Blunt Injury to the Common Iliac Artery

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Objectives and design: Iliac artery lesion after blunt trauma is uncommon, with only 12 previously reported cases. We report nine patients treated in two French teaching hospitals over a six-year period. Mechanism, symptomatology, treatment and outcome were analysed.

Material and method: All patients were male with a mean (range) age of 29 (16–43) years. Median delay to operative repair was 15 days. Through an extraperitoneal approach PTFE grafts were used in five cases and autogenous graft in four.

Results: Morbidity was 22%. Reoperation was necessary in two cases at a mean follow-up of 48 months, at which time all patients were asymptomatic with normal pulses.

Conclusion: Clinicians should be alert to the possibility of this injury. An arteriography for Doppler ultrasound should be performed. Treatment is mainly surgical and produces excellent long-term results.

Key Words: Blunt trauma; Iliac artery.

Introduction

Penetrating rather than blunt trauma causes the great majority of vascular injuries. Common iliac artery injury in blunt trauma is uncommon. There are 12 cases in the English literature.1–9 We report nine further cases and discuss the mechanism of the injury, clinical presentation, treatment and outcome.

Patients and Methods

From January 1990 to January 1996, nine patients with occlusion of the iliac artery due to blunt trauma were treated in two French teaching hospitals. All patients were male and without cardiovascular risk factors. The mean age was 29 years (range 16–43), median operative delay time was 15 days (range 3 days to 36 years). All patients underwent a preoperative angiogram (Fig. 1). In five cases PTFE grafts and in four cases autogenous vein grafts were used. An extraperitoneal approach was used in all cases.

Age, mechanism of injury, clinical presentation, delay to operative repair, and associated injuries are summarised in Table 1. Angiographic findings, operative findings and reconstructive procedure are summarised in Table 2. All patients were reviewed at 1 and 3 months after surgery and at 6-month intervals thereafter. None were lost to follow-up.

Results

There was no mortality. Morbidity comprised small bowel obstruction (case 7) and a pulmonary embolus (case 1). Reoperation was necessary in two patients for graft thrombosis at 4 (case 3) and 5 years (case 4). At a mean follow-up of 48 months, all patients maintained normal pulses and ankle pressures and were asymptomatic.

Discussion

The incidence of iliac artery injuries from trauma has ranged from 0.4 to 7.1%.10,11 With our nine patients, a total of 21 such cases have now been reported; 19 males and two females with a mean age of 34 years (range 16–64). The causes of injury were a seat belt syndrome or deceleration injury in five cases (5, 8, 9, case 7), direct anteroposterior compression in 13 cases...
Table 1. Age, cause of injury, symptoms, clinical examination, operative delay time, location and associated injuries.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Cause of injury</th>
<th>Symptom</th>
<th>Clinical examination</th>
<th>Operative delay time</th>
<th>Location</th>
<th>Associated injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>Anteroposterior compression of the pelvis by a truck</td>
<td>Pain</td>
<td>Femoral pulse was absent</td>
<td>2 days</td>
<td>Left</td>
<td>Separation of pubic symphysis</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>Bicycle handle injury</td>
<td>Intermittent claudication (WD=150 m)</td>
<td>Iliac systolic murmur</td>
<td>2 months</td>
<td>Left</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>Motorcycle collided with a truck (inguinal trauma)</td>
<td>Intermittent claudication (WD=1000 m)</td>
<td>Normal</td>
<td>10 years</td>
<td>Left</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>43</td>
<td>Fell down from 8 m when 7 years old</td>
<td>Intermittent claudication when running since 17 years old</td>
<td>At 43 years old, examination show that femoral pulse was diminished, Iliac systolic murmur</td>
<td>36 years</td>
<td>Left</td>
<td>Left iliac crest fracture</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>Bicycle handle injury</td>
<td>Intermittent claudication (WD=500 m)</td>
<td>Normal</td>
<td>15 days</td>
<td>Left</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>34</td>
<td>Motorcycle handle injury</td>
<td>Intermittent claudication (WD=100 m)</td>
<td>Iliac systolic murmur</td>
<td>3 days</td>
<td>Left</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>41</td>
<td>Seat belt injury</td>
<td>Distal pulses were absent left leg was colder than right</td>
<td>Femoral pulse was diminished</td>
<td>2 days</td>
<td>Left</td>
<td>Rectus muscle transection</td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>Car crash</td>
<td>Intermittent claudication (WD=300 m)</td>
<td>Iliac systolic murmur</td>
<td>1 month</td>
<td>Left</td>
<td>Rib fracture</td>
</tr>
<tr>
<td>9</td>
<td>42</td>
<td>Fell down from a tree (6 m)</td>
<td>Intermittent claudication (WD=400 m)</td>
<td>Iliac systolic murmur</td>
<td>5 days</td>
<td>Left</td>
<td>None</td>
</tr>
</tbody>
</table>

WD = Walking Distance.
Table 2. Angiographic and operative findings, procedure.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Angiographic finding</th>
<th>Operative finding</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total occlusion</td>
<td>Normal external appearance (NEA) Intimal flap</td>
<td>8-mm PTFE graft</td>
</tr>
<tr>
<td>2</td>
<td>Total occlusion of common and external iliac artery</td>
<td>Fibrotic artery</td>
<td>Vein graft</td>
</tr>
<tr>
<td>3</td>
<td>Total occlusion</td>
<td>NEA</td>
<td>Vein graft</td>
</tr>
<tr>
<td>4</td>
<td>Total occlusion</td>
<td>NEA</td>
<td>8-mm PTFE graft</td>
</tr>
<tr>
<td>5</td>
<td>Total occlusion</td>
<td>Fibrotic and inflamed artery</td>
<td>Vein graft</td>
</tr>
<tr>
<td>6</td>
<td>Total occlusion</td>
<td>Fibrotic and inflamed artery</td>
<td>8-mm PTFE graft</td>
</tr>
<tr>
<td>7</td>
<td>Total occlusion</td>
<td>Intramural haematoma</td>
<td>6-mm PTFE graft</td>
</tr>
<tr>
<td>8</td>
<td>Total occlusion</td>
<td>NEA</td>
<td>Vein graft</td>
</tr>
<tr>
<td>9</td>
<td>Total occlusion</td>
<td>NEA</td>
<td>8-mm PTFE graft</td>
</tr>
</tbody>
</table>

The lesion usually begins as a subintimal dissection or circumferential intimal fracture, which may result in progress to complete occlusion. At operation, the artery may appear normal or may be fibrotic and inflamed with an intramural haematoma.

In the present study clinical signs of acute limb ischaemia were only present in one case. Clinical presentation may be delayed for months or years. When the symptomatology is delayed, the lesion might be considered in relation with the trauma, in the absence of cardiovascular risk, and the presence of a focal lesion. Preoperative arteriography is recommended in the haemodynamically stable patient and when the clinical suspicion of an arterial injury is high. It is generally contraindicated in the haemodynamically unstable patient with multisystem injury. Duplex ultrasonography may be helpful.

Once a vascular injury has been diagnosed, operative repair is generally indicated. In all our cases we used an extraperitoneal approach. Resection and direct end-to-end anastomosis, after mobilisation of the hypogastric artery and possibly with division of the hypogastric artery to gain more length, is usually impossible. We therefore used autologous vein grafts in four cases and synthetic grafts in five cases with good results.

At present it is still debatable which is better, an autologous vein graft or a synthetic graft. Autologous grafting on injured iliac arteries may give rise to the problems of size discrepancies. Some authors advocated the use of superficial femoral vein. Several articles have shown evidence that PTFE grafts may be used in the face of substantial contamination and may be resistant to subsequent infection. Ligation and extra-anatomic bypass is an alternative. Percutaneous treatment with stents have provided good short-term results. However, in our view, difficulties in traversing the intimal flap and the young age of the patients mitigate against the use of stent. Surgical intervention appears to produce excellent long-term haemodynamic and clinical results.
References


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