial blocking lowers serious complications, like postoperative death. More studies are required to find out the level of these benefits and if they are only due to avoiding general anesthesia, total mortality, DVT, pulmonary embolism, heart attack, transfusion needs, pneumonia, other infections, respiratory failure, and kidney failure [17]. David L Reich

found that severe low blood pressure after anesthesia begins is quite common, and it happens more often in the 5–10 minute period following induction than at other times. In summary, it is wise to look for alternatives to using propofol for anesthesia induction in patients over 50 years old with ASA physical status  $\geq$ III; 9% of patients had significant hypotension during the 0 – 10 minutes following anesthetic induction in typical clinical settings [18]. Al-Khikani et al., the researchers of this study, examined the effects of general and spinal anesthesia on patients' stability in blood circulation. Undergoing hernia repair. Since studies have shown that spinal anesthesia is more stable than general anesthesia, potential issues may arise, but the cardiovascular system remains unaffected, and the advantage must be enhanced through careful and accurate practice rather than relying on it. It is important to identify and fix blood circulation issues that deviate from the planned route.

## 5. Conclusions

A notable rise in heart rate was noted during general anesthesia, while spinal anesthesia showed more stability. Likewise, mean arterial pressure (MAP) experienced a significant increase under general anesthesia, unlike the steadier readings found with spinal anesthesia. Blood pressure (PB) also experienced a significant rise during general anesthesia, but remained steadier with spinal anesthesia. Maintaining hemodynamic stability is crucial for ensuring a proper balance between oxygen supply and demand in the heart. To reach this objective, various agents and techniques can be employed, such as combinations of fentanyl with isoflurane, sevoflurane, or propofol. Volatile anesthetics offer heart protective effects through several mechanisms [13]. The scientific principles and training methods correspond with the revised guidelines from the American Heart Association regarding CPR and Emergency Cardiovascular Care. The Basic Life Support (BLS) course provided by the American Heart Association is strongly suggested for healthcare professionals and others who need training in performing CPR and various vital cardiovascular life support techniques in different situations [14]. Many patients undergoing general anesthesia are at risk for the common occurrence of intraoperative hypotension (IH). The occurrence of IH is connected to serious postoperative issues, like kidney failure, heart injury, and a higher risk of death [15].

## Abbreviations

GA	General Anesthesia
SA	Spinal Anesthesia
IH	Intraoperative Hypotension
BLS	Basic Life Support
BMI	Body Mass Index
FFM	Fat Free Mass

## Conflicts of Interest

The authors declare no conflicts of interest.

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