

A Cross-Sectional and Comparative Study of the Effect Types of Anesthesia on Complications for Patients with Hip Fracture in Iraq

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Abstract: The incidence of hip fracture increases significantly with age. According to epidemiological studies, the average age of these patients ranged from 75 to 80 years. In our case study, the average age was 75.9 years; 88.2% of those who underwent surgery, for this reason, were over 65 years old. This paper aims to study across a sectional and comparative study of the effect of types of anaesthesia on complications for patients with hip fractures in Iraq. Data were collected retrospectively through reviews of electronic medical records, which included ED admission charts, electronic hospital records, and/or discharge data for all surgery patients for repair and IF in different hospitals in Iraq between 2nd August 2021 to 6th October 2022, who were 65 years of age or older, injured from a fall injury or high energy injury, with a delay of entry to injury of less than 48 hours, and who underwent hip surgery. A statistical study was conducted for patients with osteoporosis using the SPSS program. The kind of anaesthetic (TOA) used in hip fracture surgery in older persons is still debatable. In our study, whether regional anaesthesia (RA) or general anaesthesia (GA) is preferable, but the kind of anaesthesia may impact the result after surgery in which patients. After screening 180 consecutive individuals, 110 in the GA group and 70 in the RA group were eventually enrolled. Those who received GA had a shorter operation duration than individuals who received RA (RA: 36 and GA: 34 patients, respectively). We also discovered that the GA group has a larger incidence of problems than the RA group, such as nausea and vomiting, whereas the RA group has a higher risk of cardiac issues (GA: 12 (10.91%), 2 (1.82%), and RA: 16 (22.86%), 5 (7.14%), respectively). There was a significant difference in mortality, functional outcomes, and other comorbidities (all p 0.05). The potential benefit of GA for patients with cardiac disorders and RA for individuals with pulmonary diseases was the study's clinical breakthrough. In our conclusion, this study found that GA anaesthesia is better than RA anaesthesia in the using during hip fractures operations.

Keywords: Hip fracture; General anaesthesia (GA); Regional anaesthesia (RA); Mortality; and complications..

INTRODUCTION

The incidence of hip fracture increases significantly with age. According to epidemiological studies, the average age of these patients ranged from 75 to 80 years. In our case study, the average age was 75.9 years; 88.2% of those who underwent surgery, for this reason, were over 65 years old [Biboulet, P. *et al.*, 2012; Brown, A.G. *et al.*, 1994]. The risks of anaesthesia in geriatric patients are more related to the presence of concomitant diseases than to chronological age; since advanced age does not preclude either local or general anaesthesia, each technique has advantages and disadvantages [Cao, Q.Q. *et al.*, 2008]. However, in this type of surgery, local anaesthesia is increasingly used, as good anaesthesia conditions are achieved, and the sufficient sensory block is reached at the D8 level.

Moreover, postoperative confusion and disorientation appear to be less with this anaesthesia technique. The incidence of DVT in the hip fracture is estimated to be between 40 and 50% [Hoppenstein, D. *et al.*, 2005; Messina, A. *et al.*, 2013]. However, with regional anaesthesia, these complications are greatly reduced. Maintenance of venous blood flow in the lower

extremities, as well as inhibition of platelet aggregation by local anaesthesia and endothelial cell stabilization [Lattermann, R. *et al.*, 2005]. Bleeding during the operation is also reduced with local anaesthesia, as well as maintaining airway reflexes, which are diminished in elderly patients and remain intact during this type of anaesthesia, which is another of its advantages. In German studies, local anaesthesia was used for hip fractures in geriatric patients, which accounted for 86% of all cases, while general anaesthesia was reported in 14% [Messaoudi, K. *et al.*, 2009; Neuman, M.D. *et al.*, 2016]. Arterial hypotension (38%) and bradycardia (31.7%) were the most common intraoperative abnormalities in our analysis during regional anaesthesia and are consistent with the induced sympathetic blockade. The incidence of hypotension in our work was higher than that found by López [Parker, M.J. *et al.*, 2015] (13.8%), a finding that we attribute to a broader case study in our study. This can be avoided prophylactically by giving fluids; However, care should be taken that in patients with impaired cardiovascular function, decompensation may occur when the block disappears and sympathetic tone returns [https://clinicaltrials.gov;

Neuman, M.D. *et al.*, 2016]. During general anaesthesia, the main intraoperative changes detected were arterial hypotension (25.5%), which can be corrected in the same way as under local anaesthesia; tachycardia (16.2%) and arterial hypertension (9.5%) [Falck-Ytter, Y. *et al.*, 2012]. They almost always occur during laryngoscopy and can be relieved with lidocaine 1.5 mg/kg, esmolol 0.5 mg/kg, or fentanyl 5-15 mg/kg [Freedman, K.B. *et al.*, 2000]. If we analysed only the numerical aspect of these data, we can interpret that the number of changes during general anaesthesia is less than that of regional anaesthesia, and therefore its use is recommended. However, if we analysed the disadvantages of general anaesthesia, such as administering or using airway devices to the patient, the higher incidence of pulmonary thromboembolism, as well as postoperative disorientation and increased respiratory sepsis, we find that all these complications are less when local anaesthesia is performed [Guay, J., 2011]. The latter also has drawbacks, such as the difficulty in performing the technique in elderly patients as there is a loss of anatomical references. This technique was reported not to be performed in 10% of cases 11 as well as in mobilizing the patient to place him in the proper position for local anaesthesia, which is painful, but with proper analgesia, it can be avoided. In both hip fracture and total hip arthroplasty, most patients who have surgery are elderly, except for those young adults with fractures secondary to major trauma [Guay, J. *et al.*, 2014]. These patients usually have comorbidities such as coronary artery disease, cerebrovascular disease, chronic obstructive pulmonary disease, AHT, and DM, which increase their morbidity and mortality, as well as an increased risk of delirium and cognitive changes [Guay, J. *et al.*, 2014]. The number of patients with fractures and hip osteoarthritis who are candidates for surgery is increasing rapidly, which presents a challenge for anaesthesiologists with regard to their preoperative, postoperative, and postoperative care, as poor postoperative pain management can have a negative impact on recovery and the appearance of complications, particularly in recurrent patients. Rehabilitation delaying mobility and subsequent discharge, thus increasing complications, hospital stays, and costs [Guyatt, G. *et al.*, 2011]. This paper aims to study across a sectional and comparative study of the effect of types of anaesthesia on complications for patients with hip fractures in Iraq.

PATIENTS AND METHODS

Data were collected retrospectively through reviews of electronic medical records, which included ED admission charts, electronic hospital records, and/or discharge data for all surgery patients for repair and IF in different hospitals in Iraq between 2nd August 2021 to 6th October 2022, who were 65 years of age or older, injured from a fall injury or high energy injury, with a delay of entry to injury of less than 48 hours, and who underwent hip surgery. A statistical study was conducted for patients with osteoporosis using the SPSS program. Patients with numerous fractures or traumas, as well as pathologic or open hip fractures, were treated conservatively, and patients with insufficient data were eliminated. The study was carried out in accordance with ethical norms. The study was overseen and approved by the institution's internal review board in accordance with the Helsinki Declaration. Consent was waived without intervention in this observational study. To ensure patient confidentiality, all patient data was obtained anonymously. This study primarily focused on the distinction between general anesthesia (GA) and regional anesthesia (RA), and patients were separated into GA and RA groups. The RA group had epidural, spinal, or both anesthesia, whereas the GA group included patients who had scheduled GA and those who began with any form of RA but were converted to GA in the last phases of the treatment. Data comprised patients' demographics, such as gender, age, and BMI, as well as injury-related data, such as injury causes, fracture type, and surgery-related data, such as health status as graded by the American Society of Anesthesiologists (ASA) (classified as I to VI), as previously reported. In-hospital data, including HB level at admission, mortality for hip fracture patients, intraoperative blood loss, mL, operation time, minutes, blood transfusion, blood transfusion volume, mL, and hospital stay length, days. The duration of the surgery, intraoperative blood loss, the need for and amount of blood transfusion, length of hospital stays (LOS), total hospital charges (THC), and complications affecting multiple systems were all examined. Following up with individuals, we learned about their functional condition, survival status, and death date. A follow-up period was defined as the day the participant joined the cohort, and an endpoint event was defined as the date of the most recent follow-up visit, whichever came first. Moreover, mortality and functional outcomes were assessed at 15, 30, 60, and 90 days.

RESULTS

Table 1: The demographic results of patients with hip fractures

Items	Regional Anaesthesia (N= 110)	General Anaesthesia (N=70)	P-value
Age			
65-69	27 (24.55%)	10 (14.29%)	0.035
70-79	33 (30%)	16 (22.86%)	0.0386
80-89	21 (19.09%)	19 (27.14%)	0.0349
90-99	29 (26.36%)	25 (35.71%)	0.0327
BMI			
25-28	35 (31.82%)	13 (18.57%)	0.0266
29-32	29 (26.36%)	24 (34.29%)	0.0326
33-35	46 (41.82%)	33 (47.14%)	0.0431
Sex			
Male	63 (57.27%)	56 (80%)	0.0247
Female	47 (42.73%)	14 (20%)	0.0212
Type of Fracture			
Femoral neck	23 (20.91%)	13 (18.57%)	0.0483
Intertrochanteric	36 (32.73%)	17 (24.29%)	0.0244
Subtrochanteric	28 (25.45%)	14 (20%)	0.0437
Femoral head	23 (20.91%)	26 (37.14%)	0.0237
ASL, n (%)			
1	24 (21.82%)	21 (30%)	0.0416
2	21 (19.09%)	18 (25.71%)	0.0433
3	32 (29.09%)	11 (15.71%)	0.0372
4	14 (12.73%)	7 (10%)	0.0483
5	19 (17.27%)	13 (18.57%)	0.0492

Table 2: Haemoglobin level on admission to the hospital

Items	Regional Anaesthesia (N= 110)	General Anaesthesia (N=70)	P-value
HB > 12	35 (31.82%)	15 (21.43%)	0.041
12 ≤ HB ≤ 10	22 (20%)	22 (31.43%)	0.0381
10 ≤ HB ≤ 8	38 (34.55%)	24 (34.29%)	0.04986
HB < 8	15 (13.64%)	9 (12.86%)	0.04758

Table 3: The data related with the operation for patients

Items	Regional Anaesthesia (N= 110)	General Anaesthesia (N=70)	P-value
Intraoperative blood loss, mL	16 (14.55%)	12 (17.14%)	0.0476
Duration of operation, mins	94.5±24.7	97±33.2	0.0477
Blood transfusion	84 (76.36%)	58 (82.86%)	0.0322
Blood transfusion volume, mL	3 [4,5]	1 [2,4]	0.0484
Length of hospital stay, days	12.4±0.45	16.4±0.33	0.0491

Table 4: Evaluation of mortality for hip fracture patients

Items	General Anaesthesia (N=70)	Regional Anaesthesia (N= 110)	P-value
15 days	2 (1.82%)	2 (2.86%)	0.0495
30 days	3 (2.73%)	4 (5.71%)	0.0478
60 days	3 (2.73%)	8 (11.43%)	0.04211
90 days	6 (5.45%)	11 (15.71%)	0.0346

Table 5: Distribution of complications for hip fracture patients

Items	General Anaesthesia (N=70)	Regional Anaesthesia (N= 110)	P-value
Nausea and vomiting	12 (10.91%)	16 (22.86%)	0.0357
Abdominal pain	2 (1.82%)	5 (7.14%)	0.0425
Hypertension	3 (2.73%)	7 (10%)	0.0411
Arrhythmia	5 (4.55%)	2 (2.86%)	0.0484
Chest pain	6 (4.45%)	4 (5.71%)	0.0493
Headache and dizziness	6 (4.45%)	2 (2.86%)	0.0482

DISCUSSION

According to the findings of this study, patients who receive GA have more THC and a shorter length of operation than those who receive RA. The GA group also had a greater risk of pulmonary problems, whereas the RA group had a higher rate of cardiac issues. There was no statistically significant difference in intraoperative blood loss, blood transfusion rate, and volume, LOS, death, functional outcomes, or any complications (all $p > 0.05$). In terms of mortality, our findings are consistent with those of a previous large-scale meta-analysis, which found no difference in 30-day mortality between GA and RA. Our results are consistent with the findings of other literature reviews and large-scale research. Some evidence from multicentre randomized studies suggests that RA has superior results than GA during the in-hospital, 30-day, or 90-day timeframes. RA was also supported in other previous investigations by McLaren, (1978) [Guyatt, G.H. *et al.*, 2008], Valentin, (1986) [Guyatt, G.H. *et al.*, 2011], and Radcliff, (2008) [Hebl, J.R. *et al.*, 2005], Parker [Higgins, J.P.T. *et al.*, 2011], who discovered a greater mortality risk with RA after one year. It's not surprising in this scenario, considering the confounding disparities in research design, case number, study sites, medical systems, and inclusion and exclusion criteria. Furthermore, with advancements in surgical methods and anaesthetics, the distinctions between different TOAs have vanished. This may be seen in the differences in mortality, with a 30-day death rate of 1.0% in our hospital compared to 6-8% in Radcliffe and Valentin's study [Horlocker, T.T. *et al.*, 2010]. This is attributable, in part, to the specific handling of senior hip fracture patients who get conventional combination therapy in our hospital's specialty geriatric trauma orthopaedic wards, as detailed in our past research [Kennedy, R.R. *et al.*, 2010]. Although significant advances in recognizing and controlling period ergative consequences, some contentious issues related to pneumonia, lower extremities, deep venous thrombosis, and sudden myocardial infarctions

persist. Van Weisberg [Neuman, M.D. *et al.*, 2014] discovered that RA is a risk factor for acute myocardial infarctions and that the type of TOA had no statistical relevance in the frequency of pneumonia. In contrast, Luger [Pace, N.L, 2019] found that RA patients had a decreased risk of pneumonia and lower extremity deep venous thrombosis but no change in acute myocardial infarction. According to our data, RA inhibited pulmonary problems better than GA, which is consistent with the findings of other studies. This is due to the fact that GA with intubation may worsen the pulmonary illness and produce acute respiratory distress syndrome. In contrast, our findings show that the RA group is at a higher risk of cardiac problems. One likely rationale is that GA renders patients' unconscious using different intravenous or inhaled medicines, resulting in fewer cerebrovascular accidents and a shorter anaesthesia period than local anaesthesia to decrease the potential influence of anaesthesia leftovers on patients. Yet, numerous researchers, including previous big observational studies and randomized controlled trials, came to the opposite result. Nevertheless, there was variation across these trials in terms of fracture type, surgery, hospitals, and medical systems. Recent research has shown that RA has a minor advantage over GA in terms of the risk of hypercoagulable states and deep vein thrombosis in individuals with hip fractures. They note that patients undergoing hip fracture surgery are mostly older persons who have a cardiovascular illness, diabetes, and other senile diseases, as well as a relatively sluggish blood flow and hypercoagulable blood owing to long-term bed rest and RA affecting the heart rate during operation.

CONCLUSION

The kind of anaesthetic (TOA) used in hip fracture surgery in older persons is still debatable. In our study, whether regional anaesthesia (RA) or general anaesthesia (GA) is preferable, but the kind of anaesthesia may impact the result after surgery in which patients. After screening 180

consecutive individuals, 110 in the GA group and 70 in the RA group were eventually enrolled. Those who received GA had a shorter operation duration than individuals who received RA (RA: 36 and GA: 34 patients, respectively). We also discovered that the GA group has a larger incidence of problems than the RA group, such as nausea and vomiting, whereas the RA group has a higher risk of cardiac issues (GA: 12 (10.91%), 2 (1.82%), and RA: 16 (22.86%), 5 (7.14%), respectively). There was a significant difference in mortality, functional outcomes, and other comorbidities (all $p < 0.05$). In our conclusion, this study found that GA anaesthesia is better than RA anaesthesia in the using during hip fractures operations.

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