

Outcomes after external iliac artery ligation in infected pseudo aneurysms of femoral artery in I/V drug abusers: role of collateral circulation

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Abstract

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Objectives: To determine the optimal management of infected pseudoaneurysms of femoral artery in I/V drug abusing patients.

Material and Methods: This retrospective study was conducted at SU-IV, Civil Hospital, Faisalabad Medical University, Faisalabad. Inpatient records of 52 patients with history of I/V drug abuse presenting with infected pseudo aneurysms of femoral artery were analysed over a 5 years period from 01 January 2011 to 31 December 2016. Only those cases were included in the study where emergency ligation of external iliac artery along with excision of pseudo aneurysm and debridement of necrotic tissue was performed. Surgical approach was through a supra-inguinal incision approaching external iliac artery retroperitoneally. Data was recorded on demographic, clinical, management and outcome parameters.

Results: 52 patients presenting with infected pseudo-aneurysms of femoral artery due to I/V drug abuse were included in the study with a mean age of 33 years (19-47). All had pseudoaneurysms in the common femoral artery proximal to its bifurcation. 26 in the mid common femoral artery, 19 in the distal third and 7 in the upper third below the inferior border of inguinal ligament. Post-operatively there was no haemorrhage, vascular thrombosis, amputations, or mortality in the series and limb salvage was 100 percent. 17 patients developed claudication in the 6 months followup period and were managed conservatively. Mean duration of abuse was 5 years.

Conclusion: We concluded that ligation of external iliac artery is a safe and effective procedure in the management of infected pseudoaneurysms of femoral artery in relatively younger group of I/V drug abuser patients. It avoids intervention in infected tissues planes and subsequent complications with remarkable limb salvage as shown in our study. Re-vascularisation can be performed in patients developing disabling claudication.

Keywords: pseudoaneurysm, I/V drug abusers, limb salvage, external iliac artery ligation, collateral circulation, Re-vascularisation, claudication.

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Introduction:

In 2007, Pakistan had an estimated 90,000 injecting drug abusers and the number has now risen to around 500,000, with the most addicted areas bordering Afghanistan's fertile poppy growing provinces.¹⁻³ Intravenous drug abuse is also a common source of transmission of blood borne diseases if the needles are shared. This is a common practice in I/V drug abusers. Complications arising at the injection site include cel-

lulitis, abscess, infected pseudoaneurysm, and infected deep vein thrombosis. Other co-morbidities may also co-exist, including hepatitis B, hepatitis C, and human immunodeficiency virus (HIV). In advertent intra-arterial or peri-arterial injection of illicit drugs leads to extravasation of blood and infection of the subsequent haematoma causing breakdown and rupture of the vessel wall and formation of an infected pseudoaneurysm.^{4,6,7} The infection causes liquefac-

Table-1: Stratification of splenic injury with age distribution (n=14)

Clinical Manifestations	Number of Patients	%age
Bleeding	41	78.8%
Pain / tenderness	38	73%
Pyrexia / chills	38	73%
Pulsatile mass	11	21%
Palpable pulses(Popliteal, dorsalis pedis)	19	36.5%
Bruit	11	21%
Thrill	11	21%

Table-2: Type of abused drugs

Drugs	Number of Patients	%age
Injection valium	21	40%
Injection nalbuphine	13	25%
Tablet valium	7	13%
Injection tramadol	6	11.5%
Injection largectil	5	9.6%

Table-3: Co-morbid diseases

HIV & Hepatitis profile	Number of patients	%age
Hepatitis C positive	25	48%
Hepatitis B positive	16	30%
HIV positive	11	21%

Table-4: Post-operative outcome

Parameter	Number of patients	% age
Uneventful	35	67.3%
Claudication	17	32%
Recurrent bleeding	0	0%
Limb loss	0	0%
Death	0	0%

tion of the central portion of the haematoma. This may communicate with the artery forming a pseudo-aneurysm. Complications include systemic sepsis, rupture and life threatening haemorrhage, limb loss and, ultimately, death. Considering the diverse nature of surgical options for the management of infected femoral pseudo-aneurysms, we conducted a retro-spective study to determine the optimal method of surgical treatment.

Material and Methods:

In-patient medical records of 52 patients presenting with infected pseudo-aneurysms of femoral artery to the surgical department were

analysed over a 5 years period. Only those cases were included in the study where emergency ligation of external iliac artery was performed. All the selected patients had bleeding or impending-to-bleed pseudo-femoral artery aneurysms and ligations were performed after proper resuscitation and arrangement of blood transfusions. A note of patient's age, duration of abuse, and type of drug abused was recorded. 28 patients were addicted to injection valium, including 7 patients using tablet valium ground and mixed in distilled water for injection, 13 to injection nalbuphine, 6 to injection tramadol, 5 to injection largectil. Hepatitis C&B profile and HIV status were determined in all patients and were positive in 25 patients (48%) 16 patients (30%) and 11 patients (21%) respectively. Systemic antibiotics were administered to all patients preoperatively. Post-operatively, the intravenous regime was continued for one week then switched over to oral antibiotics continued for four weeks. The surgical technique involved exposing the distal external iliac artery retro-peritoneally through an oblique suprainguinal incision through an uninvolved and uninfected tissue plane. The external iliac artery was then doubly ligated with No. 2 silk. Longitudinal groin incisions were made to explore the pseudo-aneurysm. Excision of pseudo-aneurysms was performed with local debridement of necrotic tissue. The distal common femoral artery was ligated just above or at the bifurcation with No. 2 silk to prevent back bleeding. The ligated vessel was covered by the sartorius muscle. Wounds were copiously irrigated and washed with normal saline and packed with saline soaked gauze. Wounds were not closed primarily and were left open in all cases. Secondary closure was delayed until the wounds were clean. Of 52 patients, 27 received I/V heparin 5000 i.u six hourly post-operatively. Open wounds were irrigated and dressed twice daily and the lower limb was monitored regularly for signs of acute ischaemia including coldness, sensory and motor loss, changes in colour and capillary refilling. Follow up period was 6-months after surgery.

Results:

All of the patients were males with a median age of 33 years (range 19-47) According to their history, the mean duration of addiction was 5-years (1-9 years) The most common clinical findings were a pulsatile groin mass in 33(63%) patients and bleeding ranging from minor ooze to major haemorrhage leading to shock on presentation in 19 patients (36%). All had pseudo-aneurysms in the common femoral artery proximal to its bifurcation. 26(50%) in the mid common femoral artery 19(36%) in the distal third and 7(13%) in the upper third below the inferior border of inguinal ligament. There was no incidence of recurrent bleeding in the post-operative period and no gangrenes of the limbs on discharge. Limb salvage was 100%. Patients were followed up in the out patient department till the wound healed completely and then onwards for 6 months. 17 patients (32%) developing claudication were managed conservatively.

Discussion:

Complications of I/V drug abuse are increasingly a frequent presentation in the emergency department. Abusers usually seek help when they develop some serious complication like a painful groin mass or bleeding from pseudo-aneurysm. Their natural outcome is rapid progression to rupture and haemorrhage, which may be fatal. The treatment of infected pseudo-aneurysm is variable including ligation alone, routine re-vascularisation, selective re-vascularisation and non surgical treatments.⁸⁻¹⁰ there is a high incidence of graft infection after immediate vascular reconstruction. Whereas reuse of femoral sites for further drug administration may cause recurrent infection at the site of reconstruction.¹¹⁻¹⁴ Primary vascular reconstruction is controversial.^{15,16} Most authors now advocate debridement, drainage, and ligation of the artery, with reconstitution, if needed, in another operation.^{17,18} This is predicted on the usual presence of sufficient collateral flow to maintain limb viability. The complications reported include haemorrhage secondary to disruption at the site of the arterial repair, septic embolisation, and infection of prosthetic graft material.^{19,20} We

preferred to approach the distal external iliac artery under emergency circumstances in bleeding or impending-to-rupture pseudo-aneurysms to achieve rapid proximal control of bleeding through an un-infected plane and ligations were performed at the same time to avoid complications of working in infected necrotic tissues. The principal anastomoses in carrying on the collateral circulation, after the application of a ligature to the external iliac artery are: the iliolumbar with the iliac circumflex; the superior gluteal with the lateral femoral circumflex; the obturator with medial femoral circumflex; the inferior gluteal with the first perforating and circumflex branches of the profund a artery; and the internal pudendal with the external pudendal.²⁰ In our study there were no amputations following ligation of external iliac and common femoral arteries. This shows that, distally, the limb gets perfusion by the development of adequate collateral circulation in this relatively younger group of patients with no concomitant peripheral athero-sclerosis. Considering the 100 percent limb salvage and moderate rate of post-ligation claudication, we recommend ligation of external iliac artery with distal ligation of common femoral artery and debridement as an effective and safe treatment in infected pseudo-aneurysms of the femoral artery as it can be rapidly achieved, is life saving, and gives acceptably good long term results while avoiding the risks of immediate reconstruction.^{21,23,25,26} Late revascularisation is indicated in patients who develop disabling claudication after ligation.^{22,24,27} It would be unadvisable in patients who continue drug abuse. Referral to drug rehabilitation centres is mandatory to prevent continued drug abuse in these patients.

Conclusion:

We concluded that ligation of the external iliac artery above the inguinal ligament is a safe and effective procedure in the management of pseudo-aneurysms of the femoral artery in a relatively younger group of patients. It achieves rapid proximal control in emergency situations, and avoids risky reconstruction in infected tissue planes and subsequent complications. Pre-

sumably, during the progressive development of false aneurysm due to chronic vessel injury related to contaminated needle pricking, there is relative ischaemia of the distal limb leading to opening up of collaterals between the internal iliac and the femoral arteries. Mean duration of abuse was 5 years, supporting this conclusion.

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Role and contribution of authors:

Dr Mohammad Ali Iqbal, collected the data and references and did the initial write up.

Dr Jai Kershan did the proof reading and formatting of the manuscript.

Dr Muhammad Najmuddin Shabbir, contributed the discussion.

Dr Muhammad Shahzeb Najam, provided the demographic data about the addiction and introduction of IV drug abuse in Pakistan.

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