Patient Reported Outcomes in Short Stem Total Hip Arthroplasty

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Background: *Many previous studies have shown good clinical and radiographic results with the short stem THA. However, few studies have evaluated patient-reported outcomes with the short stem, which is a very important indicator for assessing the outcome of short stem THA from a patient-centered perspective.*
Objectives: *To evaluate the quality of life, patient satisfaction, patient expectations and fulfilment of expectations after short stem THA.*
Materials and Methods: *Patients who have undergone short stem THA more than 1 year from index surgery were interviewed face-to-face or via telephone. Three questionnaires were used to evaluate patient-reported outcomes including quality of life, patient satisfaction, patient expectations and fulfilment of expectations.*
Results: *There were 142 patients in this study. EQ-VAS and EQ-Index showed a high level of patients' quality of life postoperatively. 98% of cases were satisfied with the outcome of short stem THA. There were significant correlations between EQ-VAS and EQ-Index with patient satisfaction ($r=0.401$, $p<0.001$ and $r=0.435$, $p<0.001$ respectively). A total 96.4% of patients had their expectations fulfilled. Patient satisfaction and quality of life were significantly correlated with expectations fulfilled. In multivariate analysis, postoperative LOS more than 5 days, limitation of climbing stairs, quality of life, postoperative complications, according to patients' view, and patient satisfaction were significantly correlated with the fulfilment of expectations.*
Conclusions: *This study showed a high level of patient's quality of life postoperatively, high patient satisfaction and high rate of fulfillment of patient expectations after short stem THA.*

Keywords: *Patient reported outcomes, Quality of life, Expectations, Total hip arthroplasty, Short stem arthroplasty*

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Introduction

The short stem Total Hip Arthroplasty (THA) was introduced widely, aiming to preserve the proximal femoral bone stock for future revision if necessary and to minimize some drawbacks of conventional stem such as proximal stress shielding and thigh pain. The other advantage of short stem is that it is easier to perform a tissue-sparing minimally invasive approach due to the smaller design.

Our previous studies and many previous studies have shown good clinical and radiographic results with the short stem THA[(1-5)]. However, few studies have evaluated patient-reported outcomes with the short stem, which is a very important indicator for assessing the outcome of short stem THA from a patient-centered perspective[(6)]. The objectives of this study were to evaluate the quality of life, patient satisfaction, patient expectations and fulfilment of expectations after short stem THA.

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Materials and Methods

Institutional review board approval was obtained for the present study. This study included all patients who have undergone Metha® short stem (B.Braun Aesculap AG, Tuttlingen, Germany) since 2010 with a minimum one year from index surgery, with age of 20-70 years old. The Metha® short stem is a cementless, collarless, and tapered short stem prosthesis. For osseointegration, the Metha® short stem is round coated with Plasmapore, Calcium-phosphate layer. This layer is supposed to have an osteoconductive effect and accelerates contact between the bone and the prosthesis. The cementless acetabular cup (Plasmacup SC; BBraun Aesculap AG, Tuttlingen, Germany) was used in all cases.

The exclusion criteria were incomplete medical records, no contact telephone number, or other disabilities. Demographic data were retrieved from medical records including age, gender, BMI, diagnosis, comorbidities, post-operative complications and Length of Stay (LOS). The interviews were performed by two physicians (RS, TT), who were not involved in the operation, with face-to-face or telephone interviews. The personal data of patients such as living situation, occupation, current hip pain, other joint pain, walking limitation,

climbing stairs and transfer limitation, type of interview, and the time from operation to interview were collected.

In this study the authors used 3 questionnaires to evaluate the patient-reported outcomes including quality of life, patient satisfaction, patient expectations and fulfilment of expectations.

Quality of life was assessed by using EQ5D5L-Thai version which had 5 dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. The patients were asked to rate their general health that day with a Visual Analog Scale 0-100[7].

The authors used 4 questions to assess the patient satisfaction after short stem THA, Q1: If you were to spend the rest of your life with your hip symptoms just the way they have been in the last 24 hours, how would you feel? (5-point Likert scale) Q2: How satisfied were they with the results of THA? (5-point Likert scale) Q3: Whether they would have the surgery on the other hip if necessary? (surgery, no surgery, not sure) and Q4: If your friends ask you whether they should have THA, what will you advise? (advise surgery, no surgery, not sure)[8].

For patient expectations and fulfilment of expectations, the survey was adapted from the Hospital for Special Surgery hip replacement expectation survey by adding 2 more questions that were more important for Thai patients, including improved ability to ride a bike or motorcycle and improved floor sitting[9]. 5-point Likert scale was used to rate the importance of each expectation (very important, important, somewhat important, minimally important and I do not have this expectation, or this expectation does not apply to me). For the fulfilment of expectations, the patients were asked to rate the extent each the expectation was now fulfilled. We used 5-point Likert scale (complete improvement, a lot of improvement, a moderate amount of improvement, a little improvement and I do not have this expectation).

Statistical analysis

The data were presented as mean, range, SD or percentages. Pearson's correlation coefficients were used to calculate the correlation between EQ-VAS and EQ-Index with patient satisfaction and between fulfillment of expectation with patient satisfaction and quality of life. Multivariate regression analysis was used to identify any variables which correlated with expectations fulfilled. A p-value less than 0.05 was considered statistically significant.

Results

A total 301 patients have undergone short-stem THA since November 2010 with a minimum one year from index surgery. Seven patients were excluded due to having other disabilities. Fifteen patients were reported by family members to have died with unrelated condition to surgery. Thirty-eight patients reported good functional status by family members but were not available for interview. Ninety-nine patients could not be contacted. The authors interviewed 142 patients, 62 face-to-face and 80 by telephone. Demographic data of the patients are shown in Table 1. Hypertension was the most commonly reported comorbidity, 32 cases (22.5%). Urinary Tract Infection (UTI) was the most common complication, 7 cases (4.9%) and the mean length of stay was 9.8 days (3-30, 3.5).

For current symptoms, 44 cases (31%) reported still having hip pain, however, most patients reported just a little pain or discomfort and 35 cases (24.7%) continued to have other joint pain. The percentage with no limitations on walking, climbing stairs and transfer was 88%, 81% and 85.2% respectively. The mean time from operation to interview was 39.6 months (12-82, 20.5) (Table 2).

Ninety-eight percent of cases were satisfied with the outcome of short stem THA. Ninety-two percent of cases decided their other hip side operated on, if necessary and 95% recommended their friends to undergo short stem THA.

Quality of life is shown in Table 3. Pain and mobility were frequently reported as patient problems preoperatively, 41.6% and 23.9% respectively. EQ-VAS and EQ-Index showed a high level of patients' quality of life postoperatively (Table 4). There were significant correlations between EQ-VAS and EQ-Index with patient satisfaction ($r=0.401$, $p<0.001$ and $r=0.435$, $p<0.001$ respectively) (Table 5).

Patient expectations are shown in Figure 1. The 3 most common patient expectations were to improve ability to walk, to stand, and relieve daytime pain. The 3 least important expectations were to improve sexual activities, to improve ability to put on shoes and socks, and to cut toenails. A total 96.4% of patients reported having their expectation fulfilled. Percentages for each fulfilled expectation are shown in Figure 2. Almost all patient expectations were fulfilled after the operations, although improved floor sitting and kneeling were the least fulfilled expectations. Patient satisfaction and quality of life presented by EQ-VAS and EQ-index were significantly correlated with fulfilled expectations (Table 6). In multivariate analysis, we found that postoperative LOS more than 5 days, limitation of climbing stairs, quality of life, postoperative complications according to patient view and patient satisfaction were significantly correlated with the fulfilment of expectations (Table 7).

Table 1 Demographic data of patients.

Parameters	Values
No. of patients	142
Mean age (year) (range, SD)	48.01 (21-68, 11.3)
< 40 (cases, %)	40 (28.2)
40-60 (cases, %)	80 (56.3)
> 60 (cases, %)	22 (15.5)
Gender (male/female)	98/44
Mean BMI (range, SD)	23.07 (15.1-33.3, 3.51)
Diagnosis (cases, %)	
Osteonecrosis of the femoral head (ONFH)	101 (71.2)
Developmental Dysplasia of the Hip (DDH)	15 (10.6)
Posttraumatic Osteoarthritis	8 (5.6)
Primary Osteoarthritis	8 (5.6)
Femoral neck fracture	6 (4.2)
Tuberculosis	3 (2.1)
Rheumatoid arthritis	1 (0.7)
Comorbidities (cases, %)	
Hypertension	32 (22.5)
Systemic Lupus Erythematosus (SLE)	6 (4.2)
Rheumatoid arthritis	5 (3.5)
Chronic Kidney Disease (CKD)	5 (3.5)
Dyslipidemia	4 (2.8)
Tumor/malignancy	2 (1.4)
Others	5 (3.5)
Post-operative complications	
Urinary Tract Infection (UTI)	7 (4.9)
Intraoperative femoral fracture	5 (3.5)
Dislocation	2 (1.4)
Pneumonia	1 (0.7)
Length of stay (days) (mean (range, SD))	9.8 (3-30, 3.5)

Table 2 Personal data of patients.

Parameters	Values
Living situations (cases, %)	
Living alone	12 (8.5)
Living with partner and/or children	130 (91.5)
Occupations (cases, %)	
Work outside	90 (63.4)
Housework	9 (6.3)
Stopped working because of hip pain	29 (10.4)
Retried	8 (5.6)
Unemployed due to other reasons	6 (4.2)
Current hip pain (cases, %)	
Yes	44 (31)
No	98 (69)
Other joint pain (cases, %)	
Yes	35 (24.7)
No	107 (75.3)
Walking limitation (post-operative) (cases, %)	
Marked limitation	1 (0.7)
Mild limitation	16 (11.3)
No limitation	125 (88)
Climbing stairs limitation (post-operative) (cases, %)	
Marked limitation	3 (2.1)
Mild limitation	24 (16.9)
No limitation	115 (81)

Table 2 Personal data of patients. (Cont.)

Parameters	Values
Limitation of transfer or sit to stand	
Marked limitation	0
Mild limitation	21 (14.8)
No limitation	121 (85.2)
Type of interviews	
Face to face	62 (43.7)
Telephone	80 (56.3)
Time from operation to interview (month) (range, SD)	39.6 (12-82, 20.5)

Table 3 Frequently reported patient problems.

EQ-5D dimension	Values
Mobility (cases, %)	
No problems	108 (76.1)
Problems	34 (23.9)
Self-care	
No problems	137 (96.5)
Problems	5 (3.5)
Usual activity	
No problems	125 (88)
Problems	17 (12)
Pain/Discomfort	
No problems	83 (58.4)
Problems	59 (41.6)
Anxiety/Depression	
No problems	127 (89.4)
Problems	15 (10.6)

Table 4 EQ-VAS and EQ-Index.

	EQ-VAS	EQ-Index
No.	142	142
Mean	86.82	0.95
SD	12.72	0.07
Median	90	0.96
25^{th}	80	0.93
75^{th}	95	1

Table 5 Correlation between EQ-VAS, EQ-Index and patient satisfaction.

	Correlation coefficient	*P*-value
EQ-VAS and patient satisfaction	r=0.401	<0.001
EQ-Index and patient satisfaction	r=0.435	<0.001

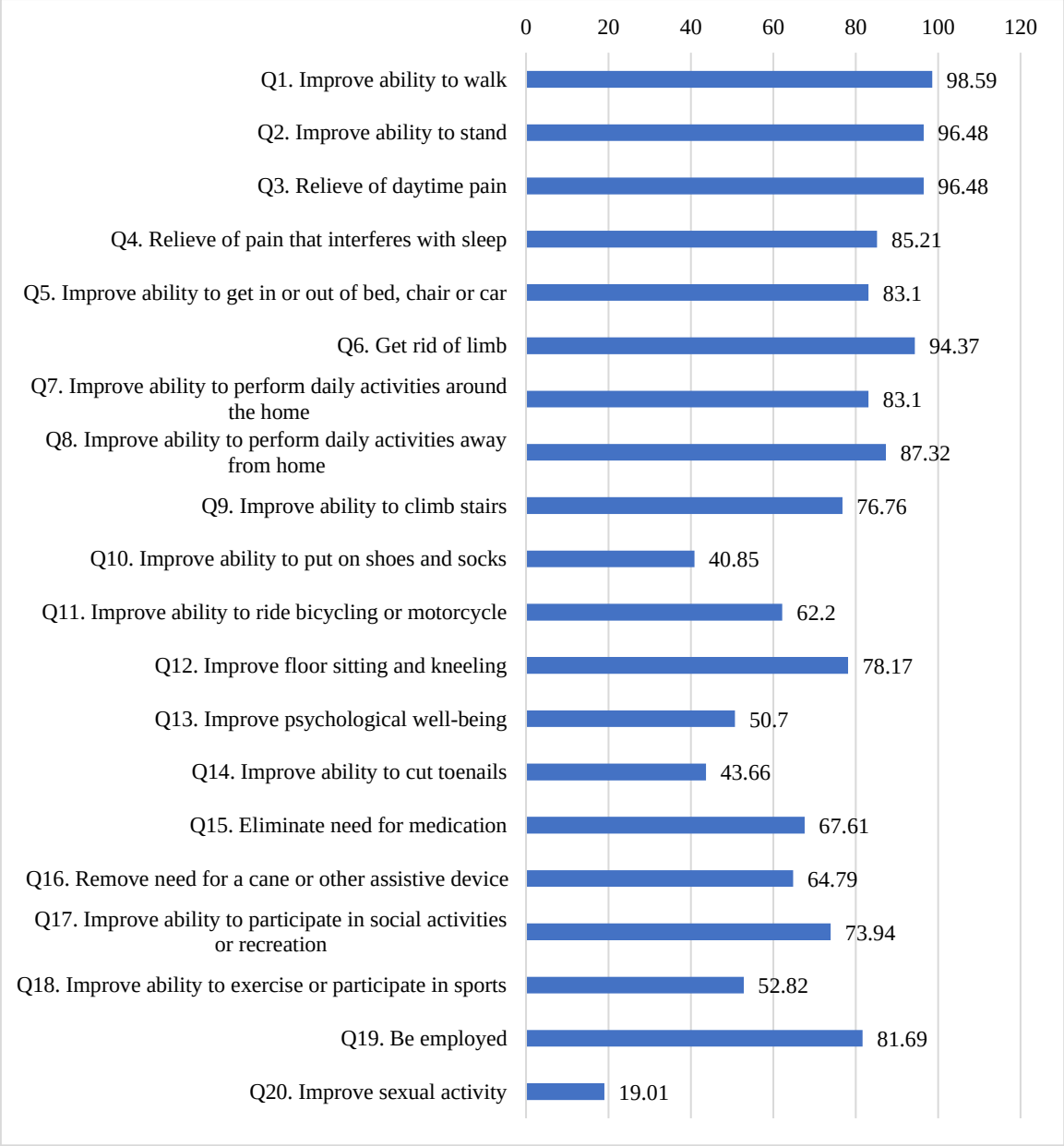

Fig.1 Percentages of patient expectations.

Table 6 Correlation between patient satisfaction, quality of life and expectations fulfilled.

Variables	Mean proportion of expectations fulfilled	*P*-value
Satisfaction		
Yes	97.07	<0.001
No	63.89	
EQ-VAS		
Higher ≥ 95	98.76	0.045
Lower < 95	95.58	
EQ-INDEX		
Higher ≥ 0.96	98.87	0.003
Lower < 0.96	94.47	

Table 7 Multivariate analysis for proportion of expectations fulfilled.

Variables	More expectations fulfilled	
	Coefficient	***P*-value**
Postoperative LOS > 5 days	3.7	0.007
Limitation of climbing stairs	-4.41	0.007
Quality of life	31.15	0.001
Postoperative complication in patient view	-27.37	<0.001
Patient satisfaction	14.48	0.009

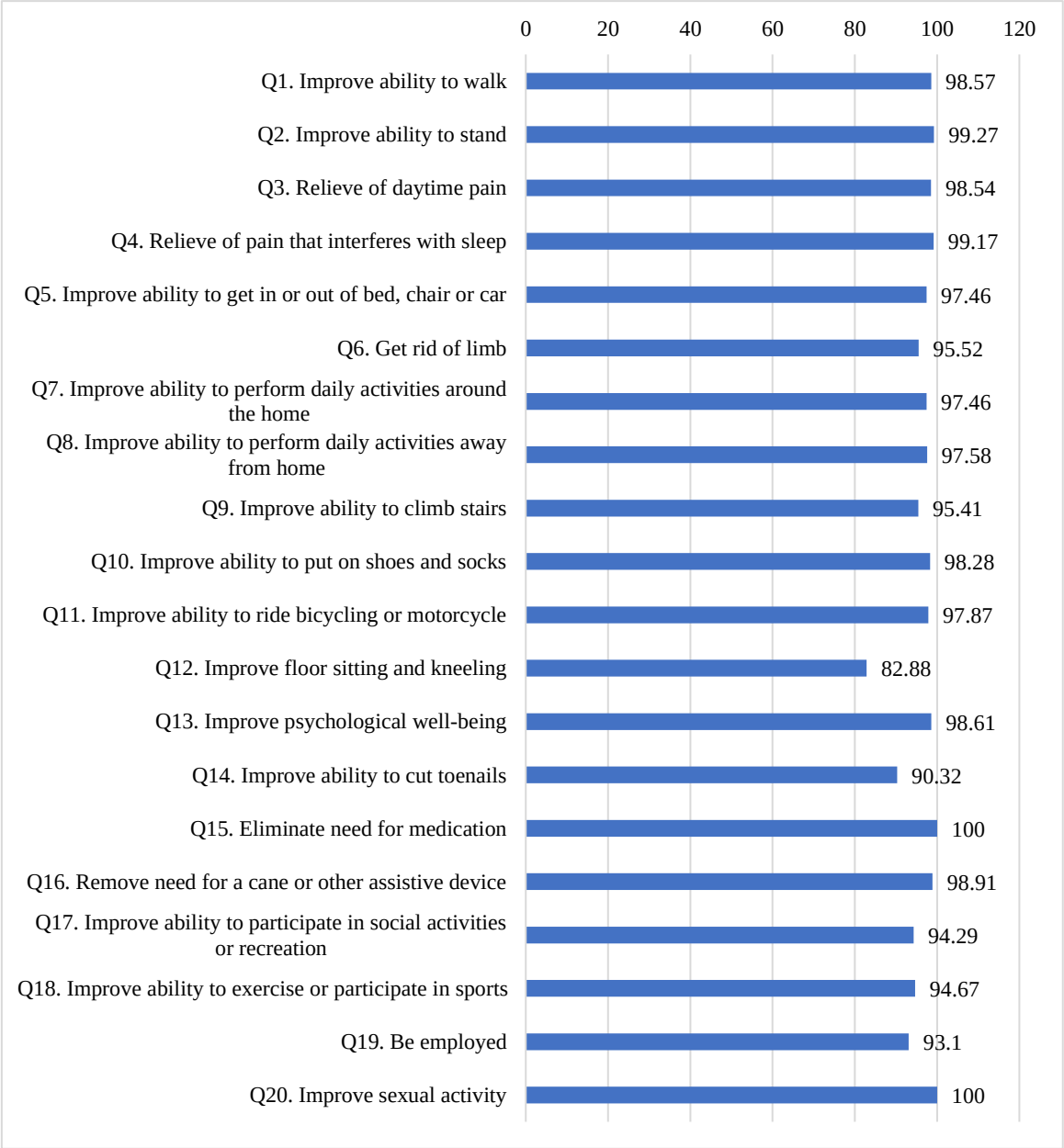

Fig.2 Percentage of patient expectation fulfilled.

Discussion

Total hip arthroplasty is one of the most successful and cost-effective operations. The conventional stem demonstrated excellent long-term clinical outcomes, according to many previous studies[10-12]. However, there was still some discrepancy between surgeon and patient-reported outcomes. Brukelman et al.[13] compared surgeon satisfaction with patient satisfaction after THA in 121 hips, they reported that in subgroup analysis with low patient satisfaction, the surgeon was significantly more satisfied than the patient ($p=0.04$).

The short stem THA showed good clinical and radiographic results in many previous studies, comparable with conventional THA[14-16]. However, there have been few studies about patient-reported outcomes after surgery. Hossain et al.[17] compared early functional and health related quality of life outcomes between 33 patients using short stem and 53 patients using conventional stem, the mean age of patients was 66.6 years (59-77) with the mean follow-up 31.4 months (24-39). They concluded that the proximally porous coated tapered short stem achieved comparable short-term functional outcomes when compared with conventional stem in patients with good bone quality.

Our previous studies have shown good clinical and radiographic results with the short stem THA[1-2]. For the patient-reported outcomes, this study showed a high level of quality of life among postoperative patients, and we found high patient satisfaction after short stem THA, (98%). There were significant correlations between EQ-VAS and EQ-Index with patient satisfaction ($r=0.401$, $p<0.001$ and $r=0.435$, $p<0.001$ respectively). This is comparable with previous studies in conventional stem, such as Mancuso et al.[8] who reported that overall 89% of patients were satisfied with the results after THA. A lower rate of satisfaction was found in patients who had a better preoperative condition, who expected improvement in non-essential activities and who reported worse postoperative condition. Anakwe et al.[18] reported that a 7% rate of dissatisfaction after THA in 850 patients. After univariate analysis, depression, preoperative Short Form 12 mental component score and symptomatic arthritis of another major joint predicted dissatisfaction at 1 year, but after multivariate analysis, only symptomatic arthritis of another major joint was significant.

We found a high rate of fulfillment of patient expectations after short stem THA in this study, 96.4%. The 3 most common patient expectations were to improve ability to walk, to stand, and relieve daytime pain. Consistent with previous studies in conventional THA, Scott et al.[19] studied 346 conventional THAs and 323 TKAs, they reported that improvement in mobility and daytime pain were the most important expectations of patients and fulfillment of expectations was highly correlated with satisfaction. Neuprez et al.[20] studied 138 patients (80 conventional THAs and 58 TKAs), and concluded that preoperative expectations were a major contributor to the final degree of satisfaction, one year after surgery.

For two more questions that we asked patients about expectations and fulfillment of expectation, we found 97.87% of cases fulfilled with improved ability to ride a bike or motorcycle, and 82.88% fulfilled with improved floor sitting and kneeling. These 2 activities are very important for transportation and daily living in Thai culture. We found that improved floor sitting and kneeling was the least fulfilled, because some patients still had difficulty performing these usual activities after surgery and had to adapt it.

In multivariate analysis, this study demonstrated that postoperative LOS more than 5 days, limitation of climbing stairs, quality of life, postoperative complication in patient view and patient satisfaction were significantly correlated with the fulfilment of expectation. This is comparable with the multivariate analysis of Mancuso et al.,[21] which interviewed 405 patients after conventional THA and found that patients who did not have postoperative limb and who had better preoperative and postoperative lower limb core scores had a greater proportion of fulfilled expectations ($p\leq0.005$).

In this study we found that the variable postoperative LOS more than 5 days positively correlated with fulfilled expectations. We believed that this is because most of our patients preferred to stay for a long time in the hospital until they felt that they had fully recovered.

There were some limitations to this study. First, the number of patients was relatively small because the remaining 99 cases could not be contacted during the interview period, it might be due to most of our patients were young and active labors working in the other area. Furthermore, it was a single center study, different outcomes might be obtained with different surgical techniques in other centers.

Conclusion

This study showed a high level of patient quality of life postoperatively, high patient satisfaction and high rate of fulfillment of patient expectations after short stem THA. Quality of life and fulfillment of expectation were correlated with patient satisfaction.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand

that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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No.

Conflict of interest

The authors have no conflict of interest to disclose.

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ผลการรักษาที่ประเมินโดยผู้ป่วยที่ได้รับการผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น

ธนัท ทิพย์พิมานชัย, พบ, ยิ่งยง สุขเสถียร, พบ, รัชวรรณ สุขเสถียร, พบ

ความเป็นมา: *การผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น ได้มีผลการศึกษาว่า เป็นการผ่าตัดที่ได้ผลดีทั้งอาการทางคลินิค และผลการฉายภาพรังสี แต่ยังมีการศึกษาที่ค่อนข้างน้อยเกี่ยวกับ ผลการรักษาที่ประเมิน โดยผู้ป่วยที่ได้รับการผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น ซึ่ง ผลการรักษาที่ประเมิน โดยผู้ป่วยนั้นมีความสำคัญ เนื่องจากเป็นการประเมินผลการรักษาโดยใช้มุมมองของผู้ป่วยเอง*

วัตถุประสงค์: *เพื่อศึกษาคุณภาพชีวิต ความพึงพอใจ ความคาดหวัง และ การเติมเต็มความคาดหวังของผู้ป่วย ที่ได้รับการผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น*

วิธีการศึกษา: *ศึกษาในผู้ป่วยที่ได้รับการผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น ที่ได้รับการผ่าตัดมากกว่า 1 ปี โดยการสัมภาษณ์ต่อหน้า หรือ ทางโทรศัพย์ โดยจะมี 3 ชุดคำถาม ที่จะใช้ในการประเมินผลการรักษา ซึ่งประกอบด้วย ชุดคำถามคุณภาพชีวิต, ชุดคำถามความพึงพอใจหลังการผ่าตัด, ชุดคำถามความคาดหวังของการผ่าตัด และ ชุดคำถามการเติมเต็มความคาดหวังหลังการผ่าตัด*

ผลการศึกษา: *ศึกษาในผู้ป่วยทั้งหมด 142 คน ผลการศึกษา EQ-VAS และ EQ-Index พบว่าหลังการผ่าตัดผู้ป่วยมีคุณภาพชีวิตที่ดีขึ้นในระดับสูง และ 98% ของผู้ป่วยมีความพึงพอใจหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น จากการวิเคราะห์พบว่า มีความสัมพันธ์กันระหว่าง EQ-VAS, EQ-Index กับ ความพึงพอใจของผู้ป่วย ($r=0.401$, $p<0.001$ and $r=0.435$, $p<0.001$) โดย 96.4% ของผู้ป่วย สามารถเติมเต็มความคาดหวังได้ตามที่ผู้ป่วยคาดหวังไว้ จากการวิเคราะห์พบว่า มีความสัมพันธ์กันระหว่างความพึงพอใจ, คุณภาพชีวิต และ การเติมเต็มความคาดหวังของผู้ป่วย จากการวิเคราะห์พหุตัวแปร พบว่า ระยะเวลานอนโรงพยาบาลมากกว่า 5 วัน, การจำกัดการเดินขึ้นบันได, คุณภาพชีวิต, ภาวะแทรกซ้อนหลังการผ่าตัด และ ความพึงพอใจ มีผลต่อการเติมเต็มความคาดหวังของผู้ป่วยหลังการผ่าตัด*

สรุป: *จากการศึกษานี้พบว่าหลังการผ่าตัดเปลี่ยนข้อสะโพกเทียมชนิดก้านสั้น ผู้ป่วยมีคุณภาพชีวิตที่ดีขึ้น, มีความพึงพอใจมาก และ สามารถเติมเต็มความคาดหวังของผู้ป่วยได้ตามที่ผู้ป่วยคาดหวังไว้*