Effect of Type of Anesthesia on total Knee Arthroplasty for Iraqi women

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Abstract: Background: Anesthesia is a critical step in guaranteeing the surgery's success. As a result, the technique of anesthetic used is critical to the success of patients receiving TKA. Most anaesthesiologists are experienced with general and/or local anesthesia, which is appropriate for TKA. **Objective:** This study aims to determine the effect of type of anaesthesia on total knee arthroplasty for Iraqi women. **Material and Method:** In this study, a descriptive cross-sectional study was applied to study the effect of type of anesthesia on total knee arthroplasty for Iraqi women from 5th February 2021 to 6th January 2022. Data were collected for 110 patients in different hospitals in Iraq, where the patients were divided into two groups, the first group of patients, which included patients under general anesthesia, which included 60, and the second group, the control group, which included patients who underwent epidural anesthesia. A statistical study was conducted for patients with osteoporosis using the SPSS program. **Results and Discussion:** Nowadays, continuous epidural anesthesia and general anesthesia are often used in total knee arthroplasty. In clinical practice, different anesthesia procedures have obvious effects on coagulation function. Epidural anesthesia has been shown to reduce postoperative hypercoagulability and prevent venous thrombosis and pulmonary embolism after surgery. Some investigators have not observed a significant difference in the effect of general anesthesia and epidural anesthesia on coagulation function in surgical patients. In addition, Epidural anesthesia has been shown to reduce postoperative hypercoagulability and prevent venous thrombosis and pulmonary embolism after surgery. Some investigators have not observed a significant difference in the effect of general anesthesia and epidural anesthesia on coagulation function in surgical patients. **Conclusion:** This study concludes that epidural anesthesia is better and more effective on patients compared to general anesthesia because the percentage of deep aura thrombosis in the group patients is less than in the control group who underwent general anesthesia. In addition, the pain scores in the group of patients who underwent epidural anesthesia were lower than the patients who underwent general anesthesia, as well as the complications were less in the patients under epidural anesthesia who were less likely to have complications than the patients under general anesthesia. In comparison to general anesthesia, epidural anesthesia can lower the incidence of DVT in patients having total knee arthroplasty and has fewer negative effects on patients' cognitive function and stress state while maintaining a high degree of safety.

Keywords: DVT; LOS Angeles; Epidural anesthesia; General anesthesia; and KTA.

INTRODUCTION

The number of persons suffering from arthritis has increased significantly as the population has aged. The World Health Organization (WHO) estimates that over 250 million people worldwide suffer from arthritis, which causes substantial disability and worse quality of life. Knee osteoarthritis (KOA) is the most common degenerative joint condition, characterized by persistent pain and limited range of motion [Global Burden of Disease Study, 2017; Glyn-Jones, S, 2015]. Total knee arthroplasty (TKA) is the most successful surgical technique for this stage of osteoarthritis. [Skou, S.T. *et al.*, 2015]

As follow that, TKA affected more than 1.3 million people in the United States in 2018, and the number is rising. Meanwhile, TKA cases in mainland China surged 5.9-fold in the same decade, from 53,880 to 374,833 [Carr, A.J. *et al.*, 2012]. The rising prevalence of TKA places a substantial financial strain on the healthcare sector. In the United States, for example, Medicare spending has steadily increased and now accounts for around 18% of the GDP. As a result, the healthcare system is struggling to provide high-quality treatment while lowering hospital expenses. The length of hospital stay (LOS) has a substantial influence on overall health care expenses and serves as a clinical proxy for service value. [Cram, P. *et al.*, 2012; Feng, B. *et al.*, 2020; Dieleman, J.L. *et al.*, 2020]

In general, LOS is an important indicator of healthcare efficiency and resource use. A low amount of weight loss minimizes the risk of infection and drug adverse effects. By managing beds effectively, it improves treatment quality and raises hospital earnings [Smith, C.D, 2012]. Several factors can influence weight loss, including patient characteristics (age, gender, BMI, comorbidities, and ASA classification); perioperative management (type of anesthesia, blood administration); surgical characteristics (approach, prosthesis design, duration), postoperative management (timing of mobilization, postoperative pain), and

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postoperative complications before discharge (infection, deep vein thrombosis). [Cross, M. *et al*., 2014; Fujiwara, S. *et al*., 2019; Aicale, R. *et al*., 2019]

In addition, Anesthesia is a critical step in guaranteeing the surgery's success. As a result, the technique of anesthetic used is critical to the success of patients receiving TKA [Rotter, T. *et al*., 2010]. Most anaesthesiologists are experienced with general and/or local anesthesia, which is appropriate for TKA. Anesthesiologists typically select the kind of anesthesia depending on their practice style and numerous patient-related considerations [Pennestrì, F. *et al*., 2019; Benazzo, F. *et al*., 2020]. After surgery, general anesthesia is associated with increased rates of nausea, vomiting, and confusion [Parsons, T. *et al*., 2021]. Regional anesthetic, on the other hand, might be compounded by block failure and catastrophic consequences such as epidural abscess, spinal hematoma, and nerve damage. The issues listed above increase the length of stay. However, the anaesthetic approach that produces shorter LOS in TKA patients is unknown [Benazzo, F. *et al*., 2020; Mertes, S.C. *et al*., 2013].

Previous studies into the relationship between the anaesthetic method and result shown that individuals having TKA under regional anesthesia had a shorter LOS than those under general anesthesia [Scholes, C. *et al*., 2021]. Recent high-quality randomized controlled trials on the association between anesthetic methods and outcomes in TKA patients, on the other hand, have shown contradictory results [Mathijssen, N.M. *et al*., 2016; Maiorano, E. *et al*., 2017]. This study aims to determine the effect of type of anaesthesia on total knee arthroplasty for Iraqi women.
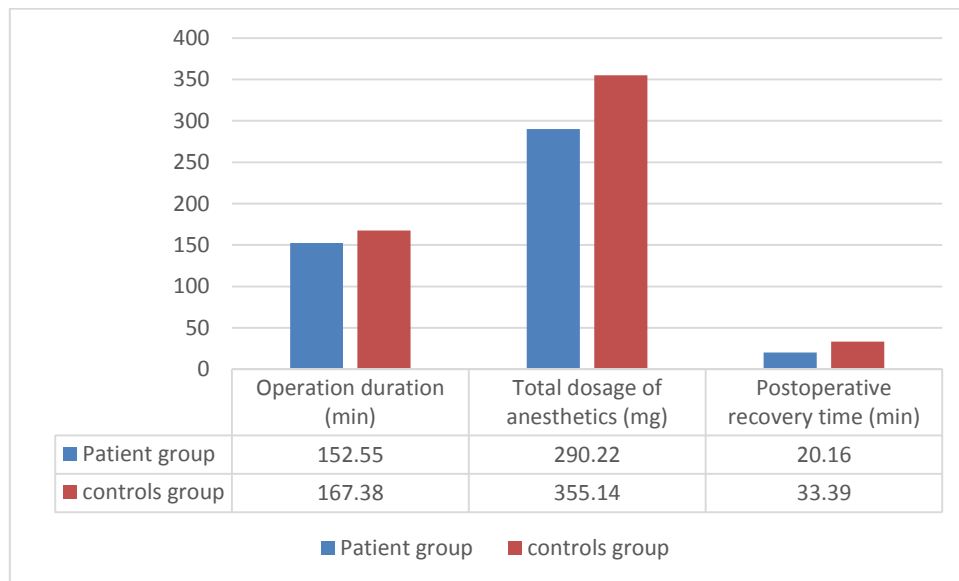
MATERIAL AND METHOD

In this study, a descriptive cross-sectional study was applied to study the effect of type of anesthesia on total knee arthroplasty for Iraqi women from 5th February 2021 to 6th January 2022. Data were collected for 110 patients in different hospitals in Iraq, where the patients were divided into two groups, the first group of patients, which included patients under general anesthesia, which included 60, and the second group, the

control group, which included patients who underwent epidural anesthesia. A statistical study was conducted for patients with osteoporosis using the SPSS program. In Table 1, patients were tested for a study demographic result of Iraqi women for patients (epidural anesthesia) and controls (general anesthesia) which included age from (35-60), BMI between ($\leq$ 28, $\geq$ 28), smoking, and economic level between (low, middle, high), as well as Educational level. A comparison of general anesthesia and epidural anesthesia was performed. Comparison of surgery time, total anesthetic dosage, and postoperative recovery time with Operation duration (min), Total dosage of anesthetics (mg), and Postoperative recovery time (min) as shown in Figure 1. Although the American Society of Anesthesiologists (ASA) Classification of Physical Health is a commonly used classification system for the preoperative health of surgical patients, there are many differences in individual anesthesiologists' ratings when characterizing common clinical concerns. This article looks at current information and assessments of the ASA physical health classification, as well as experiences with potential modification. These are included in Table 2 to find out. ASA classification for patients (epidural anesthesia) and controls (general anesthesia) and divided into I, II, and III. Besides, this study expanded to an evaluation of the Comparison of postoperative pain between the for patients (epidural anesthesia) group and controls (general anesthesia) group, where this evaluation was based on three parameters after six hours, after 12 hours, and after 24. hours as shown in Table 3. In addition, deep vein thrombosis (DVT) of female patients was studied to find out which patients who underwent general anesthesia and epidural anesthesia had more DVT, as shown in Figure 2. Besides complications, an evaluation study was performed. Postoperative complications for the patient's group and controls group at the time included Infection, Drowsiness, Nausea, and Vomiting. In Table 5, the action was taken logistic Evaluation of affected parameters of women patients' analysis as Age, infection, drowsiness, ASA, and BMI.

RESULTS

Table 1: Demographic results of Iraqi women for patients (epidural anesthesia) and controls (general anesthesia)
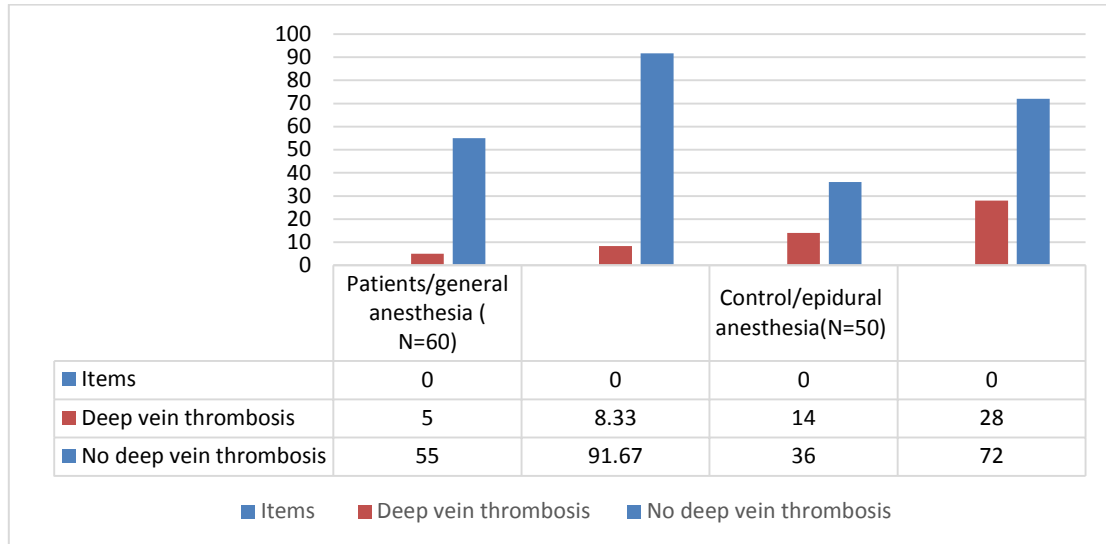
Items	epidural anesthesia (60)	General anesthesia (50)	P-value
Age			
35-39	14 (23.33%)	9 (18%)	0.046
40-44	12 (20%)	11 (22%)	0.048
45-49	9 (15%)	15 (30%)	0.045
50-54	13 (21.67%)	8 (16%)	0.044
55-60	12 (20%)	7 (14%)	0.043
BMI			
≤ 28	35 (58.33%)	28 (56%)	0.0482
≥ 28	25 (41.67%)	22 (44%)	0.047
Smoking			
Yes	5 (8.33%)	4 (8%)	0.0476
No	55 (91.67%)	46 (92%)	0.0491
ECONOMIC LEVEL			
low	15 (25%)	12 (24%)	0.049
middle	25 (41.67%)	20 (40%)	0.0492
high	20 (33.33%)	18 (36%)	0.047
Education level			
low	12 (20%)	14 (28%)	0.041
middle	20 (33.33%)	17 (34%)	0.0487
high	28 (46.67%)	19 (38%)	0.0342

	Operation duration (min)	Total dosage of anesthetics (mg)	Postoperative recovery time (min)
Patient group	152.55	290.22	20.16
controls group	167.38	355.14	33.39

Figure 1: Comparison of surgery time, total anaesthetic dosage, and postoperative recovery time

Table 2: ASA classification for patients (epidural anesthesia) and controls (general anesthesia)

ASA	epidural anesthesia (60)	general anesthesia (50)	p-value
I	17 (28.33%)	13 (26%)	0.035
II	25 (41.67%)	19 (38%)	0.047
III	18 (30%)	18 (36%)	0.041

Table 3: Comparison of postoperative pain between the for patients' group and controls group

Items	general anesthesia (60)	epidural anesthesia (50)	P-value
after 6-hours	3.23 ± 0.38	3.56 ± 0.34	0.043
after 12- hours	4.55 ± 0.33	4.89 ± 0.24	0.048
after 24- hours	3.75± 0.44	4.52 ± 0.32	0.042

	Patients/general anesthesia (N=60)		Control/epidural anesthesia(N=50)	
Items	0	0	0	0
Deep vein thrombosis	5	8.33	14	28
No deep vein thrombosis	55	91.67	36	72

Figure 2: Comparing the incidence of deep vein thrombosis between the patients' group and the postoperative control group

Table 4: Postoperative complications for patients (epidural anesthesia) group and controls (general anesthesia) group

Items	epidural anesthesia (60)	general anesthesia (50)	P-value
Infection	1 (1.67%)	2 (4%)	0.037
Drowsiness	1 (1.67%)	1 (2%)	0.037
Nausea	2 (3.33%)	3 (6%)	0.041
Vomiting	1 (1.67%)	2 (4%)	0.036

Table 5: Logistic Evaluation of affected parameters of women patients' analysis

Items	epidural anesthesia (60)	general anesthesia (50)	P-value
Age			
35-39	0.65 (0.64-1.1)	0.74 (0.64-1.4)	0.043
40-44	1.53 (0.74-1.7)	1.3 (0.91-1.6)	0.047
45-49	1.53 (1.1-1.8)	1.22 (0.92-1.51)	0.0465
50-54	1.86 (1.65-2.5)	2.24 (1.9-6.4)	0.0452
Infection	1.5 (1.24-1.6)	1.42 (1.2-2.2)	0.0422
Drowsiness	5.4 (2.2-6.9)	1.21 (0.5-2.0)	0.0388
ASA			
I	1.4 (1.34-1.6)	1.3 (1.0-2.6)	0.0444
II	1.4 (0.63-1.5)	1.23 (0.76-1.43)	0.0478
III	1.33 (1.0-1.5)	1.25 (0.77-1.65)	0.0466
BMI			
≤ 28	1.45 (1.4-1.65)	1.36 (1.1-2.5)	0.0422
≥ 28	1.44 (0.6-1.73)	1.3 (0.88-1.6)	0.0433

DISCUSSION

Nowadays, continuous epidural anesthesia and general anesthesia are often used in total knee arthroplasty [Moucha, C.S. *et al*., 2016]. In clinical practice, different anesthesia procedures have obvious effects on coagulation function [Baldawi, M. *et al*., 2020; Matharu, G.S. *et al*., 2020]. Epidural anesthesia has been shown to reduce postoperative hypercoagulability and prevent venous thrombosis and pulmonary embolism after surgery. Some investigators have not observed a significant difference in the effect of general anesthesia and epidural anesthesia on coagulation function in surgical patients [Harsten, A. *et al*., 2013]. In this study, patients' data were evaluated to study the effect of the type of anesthesia on total knee arthroplasty for Iraqi women in different hospitals in Iraq, where two groups of anesthesia were studied, the first group was epidural anesthesia and the second group was general anesthesia. In Table 1, the demographic results showed no significant differences between the two groups, as those over 40 years of age were more likely to have osteoarthritis of the knee. Besides BMI, the lowest of the 28 patients who underwent epidural anesthesia, 35 (58.33%), and the 28 (56%) general anesthesia patients had a P-value of 0.0482. In the test analysis, the demographic results showed a significantly higher percentage of non-smokers, with 55 (91.67%) for epidural anesthesia patients and 46 (92%) for general anesthesia patients with a P-VALUE of 0.0491. In addition to the economic level, it is considered that most of the middle class is more susceptible to infection, as well as the lower class, where 25 (41.67%) appeared for patients with general anesthesia and 20 (40%). Hospital and treatment cost as well. There was no significant difference in the duration of the operation between the two groups (P > 0.04), but the total drug dose and postoperative recovery time were shorter in the patients' group than in the control group. In this study, the patient group had a lower anesthesia dose and a shorter postoperative recovery time than the control group. [Harsten, A. *et al*., 2013] This may be due to excessive amounts of inflammatory substances, which can have neurotoxic effects and lead to neurodegenerative changes, affecting patients' cognition and possibly resulting in impaired cognitive function, as illustrated in Figure 1 [Abdullah, H.R. *et al*., 2020]. In Table 2, the ASA classification is presented for patients (epidural anesthesia) and controls (general anesthesia), where patients with epidural anesthesia were rated I 17 (28.33%) and

patients with general anesthesia 13 (26%) with a p-value of 0.035, where my control was rated II Patients with epidural anesthesia 25 (41.67%) and general anesthesia 19 (38%) were more affected with a p-value of 0.047 [Abdullah, H.R. *et al*., 2017]. In Table 3, an evaluation was performed for the purpose of comparing postoperative pain between the patient group (epidural anesthesia) and the control group (general anesthesia), where pain scores were included after 6 hours, 12 hours, and 24 hours, as were the illness after 6 hours and 12 hours. Needs clinical resolution, patients under general anesthesia had 3.23 ± 0.38 and 3.56 ± 0.34 under epidural anesthesia after 6 hours, while patients under general anesthesia had 4.55 ± 0.33 and patients with epidural anesthesia 4.89 ± 0.24 after 12 hours. The incidence of DVTs was compared between the two groups; the patients' group had a considerably reduced incidence, indicating that epidural anesthesia is effective in reducing the development of DVT, as it is shown in Figure 2. This study presented postoperative complications for the patients (epidural anesthesia) group and controls (general anesthesia) group, where Nausea was the most common complication for women after the operation [Warren, J . *et al*., 2020], as the patients' group for epidural anesthesia reached 2 (3.33%) and the control group for general anesthesia 3 (6%) as it is shown in Table 4. furthermore, this study is explained logistic Evaluation of affected parameters of women patients' analysis age, Infection for patients 1.5 (1.24-1.6) and controls 1.42 (1.2-2.2) as well Drowsiness for patients 5.4 (2.2-6.9) and controls 1.21 (0.5-2.0) and ASA of I classification for patients group 1.4 (0.63-1.5) and controls group 1.23 (0.76-1.43) as well as BMI with ≥ 28 for patients group 1.44 (0.6-1.73) and control group 1.3 (0.88-1.6).

CONCLUSION

Nowadays, continuous epidural anesthesia and general anesthesia are often used in total knee arthroplasty. In clinical practice, different anesthesia procedures have obvious effects on coagulation function. This study concludes that epidural anesthesia is better and more effective on patients compared to general anesthesia because the percentage of deep aura thrombosis in the group patients is less than in the control group who underwent general anesthesia. In addition, the pain scores in the group of patients who underwent epidural anesthesia were lower than the patients who underwent general anesthesia, as well as the complications were less in the patients under

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epidural anesthesia who were less likely to have complications than the patients under general anesthesia. In comparison to general anesthesia, epidural anesthesia can lower the incidence of DVT in patients having total knee arthroplasty and has fewer negative effects on patients' cognitive function and stress state while maintaining a high degree of safety.

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