Femoral neck fractures in elderly, treated by hemiarthroplasty: AMIS vs. anterolateral and lateral surgical approaches

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Main reason for minimally invasive surgical (MIS) approaches is not cosmetic result, but minimal surgical trauma
The goals of MIS in hip surgery are:

- minimal surgical soft tissue trauma
- minimal surgical trauma response
- minimal IOP and postOP blood loss
- accelerated rehabilitation
- better functional result and
- cosmetic result
• In posterior, lateral and anterolateral approaches, even in MIS, some extent of rotator or abductor muscle damage is expected.

• Muscular dynamic stability of the hip is thus impaired.
• Compared to other MIS approaches in hip surgery, AMIS approach avoids trauma of any of the hip muscles and thus spares dynamic stabilizers of the hip and motors of the hip motion.

• This enables immediate postoperative full-weight bearing and activation of the patient without range of motion limitations.
It is as well important, that posterior capsule in AMIS stays intact, so that the patient may sit, use the normal toilet or even squad as soon as postoperative pain permits.
AMIS for partial hemiarthroplasty in elderly, after hip fracture
Expected problems after hip fracture in elderly

- Higher posttraumatic and postoperative general complications
- Higher rate of local post OP complications
- Prolonged rehabilitation
- Prolonged hospital stay
- High rate of residual dependence and inability
- Shorter life-time expectancy
One of the reasons of prolonged rehabilitation and for prolonged or permanent bed rest of the elderly patients with hip fracture after hemiarthroplasty is weakness and inability to learn and use crutches.
Expected benefits of AMIS

- Minimal operative trauma
- Minimal IOP and post OP blood loss
- Less IOP and postOP complications
- Immediate postoperative mobilization of the patient without crutches
- Higher possibillity of achieving abilityi andndependancy of the elder patient
- Higher rate of survival and prologation of active life-time of the elder patient
Why?

- Because hemiarthroplasty through AMIS approach allows for immediate postoperative full-weight bearing and activation of the patient without range of motion limitations – immediate mobilization without crutches
Study design

To compare minimally invasive approaches for hemiarthroplasty of the hip:

- anterior approach (A)
- anterolateral approach (AL)
- Lateral approach (L)
• Retrospective study
• Three groups of patients: A, AL and L operated by three different senior surgeons, each experienced in certain approach, were compared
• Follow-up: 5-26 months
Inclusion criteria

• Femoral neck fracture
• Age $>$ 75 years
• Treated with hemiarthroplasty in the period from 1.3.2006 – 30.1.2008
Thera are no statistical differences regarding number of patientst, age, gender and side of fracture, among different groups.
PreOP working ability of the patients among different groups of patients was not statistically significant.
Pre OP mobility

<table>
<thead>
<tr>
<th></th>
<th>Normal walking</th>
<th>Abnormal walking</th>
<th>Almost immobile</th>
<th>immobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>13 (17.3%)</td>
<td>9 (12%)</td>
<td>2 (2.6%)</td>
<td>0</td>
</tr>
<tr>
<td>AL</td>
<td>20 (26.6%)</td>
<td>9 (12%)</td>
<td>3 (4%)</td>
<td>1 (1.33%)</td>
</tr>
<tr>
<td>L</td>
<td>9 (12%)</td>
<td>8 (10.6%)</td>
<td>1 (1.33%)</td>
<td>0</td>
</tr>
</tbody>
</table>

PreOP mobility of the patients among different groups of patients was not statistically significant
Time
injury to OP and admittance to OP

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury/OP: days (Std D)</td>
<td>7,4 (5,6)</td>
<td>5,6 (3,5)</td>
<td>5,0 (4,7)</td>
</tr>
<tr>
<td>Admittance/OP: days (Std D)</td>
<td>7,1 (5,6)</td>
<td>5,4 (2,8)</td>
<td>4,9 (4,7)</td>
</tr>
</tbody>
</table>

Injury/OP time and admittance/OP time is statistically shorter in group L than in A, but there is no statistical difference between A and AL and there is no statistical difference between AL and L.
Hospitalization time

<table>
<thead>
<tr>
<th></th>
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<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days: mean (range; Std)</td>
<td>18,9 (9-43; 8,8)</td>
<td>18,9 (10-43; 7,5)</td>
<td>24,5 (9-158; 31,7)</td>
</tr>
</tbody>
</table>

Results are not statistically different
<table>
<thead>
<tr>
<th></th>
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<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>min: mean (range; StD)</td>
<td>104 (65-215; 30,7)</td>
<td>109 (50-155; 24,9)</td>
<td>71 (35-90; 14,8)</td>
</tr>
</tbody>
</table>

OP time is statistically shorter for group L compared to groups A and AL.
There is no statistical difference among groups A and AL.
## IOP blood loss

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>mll: mean (range; Std)</td>
<td>274 (100-250; 182.7)</td>
<td>440 (100-1500; 328.6)</td>
<td>447 (100-2000; 398.1)</td>
</tr>
</tbody>
</table>

Blood loss is statistically smaller for group A compared to groups AL and L.

There is no statistical difference among groups AL and L.
Post OP blood transfusion

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>mll:</td>
<td>mean mean</td>
<td>mean mean</td>
<td>mean mean</td>
</tr>
<tr>
<td>range;</td>
<td>(0-1665;</td>
<td>(0-2255;</td>
<td>(0-2200;</td>
</tr>
<tr>
<td>StD)</td>
<td>570,3)</td>
<td>424,6)</td>
<td>623,1)</td>
</tr>
</tbody>
</table>

There is no statistical difference among groups
### OP to mobilization time

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>days: mean (range; StD)</td>
<td>2,7 (1-6; 1,7)</td>
<td>5,3 (2-20; 3,6)</td>
<td>5,6 (2-10; 2,8)</td>
</tr>
</tbody>
</table>

There is statistical difference among groups A and AL.

There is statistical difference among groups A and L.
Walking without support upon dismissal from hospital

<table>
<thead>
<tr>
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<th>AL</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Pt (out of total; %)</td>
<td>7 (25; 28%)</td>
<td>0 (34; 0%)</td>
<td>0 (20; 0%)</td>
</tr>
</tbody>
</table>
Total treatment time

<table>
<thead>
<tr>
<th></th>
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<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>days: mean (range; StD)</td>
<td>148 (510-593; 148,7)</td>
<td>161 (28-480; 132,3)</td>
<td>244 (33-760; 186,9)</td>
</tr>
</tbody>
</table>

There is statistical difference among groups A and AL.
There is statistical difference among groups A and L.
Follow-up evaluation - HHS

<table>
<thead>
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<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score: mean (range; Std)</td>
<td>60 (17-96; 23,1)</td>
<td>70,1 (32-98; 18,2)</td>
<td>59,2 (0-92; 25,6)</td>
</tr>
</tbody>
</table>

There is no statistical difference among groups.
## Follow-up evaluation - FIM

<table>
<thead>
<tr>
<th>Score: mean (range; StD)</th>
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<th>AL</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>103 (62-126; 23.1)</td>
<td>106 (31-126; 25.2)</td>
<td>112 (25-126; 24.7)</td>
<td></td>
</tr>
</tbody>
</table>

There is no statistical difference among groups
Conclusions

Results of AMIS approach have shown:

• shorter OP to mobilization time compared to AL and L approach
• shorter total treatment time and
• less IOP blood loss
• Only in AMIS group 28% of patients were dismissed from hospital walking without any support (crutches, etc)
Conclusions

• Operative time was shorter in L group than in AMIS and AL group
• There was no difference at Follow-up for Harris hip (HSS) and functional impedance measure (FIM) between the groups
Drawbacks of the study

• Not only approaches, but also surgical skill of the surgeons has been compared
• In AMIS group, learning curve is included
• The number of patients in the groups is too small to be relevant for majority of measured criteria
• The study was retrospective
• Though we could not prove statistically, we have a strong impression, that AMIS approach for hemiarthroplasty could have a positive outcome to the survival rate and improved quality of life especially for elderly patients with femoral neck fracture.
79-Year old, femoral neck fracture, hemiarthroplasty, 2. day postOP
• We are going to continue the study on a prospective and randomised bases.

Thank You!