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ORIGINAL ARTICLE

Embolectomy at the Time of Ligation of Femoral Vessels in Psuedoaneurysm in Intravenous Drug Addicts can save the Limb

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ABSTRACT

Aim: To determine the impact of embolectomy at the time of ligation of femoral artery in management of pseudoaneurysmin intravenous drug addicts
Study design: Descriptive cross-sectional study
Methods: This study was carried out at Vascular surgery department, CMH Lahore and included 28 patientsof intravenous drug addiction of both genders presenting in emergency of CMH Lahore with viable limb from 1st August 2021 to31st January 2023. Unsalvageable limbs at the time of presentation were excluded from the study. SPSS Version 20.0 was used for data analysis of age, sex, co-morbidities (infection), mode of presentation and outcome variables.
Results: This study comprised of28 patientsadmitted through Emergency Department of CMH, Lahore. The mean age was found to be 32.16 years ±7.63 years. All patients 28(100%) were males with majority belonging to third decade of life 20(71.4%).Chronic viral infection was present in all cases. Almost half of them had hepatitis B virus infection (48%) while cases positive with hepatitis C virus and HIV infections were 37% and 15% respectively.Majority of the patients came to the hospital with bleeding from ruptured pseudoaneurysm (60.7%) and infected pulsatile swelling (32.1%), while pulsatile swelling without bleedingand wrong diagnosis were least common.Alllimbs were salvaged in first and second follow-up visits, 20 patients were lost on follow up on 12th week.
Conclusion/Practical implication: Embolectomy is a very useful adjunct in the management of pseudoaneurysm of intravenous drug addicts. It should be routinely practiced in treatment of these patients to save limbs.
Keywords: Embolectomy, ligation, femoral vessels, intravenous drug addicts

INTRODUCTION

There is an alarming increase in the number of illicit drug abusers especially of young agein Pakistan in the last decade, may be due to unemployment, easy availability of such drugs and poor surveillance of law enforcement agencies. Though no current national data is availablerevealing the exact numbers of drug abusers and the choice of illicit drugs used in Pakistan, a survey conducted in 2012-2013 revealed that about 6.7 million had been indulged in the use of a prohibited substance apart from drinking and cigarette smoking in the last year. This was equivalent to almost 6% of the total population. According to gender stratification, the incidence was 9% among adult males and 2.9% among adult females. As per World Drug Report 2022, about 284 million people globallywere indulged in drug abuse.Out of these, 11.2 million people worldwide were intravenous drug abusers; approximately half of them were tested positive for hepatitis C, 1.4 million for HIV, and 1.2 million for both[1].

Drug addiction poses a hugeburden on thefinancial and public health care resources in developing countries like ours. Most drug addicts inject drugs of abuse intravenously, but subcutaneous injection (i.e. "skin-popping") is also common, sometimes, drug addict may use intramuscular route to inject drugs or intramuscular injections may occur unintentionally when the vein or the subcutaneous space is missed. Parenteral drug abuse is associated with many local and systemic complications. Local complications are extravasation of blood around injection areas, development of a sinus, abscess, ulcer, pseudoaneurysm, phlebitis and deep vein thrombosis whereas systemic complications include endocarditis, pulmonary embolism, decreased visual acuity, generalized sepsis and viral infections like Hepatitis B, Hepatitis C and HIV etc. due to sharing of needles[2].

Due to repeated injections, their superficial veins are damaged. So intravenous drug addicts resort to another easily accessible route which is femoral vein in the groin region, where they accidentally breech the wall of femoral artery leading to development of pseudoaneurysm[3]. Multiple injuries to the vessel wall due to repeated injections leads to collection of blood in the adjacent tissues with subsequent development of a pseudoaneurysm (false aneurysm), which is distinguished from true aneurysm by lack of all three basic layers of the wall of an artery[4].

A femoral artery pseudoaneurysm is a common local complication in intravenous drug abusers and manifests in any combination of the common femoral, superficial femoral, or profunda femoris arteries. A Femoral artery pseudoaneurysm consists of an outward bulging of single or multiple layers of the vessel wall[5]. The common presentation is abscess formation in groin, offensive purulent discharge, massive hemorrhage, swelling of lower limb with several disco;ored injection sites, restricted movements at hip or knee joints, gangrenous or infected foot and reduced muscle bulk due to disuse atrophy, due to severe pain[6-8]. There is no clear guideline regarding management of femoral artery pseudoaneurysm and ccontroversyexist all around the world. Nevertheless, ligating and excising pseudoaneurysm followed by primary repair has been reported in the literature with promisingoutcome [9]. However, our method of choice was ligation of pseudoaneurysm, excision, and debridement of the adjacent tissue, preceded byproximal and distal arteries embolectomy by Fogartycatheter which not only removed the distal embolus if any but also increased the flow in collaterals which are mostly in spasm due to irritant drugs.

This study's main aim was to evaluate the impact of embolectomy precedingligation of pseudoaneurysm, excision, and debridement of the adjacent tissue in our hospital as no study in Pakistan has been done on this line of treatment before.

The objective of the study was to determine the impact of embolectomy at the time of ligation of femoral artery in management of pseudoaneurysm in Intravenous drug addicts

MATERIAL AND METHODS

Study design: Descriptive cross-sectional study.
Setting: Vascular Surgery Department, Combined Military Hospital, Lahore.
Duration of study: The study will be 18 months from 1stAugust 2021 till 31January 2023.

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Sample technique: Non-probability purposive sampling.
Inclusion criteria: Intravenous drug addicts with painful, pulsatile or bleeding mass in femoral area on clinical examination, from 12 to 60 years of age.
Exclusion criteria: All the patients of pseudoaneurysm with gangrenous limb on clinical examination.
Data collection procedure: 28 patients selected for the study from vascular surgery department of CMH, Lahore. Informed consent on a printed proforma was taken. Bio-data wasnoted which comprised of age, gender, occupation and residential address of the patient. All patients with massive hemorrhage were initially resuscitated as per standard protocol. Each patient was treated with ligation of femoral vessels, embolectomy and debridement of wound. Associated problems were treated on merit. All pseudoaneurysms were ligated primarily after doing antegrade and retrograde embolectomy of femoral artery. Limb salvage was assessed for 72 hours post operatively in hospital and 4 weeks and 12 weeks after discharge on outpatient basis.
Statistical analysis: Data analysis was done with the help of SPSS version 20.The variables studied by data evaluation were age, gender, co-morbidities(infection), mode of presentation and outcome variables.Meanand standard deviation was calculated for age variable.
Procedure: Mostly were referred from different hospitals where expertise of vascular surgeon is not available. Other presented after incision and drainage leading to devastating bleeding by junior, inexperienced doctors.After resuscitation, optimization and taking informed consent, patients were shifted to operation theatre where surgical intervention was done under general anesthesia. Firstly, external iliac artery control is taken followed by superficial femoral artery control. Then Profunda femoral artery control is taken either through the aneurysm or by retrograde dissection of superficial femoral artery depending upon the size of aneurysm and severity of infection in the area. Our aim was to take control of all the three vessels and then ligation.

But before ligation of the vessels, we did proximal and distal embolectomy. We checked the distal flow with handheld doppler before ligation, embolectomy and after ligation of the vessels. In all our cases monophasic flow of anterior tibial and posterior tibial arteries was found even after ligation of vessel. Absence of the flow after ligation can predict early amputation[5,8].

Those patients in which embolus were removed by embolectomy, retrograde blood flow was restored or improved, resulting in salvage of the limb. In addition, embolectomy improved the retrograde flow both in Profunda Femoral and Superficial Femoral artery even if they don't have thrombus or embolus distally.

We observed the limb viability for up to first two to three days keeping them on therapeutic dose of anticoagulants. Wounds were debrided at the same setting and continue daily saline-soaked dressings, very rarely needed further debridement. Patients were discharged on third to fifth postoperative days and advised follow up in outpatient department and in psychiatric OPD, but unfortunately patients never came back after third follow up so we cannot comment on intermittent claudication as expected theoretically and in literatures[5,7,8].

RESULTS

All patients 28(100%) were males with majority belonging to third decade of life 20(71.4%) followed by second 5(17.8%) and fourth 3(10.7%) decades respectively as shown in fig.1

All patients had chronic infections, with the far more prevalent being hepatitis B virus (48%) followed by hepatitis C virus infection (37%) and HIV (15%) respectively (Fig. 2).

Out of 28 patients, almost two third (60.7%) presented with bleeding while presentation with infected pulsatile mass was seen in 32.1% cases. Only 2(0.07%) patients came with pulsatile swelling. None of the cases were of misdiagnosis as shown in fig 3

In all 28(100%) patients, embolectomy was done before ligation of femoral vessels and all limbs were salvaged 28(100%).

Fig. 1: Age distribution

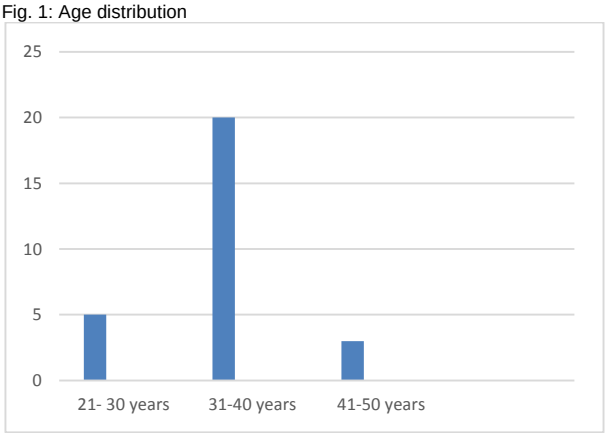


Fig. 2: Frequency of infections

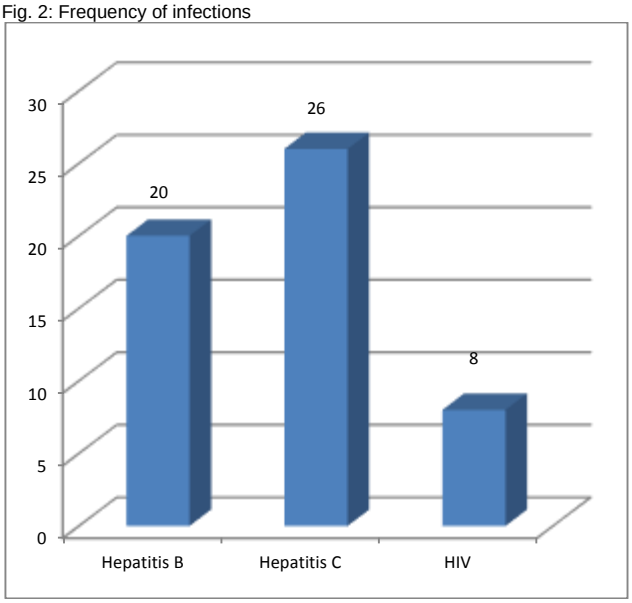
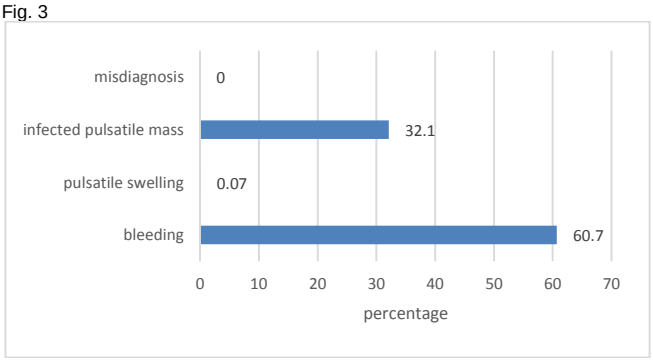


Fig. 3



DISCUSSION

Pseudoaneurysm formation occurs due to repeated peri-arterial or intra-arterial injuries under unhygienic conditions to the blood vessels from injecting drugs of abuse. Femoral vessels lying superficially in the femoral triangle is aneasy accessible route for injecting drugs. Femoral artery injuries are most common in intravenous drugaddicts followed by injuries of brachial and other vessels[4,5].

The decision about the line of treatment in an intravenous drug abuser presenting with an infected femoral artery

pseudoaneurysm is quite challenging task for the vascular surgeon as no definitive guideline protocol exists for the management of such cases at present. Ligation and excision of the pseudoaneurysm without grafting is an accepted treatment option in most of the patients with relatively reducedrisk and lesser chances of limb loss that is amputation 23% and late intermittent claudication is also 23%[10].

A recent study on such bleeding aneurysms was dealt by interventional radiologist by putting a covered stent, debridement of wound and applying vacuum assisted dressings. Those with infected sinuses were dealt later removal of infected stent and reconstruction vein graft to maintain inline flow[5]. Such facilities are not available in our setup. Moreover, unavailability and very expensive stents makes such treatment nearly impossible in our setup.

Delayed presentation, compromised, unsuitable vessels (for autogenous graft), infection, mental addiction disorders, loss on follow-up and absence of compliance with treatment are the main reasons behind failed treatment outcomes. These patients also present later with the same problem involving vessels in another location due to continued injections of drugs of abuse[9].

In our study, majority of the patients were young (21-40 years, 89.2%) which is also reported by other studies[2,9]. All patients were males in our study which is in agreement with other studies[10-12]. Female drug addiction is relatively uncommon although it is gradually increasing in our society which is quite alarming[10].

There is increased risk of infection with blood- borne viruses among intravenous drug addicts. Result of viral markers have often not provided at the time of surgery, and therefore strict care should be taken while operating these patients. In these cases,there is increasing percentage of infections such as hepatitis C, hepatitis B, and HIV[3,9,11]. According to our study, almost half of the patients had hepatitis B virus (48%) followed by hepatitis C virus infection (37%) and HIV (15%) respectively which is in agreement with other studies[2,9].

In our hospital, most commonly patients came with hemorrhage due to ruptured pseudoaneurysm (60.7%), which is in agreement with that reported in other studies (40-70%)[3,9].

In many hospitals, femoral artery pseudoaneurysm, wasmanaged by ligation of vessels and debridement of the surrounding tissues,as significant number of them were infected. The only disadvantage of this treatment was severe claudication and threatened limb ischemia which requireamputation later on as distal limb is surviving only on collateral circulation and there isloss of inline flow.A recent study in Pakistan reported there was claudication and amputation rate in 8% of the cases following the above treatment[12].

As mentioned earlier, there is no consensus on the the best strategy for surgical management of this complicated vascular problem. Most surgeons perform grafting fearing that amputation may be needed if revascularization not done. Some even tried extra anatomical by pass with autologous and PTFE grafts but the results wereeven worse with increasing numbers of reoperations, major amputations,prolonged hospital stay and increased financial cost.Other treatment options are revascularization after excision of aneurysm, percutaneous thrombin injection, coil embolizationand US guided compression therapy are not available in our emergency setup while percutaneous thrombin injection is rarely indicated in infective pseudoaneurysm[13,14].

As reported in international studies[3,4], this procedure is safe and effective option in patients with femoral pseudoaneurysm with minimal risk of ischemia leading to amputation and claudication. At the same time, it is much more cost effective than other treatment options with shorter hospital stay[7].

CONCLUSION

Embolectomy is a very useful adjunct in the management of pseudoaneurysm of intravenous drug addicts before ligation of vessels, as embolus or thrombosis from pseudoaneurysm, can block distal vessels. Also, thrombosis in superficial femoral and profunda femoral arteries can develop in hypotension,during hemorrhage or after applying tight dressings. We believe amputations needed in such cases in which distal thrombosis occurred which were salvaged after removal of embolus by embolectomy. So, it should be routinely practiced in treatment of these patients to save the limbs in the presence of good collaterals which these patients slowly developed over the period of time during development of pseudoaneurysm.

Conflict of interest: Nothing to declare

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