

EXTERNAL FIXATION IN PATIENTS WITH AGE OVER 65 YEARS WITH DISTAL RADIUS FRACTURE

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Abstract: *Aim.* This study evaluates the final outcome of the treatment of the distal radius fractures with external fixation in patients older than 65 years.

Patients and methods. Thirteen patients over the age of 65 years with a distal radius fracture were treated with external fixation. The fracture type was determined according the Frykman classification. For evaluation of the outcome six months after the operation were used: Stewart Score System; Gartland and Werley; and PRWE (Patient-rated wrist evaluation).

Results. According to the Stewart score system one patient has excellent; nine good; and three have fair result. Gartland and Werley score showed that four patients have excellent; six good; and three have fair result. According to the PRWE two patients have no pain and no functional disability; five have minimal; five have mild pain and functional disability; and one has moderate degree and frequency of pain and moderate functional disability. Statistically there is strong correlation between Gartland and Werley score and PRWE score ($r = 0.657$) and weak correlation between Stewart score and PRWE score ($r = 0.431$).

Conclusion. The external fixation of the distal radius fractures in the patients with advanced age enables high degree of functioning of the injured wrist and high level of daily activity. Judging from the benefit of enabling an "independence" of these persons, the risk for the operative treatment is sustained.

Key words: distal radius fracture, external fixation, PRWE, wrist pain, wrist function

Introduction

Statistical data show that in the world's population in 2004 there were 34.6 million persons older than 65 years, the so-called "senior citizens". This number is expected to grow to 50 million citizens by the year 2020, representing more 16.5 % of the population (Us Census Bureau, 2006). Records from US Census 1999 are indicating that the average life duration in 1970 was 70.8 years; in 2000 was 76.4 years, while in 2010 it is expected to be 77.4 years [1]. According to US Census, 1999 referring to the independent living, it is evident that out of the persons aged 65–74 years 23% are living alone (without their marital partner), while there are 41% among those aged over 75 years [1]. Imagining that some of those sustain a distal radius fracture, the question appears in what way and in what degree this distal radius fracture should be stabilised in order to provide "an independence" of this age group.

Jocelyn Harris published that in UK 71.000 patients will have a distal radius fracture annually, also showing that the incidence for female is 36.8/10000 and 8.9/10000 for male [2]. Margaret McQueen on the other hand found 145/100000 population annually, 224/ and 58/ distal radius fractures for female and male respectively [3].

According to Paul Thompson the proportion of the female-male patients with distal radius fracture is 3.9 : 1, and the female incidence grows from 10/10000 aged 60 years up to 120/10000 aged over 60 years [4]. The level of daily activities until recently was interpreted and quantified incorrectly. It was considered that the elderly needed not a wide range of daily activities, nor the frequency of those activities was important. It was thought that the patients in advanced age need a small diapason of activities (elementary use of the wrist joint) and that the frequency of performing those daily activities is small. This shows that the selection of the method of treatment for the selected types of the distal radius fractures is in advance incorrectly determined as well as the final functional outcome that was considered enough if satisfactory [3, 5].

The theory that the classical method of plaster casting gives a traditionally good functional end result for all types of fractures in distal radius fractures, especially in elderly, is being abandoned more and more often and has fewer adherents lately [5, 6, 7]. The resistance for operating the patients in advanced age that have osteoporotic characteristics and poor general health condition is understandable, but it must not be the sole criterion in making the treatment decision.

According to Fujii, the loss of radial length of over 6mm affects the functional outcome and should be reduced and maintained less than 5 mm even in elderly patients [7].

In patients in advanced age that have sustained a distal radius fracture, the age is not the only indicator for the functional needs and the level of daily activities of these patients [5, 7].

Aim of the study

The aim of this study is to examine the final outcome of the treatment of the distal radius fractures with external fixation in patients older than 65 years of age, using three different outcome measures: Stewart Score System; DPS (Gartland and Werley, Demerit point system); and PRWE (Patient-rated wrist evaluation).

Stabilisation of the distal radius fractures with an external fixation in the population over 65 years of age has a final goal of achieving a good functional result and enabling "independence" of this specific group.

Patients and Methods

The study is made in City Surgical Clinic Ss. Naum Ohridski – Skopje. It evaluates 13 patients with age over 65 years (65–83) with a distal radius fracture. The mechanism of injury is fall on an outstretched arm in pronation. All of them are treated operatively with closed reduction and application of external fixator (AO/ASIF distal radius fixator) on the wrist augmented with interfragmentary K-wires. The external fixator is applied with the standard AO distal radius external fixation technique.

The type of the fracture of the distal radius is determined according the Frykman classification [8].

For assessment of the outcome six months after operation, three different outcome measurements were used:

- Stewart Score System – for radiological evaluation [9],
- Demerit point system DPS (Gartland and Werley) – for assessment of the objective and subjective characteristics of the injured wrist as well as the residual deformity [10],
- PRWE (Patient-rated wrist evaluation) as a measure of disability, in which the patient quantifies its pain by him self, as well as the function of his wrist [11, 12].

The PRWE (Patient-rated wrist evaluation) contains 15 items: a 5-item pain subscale (4 questions refer on pain intensity and one on pain frequency), and 10 items for the injured wrist function (a 6-item specific activities subscale

and a 4-item usual activities subscale). The total score can range from 0–100 and refers to the wrist pain and disability [12].

For statistical analysis SPSS 8.0 for Windows was used. Correlation analysis for the results of the three outcome measurements was made.

Results

The study assessed 13 patients with distal radius fracture (DRF) with age over 65 years. Out of them nine were female and four male, while concerning the involvement of the injured side eight were on the left side and five on the right. The age distribution was as follows: four patients in the group 65–69; two patients in the group 70–74, four patients in the group 75–79 and three patients in the age group over 80 years (Table 1).

Table1 – Табела 1

Age distribution of the patients
Возрасна распределба на пациентиите

Age	Number of patients
65–69	4
70–74	2
75–79	4
≥ 80	3

According to the classification of the fracture type, five patients had Frykman type VI and eight patients had Frykman type VIII.

Assessment of the quality of the reduction and the anatomic position of the distal radius fracture six months after the operation was made with the Stewart Score System, were three patients had score from 4–6 points (fair), nine patients had 1–3 points (good) and one patient had score 0 – zero (excellent) (Table 2).

With the DPS (Gartland and Werley) the following results were obtained: four patients had score of 0–2 points, six patients had 3–8 points, and three patients had 9–20 points (Table 2).

The descriptors for the outcome of the patients in this study referring the PRWE are given in the (Figure 1). Two patients had score 0 – zero; five patients had score 1–20; five patients had 21–40; and one patient had score of 41–60 points.

Table 2 – Табела 2

Stewart score system and Gartland and Werley scoring six months after the operation

Stewart бодовен сисѐм и Gartland и Werley бодирање шесѐи месеци по оѐрацијата

	Stewart Score System	Gartland and Werley Score
result	number of patients	number of patients
Excellent	1	4
Good	9	6
Fair	3	3
Bad	0	0

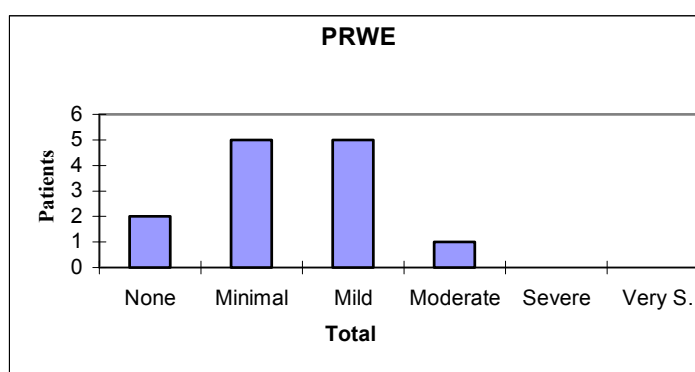


Figure 1 – Distribution of the patients according to the PRWE (Patient rated wrist evaluation) six months after the operation

Слика 1 – Расѐределба на пациентиите според PRWE (Проценка на рачниот зѐлоб од сѐрана на пациентиот) шесѐи месеци по оѐрацијата

The results of these three scoring systems were statistically analysed to determine the correlation between each (Table 3).

Only one patient showed signs of early reflex sympathetic dystrophy syndrome, one had temporary hypoesthesia of the superficial branch of the radial nerve and one had mild pin tract infection, which did not alter the final outcome.

Table 3 – Табела 3

Correlation between Stewart score, Gartland & Werley score and PRWE total score with the results of the whole series

Корелација помеѓу Stewart бодовиите, Gartland и Werley бодовиите и вкупниите бодови од PRWE со резултатите од целата серија

	A	B	C
	Stewart score	Gartland&Werley score	PRWE score
1	1	20	45.5
2	4	17	34.5
3	2	12	22
4	1	13	9.5
5	2	15	7
6	2	15	2
7	1	15	6
8	1	15	0
9	1	17	21.5
10	0	15	3
11	1	17	22
12	0	15	3
Average	2.0	16.0	16.9
Max	4	21	45.5
Min	0	12	0
r:	0.370	0.657	0.431
	A:B	B:C	A:C

Discussion

The distal radius fractures are common injuries that cause pain and disability of the injured wrist. The majority of the studies reported in the past, no matter what the method of treatment was, were focusing on the impairment; the anatomic and functional characteristics of the wrist (range of motion in the wrist, grip strength) [7, 13]. Contemporary studies are describing the pain and disability of the injured wrist joint in patients with advanced age that have sustained a distal radius fracture [5, 14]

PRWE is a specific instrument for measurement of the outcome of the distal radius fracture; it gives information, about the intensity as well as the

frequency of the pain and the ability of performing daily activities [11]. PRWE is reliable, responsive and repeatable system for outcome measuring (it can be repeated during the phases of fracture healing) [12]. This test can be performed immediately, even right after the external fixation of the wrist, contrary to the impairment measurements (range of motion, grip strength) that need some time to pass (for the fracture to heal, for the external fixator to be extracted, rehabilitation).

The indication for external fixation of the distal radius fractures not only encompasses the type of the fracture. According to Lafontaine [15] the presence of more than three criteria classify the distal radius fracture as unstable (1. dorsal angulation > 20 degrees, 2. comminution, 3. radiocarpal fracture, 4. ulnar styloid fracture, 5. over 60 years of age).

In the study of Gradl, 16 patients with distal radius fracture with age over 60 were treated with external fixation regained 83% of the extension in the injured wrist compared with the healthy one, 89% flexion and 85% pronosupination [16], McQueen when stabilised the distal radius fractures with external fixation found in 74% restoration of the grip strength compared to the uninjured hand. The range of motion was restored in 80% of the patients, except for the palmar flexion in 66% [3].

In our study, 5 patients were type VI and 8 patient were type VIII according Frykman classification, that points to the fact that these were unstable intraarticular fractures (radiocarpal and distal radioulnar joint involvement) with significant metaphyseal comminution, primary dislocation (angulation, radial shortening), ulnar lesion (fracture of the ulnar styloid with or without TFCC tear) and osteoporotic characteristics.

The Stewart score system in our study showed that three patients (23%) had fair score, nine patients or 69% had good and one patient or 7.7% had excellent score. This indicates that the external fixation enabled retention and stabilisation of the fracture in the period necessary for healing.

According to the DPS – Gartland and Werley scoring system that assesses the subjective and objective characteristics as well as the residual deformities, 3 patients (23%) had satisfactory result, 6 patients (46%) had good result and 4 patients (31%) had excellent result. So, the external fixation of the DRF in the elderly population with age over 65 years enabled good functional and aesthetic outcome.

The PRWE in the period six months after the operative intervention showed that two patients (15%) had no pain (regarding intensity and frequency) as well as any disability in performing specific and usual activities. In 5 patients (39%) there was minimal pain and minimal functional difficulties. While performing the daily activities 5 patients (39%) had mild pain and mild functional difficulties. In one patient (7.7% of the examined series) there was moderate

and frequent pain and moderate difficulty in performing the daily activities. The external fixation in DRF in the elderly patients resulted in lower intensity and frequency of pain in the injured wrist, as well as a good function of the wrist.

The analysis of correlation showed strong correlation between Gartland and Werley scores and the PRWE total scores ($r = 0.657$), meaning that the improvement of the objective characteristics (range of motion, grip strength) resulted in improvement in the PRWE scores and the patients had lower intensity and frequency of pain and less difficulties in performing specific and usual activities.

The correlation between Stewart score and PRWE score was weaker ($r = 0.431$) showing that there was weaker association between the radiographic parameters and the PRWE (pain and specific and usual activities).

Jupiter in his study of patients with distal radius fracture older than 60 years, also found strong and statistically significant correlation between patient-rated (PRWE) and objective measurements, and no correlation between radiographic and PRWE measurements [5].

The patients with a distal radius fracture with age over 65 years should be individually evaluated not only with respect to the fracture type and its instability but as well as because of the specific needs of this age group. The contemporary records for this older population emphasise the need for stabilisation of the distal radius fracture first of all because of the necessity of "independence", and increasing the level of the daily life activities [3, 5].

In the elderly patients there is an acceptable and sustainable risk for external fixation of the distal radius fractures compared to the benefit that would be obtained from the operative intervention. The possible complications are much fewer compared to the advantage that this method of external fixation gives in the elderly. When making an indication for operation of the distal radius fractures we should also focus on the need and expectations of the elderly patients, as well as on their level of daily activities.

Conclusion

- Age should not be a limiting factor in treating the fractures of the distal radius with external fixation. Elderly patients have its own specific needs that would enable them "independence".
- The external fixation in distal radius fractures in patients in advanced age enables high level of functioning of the injured wrist and high level of daily activities.
- The existence of precise criteria and highly specific and sensitive test (Gartland and Werley, PRWE) for outcome measurement in patients with distal radius treated with external fixator make the evaluation objective and valid.

- PRWE (Patient-rated Wrist Evaluation) is a valid, reliable, responsive, patient-rated test for the patients with distal radius fracture.
- As professionals we should recognize the demographic changes (the population continuously grows older), the increased incidence of DRF and the change of the life style in elderly patients.
- The treatment algorithm for the distal radius fractures in elderly patients needs to be REEVALUATED.

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Re z i m e

НАДВОРЕШНА ФИКСАЦИЈА КАЈ ПАЦИЕНТИ НА ВОЗРАСТ ПОСТАРИ ОД 65 ГОДИНИ СО ФРАКТУРА НА ДИСТАЛНИОТ КРАЈ НА РАДИУСОТ

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Цел. Оваа студија го истражува крајниот исход од третманот на фрактурите на дисталниот крај на радиусот со надворешна фиксација кај пациенти постари од 65 години.

Пациенти и методи. Тринаесет пациенти на возраст постари од 65 години со фрактура на дисталниот крај на радиусот се третирали со надворешна фиксација. Типот на фрактурата е одредуван според Frykman-овата класификација. За проценка на исходот шест месеци по операцијата се користени: Stewart бодовниот систем; Gartland и Werley; и PRWE (проценка на рачниот зглоб од страна на пациентот).

Резултати. Според Stewart бодовниот систем еден пациент има одличен; девет добар и три задоволителен резултат. Gartland и Werley бодирањето покажа кај четири пациенти одличен; кај шест добар и кај три задоволителен резултат. Според PRWE два пациента немаат ниту болка ниту функционална онеспособеност; пет имаат минимална; пет блага болка и функционална онеспособеност; и еден има средна јачина и фреквенција на болка и средна функционална онеспособеност. Статистички постои силна

корелација помеѓу Gartland и Werley бодовите и PRWE резултатот ($r = 0,657$) и слаба корелација помеѓу Stewart бодовите и PRWE резултатот ($r = 0,431$).

Заклучок. Надворешната фиксација на фрактурите на дисталниот крај на радиусот кај пациентите со напредната возраст овозможува висок степен на функционирање на повредениот рачен зглоб и високо ниво на дневни активности. Судејќи според користа од овозможувањето на „само-стојност“ на овие лица, ризикот за оперативно лекување е оправдан.

Клучни зборови: фрактура на дисталниот крај на радиусот, надворешна фиксација, PRWE, болка во рачен зглоб, функција на рачен зглоб.

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