

〈심포지움 I 12:39~12:47〉

Preferred Method of treatment(Four Part Fracture & D/L)

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한림의대

Four-part fracture and dislocation demands special treatment and judgment

:Unsatisfactory 25/56 : C/R(11/11), O/R(13/13), prosthesis(1/32) C.S. Neer II Prosthetic reconstruction

- Multicenter analysis : primary prosthetic replacement , Schai et al (1995, Switzerland
- Late prosthetic surgery for failed C/R or O/R treatment is technically difficult, results are inferior to those reported for acute primary replacement

Considerations in the four-part fractures

1. Osteoporotic fracture
2. Muscular attachments 유지
3. Radiographic evaluation이 때때로 쉽지않다
4. Avascular necrosis incidence
Neer 46.2%(6/13) Marti 46.2% Leyshon 75%(6/8)
Lee and Hansen 21.1%(4/19) Sturzenegger 35.7%(5/14)
Jakob : specific type of displaced four-part fracture(Valgus impaction of head fragment)
lower incidence 26%(5/19)

Indication for prosthetic replacement

- Four-part fracture and fracture-dislocation
- Elderly osteoporotic three-part fractures
- Chronic dislocations with impression fractures, involved more than 40%
- Head-splitting fractures
- Anatomical neck fractures in which internal fixation is not possible

Surgical Management

Humeral prosthesis insertion시 중요한 점

1. Restore humeral length : malposition-high position 피한다

2. Proper retroversion : bicipital groove을 guideline으로 활용
3. Anatomical fixation of the tuberosities to the prosthesis, humeral shaft

Surgical technique note

Modified beach chair position

Straight deltopectoral incision

biceps tendon으로 대결절, 소결절의 위치를 쉽게 판단
 골두 제거후 대결절, 소결절의 tendon 부착부 design
 cuff 상태 확인, coracoacromial ligament 보존, impingement check
 axillary nerve palpation "tug test"

Humeral shaft preparation

Correct height : fracture pattern, proximal bone loss의 정도를 평가
 trial로 적절한 position에 위치

retroversion(20-35도)으로 위치

lateral flange를 bicipital groove 후방 피질골 바로 뒤 혹은 0.5cm후방에 위치
 head size choice

trial reduction(후방, 하방에는 50%전위가능, 전방은 25%이상 초과해서는 안됨)

instability vs. large head size: humeral offset증가-tension repair of the tuberosity

two drill holes후에 cementing

Tuberosity fixation

proper reattachment and secure fixation

cuff tendon이 결절의 부착부를 통과하는 #5 nonabsorbable suture(preferred)

wire tends to fragment, functional tenodesis

longitudinal suture first, second / transverse suture superior, inferior(순서)

bone grafting(cancellous bone from the humeral head), rotator interval closure

intraoperative assessment AP(I/R, E/R), axillary view

Results : long-term F/U satisfactory result : variable (90-50%)

Neer 43 cases 90%

Green et al 28 cases 89%

function outcome dependent on age, functional requirements, cuff integrity

Warren et al 22 cases 91%

the results deterioration as the interval between the injury and the operation
 lengthened. 92점(1주 이내), 85점(1-2주), 58점(2주 이상)

→ restoration of soft-tissue tension and secure tuberosity fixation 어려움
the age 91점(70세 이전), 74점(70세 이후)

Tanner and Cofield : 16 cases 94%

Ultimate function depended on the status of the rotator cuff

Zuckerman et al 26 cases 73%

Satisfactory pain relief, return of function is less predictable

Kim 13 cases 92%

Factors affected the results :

Sound operative technique

the age of the patients

the interval from the injury to the operation

the status of the rotator cuff

systematic rehabilitation

Complications :

Technique : Instability, tuberosity nonunion, malunion

Malposition-high position (Impingement)

the greater tuberosity is below the head of prosthesis

Original trauma : infection, nerve injury, reflex dystrophy

heterotopic ossification