التدخل الجراحي في علاج كسور عنق عظام الفخذ للمرضى البالغين بأعمار تحت خصوص عمولة:

الخلاصة:

المرض من الفخذ:
1. لم يظهر تأثير عمليات تثبيت كسور عنق الفخذ جراحياً.
2. لظهر العظام الخصبية لاحذء المضاعفات (فقدان الكيس، وتخدير العظام اللاوعي) بالنسبة
لكسور عنق الفخذ لدى البالغين.

الطريقة: دوينة مسقية أجرت على مداة وتدني مرضي عابور من كسور عنق الفخذ، غذروا دوقة و란
إنسان تتراوح أعوامهم من (14 - 49 سنة) بمرور 43 سنة تم معالجتهم في مستشفى الجرح العام.

بترتوكل علاج قاليماً (عملية تثبيت الكيس عشق جراحة فخذ، أو غذرو ملثق، مع فتح كيسة فيصل
وتشير الكيس داخل الدماغ، عن طريق استخدام هبة النهبة السمنة المتغرف.)

تم متابعة حالات المرضى سراً وشععاً أفراداً بعد العاية بعد الأعوام (6 أشهر، 1 سنة).

النتائج: كسر عنق عظم الفخذ في هذه الدراسة صدق طبيعي لتشع في (AO) العالم، وقد أظهرت النتائج:
4 حالات → كسور غ ر مثليه تحت رأس عظم الفخذ B1.
10 حالة → كسور مثليه في المنطقة العقمة B2.
6 حالات → كسور مثليه تحت رأس عظم الفخذ B3.

العمل الأخر أظهر النتائج التالية:
10 حالة → تعديل بالبسط (تشريحي).
12 حالة → تعديل مع احتراف قدر قرب تشريحي.
6 حالات → تعديل غر مصبوط (غر تشريحي).

أظهرت الدراسة وجود مضاعفات بشكل تتراوح العظام، حالات واحدية من أصل عشر حالات تعديل تشري مضبوط،
ووجد عدد حالات تتراوح مريضي ولا عاجي، وفنال إصابة الكسور من أصل 18 حالة كان التعديل فيها معقلاً (أما
الاستنتاج: مع ظهور كسور عنق عظام الفخذ تحت 60 لاجراح العظام والكبد، حيث جرب معالجته معالجة
آتة طارئة.
Abstract:
We reviewed the results in 28 consecutive patients with femoral neck fracture, who were younger than 50 years at Al-Hakeem General Hospital from 2004-2006, there were 20 male and 8 female patients, they range in age from 14-50 years(mean 34.2 years), 27 patients were involved in high velocity trauma, and 17 patients of them had significant injuries to other organ systems.

Intracapsular fractures of neck of femur in young adults occur as a result of high energy trauma, such as motor-vehicle accident and fall from height, those that occur as a result of simple trauma often associated with predisposing factors such as metabolic bone disease.

The initial radiological evaluation done according to AO classification(7,10,12) and there were 4 cases undisplaced fracture, 15 cases displaced transcervical, 9 cases displaced subcapital.

Surgical treatment done by 2-3, 6.5 mm AO cancellous screws and then patients followed up clinically (Siwontikwiski)(28,30) and radiologically (Garden Index)(4,19).

There were 21.4% of patients developed non-union and 17.9% developed avascular necrosis.

The amount of displacement of fracture is important factors in developing specific complications, and successful treatment of displaced fracture depend on achieving anatomical reduction and stable internal fixation.

Purpose:
1- To study the results of operative fixation of fracture of neck of femur.
2- To identify the risk factors for non-union and osteonecrosis in adult younger than 50 years.

Patients and Methods:
A prospective study done on 28 patients with fractures of neck of femur,20 males and 8 females, who are younger than 50 years (14-50 years), mean age 34.2 years.

Those patients treated at Al-hakeem General Hospital, Orthopaedic Department from June 2003-November 2005, by standard protocol initially the fractures assessed according to AO classification(7,10,29) then treated surgically by (early closed or open reduction with capsulotomy and evacuation of fracture haematoma and internal fixation by 2 or 3 parallel 6.5 mm cancellous screws under image intensifier)(3,4,12).
Patients then followed up clinically and radiologically, early postoperatively, 3 months, 6 months, 1 year & 2 years.

The clinical assessment based on Swiontkowski et al(28,30) clinical criterias, table (1).
Table (1): Swiontkowski Clinical Criteria.(28,30)

<table>
<thead>
<tr>
<th>Number</th>
<th>Evaluation</th>
<th>Clinical criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>Excellent</td>
<td>Full range of motion (flexion &amp; extension) of hip as compared with opposite side and loss of no more than 10˚ internal and external rotation, no symptoms. normal radiograph.</td>
</tr>
<tr>
<td>2-</td>
<td>Good</td>
<td>Limitation of hip joint movement more than 10˚ in comparison with other side, mild dull ache required simple analgesia, normal radiograph.</td>
</tr>
<tr>
<td>3-</td>
<td>Poor</td>
<td>Limitation of hip joint movement more than 30˚, moderate to severe constant pain, segmental collapse of head of femur on radiograph.</td>
</tr>
</tbody>
</table>

The effect of quality of reduction on both early and late results in femoral neck fractures, was investigated extensively and assessed according to Garden study.(2,10,21)

He found that an (acceptable reduction) decrease the incidence of aseptic necrosis, non-union and degenerative joint disease.

In order to standardize the term of acceptable reduction, he developed an alignment index by which surgeon can objectively evaluate the reduction.(12,23)

The alignment index is measured on the antero-posterior and lateral X-ray, and these X-ray must be of good quality to allow accurate identification of bony trabeculae.

In the Antero-posterior view the angle formed by the central axis of medial trabecular system in the capital part and medial cortex of femoral shaft.(10)

In the normal femoral head & neck, this angle about 160˚, on lateral X-ray the central axis of the head & central axis of the neck normally lie in a straight line (180˚).

Garden believed that an alignment index after reduction within the range of 155˚ - 180˚ on both frontal and lateral views is an acceptable reduction and result in high percentage of union and decrease the risk of avascular necrosis.(4,10)

Results:

From 28 patients subjected to violent trauma with fractures of neck of femur, there were 20 (71.4%) male and 8 (28.6%) female with average age (14-50 years), with mean 34.3 years.

The mechanisms of fracture usually due to major trauma, mainly occurred due to road traffic accident (16 cases, 57.1%), followed by falling from height (9 cases, 32.1%), as showing in the table (2).

Only one case had minor trauma (3.6%), and patient had history of chronic renal failure.

Table (2): Distribution of mechanism of injuries.

<table>
<thead>
<tr>
<th>Number</th>
<th>Mechanism of injury</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>RTA</td>
<td>16</td>
<td>57.1%</td>
</tr>
<tr>
<td>2-</td>
<td>Fall From Height</td>
<td>9</td>
<td>32.1%</td>
</tr>
<tr>
<td>3-</td>
<td>Explosion</td>
<td>1</td>
<td>3.6%</td>
</tr>
<tr>
<td>4-</td>
<td>Motorcycle Accident</td>
<td>1</td>
<td>3.6%</td>
</tr>
<tr>
<td>5-</td>
<td>Chronic Renal Failure</td>
<td>1</td>
<td>3.6%</td>
</tr>
</tbody>
</table>
The majority of cases had associated injuries 60.7%, and mainly there were other associated skeletal trauma (6 cases, 21.4%), followed by head trauma (5 cases, 17.9%), as showing in table (3).

Table (3): Distribution of associated injuries with fracture neck of femur.

<table>
<thead>
<tr>
<th>Number</th>
<th>Types of associated injury</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>Other types of orthopedic injuries</td>
<td>6</td>
<td>21.4%</td>
</tr>
<tr>
<td>2-</td>
<td>Head injuries</td>
<td>5</td>
<td>17.8%</td>
</tr>
<tr>
<td>3-</td>
<td>Chest trauma</td>
<td>3</td>
<td>10.7%</td>
</tr>
<tr>
<td>4-</td>
<td>Abdominal injuries</td>
<td>2</td>
<td>7.1%</td>
</tr>
<tr>
<td>5-</td>
<td>Burn</td>
<td>1</td>
<td>3.5%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>17</td>
<td>60.6%</td>
</tr>
</tbody>
</table>

According to the AO classification, the majority of cases were displaced transcervical (B2), followed by displaced subcapital (B3), as showing in table (4).

Table (4): Frequency of fractures classification according to AO system.

<table>
<thead>
<tr>
<th>Number</th>
<th>AO Classification</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>B1 Undisplaced Subcapital</td>
<td>4</td>
<td>14.3%</td>
</tr>
<tr>
<td>2-</td>
<td>B2 Displaced Transcervical</td>
<td>15</td>
<td>53.6%</td>
</tr>
<tr>
<td>3-</td>
<td>B3 Displaced Subcapital</td>
<td>9</td>
<td>32.1%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>28</td>
<td>100%</td>
</tr>
</tbody>
</table>

Postoperatively the clinical and radiological evaluation, according to Swiontowski scoring, showed (11 cases 39.3%) excellent results, only 9 cases (32.1%), had poor results, as showing in table (5).

Table (5): Frequency of clinical & radiological evaluation according to Swiontowski Criteria.

<table>
<thead>
<tr>
<th>Number</th>
<th>Clinical &amp; Radiological Evaluation</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>Excellent</td>
<td>11</td>
<td>39.3%</td>
</tr>
<tr>
<td>2-</td>
<td>Good</td>
<td>13</td>
<td>46.4%</td>
</tr>
<tr>
<td>3-</td>
<td>Poor</td>
<td>4</td>
<td>14.3%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>28</td>
<td>100%</td>
</tr>
</tbody>
</table>
The radiological assessment according to Garden Index, showed the quality of fixation and reduction, there were 10 cases 35.7%, had perfect reduction (anatomic reduction), and 12 cases 42.9% had minimal displacement as shown in table (6).
Table (6): Distribution of quality of fixation according to Garden Index.

<table>
<thead>
<tr>
<th>Number</th>
<th>Quality of fixation</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>Perfect</td>
<td>10</td>
<td>35.7%</td>
</tr>
<tr>
<td>2-</td>
<td>Minimal displaced</td>
<td>12</td>
<td>42.9%</td>
</tr>
<tr>
<td>3-</td>
<td>Displaced</td>
<td>6</td>
<td>21.4%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>28</td>
<td>100%</td>
</tr>
</tbody>
</table>

As the operation done under the fluoroscopy with minimal soft tissue dissection there was only one case had superficial infection, and two cases were showed pulmonary complications, one of them occurred due to primary chest trauma.

The most important complications of this fractures were avascular necrosis (5 cases 17.9%), and nonunion (6 cases 21.4%), as showed in table (7).

Table (7): Distribution of postoperative complications of fracture neck femur.

<table>
<thead>
<tr>
<th>Number</th>
<th>Types of Complication</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>Pulmonary Complication</td>
<td>2</td>
<td>7.1%</td>
</tr>
<tr>
<td>2-</td>
<td>Superficial infection</td>
<td>1</td>
<td>3.6%</td>
</tr>
<tr>
<td>3-</td>
<td>Non-union</td>
<td>6</td>
<td>21.4%</td>
</tr>
<tr>
<td>4-</td>
<td>Avascular Necrosis</td>
<td>5</td>
<td>17.9%</td>
</tr>
<tr>
<td>5-</td>
<td>Implant Failure</td>
<td>1</td>
<td>3.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>15</td>
<td>53.6%</td>
</tr>
</tbody>
</table>

From 18 cases of displaced fractures, there were 10 cases (55.5%), developed avascular necrosis and nonunion, where as only 1 case (10%) developed avascular necrosis, so the displacement is the significant cause of complication (vascular necrosis and nonunion), P- (<0.05), as showed in table (8).

Table (8): the frequency of specific complications according to displacement of fractures.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Perfect</th>
<th>Displaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Avascular necrosis&amp; non-union</td>
<td>1 (10%)</td>
<td>10(55.5%)</td>
</tr>
</tbody>
</table>

P-Value < 0.05
Discussion:

The intracapsular fractures of neck of femur in young adult patients most often result from high-velocity trauma, and therefore are often associated with injuries to the head, chest or abdomen as well as other skeletal injuries\(^{(3,5,19)}\).

In the study done by Wiquest & Hansen\(^{(30)}\), the associated injuries occurred in 71.4\%, whereas in our study was 60.3\%.

The average age of the patients in Winquest & Hansen\(^{(30)}\) study was 32.4 years, so agreed with our study (34.3 years), whereas in the study done by Haidukewych & liporace\(^{(18)}\) was 42.5 years, because of large sample and upper limit age was 60 years.

The time of surgery still controversy\(^{(1,17,31)}\), although in most trauma centers of the world, the treatment of the femoral neck fractures as orthopedic emergency immediately after injuries to the head, chest and abdomen\(^{(13,23,24)}\).

Protzman & Burlkhalter\(^{(25)}\) study showed no significant development of complication if surgical treatment delayed more than 8 hours.

In our study its difficult to take timing of surgery into account because of lack of facilities.

In the study done by Taitsman & nork\(^{(29)}\), there were 9 cases classified as B1 (7.2\%), and there were 79 cases classified as B2 (63.2\%), where as in our study B1 (14.3\%), and B2 (53.6\%), the difference in these results might be due to different mechanical injuries, although we agreed with previous study in that most of cases are displaced transcervical fractures(B1).
The clinical results by Swiontwiski et al.(28,30) was 60% as excellent results and only 12% had poor results, in our study we agreed with previous study regarding to the poor results (14.3%), and disagreed with him regarding to the excellent results (39.3%), the difference might be belong to the different techniques used by previous research and to use a different program for rehabilitation.

An important part of our rationale for prompt treatment of the fracture was preservation of the blood supply to femoral head which critical for satisfactory long term results.(8,9,13)

The fracture was regarded as a vascular injury to the bone’s blood supply and the amount of displacement thought to correlate directly with degree of vascular compromise.(17,22)

Restoration of the blood supply to the femoral head following anatomical reduction. The mechanism of restoration is probably unkinking of retinacular vessels and removal of the pressure on these vessels.(5,16)

Intracapsular temponade of haematoma had also been found to damage the flow to the femoral head.(6,14)

In the study done by Taitsman & Nork(29) the anatomic reduction observed in 54% of cases and non-anatomic 18%, where as in our study 35 7% had anatomic reduction and 21 4% had non-anatomic reduction, and the difference might be related to the use of a new instrument (cannulated screws and dynamic hip screws).

In spite of improved operative techniques, non-union and avascular necrosis still the main complication of the intracapsular fractures of neck of femur, Sevitt(27) found histological evidence of partial or total aseptic necrosis in 80% of 25 femoral heads.

Haidukewych & Liporace(18) showed 17% of their patients developed avascular necrosis and this result agreed with our study (17.9%), where as 28% of cases of Corr and Kregor(11) developed aseptic (vascular) necrosis, and this might be related to the fact that this study done only on displaced fractures (Pawel's п,ш).

Regarding to the non-union there were 15% of cases developed it in the study of Haidukewych and liporace(18), and 24% of patients of Wquest and Hansen(30) study developed non-union, and this study showed higher percent than our study (21.7%) and this because they used many methods for fixation.

The displaced fractures as major factor of development of specific complications (vascular necrosis & non-union) studied thoroughly(21,23,31) and in the study of Taitsman & Nork(29) avascular necrosis developed in 22% of subcapital fractures (B3), and 17% of transcervical fractures (B2), and 4% in undisplaced fracture (B1), P<0.01, where as in our study, the displaced fractures developed avascular necrosis and non-union in 55.5% of the cases and this agreed the significance of the displacement of fractures P<0.05.

Conclusion:

Treatment of the fracture neck of femur is of great challenge to the orthopaedic surgeons as should be treated urgently.

The most impotant factor associated with development of complication (non-union and osteonecrosis) was the severity of the displacement of fracture at time of injury&the degree of postoperative displacedment.
References: