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Research Article

Success outcome of reduction in anterior shoulder dislocation by FARES method

Thirunarayanan Vasudevan*, Ramprasath Dhurvas Ramlal, Arularasan Samraj

Department of Orthopaedic Surgery, Government Royapettah Hospital, Chennai, Tamil Nadu, India

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***Correspondence:**
Dr. Thirunarayanan Vasudevan,
E-mail: thiruorthokmc@gmail.com

ABSTRACT

Background: Acute anterior shoulder dislocation is the commonest major joint dislocation. Various reduction techniques are available and the individual preferences vary. The aim of our study was to assess the success rate and safety of FARES (Fast, Reliable and Safe) method in reduction of acute anterior shoulder dislocation. The duration of reduction, the intensity of pain experienced by patients during reduction and the factors affecting both were also assessed.
Methods: A total of 161patients with acute anterior shoulder dislocation from June 2013 to May 2015 were studied. All patients underwent reduction of their dislocation by FARES method, without anaesthesia. A visual analogue scale was used to determine the intensity of pain felt during reduction.
Results: 149 cases were successfully reduced by FARES method. In the remaining 12 cases closed reduction was achieved under anaesthesia. The success rate of reduction that can be achieved by FARES method was 92.54%.The mean duration of reduction manoeuvre was 1.42 mins±31 seconds and among the studied factors, age had a statistically significant influence on duration of reduction (beta 0.370; $p<0.05$) .The mean visual analogue pain score was 1.78 ± 0.97and among the studied factors, age had a statistically significant influence on pain perception (beta 0.013; $p<0.05$).No complications were encountered in any patients.
Conclusion: Reduction of acute anterior shoulder dislocation by FARES method yields higher success rate in a quick time with less discomfort to the patients and without any complications.

Keywords: Dislocation, FARES, Reduction, Shoulder, VAS

INTRODUCTION

Acute shoulder dislocation contributes to 60% of major joint dislocations, of which 96% are anterior dislocations.[1] Different methods such as Hippocrates, Kocher, Milch, Spaso, Eachempati methods etc. are available for reduction of anterior dislocation of shoulder.[2-6]

In 2009, a prospective RCT from Greece, compared a new reduction technique of anterior shoulder dislocation (called as FARES method) with Hippocratic and Kocher method.[2] In 2012, LCH Tsoi and MCK Wong published a case series and an efficacy analysis of FARES method in acute anterior dislocation of shoulder.[9] There are only few studies that have shown the efficacy of Fares method.[2,8,9]

The aim of our study was to assess the success rate and safety of FARES method in reduction of anterior shoulder dislocation, to know duration of reduction, the intensity of pain experienced by patients during reduction and the factors affecting both.

METHODS

The study was a single centre, descriptive case series involving 161 patients. The study was conducted in our

institution from June 2013 to March 2015. The patients were informed about their participation in the study and informed consent was obtained. Patients satisfying following criteria were included in the study.

Inclusion criteria

1. Age between 18-75 yrs.
2. Patients presenting within 24hrs of dislocation,
3. Fully conscious and co-operative.
4. First episode of anterior dislocation.
5. With or without greater tuberosity fracture of humerus.

Exclusion criteria

1. Age less than 18 and more than 75years..
2. Time of presentation more than 24 hours of dislocation.
3. Dislocations associated with three or four part fracture of humerus.
4. Patients administered analgesics or sedatives before presentation.
5. Patients with poly trauma or haemodynamic instability.
6. Neurovascular injuries.

Reduction was attempted by Orthopaedic Residents by FARES method in the emergency room. Sedation or anaesthesia was not administered in any of the patients. A maximum of only one attempt was used. In patients where reduction was not possible by FARES method, reduction was achieved under anaesthesia. Those patients in whom reduction was achieved under anaesthesia were termed failure cases. Details of the patients are shown in Table 1.

Steps of reduction (Figure 1-6)

Patient was made to lie in supine position. The patient must feel as relaxed and comfortable as possible. No analgesic or sedation was used. Counter traction was not used and reduction was performed by single person without the help of assistant.

Step 1: The resident with both hands grasps the patient's hand, with the affected arm at the side, elbow extended and forearm in midprone position (Figure 1).

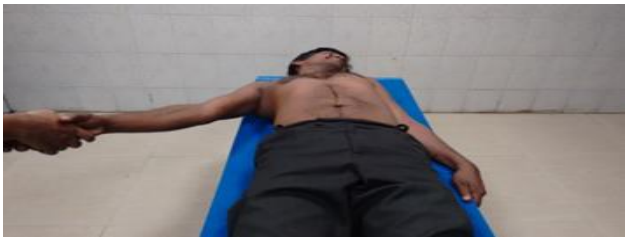

Figure 1: Patient arm held at the side, elbow extended, and forearm in midprone position.

Step 2: A longitudinal traction was applied to the affected extremity. Simultaneously vertical oscillatory movements at the rate of 2-3 cycles /sec, in a short range of about 5cm above and below the horizontal plane is applied throughout the whole reduction process to facilitate muscle relaxation (Figure 2).

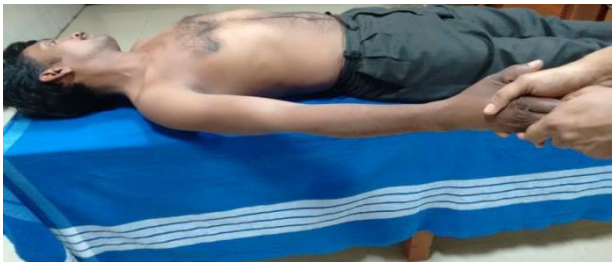

Figure 2: Longitudinal traction with vertical oscillatory movements.

Step 3: Next the affected shoulder was abducted slowly, with continuation of longitudinal traction and vertical oscillatory movements (Figure 3).

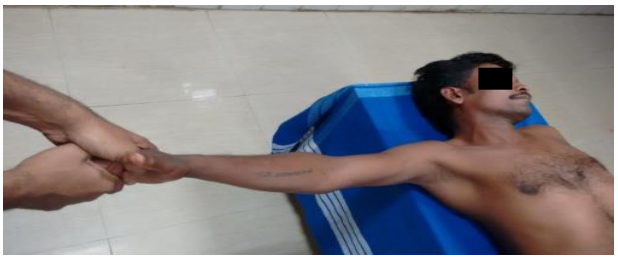

Figure 3: Arm abducted to 90^{o}, with continuation of longitudinal traction and vertical oscillatory movements.

Step 4: When the arm was abducted past 90^{0}; it was gently externally rotated with continuation of longitudinal traction, abduction and vertical oscillatory movements (Figure 4).

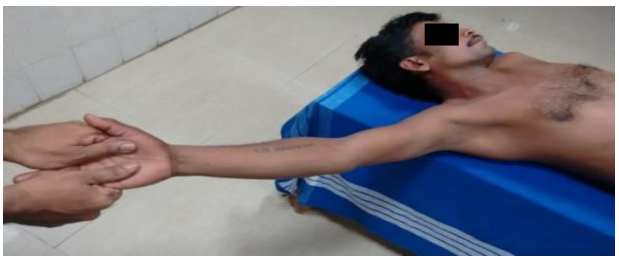

Figure 4: Initiation of external rotation at 90^{o} of abduction.

Step 5: Usually at 120^{o} of abduction, shoulder reduction was achieved (Figure 5).

Step 6: Once the reduction was achieved, the arm was internally rotated and the elbow was flexed to place the forearm over the chest wall (Figure 6).

Figure 5: Reduction achieved at 120°.

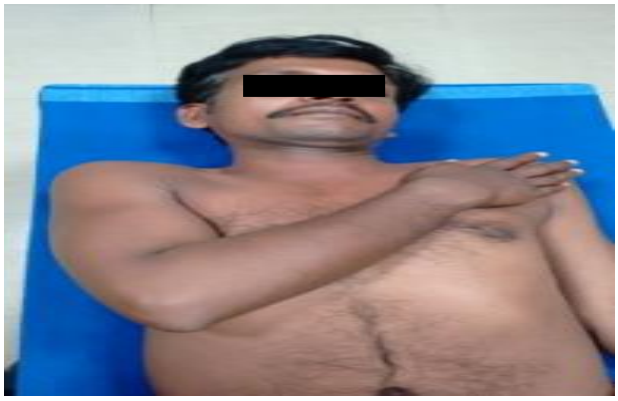

Figure 6: Internal rotation of arm.

Post reduction, the following information was noted and the reduction was confirmed by post reduction radiograph.

1. Time gap from presentation to first attempt of reduction.
2. Time taken to achieve complete reduction from onset of reduction manoeuvre.
3. Perception of pain intensity by visual analogue score.
4. Complication encountered during the reduction manoeuvre.

The Visual analogue Scale (VAS) was used to evaluate pain felt during reduction. Post reduction, patients marked the amount of pain felt during reduction on the VAS Scale. The pain score was ranging from 0 to 7 and the mean VAS pain score was 1.78±0.97. A multiple linear regression analysis of factors influencing the pain perception following the FARES reduction technique was done (Table 3). The factors that were studied were age, sex, side of injury, mechanism of injury, time gap between injury and presentation and presence of GT fracture. It was seen that among the studied factors, age had a statistically significant influence on pain perception during the reduction manoeuvre (beta 0.013; $p<0.05$), indicating that as age increases there is an increase in the pain perception following FARES method. It was also seen that women experienced a greater pain during reduction compared to men (beta 0.918; $p<0.001$).

RESULTS

Out of 161 cases, in 149 cases, shoulder reduction was successfully achieved by FARES method. The remaining 12 cases which were not reduced by FARES method were reduced under anaesthesia. No complications were encountered in any patients.

Table 1: Characteristics of study population.

Characteristic	Category	Number (%)
Sex	Male	131 (81.4)
	Female	30 (18.6)
Age	18-20 years	7 (4.3)
	21-40 years	85 (52.8)
	41- 60 years	48 (29.8)
	60-75 years	21 (13)
Side of Injury	Right	87 (54)
	Left	74 (46)
Mechanism of Injury	Accidental fall	95 (56)
	Road traffic accidents Convulsions Electric shock	66 (41) 3(1.8) 2(1.2)
Greater Tuberosity Fracture	Yes	26 (16.1)
	No	135 (83.9)
Time of presentation after injury		

Table 2: Factors affecting the reduction time.

Factor	Standardized Beta Coefficient	95% CI	p value
Age	0.370	0.049 – 0.688	0.024
Sex	11.845	-0.328 – 25.211	0.057
Side of injury	7.932	-2.135 – 17.398	0.125
Mechanism of injury	-7.810	-17.350 – 2.975	0.164
Presence of GT fracture	1.177	-11.394 – 14.982	0.788
Time gap between injury and presentation	0.005	-0.011 – 0.022	0.521

The time gap to achieve complete reduction ranged from 15 sec to 2.35 mins. The mean time gap to achieve complete reduction was 1.42min±31 sec. A multiple linear regression analysis of factors influencing the

reduction time in the FARES reduction technique was done (Table 2). The factors that were studied were age, sex, side of injury, mechanism of injury, time gap between injury and presentation and presence of GT fracture. It was seen that among the studied factors, only age had a statistically significant influence on time for reduction (beta 0.370; $p<0.05$), indicating that as age increases there is an increase in the reduction time using FARES method.

DISCUSSION

Different methods are available to achieve reduction in anterior dislocation of shoulder.[2-8] FARES method which was introduced in 2009 was gaining importance in our institution, with regard to duration of reduction and less pain perception by patients. In order to know the success rate and safety of FARES method, in our institution, reduction of anterior shoulder dislocation was done by FARES method alone, in all patients who met inclusion criteria from June 2013 to march 2015.

Only few studies are available about FARES method in literature.[2,8,9] A randomized study published in 2009 compared FARES method with Hippocratic and Kocher method, and showed that FARES method of shoulder reduction yielded higher success rate than other methods (FARES 88.7% compared to Hippocratic 72.5% and Kocher 68%).[2] The study also showed that, by FARES method the duration of reduction was quicker(2.36 ± 1.24 mins) and the pain felt during reduction(1.57±1.43) on visual analogue scale was milder. The randomized study published in 2012 compared the safety and efficacy of FARES method with that of Eachempati method and showed that the successful shoulder reduction achieved by two attempts of FARES method was 95% and the pain felt during reduction was less when compared to Eachempati method, where success rate was 91.25% and pain felt during reduction was higher.[8] The case series study published by LCH Tsoi and MCK Wong with only 9 patients in study also showed that there was higher success rate in FARES method.[9] Beattie et al in randomized control study compared Kocher method with Milch method and showed the success rate by Kocher method was 77% and Milch method was 75%. The success rate achieved by both the methods was very less than the success rate achieved by FARES method in literature reviews.[2,7-10]

Table 3: Factors affecting the pain perception during FARES reduction technique.

Factor	Standardized Beta Coefficient	95% CI	p value
Age	0.013	0.022 – 0.003	0.009
Sex	0.918	0.540 – 1.296	<0.001
Side of injury	0.179	-0.107 – 0.466	0.218
Mechanism of injury	-0.258	-0.558 – 0.042	0.092
Presence of GT fracture	-0.201	-0.596 – 0.194	0.316
Time gap between injury and presentation	0.000	0.000 – 0.000	0.290

The result of our study showed that the success rate that can be achieved by single attempt of FARES method (92.54%) was higher when compared to other methods of reduction in review of literature.[2,8,9] There was no need of sedation or analgesic to perform FARES method. Our study showed that the duration of reduction by FARES method was quick when compared to duration of reduction by other methods in review of literature.[2,8,9] The amount of pain experienced by patients in FARES method of reduction measured with VAS pain scale was less when compared to other methods in review of literature.[2,8,9] Age is an important factor affecting both the duration of reduction and pain experienced by patient during reduction by FARES method.

Table 4: Comparison of our study result with original article on FARES method.

Method	Our study (n=161)	FARES Article (n=53)
Reduction Results Success - Failure -	149(92.54%) 12(7.4%)	47 (88.7 %) 6 (11.3%)
Reduction Time	1.42 mins ± 31secs	2.36 min ±1.24
VAS score	1.78 ± 0.97	1.57 ± 1.43

Neurological complications, vascular injury and fresh fractures of humerus are certain known complications that may occur during reduction of anterior dislocation of shoulder. In our study, no complication was noted in any of the patients.

The presence of greater tuberosity fracture with acute anterior shoulder dislocation was not seen to alter the outcome of FARES method. This shows the safety of FARES method which can be easily performed in emergency department without fear of complications.

We compared our study results with the FARES article published in 2009 with regard to success rate, duration of reduction time and VAS pain score (Table 4).Our study which included 161 patients when compared to 53 patients of FARES article yielded better results with respect to success rate and duration of reduction manoeuvre.[2]

The limitation of our study is that, we did not perform other methods of reductions in our patients. Therefore we have not compared FARES method with other methods within our study.

CONCLUSION

Reduction of anterior shoulder dislocation by FARES method yields high success rate in a quick time with less discomfort to the patients. This technique is easy to learn and simple to practice in emergency department even in patient with greater tuberosity fracture of humerus, without pre medications, with no fear of significant complications.

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