Heparin Infusion; An Alternative Treatment in Acute Thromboembolic Ischemia of the Upper Limb

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ABSTRACT

Acute arterial occlusion of the upper extremity is rare or remains clinically unrecognized compared with occurrence in the lower extremities. It is almost always caused by an embolus and treatment by embolectomy with a balloon catheter as soon as possible is still the gold standard management. However surgical intervention is sometimes accompanied by complications and intravenous heparin infusion can be an alternative. In a retrospective non randomised study to assess the efficiency and safety of heparin infusion as an alternative conservative way of treating acute ischaemia in the upper limb, 25 patients presented with acute upper limb ischaemia were all treated conservatively using IV heparin infusion. Patients were then followed up in the out-patient clinic for 6 months. We were able to record regain of distal pulses during hospital admission in 19 patients. Conclusion: Heparin IV infusion can be used as an alternative safe and efficient method of treating acute ischaemia in the upper Limb provided proper patient selection. Pulses can be regained in most of the treated patients

Key Words: Acute ischaemia, upper limb, heparin infusion.

BACKGROUND

Acute occlusion of upper limb arteries is an uncommon condition that is responsible for between 15 and 18% of the procedures undertaken for critically ischemic limbs. It is almost always caused by embolism but very rarely acute thrombosis can be the cause. It is also well known that most emboli in the upper extremity occur in elderly, that is why this condition is much more common in older age groups.

Since Fogarty et al. developed a balloon catheter for treatment of acute arterial occlusion, this method dramatically simplified the technical aspects of surgical therapy for acute arterial occlusion.

Many studies have shown that peri-operative mortality is high following embolectomy. However, it was not clear whether mortality following discharge from the hospital remains higher compared with the background population.

Very few studies were made to evaluate alternative conservative management of such condition whether by thrombolysis or using IV heparin infusion. Therefor the aim of the present study is to evaluate IV heparin infusion in managing acute arterial occlusion of the upper limbs in terms of efficiency, complications and outcome.

PATIENTS & METHODS

Study was run in 2 NHS hospitals in the UK, The Royal Free hospital and Watford General hospitals from June 2008 and till March 2010, on 25 patients. They all presented with clinical symptoms and signs of acute thromboembolic ischemia of the upper limb

Criteria of exclusion:
1. Established gangrene.
2. Fixed colour changes.
3. Paralysis or severe motor weakness 2/5 or less.
4. Known allergy to heparin.

All patients had arterial duplex scan to establish the diagnosis.

All patients had heparin 1v infusion for a period between 3 to 5 days.

Base line Activated Partial Thromboplastin time Ratio (APTR) was measured before infusion. Heparin was infused using IV pump , the target APTR was set between 2 and 2.5.

During period of treatment patients were closely monitored and improvement was recorded in terms of restoration of pulses,
disappearance of pain, restoration of normal motor power, reestablishment of good capillary filling and normal colour.

Patients were then discharged on warfarin and were followed up in the surgery and anticoagulation clinic for a period of 6 months (4 weeks, 3 and 6 months).

RESULTS

Demographic:
Age ranged between 70 and 94.
18 patients were female (72%) while 7 were males (28%).
15 patients had occlusion in the left upper limb (60%) while 10 had it in the right (40%).
In 19 patients the level of occlusion was the brachial artery (76%) bifurcation while in 6 patients it was the lower axillary, upper brachial (24%).

Comorbidities:
10 patients were diabetic (40%).
22 were hypertensive on medications (88%).
20 patients had AF (80%), 12 of them were on Warfarin.
6 patients had Mitral valve disease (24%)
3 patients had cerebral vascular disease (12%).

Clinical presentation:
All patients had absent distal pulses
17 patients had significant rest pain (68%).
All patient had cold hands and fingers, and paraesthesia on the affected side.
8 patients had mottling and cyanosis of their fingers and/or hands (32%) while 17 presented had significant pallor (68%).
22 patients (88%) had considerable motor weakness (more than 2 but less than 5).

Outcome:
All patients showed an excellent response with no patient needing surgical intervention.
19 Patients restored distal palpable pulses (radial, ulnar or both) before discharge (76%).
Pain disappeared in all patients (100%) and Distcolouration was reversed in all patients (100%)
Normal motor power was restored in 23 patients (92%).
No major complication was recorded during admission (0%)

Follow up:
Follow up was as arranged for 6 months on 1, 3 and 6 months.

24 patients were compliant to the follow up (96%).
1 patient died from heart condition during period of follow up.
1 patient developed forearm claudication (4%).
4 more regained their distal pulses (16%).
No major complications or symptoms recurrence were recorded (0%).

Table (1): Presentations

<table>
<thead>
<tr>
<th>Presentation</th>
<th>No of patients</th>
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<tbody>
<tr>
<td>Absent pulses</td>
<td>25</td>
</tr>
<tr>
<td>Rest pain</td>
<td>19</td>
</tr>
<tr>
<td>Motor weakness</td>
<td>22</td>
</tr>
<tr>
<td>Coldness</td>
<td>25</td>
</tr>
<tr>
<td>Paraesthesia</td>
<td>25</td>
</tr>
<tr>
<td>Pallor</td>
<td>17</td>
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<tr>
<td>Cyanosis</td>
<td>8</td>
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Table (2): Outcome

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regained Pulse</td>
<td>23 (19 early and 4 late)</td>
</tr>
<tr>
<td>Regained motor power</td>
<td>25</td>
</tr>
<tr>
<td>Pain disappearance</td>
<td>25</td>
</tr>
<tr>
<td>Normal colour</td>
<td>25</td>
</tr>
<tr>
<td>Mortality</td>
<td>1</td>
</tr>
<tr>
<td>Major complications</td>
<td>0</td>
</tr>
<tr>
<td>Claudication</td>
<td>1</td>
</tr>
</tbody>
</table>

DISCUSSION

Acute thromboembolic ischaemia of the upper limb is usually a disease of elderly. Surgical thrombectomy is often accompanied by significant morbidity and can even show perioperative mortality (7).

Few studies discussed the IV heparin infusion as an alternative method of treating this condition.

In a study by Eyers and Earnshaw, embolectomy resulted in successful restoration of the circulation in 65–94 per cent of patients and amputation in 0–18 per cent. The mortality rate ranged from 0 to 19 per cent, despite the use of local anaesthesia, mostly from associated cardiac disease (1).

However in the same study it was reported that up to 50% of patients treated conservatively had late symptoms mainly in the form of forearm
claudication(1), in contrast to our study where the late claudication developed in only 4% of patient. This may be explained by the absence of selection criteria in their study.

In the study by Baguneid et al, 5 patients were subjected to this line of treatment with 2 showing full recovery and 3 partial recovery with no need for surgical intervention or major complications in the 5 patients (8). Again the difference in the results is due to the fact that Baguneid et al study was a randomised trial with no exclusion criteria.

**Conclusion:**

Provided proper patient selection, IV heparin infusion is a very efficient and safe method of treating acute arterial occlusion of the upper limb.

Complete resolution of the acute ischemic condition – indicated by regained pulse – is achieved in most cases.

**REFERENCES**


