

Review Article

Total hip replacement versus hemiarthroplasty in intracapsular fracture of the elderly

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ABSTRACT

Hip fracture is common among elderly and it is considered a major public health problem. Total hip replacement and hemiarthroplasty are the procedures of choice for managing intracapsular hip fracture among this population. Each procedure has its advantages and disadvantages. Total hip replacement is generally more preferred because of its safety, efficacy, higher success rates, better early recovery, and lower need for operative revision. On the other hand, it is associated with higher dislocation rates and higher general complications. Hemiarthroplasty is another safe option for management of intracapsular hip fracture. It is associated with higher stability and lower dislocation rates. However, revision may be required postoperatively, and the functional outcomes are slightly lower. This article will review the literature evidence of the advantages and disadvantages of both total hip replacement and hemiarthroplasty.

Keywords: Elderly, Hemiarthroplasty, Intracapsular fracture, Total hip replacement

INTRODUCTION

With the growing elderly population noted during the past few decades, the incidence of hip fractures increases. Elderly populations are at high risk for hip fracture due to various factors such as poor bone health, medications adverse events, frequent falls, and hazardous environment. Currently, it is estimated that 34,000 hip fractures occur annually, 90% of them occur in individuals above 65 years.¹ Females are much more affected than men (3 of each 4 affected individuals are women). In 2050, the number of hip fractures is expected to rise to above 1 million.² Up to one third of patients with hip fracture require hip replacement.³ The main established risk factors for hip fracture among elderly

include smoking, excessive alcohol intake, sedentary life styles, and frequent falls.⁴

Hip fracture among the elderly is a major public health problem worldwide because it significantly increases the morbidity and mortality in this population.⁵ Mortality rate during hospital admission ranges from 1 to 10%.^{6,7} The one-year mortality rates are estimated to range from 12-37%.⁷ Mortality is higher among men, patients above the age of 90 years, patients with dementia, and other comorbidities.⁷ Up to one half of survivors do not live independently.⁸ Hip fractures are either intracapsular (involving femur neck) or intertrochanteric. Both occur with similar frequencies. However, intracapsular fractures are 3 times more common in females in comparison to males.⁸

Many lines of management are available for treatment of hip fracture. The most commonly used are internal fixation, hemiarthroplasty, and total hip arthroplasty. Internal fixation is often preserved for young patients and, in some occasions, for young elderly (<70 years) who are not fit for prosthetic surgery. Hemiarthroplasty and total hip replacement are the two lines of option among elderly patients with hip fracture. This article will review the advantages and disadvantages of both techniques.

HEMIARTHROPLASTY

Hemiarthroplasty is a highly-standardized quick operative procedure used for management of displaced intracapsular hip fracture.⁹ The principle of the operation is to replace the femoral head only. One subtype of this procedure (known as bipolar hemiarthroplasty) is based in using a femoral prosthesis with an articulating acetabular component to decrease the friction with cartilage.⁹ This bipolar subtype, despite the higher cost, provides less wear and the possibility of conversion to total hip replacement. Single stage operation is often preferred among orthopedic surgeons to reduce the risk associated with secondary readmission and further operations. However, the benefits of such procedures should always be weighed against the risk of prolonged surgery, particularly among the elderly.¹⁰

The main advantages of hemiarthroplasty are the early recovery. It allows patients to return early back to weight bearing and mobilization.¹¹ It also provides a stabilization of the joint with minimal dislocation rates.¹¹ On the other side, many disadvantages make hemiarthroplasty unfit option for patients. Hemiarthroplasty does not suit all patients. For instance, patients with osteoarthritis will not benefit from this procedure and will most probably require conversion to total hip replacement.¹² Furthermore, some complications may occur such as symptomatic acetabular protrusion or erosion.¹³ These complications necessitate revision to total hip replacement.

TOTAL HIP REPLACEMENT

Total hip replacement is another procedure for management of intracapsular hip fracture among the elderly. It is of growing popularity during the past few years. It provides an effective procedure for restoring function and enhancing mobility. Total hip replacement comprises replacement of both the femoral head as well as the articular acetabular surface.¹⁴ Success rates among cases who had total hip replacements are promising, and only less than 4% requires surgical revisions.¹⁵ Total hip replacement surgery is a safe procedure associated with high functional outcomes. The main advantages of the procedure include the high success rate, the minimum need for revision, and the good functional outcome. The main disadvantage, on the other hand, is the relatively high early and late postoperative dislocations.^{16,17}

However, the past few decades witnessed a notable improvement in cementing, surgical techniques, and consequently long-term fixation and stabilization rates.

HEMIARTHROPLASTY VERSUS TOTAL HIP REPLACEMENT FOR INTRACAPSULAR HIP FRACTURE

To date, a procedure of choice for management of intracapsular hip fractures among the elderly remains a matter of debate. Many studies and literature reviews have been conducted to compare the advantages and disadvantages of both procedures. The main points of study were the success rate, the mortality rate, the early recovery, the long-term functional outcome, complications, and failure rates. Overall, total hip replaced is preferred to hemiarthroplasty in many centers and countries. In Europe, total hip replacement procedures are performed three times the hemiarthroplasty operations. In Canada, total hip replacement numbers are double the hemiarthroplasty numbers.¹⁸ As regards the early functional outcome and the need for operative revision, Hopley et al, in their systemic review and meta-analysis of 1 studies and 1890 patients, reported that total hip replacement had lower risk of reoperation in comparison to hemiarthroplasty (relative risk 0.57).¹⁹ Total hip replacement was also associated with a better early functional outcome and lower scores on Harris hip score. However, it was associated with higher dislocation risk (relative risk 1.48) and slightly higher complications rate (relative risk 1.14) in comparison to hemiarthroplasty. Similarly, Burgers et al²⁰ reported higher early functional outcome and higher dislocation rates among elderly patients who underwent total hip replacement compared to those who had hemiarthroplasty. Total hip replacement is generally associated with higher rates of revision of operation. However, the rates are variable among the studies.²¹

The need for revision was often claimed to be higher among patients who undergo hemiarthroplasty when compared to those who undergo total hip replacement. This is thought to be due to the wear of the articulating acetabular cartilage after hemiarthroplasty. However, an evidence for this claim is lacking. In contrast, Tol et al noted no revisions need after either procedures.²¹ Similarly, Burgers et al and Avery et al stated no statically significant difference as regards the revision rates between the two procedures.^{20,22} In contrast, some studies reported significantly higher revision rates among hemiarthroplasty patients' group. For instance, Thomas et al reported a revision rate of 8.2% among hemiarthroplasty procedure and 3.2% among total hip replacement procedure ($p < 0.05$).²³

The long-term outcome functional outcome of both total hip replacement and hemiarthroplasty could not be established. Although the health large randomized multicentric controlled trial was conducted to compare the long-term outcome of both procedures, the results

were not consistent because of the limited number of patients who were followed up for the two-years study period.²⁴ Tol et al studied the long-term outcome of total hip replacement and hemiarthroplasty of intracapsular hip replacement through conducting a 12-year cohort study on 252 elderly patients >70 years.²¹ They stated that there was no significantly statistical difference between the two procedures as regard the Harris hip scores for functional

outcome and post-operative mortality rates.²¹ Similarly, and Avery et al reported no difference between total hip replacement and hemiarthroplasty on the long-term outcome 10 years follow-up period.²² In contrast, Ravikumar et al, in their 13-year prospective study, found that cemented total hip replacement surgeries had significantly better functional outcomes in comparison to hemiarthroplasty.²⁵

Table 1: A comparison between hemiarthroplasty and total hop replacement.

	Hemiarthroplasty	Total hip replacement
Technique	Replacement of femoral head only	Replacement of femoral head and acetabular articular surface
Success rates	~92%	~97%
Mortality rate	2.4%	0.5%
Need for revision	+++	+
Intraoperative	Shorter – less blood loss	Longer
Dislocation risk	+ (more stable)	+++ (less stable)
General complications	+	++
Early recovery	+	++ (better)
Long-term functional outcome	+++	++
Postoperative infection	1%	1%
Postoperative groin pain	+++	+
Postoperative thigh pain	+++++	+

Success rates are comparable among patients undergoing total hip replacement and hemiarthroplasty. An average success rate of 92% and 97% was reported among hemiarthroplasty and total hip replacement, respectively.²³ Postoperative complications include pain, infection, dislocation, and mortality. Groin and thigh pains are often more common among patients who undergo hemiarthroplasty.²⁶ Postoperative infection occurs in about 1% of either procedures with no notable difference between them.²⁶ Mortality rates among patients undergoing either procedures were comparable. Thirty-days mortality rates were estimated to be 0.5% and 2.4% among patients undergoing total hip replacement and those undergoing hemiarthroplasty, respectively.²⁷⁻²⁹ A comparison between both procedures is summarized in Table 1.

CONCLUSION

Although both total hip replacement and hemiarthroplasty are commonly performed for managing intracapsular hip fracture among this population. Each procedure has its advantages and disadvantages. Total hip replacement is generally more preferred because of its safety, efficacy, higher success rates, better early recovery, and lower need for operative revision. On the other hand, it is associated with higher dislocation rates and higher general complications. Hemiarthroplasty is another safe option for management of intracapsular hip fracture. It is associated with higher stability and lower dislocation rates. However, revision may be required postoperatively, and the functional outcomes are slightly lower.

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