QUALITY OF LIFE OF ELDERLY PATIENTS AFTER HUMERAL SHAFT PLATE FIXATION SURGERY AT THAI BINH PROVINCIAL GENERAL HOSPITAL

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ABSTRACT

Objective: To assess the quality of life (QoL) of elderly patients with closed humeral shaft fractures treated with internal fixation at Thai Binh Provincial General Hospital.

Method: A cross-sectional descriptive study was conducted on 55 elderly patients with closed humeral shaft fractures, who underwent internal fixation with plate and screws at Thai Binh Provincial General Hospital from January 2020 to March 2024. The EQ-5D-5L scale was used to assess the quality of life of elderly patients.

Results: The quality of life index of the study group was 0.71±0.18 (ranging from 0.26 to 0.94), lower than the quality of life of the elderly population in the community. The quality of life increased in correlation with the level of functional recovery of the patients (p=0.000). Factors associated with poorer quality of life included advanced age (p=0.000), low educational level (p=0.018), no longer working (p=0.035), multiple chronic diseases (p=0.002), and associated injuries at the time of fracture (p=0.009).

Conclusions: The quality of life of patients after treatment for humeral shaft fractures using plate fixation was lower than that of the general elderly population. Factors negatively impacting quality of life, as recorded in this study, included advanced age, low educational attainment, lack of employment, multiple chronic diseases, and associated injuries at the time of the fracture.

Keywords: *Humeral shaft fracture, elderly, EQ-5D-5L*

I. INTRODUCTION

A humeral shaft fracture is defined as a break in the upper arm bone extending from the surgical neck, near the attachment of the pectoralis major muscle, to the region above the two epicondyles, where the bone begins to widen. Such fractures directly affect the function of the upper limb, impacting the patient's quality of life, particularly in the elderly population [1].

The use of plate and screw fixation in the treatment of humeral fractures is common in provincial hospitals and has generally shown favorable outcomes. However, previous studies on humeral shaft fractures in Vietnam have mostly focused on surgical outcomes and functional recovery, with limited attention given to the quality of life of elderly patients after surgical fixation [2]. This study aims to evaluate various factors related to the quality of life in elderly patients following humeral shaft fracture surgery using plate and screw fixation, with the goal of improving the quality of life for this patient group.

II. SUBJECTS AND METHODS

2.1. Study area and duration of time

Study area: Department of Orthopedics and Burns, Thai Binh General Hospital

Duration of time: from January 2020 to March 2024

2.2. Study subjects

55 elderly patients with humeral shaft fractures who underwent internal fixation with plate and screws and participated in follow-up visits during the study period.

2.3. Research methodology

A cross-sectional descriptive study was conducted, evaluating post-surgical outcomes over a period ranging from 7 to 53 months.

Quality of life: is a multidimensional concept that encompasses an individual's overall physical, mental, emotional, and social well-being. It reflects how individuals perceive their position in life within the context of their culture, values, goals, expectations, and standards.

The EQ-5D-5L (EuroQol 5-Dimensions 5-Levels) scale is widely used for assessing health-related quality of life (HRQoL). It provides a comprehensive yet simple tool to evaluate outcomes in various medical conditions, including orthopedic injuries such as humeral shaft fractures. In elderly patients, the EQ-5D-5L scale can be instrumental in understanding the broader impact of closed humeral shaft fractures on their health status.

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Received date: 8/11/2024
Revised date: 11/12/2024
Accepted date: 15/12/2024

2.4. Statistical analysis

The collected data were encoded and entered into EPIDATA 3.1 software and subsequently exported to SPSS 20.0 for statistical analysis. The research findings were presented in the form of frequency tables and percentages (%), as well as mean values and standard deviations. The Chi-square test was employed to compare differences in percentages, while the t-student test was used to compare differences in the mean values of two normally distributed quantitative variables. Statistical significance was determined at a p-value of < 0.05.

2.5 Ethical research

The research was conducted only after receiving approval from the Ethics Committee of Thai Binh University of Medicine and Pharmacy, and the technical procedures were authorized by Thai Binh General Hospital. Participants were thoroughly informed about the purpose and content of the study. Survey questionnaires were distributed only after participants had signed the consent form. During the interview process, any refusal from participants was fully respected and accepted.

III. STUDY RESULTS

Table 1. Some general characteristics of the patients (n=55)

Characteristics		Number	Percentage %
Age group	60-69	24	43.6
	70-79	22	40.0
	≥80	9	16.4
Gender	Male	23	41.8
	Female	32	58.2
Residence	Urban	10	18.2
	Rural	45	81.8
Education level	Primary - Secondary school	28	50.9
	High school	21	38.2
	College, University	6	10.9
Occupation	Employed	21	38.2
	Not employed	34	61.8
Co-habitants	Spouse	26	47.3
	Children/ Grandchildren/ relatives	28	50.9
	Living alone	1	1.8

The age group 60-69 years accounted for the highest percentage (43.6%), with females representing 58.2%. The majority of patients were from rural areas (81.1%). Most patients had an educational level of primary or lower secondary school (50.9%), and the majority were no longer employed (61.8%). Most patients lived with children/grandchildren/relatives (50.9%) or with a spouse (47.3%)

Table 2. Clinical and X-ray characteristics of humeral shaft fractures (n=55)

Characteristics		Number	Percentage %
Fracture causes	Household accidents	33	60.0
	Traffic accidents	21	38.2
	Occupational accidents	1	1.8
	Violence	0	0.0

Characteristics		Number	Percentage %
Fracture location	Upper third	20	36.4
	Middle third	16	29.1
	Lower third	19	34.5
AO classification	A	28	50.9
	B	16	29.1
	C	11	20.0
Number of comorbid chronic diseases	0	12	21.8
	1-2	24	43.6
	≥3	19	34.5
Number of associated injuries	0	33	60.0
	1-2	14	25.5
	≥3	8	60.0

Household accidents account for the highest proportion of fractures, at 60.0%. The majority of fractures occur in the upper third (36.4%) and lower third (34.5%) of the affected area. According to the AO classification, Type A fractures are the most common, representing 50.9% of cases. Most patients have one or two concomitant chronic conditions, comprising 43.6% of the sample. A majority of patients (60.0%) do not have associated injuries.

Table 3. Association between certain epidemiological factors and quality of life

Factors	Number	EQ-5D-5L Index		
		Mean	SD	p
Age group				
60-69	24	0.82	0.13	0.000
70-79	22	0.68	0.15	
≥80	9	0.47	0.14	
Gender				
Male	23	0.73	0.18	0.502
Female	32	0.69	0.19	
Education level				
Primary - Secondary school	28	0.64	0.19	0.018
High school	21	0.77	0.14	
College. University	6	0.80	0.16	
Occupations				
Employed	21	0.77	0.18	0.035
Not employed	34	0.67	0.18	
Residence				
Urban	10	0.76	0.14	0.310
Rural	45	0.69	0.19	
Co-inhabitants				
Spouse	26	0.78	0.16	0.015
Children/ Grandchildren/ relatives	28	0.64	0.18	
Living alone	1	0.56	-	

As age increases, the quality of life decreases. Quality of life improves with higher educational attainment. Patients who are still employed report a higher quality of life compared to those who are no longer employed. Additionally, patients living with a spouse have a higher quality of life than those living with children, relatives, or alone; this difference was statistically significant ($p < 0.05$). Male patients have a higher quality of life than female patients, and patients living in urban areas have a higher quality of life compared to those in rural areas. However, this latter difference was not statistically significant ($p > 0.05$).

Table 4. Association between certain fracture characteristics and quality of life

Factors	Number	EQ-5D-5L Index		
		Mean	SD	p
Fracture causes				
Household accidents	33	0.68	0.18	0.313
Traffic accidents	21	0.75	0.19	
Occupational accidents	1	0.81	0	
Violence	0	0	0	
Fracture location				
Upper third	20	0.70	0.20	0.579
Middle third	16	0.74	0.17	
Lower third	19	0.68	0.17	
AO classification				
A	28	0.68	0.18	0.321
B	16	0.71	0.19	
C	11	0.78	0.17	
Number of comorbid chronic diseases				
0	12	0.74	0.21	0.002
1-2	24	0.78	0.13	
≥3	19	0.59	0.17	
Number of associated injuries				
0	33	0.74	0.15	0.009
1-2	14	0.72	0.19	
≥3	8	0.53	0.22	

There were no statistically significant differences in quality of life between patient groups with different fracture causes, fracture locations, or AO classifications. However, in patients with multiple comorbid chronic conditions or concomitant injuries, the quality of life was lower. This difference was statistically significant ($p < 0.05$).

Table 5. Quality of Life of patients according to the EQ-5D-5L scale (n=55)

Functional recovery according to the modified NEER classification	Number		EQ-5D-5L index		p
	n	%	Mean	SD	
Very good	41	74.5	0.77	0.14	0.000
Good	10	18.2	0.58	0.14	
Average	4	7.3	0.37	0.14	
Poor	0	0	0	0	
Total	0	100	0.71	0.18	
Mean ± SD	0.71±0.18 (0.26-0.94)				

The quality of life index of patients, as measured by the EQ-5D-5L scale, at the follow-up visit was 0.71 ± 0.18. The highest score recorded was 0.94, and the lowest was 0.26. The quality of life index increased progressively with the degree of functional recovery of the patients, and this difference was statistically significant ($p < 0.05$).

IV. DISCUSSIONS

In our study, the quality of life index, as measured by the EQ-5D-5L scale, at the follow-up visit was 0.71 ± 0.18. The highest score recorded was 0.94, and the lowest was 0.26. The quality of life index increased progressively with the degree of functional recovery of the patients, and this difference was statistically significant ($p < 0.05$).

The results of our study are lower than those reported in the study by Vu Minh Tuan (2021) [1] which included 200 elderly individuals in Thach Than Commune, Quoc Oai District, Hanoi, where the quality of life index was 0.77 ± 0.13. The quality of life of elderly patients after humeral fracture surgery is lower than that of healthy elderly individuals in the general population due to the combination of several factors: reduced mobility and ability to perform daily tasks, prolonged pain, surgical complications, and negative psychological impacts, all of which contribute to the decline in quality of life. Therefore, the treatment and care of elderly patients following humeral fracture surgery should be comprehensive, addressing both physical and mental health factors, in order to improve the quality of life for this population.

Our EQ-5D-5L index is significantly higher compared to the study by Vu Minh Hai [2], in which the quality of life of patients with bone fractures was reported to be 0.23. This difference can be explained by the fact that the participants in our study were patients who had undergone surgical intervention, with stable fixation and functional rehabilitation, resulting in better quality of life outcomes compared to those still in the process of treatment for bone fractures. These findings are consistent with previous studies that have demonstrated a significant improvement in the quality of life of patients between the periods of hospitalization, discharge, and follow-up visits [3], [4].

According to the study by Den Hartog et al. (2022) [3] on 390 patients with humeral shaft fractures (145 treated conservatively, 245 surgically), the average quality of life index at 3 months post-treatment was 0.72 for the conservative treatment group and 0.77 for the surgical treatment group. These results are higher than those of our study. The research team suggests that this difference is largely influenced by age (the average age of the surgical group was 53 years, compared to 72.5 ± 8.2 years in our study). Den Hartog observed significant improvements in quality of life over time for both groups at the 2-week, 6-week, 3-month, 6-month, and 12-month follow-ups. In this study, the authors employed a prospective, interventional, descriptive clinical research design with longitudinal follow-up, comparing pre- and post-operative outcomes. Patients were monitored regularly, encouraged to engage in early functional rehabilitation, and provided with structured guidance, which likely contributed to the better quality of life outcomes observed. Therefore, it is essential to routinely monitor and assess the quality of life of patients in order to identify emerging issues and address any challenges they may face, ultimately optimizing recovery outcomes.

According to the study by Oliver et al. (2022) [4] on 291 patients with humeral shaft fractures, the mean EQ-5D quality of life index was 0.73. Among these, the index for the group with bone healing after initial surgery (62 patients) was 0.76 ± 0.25, for those with healing after conservative treatment (165 patients) was 0.77 ± 0.27, for those with healing after a second surgery following failure of conservative treatment (52 patients) was 0.64 ± 0.34, and for the non-union group after two interventions (10 patients) was 0.51 ± 0.37. Therefore, the quality of life index in our study is lower compared to the group that healed after the first treatment but higher than the non-union group after the first treatment. The research team suggests that this difference may be attributed to the longer follow-up period in Oliver's study (an average of 5.5 years), which is considerably longer than in our study. Moreover, the age range in Oliver's study spanned from 17 to 86 years, while in our study, all patients were elderly. As discussed earlier, elderly patients generally require more time to recover post-surgery compared to younger individuals. Therefore, at 6 months post-surgery, in addition to evaluating the bone healing status of patients, physicians should also assess quality of life in order to determine the

appropriate supportive measures for treatment, rehabilitation, and care, which will help optimize recovery during the subsequent stages.

According to Oliver [4], the quality of life index for the group with bone healing following conservative treatment is higher than that of the group with healing after surgery initially. However, the non-union rate after conservative treatment is significantly higher compared to surgical treatment (26.4% vs. 3.1%). Consequently, the quality of life is diminished due to the prolonged suffering from illness and pain, which also increases the financial burden due to ineffective treatment, the need for method conversion, and delayed return to work, resulting in lost economic productivity. Additionally, there is an opportunity cost in terms of time and resources when patients experience delays in returning to daily activities and productive labor. These results demonstrate that early surgical intervention in the treatment of humeral shaft fractures improves long-term outcomes, reduces treatment costs, and significantly enhances the quality of life of patients. Therefore, plate and screw fixation is the recommended treatment approach for humeral shaft fractures.

According to the results of our study, as age increases, the quality of life decreases, with this difference being statistically significant ($p < 0.05$). This can be explained by the fact that advanced age affects multiple aspects of quality of life, such as diminishing certain physical functions, leading to a gradual decline in health, as well as influencing psychological, emotional, and social interactions in elderly individuals. Quality of life improves with higher educational levels. Furthermore, the quality of life is higher in the group of patients still engaged in work compared to those who are no longer employed. Additionally, patients living with a spouse report better quality of life than those living with children, relatives, or alone; this difference is also statistically significant ($p < 0.05$). Moreover, in patients with multiple concomitant injuries or numerous comorbid chronic conditions, the quality of life is significantly lower, with statistical significance. These findings are consistent with the study on quality of life in the elderly by Vũ Minh Tuấn [1]. Comorbid chronic diseases present a significant challenge in providing care and treatment services for the elderly and are an important predictor of quality of life decline in this population.

V. CONCLUSION

The quality of life of elderly patients following surgical treatment with plate and screw fixation for humeral shaft fractures is low. The quality of life improves progressively in relation to the degree of functional recovery of the patient. Poorer quality of life is associated with advanced age, multiple comorbidities, and concomitant injuries.

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