

# Comparison of Quality of Life between Fixation and Arthroplasty in Intertrochanteric Fracture of Femur in Elderly Patients

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**Background:** Standard treatment for intertrochanteric fracture is internal fixation. Arthroplasty is an alternative treatment for these fractures in some specific conditions. Apart from hip functional score, health-related quality of life (HRQoL) is one of the interesting domains that can reflect the outcome of the treatment. However there are many conditions affecting HRQoL especially in the elderly patients.

**Objective:** To evaluate the HRQoL of the patients between treatment of intertrochanteric fracture in elderly with fixation and arthroplasty.

**Materials and Methods:** In this retrospective study, 143 intertrochanteric fracture patients who were treated during 2001-2015 were included. The patients were divided into 2 groups; 82 patients in fixation group and 61 patients in arthroplasty group. HRQoL between 2 groups were compared by EuroQol-5D-5L(EQ-5D-5L) index score at 3, 6 and 12 months postoperatively.

**Results:** The mean of EQ-5D-5L index score was significantly better in arthroplasty group than fixation group at 3 months (0.8 vs 0.6)( $P < 0.05$ ) and 6 months (0.91 vs 0.78)( $P < 0.05$ ) postoperatively. However, there was no significant difference at 12 months (0.94 vs 0.87)( $P = 0.15$ ).

**Conclusion:** Arthroplasty in intertrochanteric fracture in elderly might give better quality of life than fixation in the early postoperative period.

**Keywords:** intertrochanteric fracture, hip arthroplasty, internal fixation, quality of life, HRQoL

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## Introduction

Population tend to live longer due to development in modern medicine. The number of the elderly was increasing as well as the disease that associated with aging population such as hip fracture especially intertrochanteric fracture<sup>(1,2)</sup>.

Hip fractures deteriorate quality of life of patients because of prolonged hospital stay and rehabilitation. Independent daily activities are difficult especially in the developing countries which public facilities for handicap are not fully constructed<sup>(3,4)</sup>.

Today the standard treatment of intertrochanteric fractures is internal fixation. Non-weight bearing ambulation after internal fixation in elderly is very difficult. Arthroplasty is an alternative treatment that is purposed to be use in some patients such as severe osteoporosis, neoplasm and preexisting arthritis. However, there are a few reports about treating intertrochanteric fracture with arthroplasty<sup>(5,6)</sup>.

Most studies focus on function of the hip that could not directly reflect patient satisfaction<sup>(7,8)</sup>. The authors think that quality of

life is one of the important domain that can reflect patient satisfaction and also the successful surgical outcome. So this study was conducted to compare the quality of life between fixation and arthroplasty of intertrochanteric fracture in elderly<sup>(9)</sup>. The result of this study should give more knowledge and improvement of treatment of fracture in this region.

## Materials and Methods

From 2001-2015, 445 patients with intertrochanteric fracture were treated at The King Chulalongkorn Memorial Hospital (KCMH) were included in this study. Inclusion criteria were patients with intertrochanteric fracture who underwent fixation or arthroplasty in KCMH, age of more than 65 years old, patients or patient's caregivers were able to understand and can complete all questionnaire. Exclusion criteria were patients with multiple trauma, pre-injury status was non-ambulatory and patient with psychiatric problems. One hundred and forty-three patients were included in this study. The patients were divided into 2 groups by a type of treatment (fixation vs arthroplasty) (Fig. 1). All of the patients were treated with 10 high experience orthopaedics surgeons. Decisions to perform fixation or arthroplasty in each patients were done by individual surgeons. Every patients received

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similar post-operative rehabilitation protocol specified according to the operative procedure.

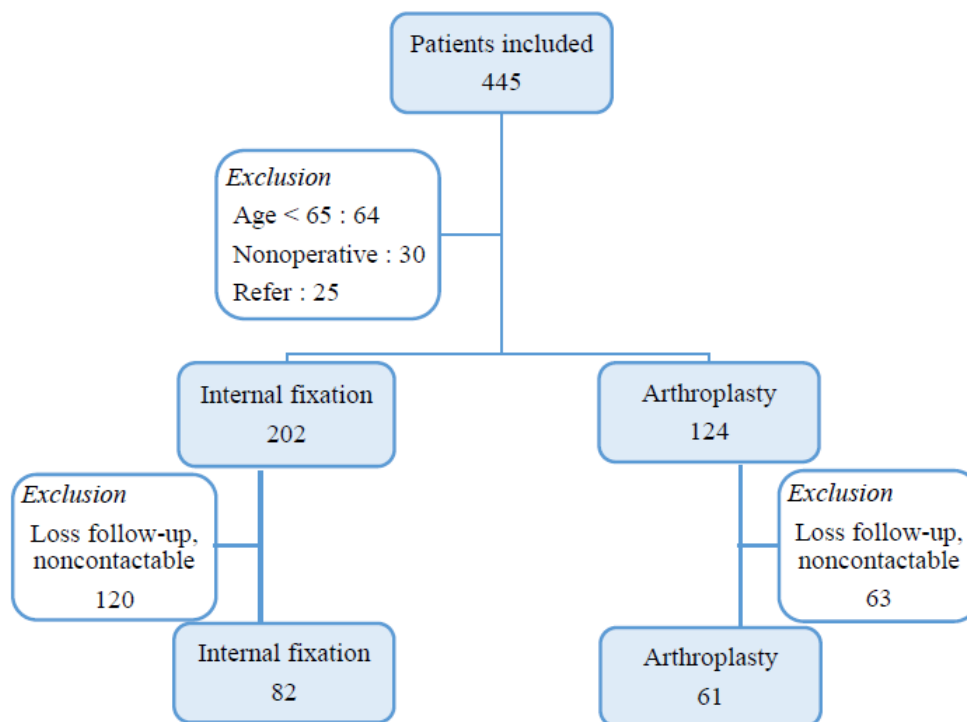
The fixation group was consisted of 5 types of internal fixation: dynamic hip screw (DHS), proximal femoral nail (PFN), Ender nails, locking plate and angle blade plate (ABP). The arthroplasty group was consisted of 3 types: total hip arthroplasty (THA), bipolar hemiarthroplasty and unipolar hemiarthroplasty.

The EuroQol-5D-5L(EQ-5D-5L) index was used for evaluating quality of life of the patients<sup>(10)</sup>. An EQ-5D-5L index score of 0 indicates the worst possible health state, and a value of 1 indicates full health state. Five domains (Mobility, self-care, daily activity, pain and anxiety) that represent each categories of quality of

life were explained to the patients or the patient's caregiver. Then the patients or the patient's caregiver had to complete the questionnaire. Every patients were assigned to complete the questionnaire at 3, 6 and 12 month postoperatively.

#### Statistical analysis

The EQ-5D-5L score in each dimension was adjusted to utility score. Then sum of utility score in 5 dimensions was used for calculation. Difference of mean of utility score between 2 groups were analyzed with independents t-test. Comparison difference of proportion of sex between 2 groups by Chi-square test. Statistically significant was  $P$ -value  $< 0.05$ .



**Fig.1** Intertrochanteric fracture patients treated in KCMH during 2001-2015

## Results

Table 1. demonstrated the demographics data of the study population. There was high ratio of male patient in fixation group compared to arthroplasty group (32.9% vs 14.8%) ( $P = 0.013$ ).

The EQ-5D-5L index score which reflex HRQoL was significantly better in arthroplasty group at 3 months, 6 months postoperatively ( $P < 0.05$ ).(Fig.2) However at 12 months postoperatively, it was no significant difference in the score ( $P = 0.15$ ). The EQ-5D-5L index score in both group increased significantly in every postoperative visit ( $P < 0.001$ )(Table 2).

In arthroplasty group, there were 3 THA, 27 bipolar hemiarthroplasty and 31 unipolar hemiarthroplasty. Because of limited number in THA, this study compared EQ-5D-5L score between bipolar and unipolar hemiarthroplasty. The authors found that there was no difference in EQ-5D-5L index score between bipolar and unipolar hemiarthroplasty group (Table 3).

In fixation group, there were 58 DHS, 5 PFN, 9 Ender nails, 1 locking plate and 9 ABP. We found that EQ-5D-5L index score in DHS group was less than ABP group at 3 months and 6 months postoperatively ( $P < 0.05$ ). There was no statistically significant difference between DHS vs PFN and DHS vs Ender nail.

**Table 1** Demographic data of the study population

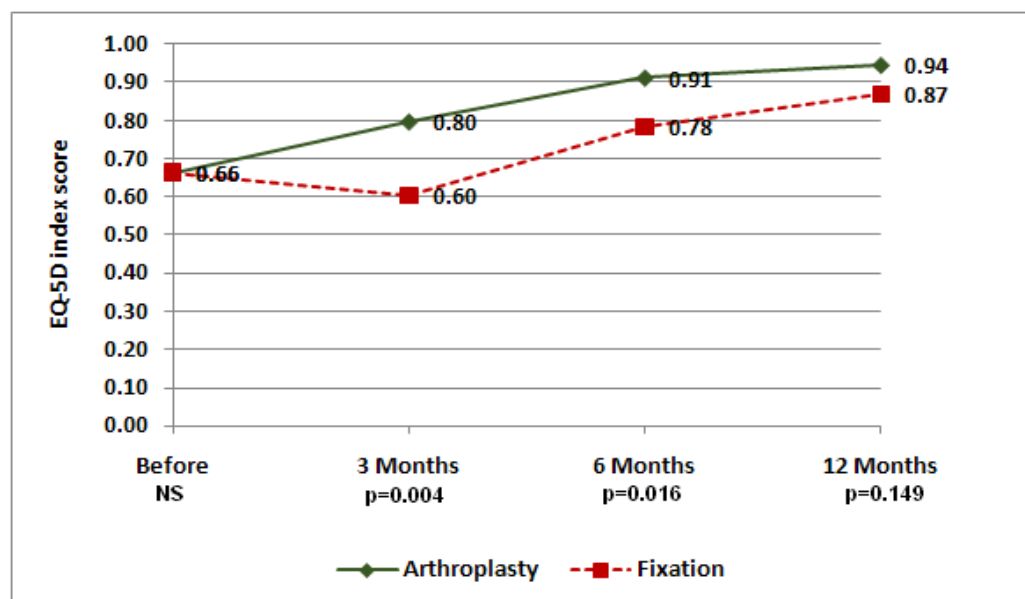
	Arthroplasty (n=61)	Fixation (n=82)	P-value
Sex			
Male	9 (14.8%)	27 (32.9%)	
Female	52 (85.2%)	55 (67.1%)	
Age (years), Mean±SD	80.51 ± 7.60	78.98 ± 7.46	0.230
Death	25 (41%)	38 (46.3%)	0.523

Values presented as n(%) and Mean±SD. P-value corresponds to Chi-square test

**Table 2** Comparing EQ-5D-5L between arthroplasty and fixation group

Follow-up time	Type of surgery		P-value <sup>(1)</sup>
	Arthroplasty (n=61)	Fixation (n=82)	
3 Months	0.8 (0.51, 0.8)	0.6 (0.37, 0.78)	0.004*
6 Months	0.91 (0.63, 1)	0.78 (0.47, 0.91)	0.016*
12 Months	0.94 (0.66, 1)	0.87 (0.57, 1)	0.149
P-value <sup>(2)</sup>	< 0.001*	< 0.001*	

Values presented as Median (IQR; percentile 25, percentile 75). P-value corresponds to <sup>(1)</sup> Mann-Whitney test (Between group) and <sup>(2)</sup> Wilcoxon Signed Ranks Test (Within group)

**Fig. 2** EQ-5D-5L score between arthroplasty and fixation group at 3 months, 6 months and 12 months**Table 3** Comparison quality of life in arthroplasty group

Follow-up time	Type of surgery		P-value
	Bipolar (n = 27)	Unipolar (n = 31)	
3 Months	0.8 (0.6, 0.8)	0.8 (0.42, 0.8)	0.622
6 Months	0.89 (0.61, 0.91)	0.91 (0.56, 1)	0.448
12 Months	0.94 (0.66, 1)	0.91 (0.6, 1)	0.987
P-value	0.002*	< 0.001*	

Values presented as Median (IQR; percentile 25, percentile 75). P-value corresponds to Mann-Whitney test (Between group) and Wilcoxon Signed Ranks Test (Within group)

## Discussion

An intertrochanteric fracture is one of the most common fracture around the hip as well as femoral neck fracture. The standard treatments are internal fixation with DHS or PFN. Many complications were reported such as fixation failure, malunion and non-union especially in osteoporotic bone. Non-weight bearing after fracture fixation in elderly were troublesome. Alternative treatments such as arthroplasty might have benefit because patients can do early weight bearing. We think that quality of life in arthroplasty group should be better than fixation group.

This study was the first study to compare health related quality of life of elderly patients with intertrochanteric fracture which underwent fixation and arthroplasty. All previous studies reported results with organ specific scoring (eg. Harris hip score). The results of these studies varied in favor among arthroplasty and fixation<sup>(7,18,19)</sup>. Our study showed that arthroplasty gave better quality of life in early postoperative period (< 6 month). This might be explained that patients in arthroplasty group were less painful, patients could ambulate faster and better than in fixation group.

This study had limitations. First, it was a retrospective study in which many data were inhomogeneous such as various technique in fixation and arthroplasty groups and there were many incomplete data such as classification of fracture, comorbid diseases, and perioperative complications. And also, some data were recalled more than 5 years. Second, selection bias may be presented that patients with more stable fracture pattern were more likely to be treated with internal fixation than those with unstable fracture pattern that tend to be treated with arthroplasty. It was also difference in male and female proportion between two groups. Third, we do not have the data about the pre-injury ambulatory status that might affect the postoperative rehabilitation program. Last, small number of sample size may reduced the power of this study.

Primary arthroplasty in intertrochanteric fractures in elderly provided good results due to early ambulation<sup>(12,13-17)</sup>. Many studies showed better clinical outcome in arthroplasty than internal fixation<sup>(7,18)</sup>. However some studies show no significant difference between 2 groups<sup>(8)</sup>. In contrast some studies show better clinical results in fixation group<sup>(19)</sup>.

Our study concludes that arthroplasty in intertrochanteric fracture in elderly might give better quality of life than fixation in the early postoperative period (< 6 month). This might help surgeons to select proper choice of treatment in elderly patients with fracture in this region. However the future study should be collected all of

important data that may affect the results and should be prospective method.

## Conclusion

Arthroplasty in intertrochanteric fracture in elderly might give better quality of life than fixation in the early postoperative period.

## Potential conflicts of interest

None.

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## การเปรียบเทียบคุณภาพชีวิตของผู้ป่วยที่มีกระดูกสะโพกหักที่รักษาด้วยวิธีผ่าตัดตามกระดูกและการผ่าตัดเปลี่ยนข้อเทียม

ยศวีร์ พรมีไชย, พบ, ธนะเทพ ต้นผ่่าพงษ์, พบ

**วัตถุประสงค์:** เพื่อศึกษาคุณภาพชีวิตของผู้ป่วยกระดูกสะโพกหัก (*intertrochanteric fracture*) ที่รักษาด้วยวิธีการผ่าตัดยึดตามกระดูกด้วยโลหะ ซึ่งเป็นวิธีการรักษาตามมาตรฐานทั่วไป เปรียบเทียบกับการรักษาด้วยการผ่าตัดเปลี่ยนข้อสะโพกเทียม

**วิธีการศึกษา:** เก็บรวบรวมข้อมูลผู้ป่วยกระดูกข้อสะโพกหัก (*intertrochanteric fracture*) ย้อนหลังตั้งแต่ปี พ.ศ.2543 ถึง พ.ศ.2558 ที่รักษาด้วยวิธีการผ่าตัด ได้ทั้งสิ้น 143 ราย แบ่งเป็นการรักษาด้วยวิธีผ่าตัดยึดตามกระดูก 82 ราย และวิธีผ่าตัดเปลี่ยนข้อสะโพกเทียม 61 ราย โดยเปรียบเทียบคุณภาพชีวิตหลังการผ่าตัดรักษาที่เวลา 3, 6 และ 12 เดือน โดยใช้แบบสอบถาม *EuroQol-5D-5L(EQ-5D-5L)* ฉบับภาษาไทย

**ผลการศึกษา:** ค่าเฉลี่ยของคะแนน *EQ-5D-5L* ของผู้ป่วยกลุ่มที่ผ่าตัดด้วยวิธีการเปลี่ยนข้อสะโพกเทียม มีคะแนนมากกว่ากลุ่มที่ผ่าตัดด้วยการตามกระดูกอย่างมีนัยยะสำคัญหลังจากผ่าตัดไปแล้ว 3 เดือน ( $0.8$  vs  $0.6$ ) ( $P < 0.05$ ) และ 6 เดือน ( $0.91$  vs  $0.78$ ) ( $P < 0.05$ ) อย่างไรก็ตามหลังจากผ่าตัดไปแล้ว 12 เดือน คะแนนของทั้งสองกลุ่มไม่แตกต่างกัน ( $0.94$  vs  $0.87$ ) ( $P = 0.15$ )

**สรุป:** การรักษาผู้ป่วยกระดูกสะโพกหักด้วยวิธีการผ่าตัดเปลี่ยนข้อสะโพกเทียม น่าจะทำให้ผู้ป่วยมีคุณภาพชีวิตที่ดีกว่าการรักษาด้วยวิธีการผ่าตัดยึดตามกระดูกด้วยโลหะ ในช่วงเวลา 6 เดือนหลังจากผ่าตัด

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