

## 상완골 대결절 단독 골절의 수술적 치료 결과

문은선·김명선·김영진

전남대학교 의과대학 정형외과학교실

**목 적:** 대결절 단독 골절에 대한 수술적 치료 결과를 분석하고, 수술 방법 및 술 후 재활의 적절성에 대해 평가해보고자 하였다.  
**대상 및 방법:** 1년 이상 추시가 가능하였던 10명을 대상으로 하였으며, 평균 연령은 52.3세였다. 골편의 위치, 크기, 분쇄 유무 및 동반 손상 여부에 따라 수술 도달법 및 고정 방법을 달리하였으며, 술 후 재활은 환자마다 개별화하였다. 임상적 결과는 UCLA 및 Constant scoring을 이용하였다.

**결 과:** UCLA 점수는 우수 3예, 양호 5예, 불량 2예였으며, Constant 점수는 우수 8예, 양호 2예였다. 골유합은 재수술의 경우를 제외하고 평균 7.6주에 얻을 수 있었다. 고정 방법으로는 유관 나사만을 사용한 경우가 2예, 비흡수성 봉합사만을 사용한 경우는 3예였고, 두 방법을 동시에 사용한 경우가 5예였다. 재수술은 2예에서 시행하였으며, 동반 손상을 간과하고 수술을 시행하였던 경우와 술 후 재활 과정 중 적절한 보호가 부족했던 경우였다.

**결 론:** 저자들은 상완골 대결절 단독 골절에 대한 수술적 치료에 있어 동반 손상의 유무 파악과 골편의 크기와 분쇄 유무에 따라서 적절한 내 고정물과 수술적 도달법을 선택하는 것이 매우 중요하다고 생각한다. 또한, 수술 당시의 골절부 고정의 안정성에 따라 술 후 재활을 개별화하는 것과 골절부에 대한 적절한 보호가 보다 좋은 임상적 및 방사선학적 결과를 얻는 데 중요하였다.

**색인 단어:** 대결절 단독 골절, 수술적 치료, 고정 방법, 재활

## The Surgical Outcomes for Isolated Greater Tuberosity Fracture of Proximal Humerus

Eun-Sun Moon, M.D., Myung-Sun Kim, M.D., Young-Jin Kim, M.D.

Department of Orthopaedic Surgery, College of Medicine, Chonnam National University, Gwangju, Korea

**Purpose:** To evaluate the adequate surgical methods and postoperative rehabilitation by analyzing the outcome of surgical treatment for isolated greater tuberosity fracture of proximal humerus.

**Materials and Methods:** Ten patients who allowed at least 1 year follow up after the surgical treatment of isolated greater tuberosity fractures were evaluated. Their mean age was 52.3 years (range, 28~67) and mean follow up duration was 23.8 months (range, 12~36). We choosed the different approaches and fixation methods according to size, location and presence of comminution of the fragment, and combined injury. The rehabilitation programs were indivisualized and we evaluated the clinical outcomes using UCLA and Constant scoring system.

**Results:** According to the UCLA scoring system, 5 cases were excellent, 3 cases were satisfactory, and 2 cases were unsatisfactory. By the Constant scoring system, 8 cases were excellent and 2 cases were good. The average bony union time was 7.6 weeks (range, 6~8) except the 2 cases of revision surgery. Two cases were operated using cannulated screws alone, 3 cases using only nonabsorbable sutures and 5 cases using cannulated screws and nonabsorbable sutures. One out of two revision cases was developed from the negligence of preoperative shoulder anterior dislocation with rupture of subscapularis, and the other was caused by improper immobilization of the fracture site postoperatively.

**Conclusion:** Not only the adequate surgical approaches and the fixation methods according to the size and comminution of fragment, but also the identification of combined injuries were very important in the surgical treatment for the isolated greater tuberosity fracture. And we considered that the adequate postoperative rehabilitation and proper protection based on the intraoperative fixation stability play an important role for the better clinical and radiological outcomes.

**Key Words:** Greater tuberosity fracture, Surgical treatment, Fixation method, Rehabilitation

서론

28~67) 가 6 , 가 4 .  
23.8 ( , 12~36) , 가  
가 , 6 (60%), 가 4 (40%) ,  
가 3 , 2 , 가 1 .

9) .

2. 치료 방법

가

가

8,13,16,17) . 10 가 , 5  
mm 가  
. 7  
가 1 가  
가

대상 및 방법

1. 연구 대상

No.2  
Ethibond suture (Ethicon, Inc., Somerville, New Jersey)

2003 3 2005 2  
1 가 가  
10 52.3 ( , (deltopectoral ap-

Table 1. Patients demographics

Case	*Sex/Age	† Associated injuries	Fixation materials	Approach	Complications	Clinical results	
						UCLA	Constant
1	F/66	Shoulder DL	Screw Ethibond	Deltoid split	-	33	92
2	M/46	Distal radius Fx Coracoid Fx Shoulder DL Subscapularis rupture	Screw Ethibond	Deltopectoral	Fixation loss and DL	24	79
3	M/59	(-)	Screw Ethibond	Deltoid split	-	35	98
4	F/44	L3 Fx	Ethibond	Deltoid split	-	31	92
5	M/28	(-)	Ethibond	Deltopectoral	-	35	100
6	F/43	(-)	Screw Ethibond	Deltoid split	Fixation loss	33	88
7	M/47	Shoulder DL	Screw Ethibond	Deltopectoral	-	29	85
8	M/67	(-)	Screw	Deltopectoral	-	29	85
9	M/62	Shoulder DL	Screw	Deltopectoral	-	29	89
10	F/61	(-)	Ethibond	Deltopectoral	-	24	80

\*M: Male, F: Female, † DL: Dislocation, Fx: Fracture, L3: Third lumbar vertebra.

proach) , , (deltoid split approach) . 가 . approach) , 4 (4~6 approach) 2 , 3 가 5 (Table 1).

1 2 4. 합병증 (6~8 ) 10 2 , 1 1

### 3. 결과 판정

가 , , UCLA scoring system<sup>3)</sup> , 5가 , 4 (Fig. 1). 1 2 Constant scoring system<sup>5)</sup> 가 , 가 (Fig. 2).

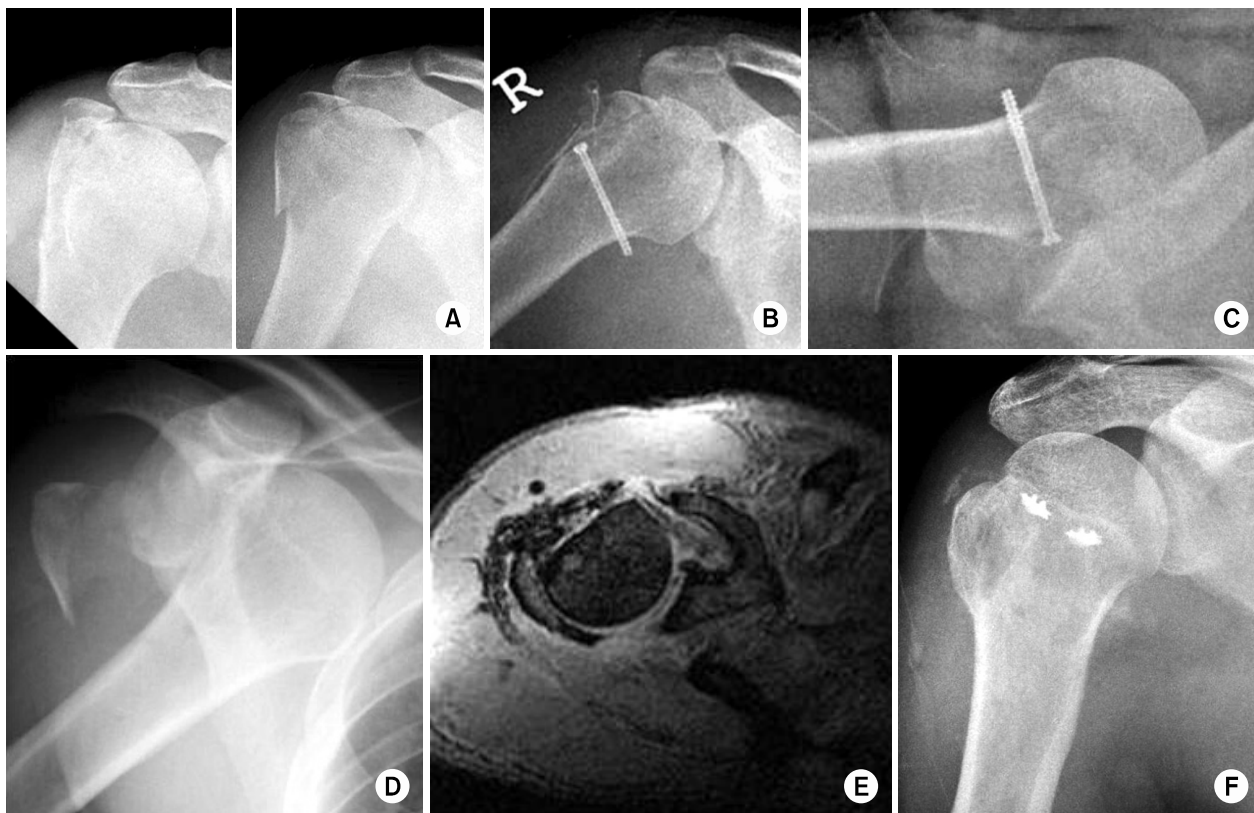
### 결 과

#### 1. 임상적 결과

UCLA (excellent)가 3 , (good)가 5 가 8 (80%) (poor) 2 (20%) . Constant (excellent)가 8 (80%), (good)가 2 (20%) , (moderate) (poor) .

#### 2. 방사선학적 결과

Flatow<sup>6)</sup> 가 1 cm Bigliani<sup>1)</sup> 5 mm . Platzer<sup>13)</sup> 3 mm 3 mm 가 , 가 . 가 8 7.6 ( , 6~8) , 가 , 가 . 가 , Park<sup>12)</sup> 5



**Fig. 1.** (A) 46-year-old male and his initial anteroposterior and external rotational radiographs show isolated greater tuberosity fracture.

(B) Immediate postoperative radiograph shows fracture fixation using one cannulated screw through the deltopectoral approach.

(C) But, anterior shoulder dislocation was developed at postoperative 1 day.

(D) The initial anteroposterior radiograph obtained from the local hospital shows the previous existence of anterior shoulder dislocation.

(E) MRI showed the complete subscapularis tear.

(F) At 2 years 8 months after fracture fixation using tension band suturing with nonabsorbable sutures and subscapularis repair with suture anchors, the radiograph shows good fracture healing.

mm

3 mm

Carrera <sup>2)</sup>

Kim Ha<sup>10)</sup>

가

Green

Izzi<sup>7)</sup>

, SLAP

<sup>14,15)</sup> Taverna <sup>17)</sup>

가

1



(E) She underwent the revision surgery for greater tuberosity fracture using tension band suturing with nonabsorbable suture through the same approach and the radiograph at 3 year after operation shows good fracture healing.

가

가

,

, ,

가 ,  
가

가 . Flatow <sup>6)</sup>

가

, ,  
가

6 , 3  
<sup>14)</sup>

가

가 ,  
가

## 결 론

가

## 참 고 문 헌

- 1) Bigliani LU, Flatow EL: Acromioclavicular fractures of the proximal humerus. In: Rockwood CA, Matsen FA III eds. The shoulder. 2nd ed. Philadelphia, WB Saunders Co: 337-389, 1998.
- 2) Carrera EF, Matsumoto MH, Netto NA, Faloppa F: Fixation of greater tuberosity fractures. Arthroscopy, **20**: e109-111, 2004.
- 3) Constant CR, Murley AH: A clinical method of functional assessment of the shoulder. Clin Orthop Relat Res, **214**: 160-164, 1987.
- 4) DePalma AF, Cautilli RA: Fractures of the upper end of the humerus. Clin Orthop Relat Res, **20**: 73-93, 1961.
- 5) Ellman H, Hanker G, Bayer M: Repair of the rotator cuff. End-result study of factors influencing reconstruction. J Bone Joint Surg Am, **68**: 1136-1144, 1986.
- 6) Flatow EL, Cuomo F, Maday MG, Miller SR, McIlveen SJ, Bigliani LU: Open reduction and internal fixation of two-part displaced fractures of the greater tuberosity of the proximal part of the humerus. J Bone Joint Surg Am, **73**: 1213-1218, 1991.
- 7) Green A, Izzi J: Isolated fractures of the greater tuberosity of the proximal humerus. J Shoulder Elbow Surg, **12**: 641-649, 2003.
- 8) Kang HJ, Lee DH, Yoon HK, Hahn SB: Cannulated screw fixation for 4 part fractures of the neck of humerus. J Korean Fracture Soc, **18**: 432-436, 2005.
- 9) Kim E, Shin HK, Kim CH: Characteristics of an isolated greater tuberosity fracture of the humerus. J Orthop Sci, **10**: 441-444, 2005.
- 10) Kim SH, Ha KI: Arthroscopic treatment of symptomatic shoulders with minimally displaced greater tuberosity fracture. Arthroscopy, **16**: 695-700, 2000.
- 11) Neer CS: Displaced proximal humeral fractures. I. Classification and evaluation. J Bone Joint Surg Am, **52**: 1077-1089, 1970.
- 12) Park TS, Choi IY, Kim YH, Park MR, Shon JH, Kim SI: A new suggestion for the treatment of minimally displaced fractures of the greater tuberosity of the proximal humerus. Bull Hosp Jt Dis, **56**: 171-176, 1997.
- 13) Platzer P, Kutscha-Lissberg F, Lehr S, Vecsei V, Gaebler C: The influence of displacement on shoulder function in patients with minimally displaced fractures of the greater tuberosity. Injury, **36**: 1185-1189, 2005.
- 14) Rockwood CA, Green DP: Fractures in adults. 5th ed. Philadelphia, Lippincott: 1012-1017, 2001.
- 15) Schai PA, Hintermann B, Koris MJ: Preoperative arthroscopic assessment of fractures about the shoulder. Arthroscopy, **15**: 827-835, 1999.

- 16) **Shin DJ, Chang SA, Byun YS, Hwang DH, Lee SR, Kim SH:** T-plate fixation for two- and three-part fractures of the proximal humerus. *J Korean Fracture Soc*, **18**: 426-431, 2005.
- 17) **Taverna E, Sansone V, Battistella F:** Arthroscopic treatment for greater tuberosity fractures: rationale and surgical technique. *Arthroscopy*, **20**: e53-57, 2004.