

Management of Pseudoaneurysms in IV Drug Users

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Abstract

Introduction: Pseudoaneurysms are major vascular complications in intravenous drug abusers. They are potentially fatal, often infected and require urgent management.

Method: This is a retrospective study of the prevalent practice of their management in our center. The inpatient medical charts of the patients spanning 5 years (Sep 2006 to Aug 2011) were reviewed. Data were obtained on their demographic, clinical, management and outcome parameters.

Result: Among the thirty intravenous drug users presenting with pseudoaneurysms (excluding one who bled to death before surgery), 28 had their femoral artery involved. Most of them (90%) were infected. Nearly half of the patients (45%) were seropositive for HIV and/or HCV. All were operated, with no mortality. Ligation and debridement was the technique used almost exclusively (83%). One brachial artery was repaired primarily, whereas 3 femoral and 1 brachial pseudoaneurysms were managed with autologous saphenous vein bypass. Five patients had neurological complications, and 5 others had non-limb threatening claudication which got better with medical management. Mean follow up period was 11 months.

Conclusion: Ligation and debridement appears to be a simple, safe and effective procedure in infected pseudoaneurysms in IV drug users.

Keywords: Claudication, IV Drug Users, Infected Pseudoaneurysms, Ligation

Introduction

A pseudoaneurysm is a pulsating, encapsulated hematoma in communication with the lumen of a ruptured artery. Terms often used synonymously are false aneurysm, pulsatile hematoma, and communicating hematoma. Although blunt injuries can also be the cause, most of the pseudoaneurysms result from a penetrating injury to the artery, like stabs, gunshot wounds and inadvertent repeated arterial puncture by intravenous drug users (IVDU). Those occurring at the vascular access sites (e. g. after percutaneous diagnostic or therapeutic cardiovascular interventions and hemodialysis) constitute the so-called *iatrogenic* pseudoaneurysms. Most common site is the common femoral artery, which is also the case with IVDUs. Drug abuse is an ever-increasing social and health problem globally. Pseudoaneurysms get frequently infected, and may culminate in fatal bleeding or limb loss, demanding emergent management. Various non-operative strategies have been used for *uninfected*

pseudoaneurysms mostly resulting from vascular access complications. Surgery is indicated in infected pseudoaneurysms, with options ranging from ligation to revascularization with their attendant merits and demerits.

In this article, we review our experience with management of pseudoaneurysms in IVDUs at our center.

Methods

This is a retrospective review of prospectively kept records of IVDUs presenting with pseudoaneurysms, managed under a single vascular surgery unit over a period of five years, from Sep 2006 to Aug 2011. All the patients followed the same treatment protocol. Upon clinical suspicion, all underwent a Doppler USG of the concerned limb except a patient who was massively bleeding at presentation and had to be rushed to operating room. Emergent surgery was planned in each of them as soon as diagnosis was made. All the patients received IV antibiotics (ceftriaxone, cloxacillin,

metronidazole) started before the operation and continued thereafter till fever was present. Thereafter, they were kept on oral antibiotics till signs of wound infection were present. In the ward, wounds were dressed at least once daily, and patients were monitored for features of limb ischemia. Patients were discharged as soon as they were stable and ambulatory. Follow up was done in the outpatient clinic till the wound had healed completely, and then every three months. Neurological and vascular status of the limb was checked in every visit.

Result

Thirty one patients with history of chronic intravenous drug abuse presented to the emergency room. One patient with groin pseudoaneurysm died of torrential bleeding on the way to the operating room. Thirty patients were operated. All were males, with age ranging from 14 to 65 years (mean 25.4 years).

Right common femoral artery was the mostly involved site (n=21; 67%) followed by left common femoral (n=7; 23%). Left brachial artery was the site of injury in 3 patients (9%). The duration of intravenous drug abuse varied from 4 months to 20 years, with median duration of 2 years. Presentation was delayed by 2 days to 3 months after the onset of symptoms, and most of the late presenters were from outside Kathmandu Valley. The most common symptom was a lump at the groin or the cubital fossa, and the most common sign was a pulsatile mass. All of the brachial and 26 (92%) of the femoral pseudoaneurysms were infected. Eight of the latter were bleeding at presentation, with one of them dying due to torrential bleeding on the way to the operating room. Six patients were HIV seropositive, 4 were HCV seropositive and 4 tested positive for both, making total seropositivity rate 45%.

All patients were treated surgically. (Table 1) The choice of operative technique was governed largely by the condition of the wound. In the femoral group, proximal control was taken retroperitoneally via a suprainguinal incision in external iliac artery in 21 cases (77%) and in the common femoral artery in 7 (23%). The distal ligation was done as low as possible. The groin wound in all patients was packed and left open to heal by secondary intention.

Table 1: Operative Techniques

Operation	Femoral	Brachial
Ligation and debridement	24	1
Primary repair	-	1
Excision and vein graft	3	1

Two patients had recurrent groin wound bleeding managed by multiple suture ligations and packing in the inpatient ward. (Table 2) The neuromuscular deficit noted in all 5 patients was associated with massive debridement in the groin leading to injury of femoral nerve and also of the flexor muscles of the thigh. The claudication noted in 5 patients was managed conservatively. No limb was lost as a result of vascular insufficiency. There was no perioperative mortality. Follow up data was available in 20 patients only. The mean follow up period was 11 months, with a range of 3 months to two years. Patients who developed claudication in the immediate postoperative period had persistence of minimal symptoms on medical treatment.

Table 2: Postoperative outcome

Parameter	N	%
Uneventful	19	63
Recurrent bleeding, not requiring re-exploration	2	6
Recurrent bleeding, requiring re-exploration	0	0
Claudication	5	16
Limb Loss	0	0
Neuromuscular deficit	5	16
Mortality	0	0

Discussion

With the skyrocketing trend of intravenous drug use, vascular surgeons are increasingly facing the challenge in managing their complications.¹ Pseudoaneurysms are the commonest vascular problems in people who inject drugs. Diagnostic algorithm usually consists of clinical suspicion in an appropriate setting; often confirmed by Doppler Ultrasound. CT Angiogram and MR Angiogram are alternative techniques of delineating the lesion. Doppler USG was done in all patients in the current series. Non-operative treatment modalities like USG-guided compression repair (UGCR), endovascular placement of covered stents, USG-guided percutaneous injection of thrombin and coil embolization are usually not applicable to infected pseudoaneurysms. For the latter, surgery is the only form of treatment.

Globally, about 15.9 million people inject drugs and about 3 million of them are currently living with HIV.² About 3.3 million IVDUs are from South and Southeast Asia.³ In Nepal, approximately 16100-28000 people inject drugs. (4) Of them, an estimated 60-70% is infected with HIV³; a figure much higher than the rest of the world. The current series notes a third of the IVDUs being infected with HIV.

Approximately 75% of all admissions for accidental intra-arterial drug injections involve the lower limb; hence, the most common site of infected pseudoaneurysm is the inguinal region.⁴⁻⁶ Our observation shows the groin to be even more commonly affected.

Although population based prevalence data are not available, pseudoaneurysms are not uncommon entities. However, no formalized policies have been accepted for the management of infected pseudoaneurysms.¹ Treatment varies from excision and ligation of the involved vessel to ligation and routine revascularization.⁷ Proponents of simple ligation argue that incidence of graft infection following immediate reconstruction is high. Also, autologous veins are rarely available in IVDUs, for obvious reasons. Moreover, because of the addicts' tendency to reuse femoral sites for further drug administration, arterial reconstruction may be in jeopardy of recurrent infection.⁸ On the other hand, a high rate of amputation after ligation in some series is a pointer towards the need for routine revascularization. 'Advances in antibiotics and vascular surgery' has been quoted as the basis for routine revascularization by some.⁹ None of these approaches have proven entirely appropriate in all cases. In fact, some authors have adopted a more selective attitude towards revascularization, either simultaneously with ligation or as a delayed procedure as required.¹⁰ Reddy *et al* have attributed an amputation rate of 11% (6 of 54) in their series to the ligation of common femoral artery above bifurcation. All of their prosthetic grafts had to be removed due to infection.⁶ In a study by Arora *et al*, a simple arterial ligation was done for all patients. There was no amputation after the operation and the only complication was mild claudication after 18 months.¹¹ McIlroy *et al* conducted a study in which ligation was done in 48 and reconstruction in 12 drug abusers. Interestingly, reconstructive approach resulted in more complications in form of graft infection and amputation.¹² Similarly, Cheng *et al* and Johnson *et al* have recommended ligation as the safer method, on the basis of their observations.^{7,10} Fazel *et al* from Iran have strongly concluded that ligation is the optimal treatment for pseudoaneurysms in IVDUs.¹³

Studies favoring early reconstruction have been marred by their inconsistencies, poor long term results and small sample size.^{9, 14, 15}

In order to solve the problem of selecting as to which patient undergoes reconstruction, various groups have advised various methods. Arora *et al* made use of intraoperative Doppler examination of a pedal artery after test-clamping of the external iliac or the common femoral artery. If Doppler signals were present, common femoral artery would be

simply ligated. This approach prevented amputation in all of their patients.¹¹ Hu *et al*, by using intraoperative angiography, showed that adequate collateral circulation usually serves to save the limb after ligation of pseudoaneurysms.¹⁶

Conclusion

Pseudoaneurysms in IV drug abusers present frequently in an infected state, usually delayed by several days to weeks. As a result, ligation and debridement appears to be a simple, safe and effective procedure, saving life and limb with minimal morbidity. However, there is a need to evaluate the long term follow up on these patients.

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