Femoral neck fractures
Total hip replacement
Subcapital hip fractures
The use of THR

• Historical data
• RCT outcomes
• 3 groups of patients
Displaced subcapital fractures

Which method is best?

Arthroplasty or Fixation?
Displaced subcapital fractures

The choice of implant depends on the patient
Displaced subcapital fractures

Who is suitable for a hip replacement?
Displaced subcapital fractures

3 patient groups

• Cognitive/mobility impairment (70%)

• Fit older patient (25%)

• Younger patient (< 5%)

• Approx 30% suitable for THR
Displaced subcapital fractures

3 patient groups

- Cognitive/mobility impairment (70%)
- Fit older patient (25%)
- Younger patient (< 5%)
- Approx 30% suitable for THR
Displaced subcapital fractures

1. What is the best choice of treatment in the older patient with impaired mobility and/or cognitive function?
Meta-analysis, Sept 2003
Bhandari et al, JBJS

• 14 randomised trials
• Compared IF with arthroplasty
• Mortality, revision, function, surgical data
Meta-analysis, Sept 2003

Findings

- IF shorter operation, less blood loss
- Mortality *slightly* greater with arthroplasty
- Revision 4 times higher with IF
- Pain and function not different
Conclusion

In older patients with poor mobility or cognitive impairment, an arthroplasty is probably the best treatment.
Conclusion

In older patients with poor mobility or cognitive impairment, an arthroplasty is probably the best treatment
2. Which option is the best for the fit older patient?
Total hip replacement

Not a popular treatment for subcapital fractures
Taine and Armour 1985
Findings

- 57 patients at 42 months
- 12% rate of dislocation
- 12% rate of revision
- Indications were loosening/dislocation
Greenhough and Jones 1988

Findings

- 37 patients at 56 months
- 18 (49%) rate of revision
- 22% radiologically loose
- Recommended against THR
Meta-analysis Lu-Yao 1994
Findings for 746 cases of THR

• Dislocation rate 11%
• Deep infection 1%
• Pulmonary embolism 3%
• No pain at 2 years 81%
THR for subcapital fractures
Changes in last 10 years

• More randomised trials
• Larger numbers of patients
• Better follow-up and documentation
• Better evidence to base decisions
## RCTs of displaced intracapsular hip fractures

<table>
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Clinical Results
Hospital stay
Differences not significant

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<tr>
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<th>Duration</th>
<th>% discharge home</th>
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<tr>
<td>Fixation</td>
<td>10.6</td>
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<td>11.5</td>
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<td>THR</td>
<td>12.3</td>
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## General complications

Differences not significant

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<tr>
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<th>PE</th>
<th>CVA</th>
<th>MI</th>
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<tbody>
<tr>
<td>Fixation</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
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<tr>
<td>Bipolar</td>
<td>6%</td>
<td>3%</td>
<td>4%</td>
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<tr>
<td>THR</td>
<td>1%</td>
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Mortality at 2 years
Differences not significant

- Reduction and fixation 13%
- Bipolar 13%
- THR 9%
Dislocation
Differences not significant

• Reduction and fixation 4%
• Bipolar 3%
• THR 3%
Infection
Differences not significant

- Reduction and fixation 6%
- Bipolar 4%
- THR 4%
Further surgery

- Reduction and fixation 39%
- Hemiarthroplasty 7%
- THR 9%
Displaced subcapital fracture
61 yr old male
Displaced subcapital fracture

61 yr old male
Displaced subcapital fracture
61 yr old male
RCTs of displaced intracapsular hip fractures

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Mortality at 1 year

- Fixation: 164/819 (20%)
- Hemiarthroplasty: 157/738 (21%)
- THR: 47/409 (11%)
Dislocation rates

- Fixation: 11/230 (5%)
- Hemiarthroplasty: 17/738 (2%)
- THR: 29/409 (7%)
Revision surgery rates

- Fixation: 337/817 (41%)
- Hemiarthroplasty: 68/738 (9%)
- THR: 23/403 (6%)
Functional Outcomes
Hip Rating Questionnaire

Score

4 1yr 2yr

Fixation Hemi THR
Euroqol Utility Score

Score

4 | 1yr | 2yr

Fixation | Hemi | THR
Summary - Functional outcome
Blomfeldt, 2007

- Bipolar vs THR
- No difference in complication rates
- THR less pain at 1 year
- THR better hip function at 1 year
Successful Fixation vs THR?

THR is significantly better at 2 years

Score

HRQ

Euroqol

Fixation
THR
STARS
Economic Outcomes
Average Hospital Costs (£) Over 24 months

- Fixation
- THR
- Hemi

Admission categories:
- Non-hip
- Hip
- Original
Average Hospital Costs (£)
Over 24 months

- Fixation
- THR
- Hemi

Admission
- Non-hip
- Hip
- Original
Summary - Clinical results

• Mortality rates  no difference

• General complications  no difference

• Hospital stay  no difference

• Infection/dislocation  no difference
Main clinical difference

Higher reoperation rate after reduction and fixation

39 - 47%
Summary - Functional outcome

- Fixation poorest functional outcome
- THR vs Hemi no different initially
- THR best at 2 years
- THR better than successful fixation
Summary - Economic outcome

• Fixation most expensive treatment

• THR cheapest treatment
Total hip replacement

What about survivorship?

Not much data
Lee et al, 1998
Findings for patients with femoral neck fractures

- 126 patients at 10 years
- 95% survival at 5 years
- 94% survival at 10 years
- 89% at 15 years
- 84% at 20 years
Conclusion 2

Displaced subcapital fracture in the fit older patient

THR is associated with the best clinical, functional and economic outcome
Displaced subcapital fractures

In patients under 60 years, internal fixation is usually considered the treatment of choice.
Displaced subcapital fractures

Young patients with these injuries often have conditions predisposing to osteoporosis.
Displaced subcapital fractures
Review of patients < 60 years

• 10,400 hip fractures 1988 – 2001
• 127 displaced subcapital fractures
• 1.2% of all hip fractures
• 3% of all displaced subcapital fractures
Displaced subcapital fractures

Predisposing conditions

• Medical co-morbidity
• Alcohol
• Smoking
• Medication esp steroids
Sex and Age Distribution

Displaced subcapital fractures in patients < 60 years

Number of Patients

- < 20
- 20-29
- 30-39
- 40-49
- 50-59

Male
Female
Displaced subcapital fractures
Modes of failure

• Fixation failure

• Nonunion

• Avascular necrosis
Displaced subcapital fractures
Risk factors in young patients

- Medical comorbidity 45%
- Alcohol abuse 32%
- Smoking 30%
- Steroids 21%
- Neuromuscular disorder 13%
- Previous low energy fracture 12%
- Rheumatoid arthritis 4%
Results
Displaced subcapital fractures

Modes of failure

- Fixation failure: 12%
- Nonunion: 5%
- Avascular necrosis: 13%
- Total: 29.4%
Displaced subcapital fractures
Relation to risk factors

• \leq 2 \text{ risk factors} \quad 26\% \text{ failure}
• > 2 \text{ risk factors} \quad 64\% \text{ failure}
Displaced subcapital fractures
Some risk factors are worse than others

• Chronic renal failure
• Rheumatoid arthritis
• Alcohol abuse
Conclusion 3
Young patients with displaced subcapital fractures

Healthy patients with no risk factors should have internal fixation, otherwise consider arthroplasty
Summary
THR in femoral neck fractures

• Frail elderly – modern hemiarthroplasty
• Fit older – THR
• Unfit younger – THR
• Alcohol abuse – ?hemiarthroplasty
THR for femoral neck fracture
The future

- Increase use of THR
- Bipolar vs THR
- Modern implants