International Journal of Health Systems and Medical Sciences
ISSN: 2833-7433
Volume 03 Number 01 (January) 2024
Impact Factor: 10.87
SJIF (2023): 3.656

www.inter-publishing.com

Complications of Patients Who Underwent Total Hip Replacement Surgery According to Their Severity, Type, And Ct Findings

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ABSTRACT

Background: Total hip replacement surgery can be defined as the most performed and successful surgeries in recent times. The use of computed tomography technology has greatly improved the accuracy of determining the condition of the hip joint. Objective: This study was aimed to determine and assess the complications and CT scan outcomes related to patients with total hip replacement surgery. Patients and methods: A cross-sectional study was conducted which occurred in different hospitals in Iraq, recruiting 106 patients who had undergone total hip replacement surgery through February 8th, 2022, and August 16th, 2023. Clinical data were collected into patients who diagnosed under CT imaging where it was determined the status of the hip joint. The clinical and demographic characteristics were determined into male and female patients aged between 20 and over 50. Postoperative complications were diagnosed using CT scans. Additionally, this study was assessed the pain levels of patients through ten days after total hip surgery by (NRS) scale, which ranged between (0 – 10) where 0 can indicate no pain while 10 can indicate severe pain. Results: clinical results can indicate that most of the patients (41) with total hip replacement surgery were over 50 years old. The number of male patients was higher than that of female patients, with 70 and 36 patients, respectively. Osteoporosis was present in 34 patients, while fractures or dislocations of the hip joint were observed in 28 patients. In this study, 51.89% of participants were smokers. The most common symptoms reported were stiffness (27 cases), pain (20 cases), and limping (24 cases). The most prevalent concomitant diseases were hypertension (42 patients) and diabetes (32 patients). The study found that the most common complications after surgery, as recorded by a CT scan, were infections (5 cases), blood clots (3 cases), and bleeding (3 cases), with a mortality rate of only 4 cases. Pain scores of patients were assessed within ten days after surgery, and the success of the surgery technique in controlling patients was examined. The study concluded that the NRS scale reached a score of 1 in the last few days. Conclusions: This study

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demonstrates the effectiveness of total hip replacement surgery in improving patients' quality of life, as determined by their ability to move with better performance, lower pain levels, and fewer complications associated with the surgery, as shown by CT scans.

KEYWORDS: Total hip replacement surgery; CT scan; postoperative complications; and Quality-life, ASA

INTRODUCTION

Total hip replacement surgery (THR) is one of the most frequent and successful procedures in recent years in the field of orthopedic surgery [1]. In the public hospitals of our country, about 30,000 ATC interventions are performed annually. In a study carried out in the United States, it was found that in that autonomous community, about 5,000 primary arthroplasties and about 700 revision arthroplasties are performed annually [2-4]. The most common indication is primary or secondary coxarthrosis, followed by avascular necrosis, rheumatoid arthritis, metastatic lesions, and dysplasia [5]. Transverse Central Axis (TCA) is also indicated in intracapsular fractures of the femur. Aseptic loosening (AA) of the prosthetic components can occur over time and is the main cause that motivates hip revision surgery. Infection should be considered in every patient affected by AA [6]. The loosening can be found in the acetabular or femoral material. AA is more frequent in male patients, young or with a high level of activity. Obesity, rheumatoid arthritis, or previous surgery on that joint are also considered risk factors [7,8]. The design of the implants, the poor placement of the components, or a thin/incomplete cement layer have been postulated as causes of prosthetic loosening. With the improvement of materials in recent decades, the incidence of OA has decreased. Periprosthetic osteolysis where it is the main cause of OA and is caused by the foreign body reaction generated by the presence of wear particles from the articular surfaces of the implant (mainly polyethylene) in the different contact areas or the different interfaces (prosthesis-bone, prosthesis-cement, cement-bone) [9-11]. This reaction is of the granulomatous type and triggers a cascade of inflammatory mediators. Osteolysis is usually asymptomatic at its onset, although radiologically, it may be evident even without presenting symptoms [12]. Acetabular osteolysis is an important problem that affects the long-term survival of the total hip prosthesis [13]. Since lytic lesions may be asymptomatic until extensive bone loss has occurred, early detection of these lesions is important. The routine follow-up of patients with hip prostheses is conventional radiology. However, in cases of persistent pain and normal or doubtful X-ray, other imaging methods such as magnetic resonance imaging, computed tomography, or even arthrography can give valuable additional information to detect the cause of the symptoms [14,15]. Multi-detector computed tomography (MDCT) is especially useful for detecting possible complications such as osteolysis with loosening of the prosthesis, fractures, wear of the lining, soft tissue calcifications, or fluid collections periarticular [16]. The duration of a CT procedure depends on the size of the area of the body being scanned, but in general, it only lasts from a few minutes to half an hour. For most people, CT is given on an outpatient basis in a hospital or radiology center without having to stay in the hospital overnight [17]. Complications in THR are relatively common and are divided into short-term complications (less than six weeks after surgery) and long-term complications (more than six weeks after surgery). [18]

PATIENTS AND METHODS

In a cross-sectional study, 106 patients who underwent THR surgery in different hospitals in Iraq were recruited for a period between February 8th, 2022, to August 16th, 2023. Clinical data were collected for

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patients who underwent CT imaging diagnosis to determine the status of the hip joint. This study determined the clinical demographic characteristics of patients in the age group between 20 to >50 for both males and females. This study recorded all patient data in terms of age, sex, symptoms, causes, ASA, comorbidities, and smoking status.

This study showed the results of patients undergoing THR surgery, as the surgery criteria included the duration of surgery, the type of anesthesia used, the patient's condition during surgery, which was exposed to both rates of high blood pressure and bleeding, as well as post-surgery in terms of the rate of hospitalization, hospital stay, follow-up, and mortality rate.

Patients' postoperative complications were diagnosed by CT scan. Moreover, this study determined patients' pain scores after the first ten days of total hip surgery using a numerical rating scale (NRS), which was determined between (0 - 10), where 0 represents no pain and 10 represents severe pain. Also, we evaluated the results related to the health quality of life of patients after total hip surgery using the SF-36 questionnaire, where the quality of life data was classified into physical performance, physical role, mental health, emotional role, social role, physical pain, and general health, where the quality of life scale ranges from A life from 0, which represents the worst, to 100, which represents the best.

Results

Table 1: Baseline Demographic characterises of total hip surgery patients in this study.

Characteristics	Number of patients [106]	Percentage [%]
Age		
20 – 30	15	14.15%
31 – 40	20	18.87%
41 – 50	30	28.30%
> 50	41	38.68%
Gender		
Males	70	66.04%
Females	36	33.96%
Symptoms		
Pain	20	18.87%
Stiffness	27	25.47%
Limping	24	22.64%
Swelling	23	21.70%

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Difficulty with daily activities	12	11.32%
Etiology		
Osteoarthritis	34	32.08%
Rheumatoid arthritis	25	23.58%
Fractures or dislocations of the hip joint	28	26.42%
Avascular necrosis	19	17.92%
ASA		
I	10	9.43%
II	45	42.45%
III	33	31.13%
IV	18	16.98%
Comorbidities		
No of comorbid	36	33.96%
Hypertension	42	39.62%
Diabetes	32	30.19%
Congestive heart failure	27	25.47%
Obesity	49	46.23%
Renal failure	12	11.32%
Smoking		
Yes	55	51.89%
No	51	48.11%

Table 2: Clinical outcomes of patients related to total hip surgery.

Variables	Patients' Outcomes
Operative time, hours, (mean ± SD)	1.7 ± 0.3
Anaesthesia used, N [%]	
General	75 [70.75%]
Regional	31 [29.25%]
High blood pressure, N [%]	

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Yes	20 [18.87%]
No	86 [81.13%]
Blood loss, N [%]	
Yes	13 [12.26%]
No	93 [87.74%]
Recovery time, week (mean ± SD)	6.8 ± 1.4
Length of hospital stay, Days, (mean ± SD)	6.5 ± 2.7
Follow-up, Days, months (mean ± SD)	[3 – 6] months
Number of mortalities, N [%]	4 [3.77%]

Table 3: Post-operative complications by CT scan.

Complications	Number of patients	Percentage [%}
Infection	5	4.72%
Blood Clots	3	2.83%
Bleeding	3	2.83%
Implant Problems	2	1.89%
Nerve Injuries	2	1.89%

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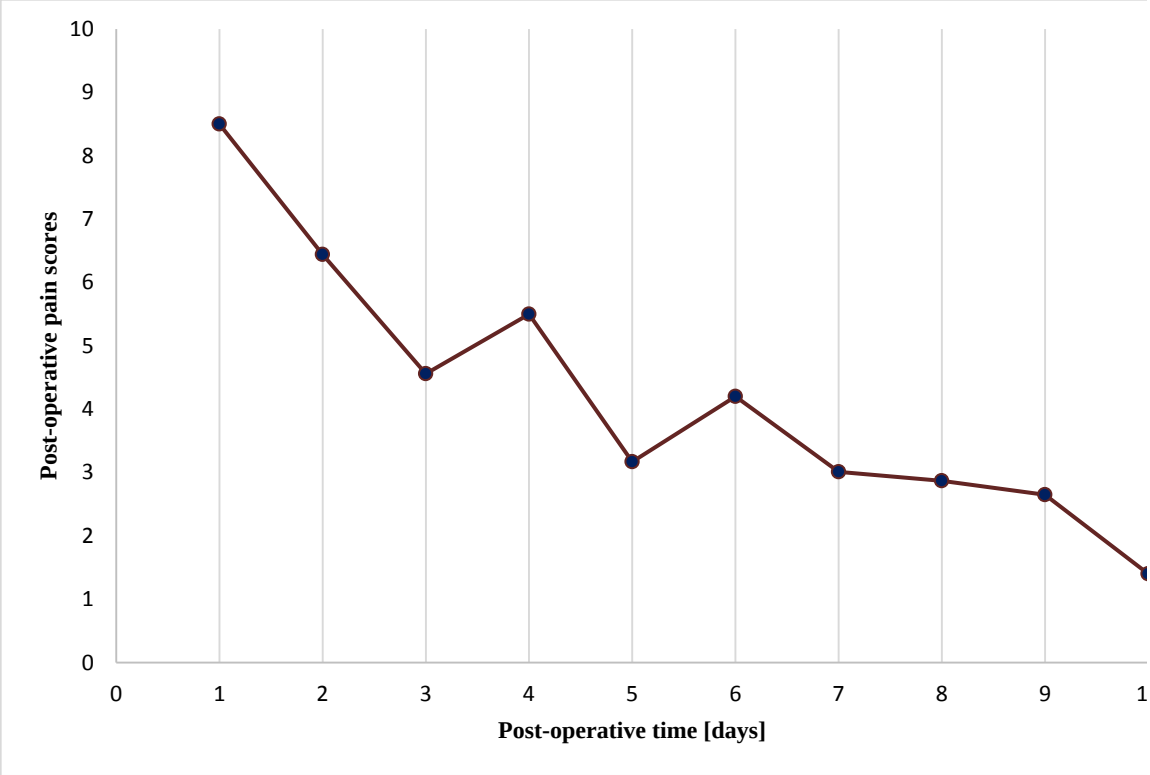

Figure 1: Post-operative pain outcomes related to patients versus time by

Table 4: Assessment of quality of life-related to patients with total hip surgery by SF-36.

Variables	Quality of life [mean ± SD]
Physical performance	70.12 ± 22
Physical role	72.5 ± 26.13
Mental health	55.38 ± 29.87
Emotional role	72.7 ± 19.64
Social role	60.65 ± 33.84
Physical pain	70.68 ± 26.47
General Health	65.85 ± 24.88

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DISCUSSION

This study aimed to evaluate the results of THR surgery and complications surrounding patients after surgery, as well as the results of CT scans. This study indicated a high rate of hip injury in elderly patients, with their ages over 50, as the number of cases reached 41 patients, with the rate of males being 70 cases, higher than that of females, 36 cases. Stiffness was 27 cases, pain was 20 cases, and limping was 24 cases. Symptoms are widespread in patients who underwent THR surgery. This study suggested that most of the causes were due to the presence of osteoporosis in 34 patients and fractures or dislocations in the hip joint in 28 patients. ASA grade II reached 45 cases, and type III reached 33 cases. This study showed that a large percentage of patients suffered from hypertension, including 42 patients and 32 patients from diabetes. Smoking is considered a major factor that contributes to bone weakness, as the percentage of smokers reached 51.89%.

Regarding the clinical outcomes related to patients before and after total hip surgery, this study recorded data for patients who underwent THR surgery, as it included a surgical time of between one and two hours, as some patients (75) underwent general anesthesia and others (31) underwent regional anesthesia. Clinical outcome include blood loss, which was reported in 13 patients, and high blood pressure in 20 patients. The average hospitalization time for patients they were ranged between six to eight weeks, with the average stay in the hospital being 6.5 ± 2.7 days. All patients underwent the post-operative follow-up lasting from three to six months, with a mortality rate of only 4 cases that were not controlled in intensive care.

In addition, all patients underwent a CT scan diagnosis to exclude complications after surgery, as there were 15 medical cases that were exposed to complications, the most prominent and widespread of which were infection with 5 cases, blood clots in 3 cases, and bleeding in 3 cases as well. Moreover, this study evaluated the pain scores of patients after surgery within ten days and examined the extent of the success of this surgical technique in controlling patients, which concluded that the last days reached a score of 1 according to the NRS scale. Also, this study evaluated the quality of life of patients after surgery, including physical pain (70.68 ± 26.47), emotional role (72.7 ± 19.64), and physical role (72.5 ± 26.13).

Previous studies have shown that age is a factor that greatly influences patients who have undergone THR surgery, as age reduces patients' bone density and muscle strength, which slows down the rate of recovery in patients and is a negative indicator of public health, as it increases patients' risk of complications during and after surgery. On the other hand, younger patients have a faster recovery rate and a faster and better recovery time, as well as a positive indicator associated with a much lower complication rate compared to older patients, which further improves results in the long term.

Another study was presented in, which it clarified the extent to which comorbidities can have significant effects on patients. It indicated that comorbidities may increase the risks of THR surgery, make it more difficult, increase the rate of post-operative complications, delay recovery, and make it difficult for those with chronic conditions to have difficulty in the body's ability to heal. Faster tissue regeneration which results in prolonged rehabilitation and poor blood circulation. [19]

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An American study indicated the harmful effects of smoking on patients, as smoking causes poor blood flow and oxygen levels, causing a delay in the healing process and increased pain and post-surgical complications as a result of a weak immune system and respiratory problems, which is accompanied by difficulty in eliminating bacteria and viruses [20], which results from the occurrence of infection as one of the main complications in patients [21]. Regarding the results of the hip after surgery, a Spanish study showed the importance of using CT scans in evaluating the condition of the hip joint after surgery, as CT scans were considered to be safe and CT scans were considered an effective technique in examining complications and evaluating hip healing, functioning, and post-surgery more accurately and better. [22]

CONCLUSION

This study praises the positive role of THR surgery in treating patients. THR surgery is associated with positive results in improving patients' quality of life and enhancing hip mobility after surgery in the short and long term. Also, this study was distinguished by highlighting successes and improvements in the effectiveness of surgery in significantly reducing the rate of pain, allowing them to regain daily activities to a greater extent and a faster recovery rate. Moreover, a CT scan has a distinct role as a non-surgical tool in accurately diagnosing patients' post-surgical complications, as it showed the occurrence of 15 cases associated with post-surgical complications, the most prominent of which were infection, blood clots, and bleeding.

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