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Spinal Anesthesia and Femoral Fractures

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Abstract: Background: Most hip fracture patients are elderly and treated with surgery that requires anaesthesia where the fracture is due to a simple fall or another type, and These patients often have many other medical problems associated with aging that put them at risk of dying after anaesthesia. **Objective:** This research aims to study the impact of spinal Anaesthesia on femoral fractures (hip fractures). **Materials and methods:** In this study, 80 pain patients were recruited into Femoral Fractures, where they were administered on two groups of anaesthesia, namely spinal anaesthesia and general anaesthesia**.** The two types of anaesthesia were applied to both sexes, male and female, for both groups: spinal anaesthesia for 40 patients and general anaesthesia for ages between 50 and 70, considering the height and weight of the patient in diagnosing patients' condition. This study relies on the SPSS program to determine the mean, SD, and the application of statistics to find out which anaesthesia most affects spinal or general on both of male and female patients. **Results:** This study specialized in the results of the analysis based on specific topics such as age, gender, Weight Surgical Techniques, Weight Surgical Techniques, and Smoking Anaesthesia Time for the patient for both males and females, where these data were divided into two groups: Spinal Anaesthesia, the number of 40, and the other, General Anaesthesia, the number of 40. This paper presented the ASA classification for four types, including Healthy, Mild systemic disease, Severe systemic disease, and not incapacitating, where Mild systemic disease included the most cases of both patients for two groups, Spinal with 12 (30%) and General 10 (25%) with a P-value of up to 0.042. Conclusion: The results indicate that the survival during 30 days after hip fracture surgery for patients under spinal anaesthesia is more survival and lower mortality rate than for patients under general anaesthesia regarding the incidence of deep vein thrombosis and the amount of blood lost. Patients under general anaesthesia are most susceptible to complications, as hypotension was caused by spinal anaesthesia because of the amount of blood lost.

Keywords: Spinal Anaesthesia; General Anaesthesia; Hip fractures; Hemiarthroplasty, Hypotension.

INTRODUCTION

People over 65 have two times more disabilities and four times more restrictions, they visit a doctor more frequently, and their stay in the hospital is longer. [Roche, J.J.W. *et al*., 2005]

Most hip fracture patients are elderly and treated with surgery that requires anaesthesia. In general, the fracture is due to a simple fall. These patients often have many other medical problems associated with aging that put them at risk of dying after anaesthesia. Spinal anaesthesia involves injecting a solution containing a spinal anesthetic into the spine (axial nerve block) or around the nerves outside the spine (peripheral nerve block) to prevent leg pain from a hip fracture. [Miller, C.P. *et al*., 2014]

Cuba has an aging population due to an increase in life expectancy, which means an increase in various surgeries, such as hip surgery due to osteoporosis and falls from one's height. [Lee, D.J. *et al*., 2014]

Fall is one of the most important predisposing factors for hip fracture, and the risk of falling increases with age, affected by neuromuscular changes, general deterioration, consumption of anxiolytics or psychotropic substances, neurological diseases, disoriented state, and decreased defense mechanisms. Between 25 and 33% of those over 64 years of age report a decrease in the past year, while the incidence in people over 80 years of age increases by up to 50%. [Sandby-Thomas, M. *et al*., 2008; Yun, M.J. *et al*., 2009; Iamaroon, A. *et al*., 2010]

In England, 77,000 hip fractures occur annually. 75% of fractures occur in women, and more than 98% were surgical (5). Mexico has more than 100 daily fractures, and the annual fracture rates in the two major health systems were published in 2005 and correspond to 169 women and 98 men per 10,000 person-years. [Bhana, N. *et al*., 2000; Tobias, J.D. *et al*., 2012]

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Cases will double in North America in 2030. It is currently one of the most common orthopedic procedures associated with perioperative morbidity and mortality, and mortality at one year after fracture is approximately 30%, although only 10% is also attributable to fracture. [Erdil, F. *et al*., 2009]

Due to the frequent occurrence of this disease among the elderly, making it amenable to surgical treatment, it has had a significant impact on the practice of anaesthesia. In recent decades, more and more surgeries have been performed than a few years ago, as aging and its attendant conditions increase morbidity and mortality. [Neuman, M.D. *et al*., 2012; Dahan, A. *et al*., 2011]

The purposes of anaesthesia have not changed, despite the development of new technologies and therapies, since the organs most involved in the practice of anaesthesia are those related to the autonomic, central, peripheral, cardiovascular, and renal nervous systems, including the liver. [National Services Scotland, 2019]

Optimal management of anaesthesia depends on a clear understanding of the anatomical, physiological, pharmacodynamic, and kinetic changes that occur with age. Indeed, the effects of age on anaesthesia medications should be considered in geriatric patients. [Frey, T.M. *et al*., 2019; Stanley, T.H. *et al*., 2014]

Although there are many anaesthesia techniques available for hip surgery, the choice of technique depends on several factors: the patient's comorbidities, the type of revision, the reason for the revision, the expected duration, and the expected blood loss [Jonkman, K. *et al*., 2017]. This paper aims to study the impact of Spinal Anaesthesia on Femoral Fractures.

MATERIALS AND METHODS

In this study, 80 pain patients were recruited into Femoral Fractures, where they were administered on two groups of anaesthesia, namely spinal anaesthesia and general anaesthesia. The two types of anaesthesia were applied to both sexes, male and female, for both groups: spinal anaesthesia for 40 patients and general anaesthesia for ages between 50 and 70; considering the height and weight of the patient in diagnosing his condition then, you can see it in Table 1.

Both anaesthesia included patients in weights 170 for spinal anaesthesia 172 for the year on both sexes, where certain techniques and mechanisms were implemented in this thesis, where hemiarthroplasty and ORIF % to include their association with spinal anaesthesia for general anaesthesia. This study was built on the basis that the time of anaesthesia reaches the spinal and general, where the smoking factor was taken into account in the effect of the fracture, as well as the effect of smoking on the diagnosis of the patient's fracture and the necessary surgery.

Based on ASA classification, ASA has been classified into four types, including Healthy, Mild systemic disease, Severe systemic disease, and not incapacitating.

Moreover, postoperative pain scores for fractured patients were estimated, and these scores included Lateral position, Lumbar puncture, and Hip flexion, as shown in Figure 1. This study identified all Intraoperative adverse effects and perioperative complications.

These complications include Bradycardia, Agitation, Hypotension, and Incomplete anaesthesia, as shown in Table 3, and the evaluation of blood loss during hip fracture surgery, as shown in Figure 2.

This study diagnosed both types of anaesthesia based on the number of deaths for both types of anaesthesia.

RESULTS

Table 1: Characteristics of demographic results of patients

Variables	Spinal Anaesthesia (N=40)	General Anaesthesia (N=40)	P-value
Age, N (%)			
50-54	7 (17.5%)	6 (15%)	0.0573
55-59	9 (22.5%)	12 (30%)	0.036
60-64	10 (25%)	9 (22.5%)	0.043
65-70	14 (35%)	13 (32.5%)	0.045
Height			

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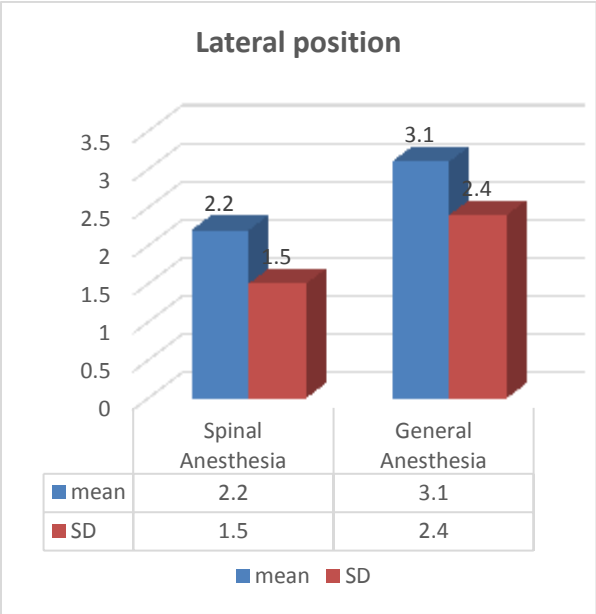
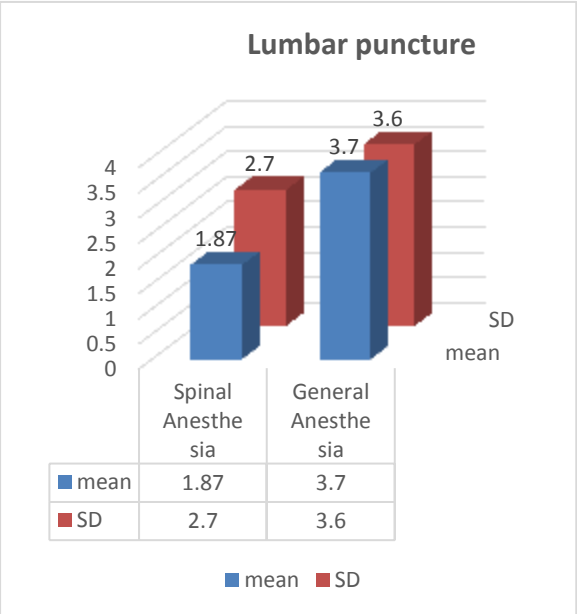
Male	174±4	177±5	0.043
Female	165±5.3	162±3.3	0.041
Weight			
Male	90±4.2	94±2.5	0.041
Female	82±2.7	85±3.9	0.037
Sex			
Male	29 (72.5%)	23 (57.5%)	0.033
Female	11 (27.5%)	17 (42.5%)	0.028
Surgical Techniques n %			
Hemiarthroplasty %	25 (62.5%)	27 (67.5%)	0.041
ORIF	25 (37.5%)	13 (32.5%)	0.0422
Anaesthesia Time(min)	120±26	125±26	0.0445
Smoking			
Yes	30 (75%)	33 (82.5%)	0.036
No	10 (25%)	7 (17.5%)	0.0386

Table 2: Distribution of patients according to ASA classification

ASA type	Spinal Anaesthesia (N=40)	General Anaesthesia (N=40)	P-value
Healthy	9 (22.5%)	8 (20%)	0.0476
Mild systemic disease	12 (30%)	10 (25%)	0.042
Severe systemic disease, not	10 (25%)	11 (27.5%)	0.048
incapacitating	9 (22.5%)	11 (27.5%)	0.043





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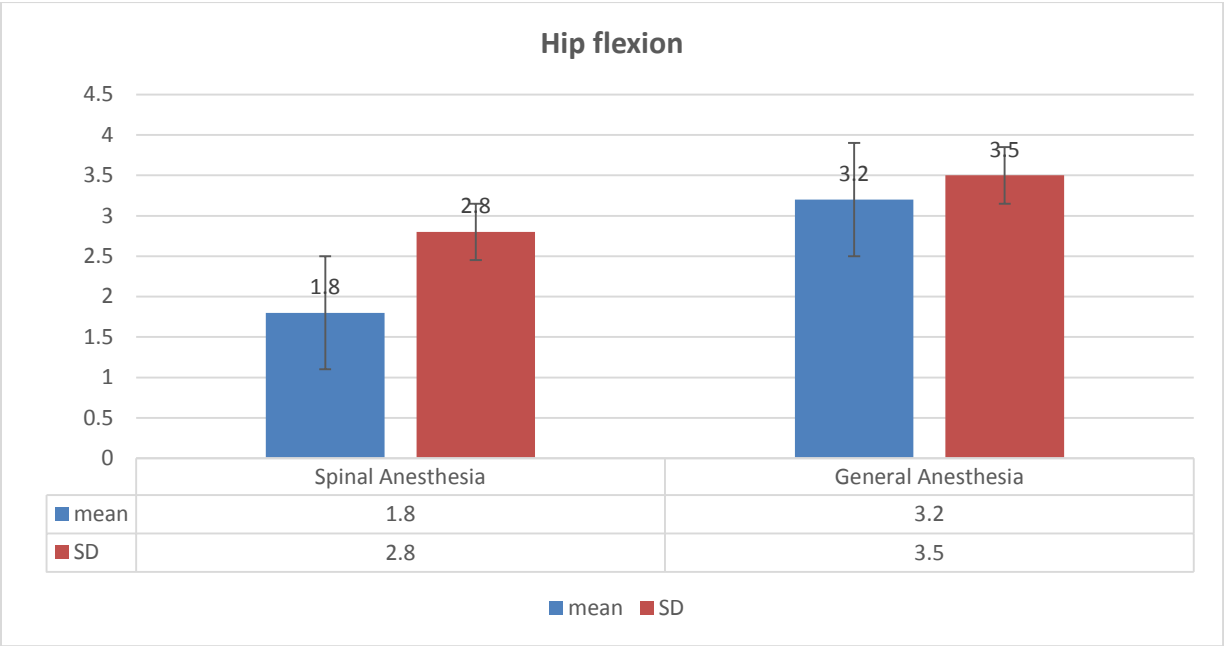

Figure 1: Pain scores to the positional changes during spinal anaesthesia procedures

Table 3: Intraoperative adverse effects and perioperative complications

Complications	Spinal Anaesthesia (N=40)	General Anaesthesia (N=40)	P-value
Bradycardia	2 (5%)	6 (15%)	0.023
Agitation	6 (15%)	3 (7.5%)	0.028
Hypotension	3 (7.5%)	8 (20%)	0.032
Incomplete anaesthesia	5 (12.5%)	5 (12.5%)	0.05

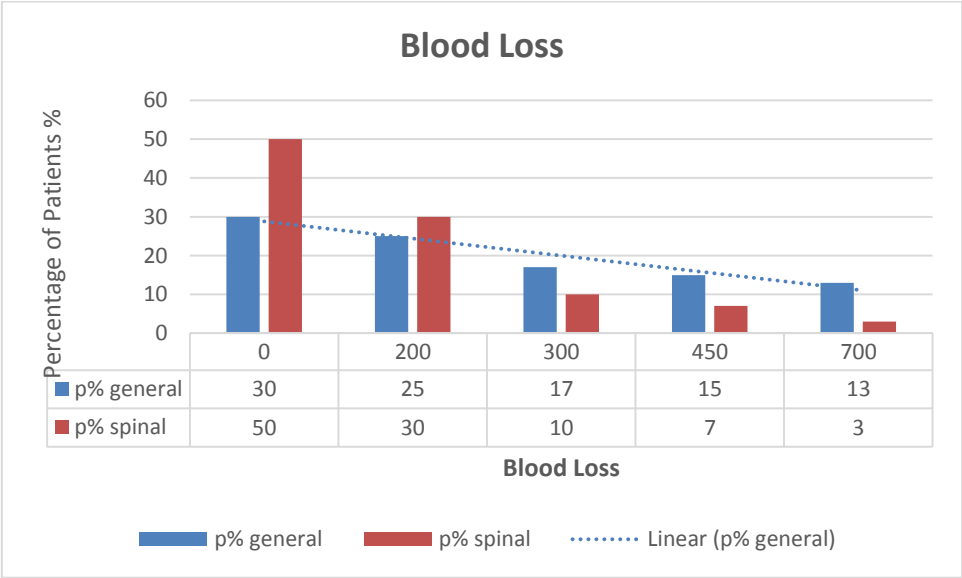

Figure 2: Evaluation of blood loss during hip fracture surgery

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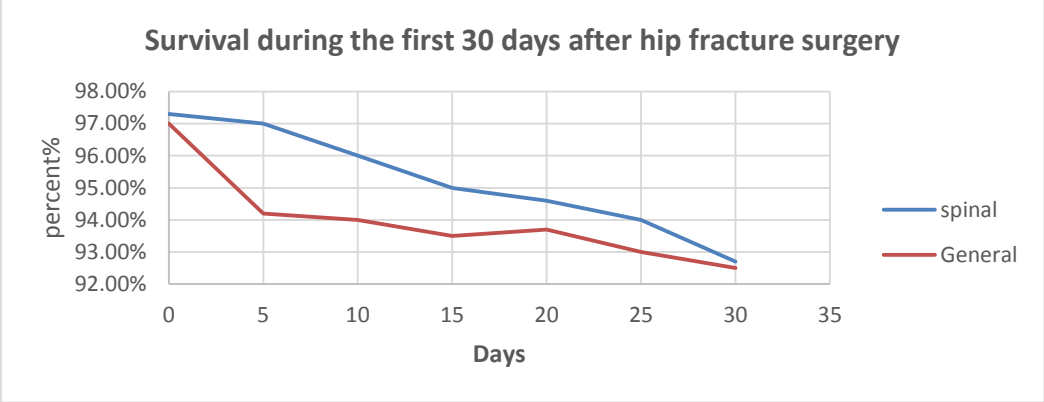

Figure 3: Survival during the first 30 days after hip fracture surgery

DISCUSSION

This study was applied to 80 cases of hip fracture patients, as a statistical study was conducted in hospitals registered with data in Iraq.

This study specialized in the results of the analysis based on specific topics such as age, gender, Weight Surgical Techniques, Weight Surgical Techniques, Smoking Anaesthesia Time for the patient for both males and females, where these data were divided into two groups: Spinal Anaesthesia, the number of 40, and the other, General Anaesthesia, the number of 40.

In terms of age, this study estimated that most people over the age of 50 are more likely to undergo hip fracture surgeries, as the number of cases reached 14 (35%) for Spinal Anaesthesia and 13 (32.5%) for General Anaesthesia with a P value of 0.045.

This paper also dealt with the study of the patients' heights and weights, which reached the lengths for both females and males of Iraqi patients, as it determined males to be 174 ± 4 Spinal, while females Anaesthesia, General Anaesthesia 177 ± five as shown in Table 1. Studies in Germany have shown that the factor of weight, smoking, and other puts the patient at greater risk and lead to osteoporosis, and this is what makes people over fifty more vulnerable to injury. [Lötsch, J. *et al*., 2005]

Also, this study estimated the percentage of smokers for both types of anaesthesia, Spinal and General, as smokers were 30 (75%) for Spinal Anaesthesia, 33 (82.5%) for General Anaesthesia, while non-smokers were 10 (25%), Spinal Anaesthesia 7 (17.5%), General Anaesthesia. In addition, this study presented both types of Surgical Techniques related to hip fractures and included both Hemiarthroplasty and ORIF. Hemiarthroplasty for Spinal Anaesthesia reached 25 (62.5%), for General Anaesthesia 27 (67.5%), while for ORIF 25 (37.5%) for Spinal Anaesthesia 13 (32.5%) for General Anaesthesia. It demonstrated modern surgical techniques and was applied in several hospitals in Brazil, and they underwent 240 cases of patients with spinal and general anaesthesia. Both Hemiarthroplasty and ORIF were used, and their effect and strength in spinal anaesthesia were more than in general anaesthesia. [Chau, D.L. *et al*., 2008]

This paper presented the ASA classification for four types, including Healthy, Mild systemic disease, Severe systemic disease, and not incapacitating, where Mild systemic disease included the most cases of both patients for two groups, Spinal with 12 (30%) and General 10 (25%) with a P-value of up to 0.042 as shown in Table 2.

This study presents Pain scores to the positional changes during spinal anaesthesia procedures related to three types of Lateral position, Lumbar puncture, and Hip flexion, where the highest pain scores were reached for Lateral position (), Lumbar puncture (), and Hip flexion (). This study presented intraoperative adverse effects and perioperative complications, including Bradycardia, Agitation, Hypotension, and Incomplete anaesthesia. The most effective effect on patients was Hypotension for General Anaesthesia, which reached 8 (20%) cases, while Agitation was 6 (15%), as shown in Table 3; where Some patients lose a lot of blood, and this is shown in Figure 2, where most of the blood loss reached patients with General Anaesthesia, making the possibility of his survival a matter of concern, [Sia, S. *et al*., 2004; Mei, B. *et al*., 2018; Su, X. *et al*., 2016] and that is displays Figure 3 Survival during the first 30 days after hip fracture surgeon, and the flow path of the line was for patients Under Spinal Anaesthesia more surviving than

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General Anaesthesia. [Inouye, S.K. *et al*., 2014; Kim, K.H. *et al*., 2014]

CONCLUSION

In conclusion, these studies were subjected to 80 patients for each of the two groups, 40 patients under general anaesthesia and 40 under spinal anaesthesia in Baghdad hospitals for both male and female patients, as more hip fractures affect males than females. In addition to, the factors of weight, smoking, and the age of the patient, which increase the severity of complications after surgery, which cause blood loss and the patient's life.

The results indicate that the survival during 30 days after hip fracture surgery for patients under spinal anaesthesia is more survival and lower mortality rate than for patients under general anaesthesia with regard to the incidence of deep vein thrombosis and the amount of blood lost. Patients under general anaesthesia are most susceptible to complications, as hypotension was caused by spinal anaesthesia as a result of the amount of blood lost.

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