ACUTE ISCHEMIA OF EXTREMITIES THROUGH ARTERIAL TRAUMAS

ABSTRACT.
Introduction: The traumas of the extremity with vascular involvement rise difficult problems in diagnosis and treatment.
Material and method: 150 cases, timeframe 1961-2005. There are performed 116 interventions for arterial reconstruction.
Results: The preservation of the extremity was obtained in 77.3% of cases, the loss of the extremity in 15.3% the death rate was 7.3%.
Conclusions: The decrease of the ischemic interval, the immediate reestablishment of the arterial flow, the treatment of related injuries are decisive elements in obtaining the preservation of the extremity.
Keywords: ISCHEMIA ACUTĂ A EXTREMITĂŢILOR PRIN TRAUMATISME ARTERIALE

INTRODUCTION
Despite all the progresses registered in the last decades regarding the arterial reconstructive surgery, the arterial traumas of the extremities continue to be one of the most difficult issues in the emergency surgery.

With the increase of accident rate, we notice the enhancement of number of extremity vascular injuries. They appear frequently either associated with injuries of other structures of the extremity, or in the frame of polytraumatisms, elements which create difficulties for diagnosis and treatment.

The extremity traumas with arterial involvement cause usually a massif external hemorrhage or a brutal acute ischemia, which could cause loss of the extremity or even patients’ life.

The interventions of arterial reconstruction improved a lot the prognosis of these patients. This paper presents the experience of the 2nd Clinic of Surgery regarding the traumas of the extremity with arterial involvement in a group of 150 cases hospitalized in the time-frame between 01.08.1961 – 31.12.2005

MATERIAL AND METHOD
The group of patients includes 150 cases registered between 1961-2005, 128 male (85.3%) and 22 female (14.7%), the ratio male / female being 5.8/1. The average
age was 32.5 years, with limits between 8-81 years. It is
noticed the prevalence of young male patients.

The analysis of artery trauma causes points out that
labor accidents (35 cases) and road accidents (62 cases)
represent 64.7% of the cases, taking the first place.
Mixed aggressions (16 cases) together with self
aggressions (10 cases) represent a percent of 17.3%,
taking the second place, on the third being the other
aggressions 10.7% (16 cases) and iatrogenic injuries
7.3% (11 cases).

The mechanism which produced the injury can be
directly through the plaque 56% (84 cases) or through
breach and contusion 29.3% (44 cases) or indirectly
through fracture 6% (9 cases) or through thrombosis
8.7% (13 cases).

We can notice the high frequency of arterial wounds.
The diagnosis of indirect injuries is more difficult and
leads to delay in intervention. For example the case of an
eight years old child, in which a femur fracture leaded to
the thrombosis of the femoral artery, not diagnosed in
two hospitals for 8 days.

The study in the topography of the injuries showed
that the arteries of the upper limb are more frequently
affected (76 cases) than the arteries of the lower limb (74
cases) (Table 1).

Table 1. The topography of the injuries

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<tr>
<td>Femoral</td>
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<td>10</td>
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<td>39</td>
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<td>Tibial</td>
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<td>7</td>
<td>19</td>
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<tr>
<td>Popliteal</td>
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<td>4</td>
<td>7</td>
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<tr>
<td>Subclavicular</td>
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<td>-</td>
<td>2</td>
<td>4</td>
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<tr>
<td>Axilar</td>
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<td>3</td>
<td>3</td>
<td>9</td>
<td>15</td>
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<tr>
<td>Humeral</td>
<td></td>
<td>7</td>
<td>15</td>
<td>14</td>
<td>36</td>
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<tr>
<td>Radial</td>
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<td>-</td>
<td>6</td>
<td>5</td>
<td>11</td>
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<tr>
<td>Cubital</td>
<td></td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>8</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>28</td>
<td>48</td>
<td>74</td>
<td>150</td>
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</table>

Table 1. The topography of the injuries

Graphic 1. The topography of the injuries
The frequency of the affected arteries were in order: superficial femoral a. (39 cases), humeral a. (36 cases), tibial a. (19 cases) and axilar a (15 cases). As far as the duration between the moment of the trauma and the hospital admission, it was noticed a somewhat important delay. Thus 92 patients (61.3%) were admitted in a time-frame less than 6 hours from the debut, 26 patients (17.3%) in time frame of 6-12 hours and 31 patients (20.7%) in a time-frame longer than 12 hours, from which 9 after more than 24 hours. In 5 cases surgical maneuvers were made in other clinics whiteout recognizing the arterial injury, or after the attempt of arterial suture.

The sternness of the arterial traumas was emphasized by the presence of associated injuries. In 34 cases (22.7%) there were isolated injuries and 111 cases (74%) presented associated injuries: venous 39 cases (35.1%), nervous 30 cases (20%), joint - muscular - tendinous 47 cases (31.3%).

One can notice a high frequency of associated injuries, in 12 cases the artery injuries being diagnosed in the polytrauma. Therefore we consider that for the patients with associated injuries, in the slightest suspicion of an artery injury it is recommended to perform an arteriography or a surgical exploration of the artery( on an exploratory arteriotomy) which can highlight a possible injury of the intima or a segmentary thrombosis.

**RESULTS AND DISCUSSIONS**

The treatment was surgical for all patients. Besides the surgical intervention were performed general procedures to control the hemorrhagic shock and / or the toxic shock at those with long term ischemia.

Results after surgery:
- ✓ limb conservation 116 cases (77.3%);
- ✓ amputation 23 cases (15.3%);
- ✓ death 11 cases (7.4%).

The surgical treatment was divided in 2 groups of interventions: arterial reconstruction and other operations (table 2). Those were:
- ✓ lateral suture in 41 cases, procedure performed in lateral arterial wounds,
- ✓ angioplasty with venous patch in 6, cases in arterial injuries with wall deficiency, but without interruption of the wall continuity
- ✓ termino – terminal anastomosis in 33, cases in recent injuries limited to the arterial wall,
- ✓ interposition of venous in 16 cases,
- ✓ interposition of Dacron graft in 24, cases in wide injuries of the artery (crushes) after the resection of the injured segment,
- ✓ bypasses in 16 cases - 2 axilo femoral with Dacron graft, performed in case of injury of large arteries

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<tr>
<td></td>
<td>Good</td>
<td>Amputation</td>
<td>Death</td>
<td>Good</td>
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<tr>
<td>Lateral suture</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>22</td>
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<tr>
<td>Termino-termino-anastomosis</td>
<td>12</td>
<td>-</td>
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<td>10</td>
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<tr>
<td>Shunt</td>
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<td>-</td>
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<tr>
<td>Graft</td>
<td>5</td>
<td>-</td>
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<td>10</td>
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<td>Primary amputation</td>
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<td>By-pass</td>
<td>-</td>
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<tr>
<td>Interposition of venous autograft</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>Angioplasty with venous patch</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>TOTAL</td>
<td>22</td>
<td>3</td>
<td>3</td>
<td>42</td>
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Table 2. The surgical treatment
with distal segmentary arterial thrombosis, hospitalized with delay,
- shunt in 7 cases,
- primary amputation in 7 cases.
Supplementary to those intervention there were also performed:
- venous suture or termino-terminal anastomosis at 19 patients,
- primary neuroraphy at 10 cases
- osteosintesis with the immobilization of the fracture at 11 patients. A special attention was paid to the treatment of the parts injuries soft, hematomas and skin deficiencies.

The immediate postoperative results were good in 116 cases (77.3%), a preservation of the limb being obtained. At 23 (15.3%) patients amputations were performed.

The postoperative complications were register in 50 cases, with a resulting postoperative morbidity of 22% (11 cases). The most frequent complications were the infection of the wound and arterial thrombosis.

The postoperative mortality (11 deaths) is explained by the gravity of these injuries and the complexity of the interventions that were practiced. It was due to the hemorrhagic shock 27.3% (3 cases), toxico-skeptic shock 54.5% (6 cases) and deep thrombophlebitis 18.2% (2 cases).

**CONCLUSIONS**

The arterial trauma of the extremities raise difficult problems of diagnosis and treatment and often they represent major emergencies.

The reestablishment of the blood flow in the main arterial axis of the extremity even if these require a complex intervention of arterial reconstruction should be the main gold in all patients which come without irreversible distal tissue injuries.

**Table 3. Postoperative complications**

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<tr>
<th></th>
<th>Preservation of extremity</th>
<th>Amputations</th>
<th>Death</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>Wound infection</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>Arterial thrombosis</td>
<td>7</td>
<td>11</td>
<td>-</td>
<td>18</td>
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<tr>
<td>Secondary hemorrhage</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Profund thrombophlebitis</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
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<tr>
<td>TOTAL</td>
<td>16</td>
<td>23</td>
<td>11</td>
<td>50</td>
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</table>
The following points are required to improve the results in the treatment of extremity arterial trauma:

- shortening the ischemic interval by admitting more promptly and directly the cases to the services in change with solving these kind of injuries;
- early intervention to reestablish the blood, flow (correct approach and surgical technique);
- simultaneous repair of associated injuries.

REFERENCES: