Schoudergroep TerBrugGen

Irish Shoulder & Elbow Society Annual Meeting 2021

Irish Shoulder & Elbow Society

Shoulder arthroplasty for acute proximal humeral fracture

'Timing of surgery'

Anne Karelse MD PhD

Indications:

- Head split , fracture dislocation, impaction, communition
- High risk of head necrosis

Salvage treatment

Timing of surgery ?

Shoulder arthroplasty for acute proximal humeral fracture

Timing of shoulder arthroplasty in comminuted proximal humerus fracture, how much does it matter?
Abdelhady AM, Eur J Orthop Surg Traumatol. 2013

Outcome is affected by:

- Bone quality
- Healing of tuberosities
- Timing of surgery

Shoulder arthroplasty for acute proximal humeral fracture

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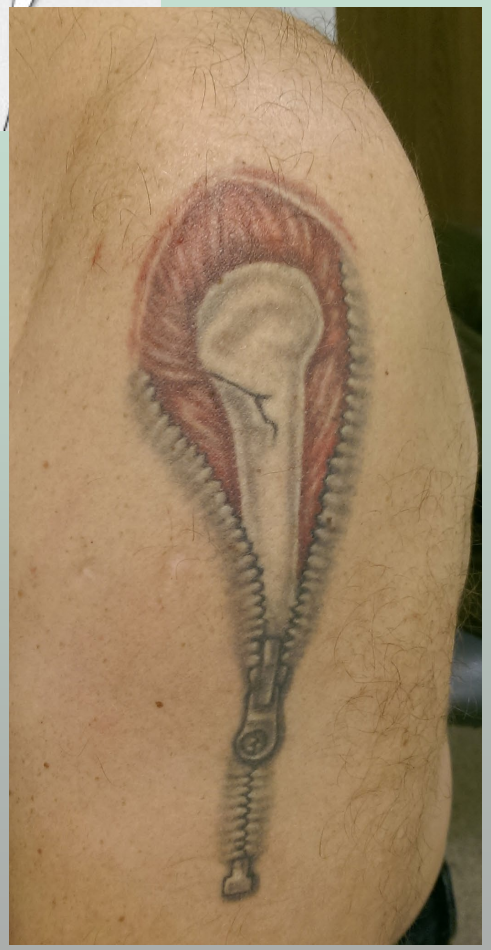
Outcome is affected by:

- Bone quality
- Healing of tuberosities
- Timing of surgery

Surgery < 3 days : better outcome in ROM & strength
≥7 d: worse outcome

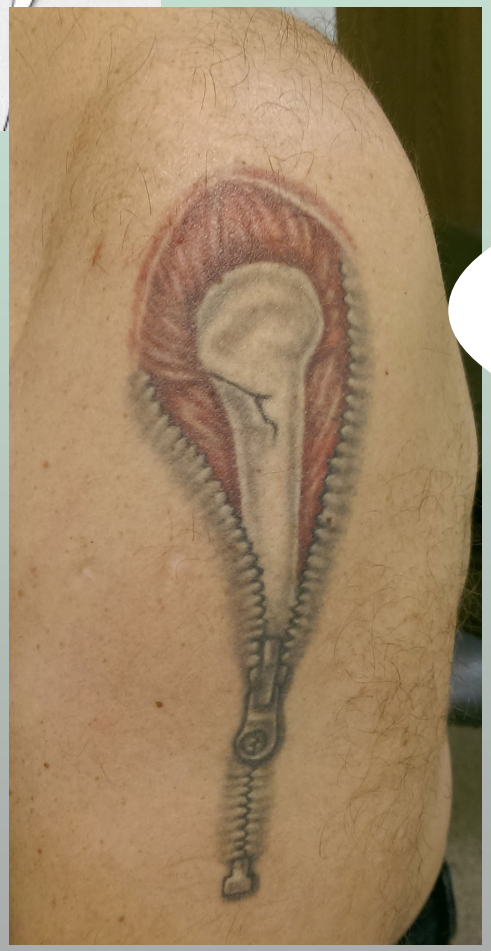
'Bone AND soft tissue injury'



Healing process has 3 phases:

- Degeneration phase: hematoma, necrosis, inflammatoy cell response
  1-3 dg
- Repair phase: phagocytosis, muscle regeneration and scar formation
  2-20 dg
- Remodeling phase: reorganisation of scar tissue, muscle and tendon
  10 dg - ..

'Bone AND soft tissue injury'



Healing process has 3 phases:

- Degeneration phase: hematoma, [illegible] cell response

Peak repair phase
at 14 days

- [illegible] phagocytosis, muscle regeneration and scar formation
  2-20 dg
- Remodeling phase: reorganisation of scar tissue, muscle and tendon
  10 dg - ..

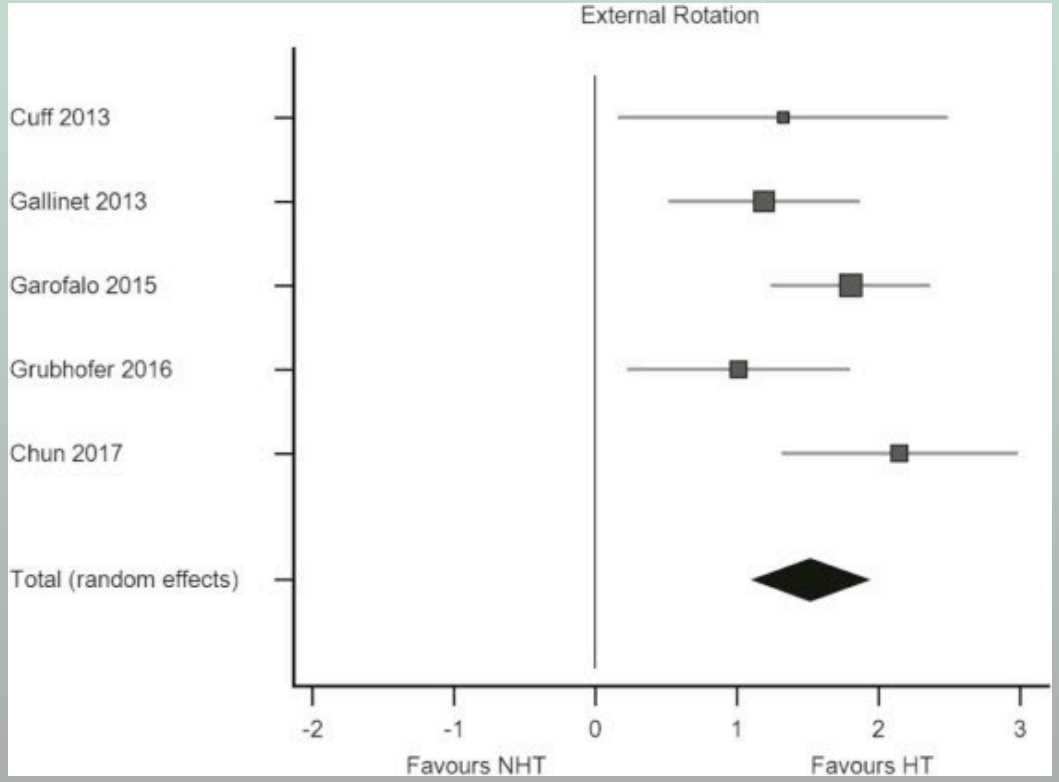
Hemiarthroplasty: Failure of fixation & healing of tuberosities = worse functional outcome.

Table 3 Results from recent studies of hemiarthroplasty for fracture.

Authors (date)	Number of cases (FU)	Number/Type of implant	FU	Mean active ant. elevati		ional
Prakash et al. (2002) [6]	33 (22)	6 1G 16M	33 mo	93°		
Boileau et al. (2002) [4]	73 (66)	66 M	27 mo	101°		6 pts
Robinson et al. (2003) [8]	163 (138)	85 1G 53 M	6.3 yrs	–		4 pts
Mighell et al. (2003) [33]	80 (72)	80 M	36 mo	128°		pts
Demirhan et al. (2003) [23]	48 (32)	11 1G 21 M	38 mo	113°		8 pts
Kralinger et al. (2004) [5]	167	39 1G 128 M	29 mo	41.9% > 90°		5.3 pts
Jacquot et al. (2004) [52]	72	72 DF	18 mo	130°		ond 73%
Anjum et al. (2005) [48]	22 (20)	9 1G 11 M	33 mo	–		7.5 pts
Krishnan et al. (2005) [24]	34 (32)	32 DF	18 mo	117°		
Grönhagen et al. (2007) [7]	82 (46)	12 1G 70 M	53 mo	–		2 pts
Pavlopoulos et al. (2007) [53]	51	35 1G 16 M	5.5 yrs	–		7.5 pts
Fallatah et al. (2008) [51]	56 (45)	18 1G 27 M	48 mo	87°		e: 63.3%
Greiner et al. (2008) [38]	43 (30)	30 M	22.7 mo	–		7 pts pts
Padua et al. (2008) [10]	21	1G et M	41 mo	113°		DASH:
Antuna et al. (2008) [49]	85 (57)	57 1G	10.3 yrs	100°	84%	

1G: first generation, M: modular prosthesis, DF: fracture-dedicated prosthesis.

RSA: Failure of fixation & healing of tuberosities = less active flexion and external rotation.



Tuberosity healing after reverse shoulder arthroplasty for complex proximal humeral fractures in elderly patients, does it improve outcomes ? a systematic review. Jain, JSES 2018.

Timing of surgery

Delaying factors

- Patient related
- System related:

  - Surgeon
  - Implant

Patient factors

Risk factors for and timing of adverse events after total shoulder arthroplasty. Lovy A, JSES 2017

6000 TSA : 2,5 % Severe adverse events

2,7 % Readmission < 30 days

71% Medical: Thrombo-embolic, Pneumonia

22 % Surgical: Dislocation, Woundinfection leading to surgery

X 2 if Prosthesis for fracture

Patient factors

Risk factors for and timing of adverse events after total shoulder arthroplasty. Lovy A, JSES 2017

Risk factors

- Age
- ASA classification 3 / 4 (Diabetic, Cardiac)
- Pulmonary disease
- Hypertension
- Bleeding- causing disorders
- Functionally dependent
- Inflammatory artritis

Patient factors

Risk factors for and timing of adverse events after total shoulder arthroplasty. Lovy A, JSES 2017

If 3 or more risk factors:

Readmission x12

Severe adverse events x 3,5

Preoperative risk stratification to optimize patients condition for surgery avoids complications and improves outcome, at a lower cost.

Patient factors

Does the timing of surgery for proximal humeral fracture affect inpatient outcomes? Menendez M, JSES 2014.

- 87% had surgery < 2 day
- 13 % surgery from day 3

- Delay of surgery results in more complications and prolonged length of stay, less routine discharge
- Risk factors for delay: age, comorbidities, insurance, social status, weekend admission !

Surgical factors

- Experience : numbers, years

- Cementing technique
- Soft tissue management
- Height of prosthesis
- Fixation of tuberosities
- …

Surgical factors

The relationship between surgeon and hospital volume and outcomes for shoulder arthroplasty.
Jain N, JSES 2004

Surgeon volume is associated with cost and variation in surgical treatment of proximal humeral fractures.
Jain N, Clin Orth 2012

High-volume surgeons in high-volume hospitals have better outcomes and lower hospital costs. (mortality, length of stay, complications, routine discharge, ...)

Implant factors

Total arthroplasty versus hemiarthroplasty for glenohumeral osteoarthritis: role of provider volume.
Jain N, JSES 2005

Fracture specific stems / Platformsystems

Surgeons preference

Availability

High volume providers

Timing is everything

Conclusion: Timing of surgery

- Ideal timing is day 1 to 3 posttrauma,
- After 14 to 20 days mobilisation and fixation of tuberosities is impossible,
- Optimise patient condition to prevent complications,
- Surgery < 3 days: less complications,
- Avoid delay for non medical reasons,
- Operate with an experienced team.

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Thanks

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fellowship