Surgical versus conservative treatmentfor Neer´s type II and III proximal humerous fracture

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Abstract:

Background: Proximal fractures of the humerus constitute 5-8% of all fractures although more than 80% of these heal without surgical intervention, the rate of nonunion vary between 1% and 23% in displaced non impacted fractures of the surgical neck. The most commonly used classification for these fractures is Neer´s classification. The aim of treatment is to attain a painless functional shoulder.

Objectives: To compare the results of surgical versus conservative treatment of fracture neck of humorous Neer´s types II & III regarding functional outcome.

Patients and methods; Prospective study including 40 patients having fracture proximal humerous Neer`s type II& III attending Al-Yermouk teaching hospital from Nov 1st 2011 to Nov 1st 2013. Twenty patients were treated surgically and twenty were treated conservatively, all the patients were subjected to early physiotherapy and followed up at 3 months then functional evaluation of shoulder was done using Constant's Scoring System;

Results: The study sample included 40 patients; we got better results regarding pain, strength, range of motion and daily life activities in surgical treatment than conservative treatment.

Conclusion: Early operative management with adequate reduction and early physiotherapy is worth trial to gain early functional outcome.

Keywords: Fracture proximal humerus, Constant score, internal fixation

Introduction:

Proximal humerous fracture(PHF) constitute 5-8% of all humeral fractures although more than 80% of these heal without surgical intervention, the rate of nonunion vary between %1 and 23% in displaced and non impacted fractures of the surgical neck [1,2].

The aim of treatment is to attain a painless and simultaneously functional shoulder [2, 3].

Neer estimated that approximately 85% of all PHF are undisplaced [4- 6].In that no bone fragment is displaced by more than one centimeter, or angulated more than 45 degrees is often cited [7] , a lower figure of 49% is reported in a prospective study of over 1000 PHF[5] .

Surgery is usually reserved for displaced and unstable fractures and those with more complicated fracture patterns which allow earlier movement of the shoulder and elbow [5, 7].

Nowadays commonly used classifications are the Neer`s and the AO/ASIF, Neer`s classification based on Codman's four fragment classification(including humeral head, shaft, lesser and greater trochanter, and fracture part is considered displaced if displaced by 1 cm or angulated by 45^{o}) and is divided into 16 categories [8-10]. Immobilization of the shoulder using a collar and cuff (CAC) for 2 weeks followed by physical therapy is a widely accepted procedure [11-14]. Lungberg et al. found no advantage of physiotherapy compared with independent exercises, but Koval et al. found excellent or good results in 77%, using an independent exercises and more detailed evaluation system [15, 16]. Zyto described in a 10 year follow-up study that despite low functional scoring patient contentment is good and therefore non-operative treatment should be considered [17]. A later study by Lill et al. considered a conservative therapy in II and III parts fractures as a good option [16]. Although the outcome may be satisfactory in elderly patients with a sedentary lifestyle, in younger or active elderly patients operative treatment should be considered when displacement of the tuberosities or the joint surface may compromise long-term shoulder function substantially [18- 21]. Surgical treatment may include transosseous suture, close reduction and percutaneous fixation, conventional plate, locked plate, or hemiarthroplasty [22-35].

The functional outcome is usually assessed according to Constant`s score (CS); maximum (CS) is 100, it was graded as poor (0–55 points), moderate (56–70), good (71–85), or excellent (86–100). It assesses four individual parameters namely: pain (15 points), daily life activities (20 points), range of motion (40 points), and strength (25 points), the higher the score the more satisfactory is the shoulder function[36- 41].

Patients and Method:

prospective study including 40 patients having fracture proximal humerous Neer`s type II& III attending Al-Yermouk teaching hospital from Nov 1st 2011 Nov 1st 2013, they were 25 males and 15 females their ages were 19 -55y with a mean age of 38.1 years. There were 25 type II and 15 type III fractures.

Patients were randomly divided into two groups; twenty treated by open reduction and internal fixation (ORIF); by plate and screw or multiple k-wire and tension band (surgery done by different approaches), and 20 were treated by (CAC) or U shape slab (figs 1-4).

All the patients were followed up at 3 months to record the results, patients with complicated fractures and other injuries had been excluded. All patients subjected to early physiotherapy program, (CS) System was used to see the results. The sampling design was a non– probability convenient

sample. The patients included in the study were interviewed and examined according to a questionnaire. The purpose and procedures of study were explained to all participants.

Results:

Forty patients with fracture proximal humerous participated in the study. In table-1patients were distributed according to; ages (with Mean± SD 38.1±10.6 for (ORIF) group and Mean± SD 37.9±11.1 for the conservative group), gender (25; 62, 5% males and 15; 37, 5% females) and according to Neer`s classification (25; 62, 5% type II and 15; 37, 5 % type III).

After treatment the severity of pain, the activity level and arm positioning was determined according to table- 2.

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Table No.1: Distribution of patients according to age, gender, and type of fracture.

		ORIF	Conservative	Total	P value
Age years	<30	6 30.0%	5 25.0%	11 27.5%	0.579
	30—39	6 30.0%	4 20.0%	10 25%	
	40—49	4 20.0%	8 40.0%	12 30%	
	50-55	4 20.0%	3 15.0%	7 17.5%	
	Mean± SD	38.1±10.6	37.9±11.1	38.0±10.85	
gend	Male	13 65%	12 60%	25 62.5%	0.744
	Female	7 35%	8 40%	15 37.5%	
Neer´	Type II	14 70.0%	11 55.0%	25 62%	0.327
	Type III	6 30.0%	9 45.0%	15 38%	
P values; 0.579, 0.744, 0.327*Significant using Pearson Chi-square test at 0.05 levels					

Table No. 2: Distribution of patients according to pain level, activity level and arm positioning.

		ORIF	Conservative	Total	P value
Pain level	Severe	- 0%	1 5.0%	1 2.5%	0.027
	Moderate	3 15.0%	9 45.0%	12 30%	
	Mild	12 60.0%	10 50.0%	22 55%	
	None	5 25.0%	- 0%	5 12.5%	
Activity level	Unaffected sleep	2 10%	4 20%	6 15%	
	Full recreation/Sport	4 20%	10 50%	14 35%	
	Full work	14 70%	6 30%	20 50%	0.040
Arm positioning	Up to waist	. .	. .		
	Up to xiphoid	. .	2 10%	2 5 %	
	Up to neck	2 10%	11 55%	13 32.5%	
	Up to top of head	11 55%	6 30%	17 42.5%	0.003
	Above head	7 35%	1 5%	8 20%	
P values: 0.027, 0.040, 0.003 *Significant using Pearson Chi-square test at 0.05 levels.					

In table -3 we considered the level of pain in forward flexion and lateral elevation.In table- 4 we considered the level of pain in external and internal rotation.

Table No. 3: Descriptive statistics for the study sample for level of pain in forward flexion and lateral elevation

	degree	ORIF	Conservative	P value
Forward flexion	0--30	. .	. .	0.010
	31--60	. .	. .	
	61--90	. .	. .	
	91--120	6 30%	12 60%	
	121--150	14 70%	8 40%	
	151--180	. .	. .	
Lateral elevation	0--30	. .	. .	0.051
	31--60	. .	. .	
	61--90	. .	1 5%	
	91--120	7 35%	9 45%	
	121--150	7 35%	10 50%	
	151--180	6 30%	. .	
P values: 0.010, 0.051*Significant using Pearson Chi-square test at 0.05 levels				

Table No.4: Descriptive statistics for the study sample for level of pain in external and internalrotation

		ORIF	Conservative	Total	P value
External rotation	Hand behind head with elbow held forward	-	-	-	0.023
	Hand behind head with elbow held back	1 5.0%	9 45.0%	10 25.0%	
	Hand on top of head with elbow held forward	9 45.0%	7 35.0	16 40.0%	
	Hand on top of head with elbow held back	9 45.0%	4 20.0%	13 32.5.0%	
	Full elevation from on top of head	1 5.0%	-	1 2.5.0%	
	Total	20 50.0%	20 50.0%	40 100%	
Internal rotation	Dorsum of hand to lateral thigh	- -	-	- -	0.348
	Dorsum of hand to buttock	- -	- -	- -	
	Dorsum of hand to lumbo sacral junction	- -	1 5.0%	1 2.5%	
	Dorsum of hand to waist	7 35.0%	9 45.0%	16 40.0%	
	Dorsum of hand to 12th dorsal vertebrae	11 55.0%	10 50.0%	21 52.5%	
	Dorsum of hand to inters scapular region	2 10.0%	- -	2 5.0%	
	Total	20 50.0%	20 50.0%	40 100%	
P values; 0.023, 0.348 *Significant using Pearson Chi-square test at 0.05 levels					

In table-5 we considered the level of power of lateral elevation. In table-6 we considered the total score and we found that the Mean± SD was 69.20±10.89 in ORIF with mode of 79 and the median (50^{th}) was 71 while in conservative group we found that the Mean± SD was 55.55±7.84 with mode of 54 and the median (50^{th}) was 56.

Table No.5: Descriptive statistics for the study sample for level of power of Lateral elevation

Power in pounds	ORIF	Conservative	Total
0	. .	. .	. .
1—3	. .	. .	. .
4—6	. .	2 10.0%	2 5.0%
7--9	3 15.0%	4 20.0%	7 17.5%
10--12	3 15.0%	9 45.0%	12 30.0%
13--15	5 25.0%	3 15.0%	8 20.0%
16--18	3 15.0%	1 5.0%	4 10.0%
19--21	4 20.0%	1 5.0%	5 12.5%
22--24	2 10.0%	. .	2 5.0%
>24	. .	. .	. .
Total	20 50.0%	20 50.0%	40 100%
P value; 0.107 *Significant using Pearson Chi-square test at 0.05 levels.			

Table No.6: Total score (the mean – mode –range –median).

Total score	ORIF (n=20)	Conservative(n=20)
Mean± SD	69.20±10.89	55.55±7.84
Standard Error of Mean	2	2
Mode	79	54
Range	43-83	39-69
Percentile 5^{th}	48	41
25^{th}	62	52
50^{th}(Median)	71	56
75^{th}	79	61
95^{th}	82	69
99^{th}	83	69
P value; 0.0001*Significant difference using Students-t-test for difference Between two independent means at 0.05 levels		

fig 1 fracture proximal humerous II parts fracture

fig 2 fracture proximal humerous III parts fracture

fig 3 fracture proximal humerous II parts fracture post -operative

fig 4 fracture proximal humerous III parts fracture post-operative

Discussion:

In the current study, the ORIF group showed a significantly better CS than the conservative treatment group. We considered the 10-point difference in the CS to be a clinically important difference in accordance with the findings of two previous clinical studies; Olerud et.al. and Konigshausen et.al[42-44].

We found that the mean of our CS was 69.20 in ORIF and 55.55 in conservative method this finding goes with Björkenheim et al. who found that the CS mean was 68, 50 after (ORIF) in Neer's type II& III andLefevre- Colau et al who found that the CS mean was 61.1 after 3months of conservative management [40,45]. All these finding goes with Olerud et al who found advantage in functional outcome in favor of the locking plate compared to non operative treatment in patients with a displaced type III fracture but our study goes against Sanders et al result in which they found that non surgical treatment should have a more prominent role in the treatment of PHF ([46, 47]. Regarding pain severity we found that 85% of ORIF group had mild to no pain with movement while the conservative had 50% moderate to severe pain, these finding goes with Zyto et al and Hintermann et al who found that pain range from mild to no pain after ORIF [30,48]. Regarding activity level 70% of ORIF group return to full work in comparison to 30% of conservative group with p value of 0.040, regarding arm positioning 35% of ORIF group can reaches above head and only 5% of the conservative group can reach above the head, regarding power about 14; same level after 3 months with a P value of 0.107. All shoulder movements showed significant improvement with surgical management as compared to conservative one .with significant p value.

Conclusions:

It can be said that with Neer`s type II or III PHF in young adult early operative management with adequate reduction and early physiotherapy is worth trial to gain early and good functional outcome.

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