

# Studying the effects of primary arthroplasty on post-treatment results among elderly patients with pertrochanteric fracture

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## Abstract

Various therapeutic methods are available to treat patients with intertrochanteric fracture, which is usually caused by falling down. This complication is usually observed among the elderly, particularly old women. The choice of the proper therapeutic method depends on many factors including patient's condition, type of fracture, and the amount of movement. Hip arthroplasty is one of these therapeutic methods, which have certain advantages and disadvantages. Immediate resumption of walking with the ability of weight toleration and absence of complications such as aseptic necrosis are some advantages of this method. Sixty-eight elderly patients with pertrochanteric fracture who had resorted to Iranian Army's hospitals and had undergone arthroplasty. These cases were examined with due comparison with historical and external controls. Variables such as a type of operation, age, post-operation pain, the pace of resuming walking ability, embolism, surgical site infection, bed sore and DVT were studied and compared against standard operation. The results achieved through assessment of variables showed a significant difference with standard operation in terms of variables such as post-operative movement ability, pain scale in various times, surgical complications, embolism, surgical site infection, bed sore, and DVT. Post-operative pain within the first 3 months following it are some complications with not much attention is paid to them, but they are important complications which can cause many negative and influential effects on patients. Arthroplasty is more expensive than standard operation and the patient may initially feel more pain.

## Introduction

Fracture of the neck of femur bone is one of the most common types of fractures observed in the old age. There are various problems in this age concerning operating and preserving bone head using arthroplasty including nonunion, femur head avascular necrosis, old patients' problem in resuming normal walking after operation, open fixation and internal fixation of dislocated bone which entails putting no weight on this organ for a relatively long period. Observing the difficulty and complications of this operation, it is better to substitute femur bone head with prosthesis. In this operation, the head of thigh bone is removed and replaced by a prosthesis made of a proper metal and the patient will resume his movement capability within two or more days following the operation.<sup>1,2</sup>

Immediate resumption of normal walking, weight toleration and elimination of side effects such as aseptic necrosis, nonunion, and fixation failure as a result of internal fixation are the advantages of arthroplasty. Further to the theoretical advantages of this method, 56% of fractures treated by replacing femur neck exhibited no side effects and only 18% of them required a second surgery.<sup>2-4</sup> Despite great advantages, using hemiarthroplasty has some disadvantages such as incompleteness of the joint of the individual undergoing operation. Full hip replacement was needed in 55% of all cases to complete the process of treatment.<sup>5,6</sup> Many studies have shown that the operation required for hemiarthroplasty is more extensive than internal fixation operation, although no significant difference was observed between internal fixation and primary hemiarthroplasty in terms of mortality and morbidity.<sup>7-9</sup> Hemiarthroplasty complications can be divided into early and delayed (late) categories. One of the early complications of hemiarthroplasty is the 14% death toll in the first year following the operation compared to 9% usual population in this age.<sup>10</sup>

Studying the effect of primary arthroplasty on post-treatment results in patients with pertrochanteric fracture depends upon the quality of spongy bone. Although connection of internal cortex will restore the internal stability of the bone, good bone quality on the area of head and neck is a necessary factor to fix the proximal piece.<sup>3</sup> Considering the advantages and disadvantages of hemiarthroplasty method, indications have been stated to replace prosthesis in fracture by moving femur's neck many of which are controversial. Selected physiological age is one of these relative indications.<sup>11,12</sup>

Based upon the patient's condition, type

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of fracture, extent of movement, etc., various methods are utilized to treat femur neck fracture. Hip hemiarthroplasty is one of these therapeutic methods whose utilization indications have been stated. Various approaches can be taken to conduct hemiarthroplasty among those patients candidate for this operation. Lateral and posterior approaches are two examples of these methods with their own advantages and disadvantages specified in many studies. So far, no approach has been described more favorable than others. This is the first research that has sought to study the effect primary arthroplasty on post-treatment results among elderly patients with pertrochanteric fracture resorting to Iranian Army's hospitals from 2009 to 2011.

## Materials and Methods

The present research has studied as many as 68 elderly patients with pertrochanteric fracture who had resorted to Iranian Army's hospitals and had undergone arthroplasty. These cases were examined with due comparison with historical and external controls. To obtain patients' data, they were visited by specialists within 2 weeks, 6 weeks, 3 months, and 6 months following the operation and their files and information got completed. Pertrochanteric fracture approved by a specialist and aging older than 69 years were the inclusion criteria defined for this research. Variables such as a type of operation, age, post-operation pain, the pace of resuming walking ability, embolism, surgical site infection, bed sore and DVT were studied in the present research.

SPSS version 22 was used to analyze the resulting data. Percentage was used to describe qualitative variables while quantitative variables were described using mean, SD, mean standard error, minimum value, and maximum value. Quantitative variables and their distribution was studied using Kolmogorov-Smirnov (KS) and P-value > 0.05 was considered to be the normal distribution. Considering the distribution of variables, parametric and non-parametric tests were used to compare the means in each group, while Chi-square statistical test was used to study qualitative variables.

## Results

Kolmogorov-Smirnov (KS) test was used to study the age variable with the resulting p-value being less than 0.05 rendering the distribution of the variable in the population studied as normal. The average age of the 68 patients who had undergone arthroplasty was 75.65 years old with a SD of 10.35. The oldest and youngest patients were 91 and 69 years old respectively.

Using chi-square test ( $P > 0.05$ ), this variable was studied and the following results were achieved: there were 24 male and 44 female participants in arthroplasty group which exhibited no significant difference with 25 males and 43 females partici-

pating in standard operation group.

### Post-operation movement ability

Chi-square test was used to study this variable ( $P < 0.001$ ). 5 cases who had undergone arthroplasty were not able to walk within 48 hours, while 63 were able to resume walking with the aid of assistants. The whole 68 patients undergoing arthroplasty were able to walk without getting help from anybody after 3 months. Table 1 presents the number of people studied in the standard and arthroplasty in various assisted modes and various time tables following the operation. A comparison of various states in walking ability showed a significant difference between arthroplasty and standard operation.

### Pain

Chi-square ( $P < 0.001$ ) test was used to study this variable. All those cases undergoing arthroplasty felt pain within 48 hours following the operation and this number reduced to 31 cases within 6 months following the operation. No cases of pain were reported within 6 months following the operation. The results indicate a significant difference between arthroplasty and standard operation in terms of post-operation pain levels. Table 2 shows pain scales in arthroplasty and standard operation within 48 hours, 6 weeks, 3 months, and 6 months following the operation.

### Surgical side effects

Using chi-square test ( $P < 0.05$ ), the side effects of arthroplasty and standard operation were studied in this research and a significant difference was observed between them. Surgical side effects were observed among 4 who had undergone arthroplasty, while these complications were observed among 45 who had undergone standard operation.

### Surgical site infection, embolism, bed sore, and DVT

The present research also used chi-square test ( $P < 0.05$ ) to study surgical site infection, embolism, bed sore, and DVT and a significant difference was observed in terms of these variables among those undergoing various operations. No cases of embolism and DVT were observed among those undergoing arthroplasty, but 1 case of surgical site infection and 3 cases of bed sore were observed among them. Table 3 represents the number of people with embolism, surgical site infection, bed sore, and DVT in arthroplasty and standard operation. Figure 1 shows the number of individuals studied for embolism, surgical site infection, bed sore, and DVT in standard operation and arthroplasty.

**Table 1. The number of participants studied in standard operation and arthroplasty in various assisted modes and time frames.**

Type of operation	Pain	48 hours after operation	6 weeks after operation	3 months after operation	6 months after operation
Arthroplasty	Unable to walk	5 cases (7.35%)	0 cases (0%)	0 cases (0%)	0 cases (0%)
	Aided walking	63 cases (92.65%)	5 cases (7.35%)	0 cases (0%)	0 cases (0%)
	Walking without aid	0 cases (0%)	63 cases (92.65%)	68 cases (100%)	68 cases (100%)
Standard operation	Unable to walk	68 cases (100%)	53 cases (77.94%)	13 cases (19.11%)	10 cases (14.70%)
	Aided walking	0 cases (0%)	15 cases (22.05%)	55 cases (80.88%)	31 cases (45.58%)
	Walking without aid	0 cases (0%)	0 cases (0%)	0 cases (0%)	27 cases (39.70%)

**Table 2. Pain scale in both types of operation within 48 hours, 6 weeks, 3 months, and 6 months following the operation.**

Type of operation	Pain	48 hours after operation	6 weeks after operation	3 months after operation	6 months after operation
Arthroplasty	Yes	68 cases (100%)	68 cases (100%)	53 cases (77.94%)	31 cases (45.58/5)
	No	0 cases (0%)	0 cases (0%)	15 cases (22.05%)	37 cases (54.42%)
Standard operation	Yes	68 cases (100%)	31 cases (45.58%)	15 cases (22.05%)	0 cases (0%)
	No	0 cases (0%)	37 cases (54.42%)	53 cases (77.94%)	68 cases (100%)

**Table 3. The number and rate of those experiencing embolism, surgical site infection, bed sore and DVT in arthroplasty and embolism.**

Complication	Embolism	Surgical site infection	Bed sore	DVT
Arthroplasty	-	1 case (1.47%)	3 cases (4.41%)	-
Standard operation	1 case (1.47%)	22 cases (32.35%)	16 cases (23.52%)	6 cases (8.82%)

## Discussion

Intertrochanteric fracture is a term used to describe fractures where the line of fracture passes through both small and big trochanters of thighbone. This fracture is usually the result of falling down among the elderly and particularly old women.<sup>1</sup>

Considering the related literature and the results of the studied conducted in this field, we may conclude that there are several therapeutic measures available to treat these patients and the best one must be selected based upon the type of fracture, patients' status, extent of displacement, etc.<sup>13</sup>

In the standard and usual method, the orthopedic physician first puts the fractured bone in its place and then fixes the site of fracture. Based upon the site of fracture, various tools are used to fix it.<sup>8</sup> Unfortunately, there is a high possibility of death among old patients in the first year of fracture regardless of undergoing the operation or not. None of the therapeutic methods is hip arthroplasty. A review of the related literature has found various advantages and disadvantages for each method and no approach is absolutely preferable to the other one.<sup>14</sup> The present research has studied 68 elderly patients with pertrochanteric fracture who had resorted to Iranian Army's hospitals from 2009 to 2011 in terms of various variables.

The average age of the 68 patients who had undergone arthroplasty was 75.65 years old with a SD of 10.35. The oldest and youngest patients were 91 and 69 years old respectively. On the other hand, the average age of the patients studied by Dr. Niknam was 78.12 years with a SD of 11.8. The youngest and oldest participants were 69 and 92 years old respectively. Using inde-

pendent samples T-test ( $P > 0.05$ ), no significant difference was observed between the two groups studied in terms of age. The two groups were matched in terms of age.

There were 24 males (35%) and 44 females (65%) in arthroplasty group, while this ratio in the standard operation group was 25 (37%) to 43 (63%). Based upon chi-square test ( $P > 0.05$ ), no significant difference was observed between the two groups in terms of their gender. 63 cases (93%) resumed normal walking within 6 weeks following the operation and the remaining 7% could walk normally without any aid by the end of the third month following their operation in arthroplasty group. This procedure was much slower in standard operation group and only 15 patients (22%) could resume walking with the aid of assistants within the first 6 weeks following the operation while most of those patients who could start walking without any aid were reported to have accomplished this 6 months following the operation. An analysis of this difference with chi-square test proved it to be significant ( $P < 0.001$ ).

In a research by Laupacis *et al.* (2002), the pace of resuming normal walking within 6 weeks and 3 months was studied and the results were in line with those achieved here.<sup>15</sup> There were 4 cases (6%) of post-operation side effects in arthroplasty group, while this number in the standard operation group was 45 (66%). This difference is significant ( $P < 0.05$ ). There were 3 cases of bedsores and 1 case of surgical site infection in arthroplasty group. The following frequencies of side effects were observed in standard operation group: 22 cases of surgical site infection (32%), 16 cases of bedsores (23%), 6 cases of DVT (9%), and 1 case of embolism (1.4%). These results are in line with many researches.<sup>15-18</sup>

## Conclusions

Not much attention is usually paid to the occurrence of pain after operation and within the first 3 months following it. However, it is a very important complication, which can cause negative and significant effects on patients. Although arthroplasty is more expensive than standard operation and the patient may initially feel greater pain, but the quality of life (which is a major goal of this operation) is much better in arthroplasty.

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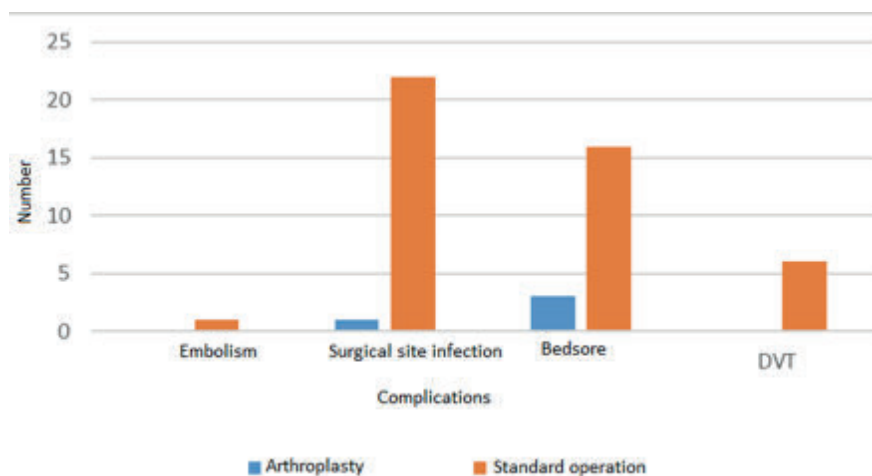


Figure 1. The number of people studied for embolism, surgical site infection, bedsores, and DVT in arthroplasty and standard operation.

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