



ORIGINAL ARTICLE

Optimal management of infected femoral pseudo aneurysm in drug addicts presenting to Benazir Bhutto Hospital, Rawalpindi.

Sehrish Siddique¹, Muhammad Haroon Anwar², Tayyab Mumtaz Khan³, Naeem Zia⁴

Article Citation: Siddique S, Anwar MH, Khan TM, Zia N. Optimal management of infected femoral pseudo aneurysm in drug addicts presenting to Benazir Bhutto Hospital, Rawalpindi. Professional Med J 2022; 29(11):1625-1629. <https://doi.org/10.29309/TPMJ/2022.29.11.7233>

ABSTRACT... Objective: To compare the outcomes of excision of pseudo aneurysm along with ligation and local debridement with the outcomes of excision of pseudo aneurysm along with ligation and revascularization in the management of infected femoral pseudo aneurysm among drug addicts. **Study Design:** Retrospective Analytic study. **Setting:** Surgical Unit-1, Benazir Bhutto Hospital, Rawalpindi. **Period:** July 2010 to July 2019. **Material & Method:** Among patients presented with pseudo aneurysm in Surgical Emergency and out patients department. Data was collected through medical record of the hospital. P-value less than 0.05 was set statistically significant. **Results:** Mean age and duration of addiction for study population were 36.50 years with SD of ± 6 years and 2.80 years with SD of ± 0.90 years respectively. All enrolled participants were males (100%). Heroin (76%) was the most common used by addicts while other drugs included benzodiazepine (12%), amphetamine (8%), and cocaine (4%). Left sided femoral artery (70%) was more involved in pseudo aneurysm as compare to right sided femoral artery (30%). Post operative adverse events percentage for ligation without revascularization was 22.72%, whereas, it was 100% for ligation with revascularization. Mortality was 0% for excision with ligation and local debridement while it was 50% for excision with ligation and revascularization. **Conclusion:** For the optimal management of infected femoral pseudo aneurysm, excision with ligation and local debridement is effective in comparison to excision with ligation and revascularization among addicts.

Key words: Addicts, Femoral, Hospital, Infected, Management, Optimal, Pseudo Aneurysm, Rawalpindi.

INTRODUCTION

Drug addiction is one of the devils which our society has been facing since ancient times. 7.8 million Population is drug addict in Pakistan and 430,000 people use to take drugs by IV route.¹ Heroin was found to be the main drug used for addiction with majority of the addicts using inhalational route in the form of smoking for drug administration with only 15.6% of the addicts using IV route. Majority of these patients started drug abuse during their teenage.²

Various risk factors for drug addiction exist such as peer pressure, low socioeconomic status, family disputes and depression. These factors were identified as major risk factors in a study carried out in Rawalpindi and Islamabad.²

Drug addiction has wide range of adverse effects ranging from social issues to physiological and then finally to pathological. Moreover, it also puts negative impact on the economy of a nation. The pathological effects depend upon type as well as route and site of drug administration. Femoral area is the most common site for injection because of easy accessibility.³ Repeated injections to femoral area under aseptic conditions results in formation for infected femoral pseudo aneurysm which is a common vascular complication occurring among drug addicts.^{4,5}

Femoral pseudo aneurysm can complicate into abscess formation, sepsis or it can rupture lead to catastrophic hemorrhage with loss of limb and can prove to be fatal. Thus, femoral aneurysms are needed to be repaired. Furthermore, there

1. FCPS, MRCPS, Senior Registrar Surgical Unit-1, Holy Family Hospital, Rawalpindi.
2. MBBS, Postgraduate Trainee Anesthesia, PIMS.
3. MBBS, House Surgeon Surgical Unit-1, Holy Family Hospital, Rawalpindi.
4. MBBS, FCPS, FRCS, Professor Surgery, Benazir Bhutto Hospital, Rawalpindi.

Correspondence Address:
Dr. Sehrish Siddique
Department of Surgical Unit-1,
Holy Family Hospital, Rawalpindi.
sehrishsiddique37@yahoo.com

Article received on: 16/03/2022
Accepted for publication: 23/07/2022

is high incidence of Hepatitis B, Hepatitis C, and HIV infections among IV drug abusers because of needle sharing habit.^{6,7} These blood-borne viral infections along with presence of retained needles pose some serious challenges to vascular surgeons for repair of Infected femoral Pseudo aneurysm especially if digital pressure is applied to control bleeding during surgery there by increasing the risk of horizontal transmission of infection to surgeon particularly in setting of retained needles.⁸

Currently two treatment options are available for treatment of femoral pseudo-aneurysm: First one is ligation and excision of pseudo aneurysm with local debridement only, while second one is ligation, excision of pseudo aneurysm with revascularization.^{1,10}

In our study we will retrospectively review the outcomes of these two treatment options. After the completion study we would be able to suggest the treatment of choice for infected femoral pseudo aneurysm management.

MATERIAL & METHODS

Our retrospective analytical study was carried at Surgical Unit 1 of Benazir Bhutto Hospital, Rawalpindi from July 2010 to July 2019. From medical records only those patients were enrolled into the study that had documented drug addiction and presented with infected femoral or external iliac pseudo aneurysm due to IV drug abuse, irrespective of their presentation to outpatient department or surgical emergency. Patients with pseudo aneurysm due to other causes like hemodialysis, arteriovenous, and trauma were excluded from the study.

Total 26 patients were enrolled into the study, out of which 21 presented in the ER and 5 presented in the OPD. Details such as patient age, gender, type of drug abuse, duration of addiction, site, and side of femoral aneurysm along with presenting signs and symptoms were obtained from hospital medical records. Workup of patients included Serology for Hepatitis B and C, HIV and baseline investigations (Blood complete picture, Blood clotting tests, Liver Function test, Renal function

test, Chest x-ray, and Electrocardiogram) to assess the fitness for surgery. Those with positive results underwent PCR for respected disease and results recorded. Further Investigations performed were Arterial Doppler Duplex and CT angiogram. Those with emergency presentation of rupture with catastrophic hemorrhage had investigations tailored according to the need. Patients were administered antibiotics in the peri-operative period and were strictly monitored for signs of ischemia post-operatively.

Patients were divided into two groups on the basis of operation done for them. One group operated through excision of pseudo aneurysm with ligation and local debridement, while second group was operated via excision of aneurysm together with ligation and revascularization. Polytetrafluoroethylene = PTFE and reverse great saphenous vein were used for revascularization.

The data analysis was carried out using SPSS Version 25.0 (IBM Corp., Armonk, NY, USA). P-value of <0.05 was set statistically significant. Mean and standard deviation (SD) were determined for quantitative information, whereas frequency and percentages were determined for qualitative information.

The data were arranged for age, gender, duration of addiction, drugs used for addiction, side of pseudo aneurysm, mode of presentation, presenting symptoms, presenting signs, blood born infections, site of pseudo aneurysm, side of pseudo aneurysm procedure done, site of revascularization, material used for revascularization, and outcome of procedures.

RESULTS

Mean age for 26 enrolled patients was 35.5years with $SD \pm 6$ years, while the mean of duration of addiction in years was 2.80 years with SD of ± 0.90 year. Most common used drug was heroine by addicts. 76% of the patients injected Heroine, 12% injected amphetamines, 8% injected amphetamines, whereas 4% injected cocaine. The percentage of patients who had injection site on left side of their bodies was 70% whereas, 30%

cases had site of injection on right side of their bodies.

Variable	Number (%)
Gender	
Male	26 (100%)
Female	0 (0%)
Mode of Presentation	
ER	21 (80.7%)
OPD	5 (19.3%)
Presenting Symptoms	
Pain	16 (60%)
Bleeding	3 (11%)
Fever and chills	8 (30%)
Numbness of Limb	3 (11%)
Presenting Signs	
Pulsatile mass	15 (58%)
Limb edema	6 (23%)
Bruit	8 (30%)
Gangrene	1 (3%)
Blood borne Viral Infections	
HCV	19 (73.1%)
HBV	3 (11.5%)
HIV	4 (15.4%)
Site of pseudo-aneurysm	
Common Femoral Artery	16 (61.5%)
Superficial Femoral Artery	4 (15.4%)
External Iliac Artery	6 (23.1%)
Procedure/Intervention done	
Excision of aneurysm with ligation and local debridement	22 (84.6%)
Excision+ Ligation + Revascularization (Bypass)	4 (15.4%)
Site of bypass	
Obturator bypass	2 (50%)
Sub-cutaneous bypass	2 (50%)
Material used for bypass	
PTFE	2 (50%)
Reverse Great Saphenous Vein	2 (50%)

Table-I. Manifestation of statistical analysis:

Polytetrafluoroethylene = PTFE

Outcome of two procedures done for groups were different. Only 2 patients died in the post operative period, one died because of sepsis and other died because of catastrophic bleeding of ruptured femoral pseudo aneurysm. Both of these underwent index revascularization procedures. None of the patients died who operated via ligation with excision and local debridement method.

Among the ligation group 4 patients at the end of 1st week presented with intermittent claudication while 1 patient presented with numbness. So, the adverse post operative events accounted about 22.72% of the patients in ligation group. These patients underwent arterial Doppler and then extra-anatomic bypass with PTFE and their symptoms improved.

While among revascularization group 50% of the patients presented with infected graft while 50% presented with graft thrombosis in the post-operative requiring additional interventions.

DISCUSSION

Drug addiction has become one of the major health problems around the globe. Drug addiction creates various issues that could be related to social norms, health or nation's economy. All of the patients were male in our study and a study has also reported male dominance in their participants.¹ Most common symptoms and signs among patients were pain at the site of injection and pulsatile mass respectively. In contrast to our study findings, a study that was conducted in Karachi, Pakistan showed bleeding as most common presenting symptom among addicts.¹

Drug addicts uses drugs through different routes including oral, inhalation, intravenous, and topical. Among these routes intravenous has some specific negatives impact at the site of injection. One of the most common is pseudo aneurysm of involved vessel.

The common vascular injury site of injection is femoral vessel followed by brachial and other vessels. Majority of the drug addicts reserving to IV drug abuse, inject themselves over the femoral area since it is easily accessible. The aim of the drug addict is to inject the drug in the femoral vein but since the artery lies very close to femoral vein, it easily gets traumatized. Repeated trauma to femoral artery ultimately results in formation of pseudo aneurysm.⁵ Moreover, left side femoral vessels (70%) were more affected in our study population and this finding was supported by a study in literature with 75.6% involvement of left femoral vessels in pseudo aneurysm formation.¹

The pseudo aneurysm easily gets infected due to lack of aseptic techniques during injection among addicts. Furthermore, due to sharing of needles among drug addicts these individuals usually suffer from Hepatitis B, Hepatitis C, and HIV. In a study carried at Lahore Pakistan the overall prevalence of HIV among drug addicts was 21.1% while Hepatitis C and B had prevalence of 34.3% and 3.2% respectively.⁶ Contrary to our study findings among our addicts presented with infected femoral pseudo aneurysm 73.1% had Hepatitis C while 11.5% and 15.4% had Hepatitis B and HIV respectively. Moreover, in about 20% of patients needles are broken during injection which can then be retained within the femoral aneurysm.⁷ Retained needles can cause abscess formation and cellulitis as well as local pain thus complicating the treatment process.^{8,9} Presence of retained needles, infection at site of aneurysm as well as presence of blood borne infections complicate the treatment of infected femoral pseudo aneurysm in drug addicts.

The treatment of pseudoaneurysm is all in all a difficulty for vascular specialists all over the planet. Late presentation, compromised vessels (for autogenous join), mental fixation problems, loss of follow-up, and absence of consistence with medication are the fundamental causes for troublesome results. These patients additionally present later with a similar issue however at various locations. The two primary lines of treatment for infected femoral pseudo aneurysm include ligation of aneurysm along with local debridement against the revascularization techniques.^{1,10}

Revascularization involves the use of grafts. Grafts can be of PTFE or they can be of Great Saphenous vein grafts used in reverse manner. However, placing a graft in the setting of infected femoral aneurysm frequently leads to graft infection ultimately leading to graft failure. Therefore, people advocate the use of extra-anatomic bypass so that the site of infection could be avoided and thus graft patency results can be improved.^{10,11}

Still long term follow-ups of procedures involving

revascularization via placement of grafts have shown high incidence of graft failure usually due to infection.¹² Similar results have been obtained in our study with 50% of grafts were infected while remaining were thrombosed. Although in our study we used extra-anatomical bypass but still failure rate was 100%. Poor health status associated with drug abuse along with bacteremia in the setting of infected pseudo aneurysm may account for this.

In studies that were conducted in United States of America and Pakistan excision of infected femoral pseudo-aneurysm with ligation and local wound debridement was found to be effective whereas, revascularization procedures were not recommended as they were found to be associated with increased infection and thus mortality.^{3,13}

In another study carried out by Saini NS et al. ligation with debridement was recommended as treatment of choice for infected femoral pseudo aneurysm with delayed revascularization can be considered among those who developed signs/symptoms of ischemia supported along with relevant investigations.¹¹

In accordance with above studies, in our study there was 100% graft failure rate in the peri-operative period along with death of two patients seen in revascularization group whereas, none being observed in ligation group. Furthermore, in ligation group only 22.72% of the patients developed signs of ischemia at 1st week which later underwent revascularization with no graft failure or adverse events documented at follow-up of 2nd weeks, 1st month, and 6th month.

Our study along with the support of its findings by various studies in literature, recommend that the treatment of choice for infected femoral pseudo aneurysm is excision along with ligation and local debridement instead of excision along with ligation and early revascularization.

Further, studies are required to find the causes of early graft failure and high mortality among patients who are treated with excision along with

ligation and early revascularization.

CONCLUSION

In short, on the basis of our retrospective analytical study we recommend ligation, excision with local debridement as treatment of choice while dealing with infected femoral pseudo aneurysm and this study has shown that excision with ligation and local debridement is more beneficial than excision with ligation and revascularization of infected pseudo aneurysm.

Copyright© 23 Jul, 2022.

REFERENCES

- DDin NU, Berlas FT, Rehman KU, Ali G, Salahuddin F, Mumtaz A. **Outcomes of femoral artery pseudoaneurysm in intravenous drug abusers managed at a tertiary care center.** Cureus. 2021 Feb; 13(2):1-6 e13350.
- Ghazal P. **Rising trend of substance abuse in Pakistan: A study of sociodemographic profiles of patients admitted to rehabilitation centres.** Public health. 2019 Feb 1; 167:34-7.
- Quiroga E, Shalhub S, Tran NT, Starnes BW, Singh N. **Outcomes of femoral artery ligation for treatment of infected femoral pseudoaneurysms due to drug injection.** Journal of Vascular Surgery. 2021 Feb 1; 73(2):635-40.
- Rehman KU, Berlas MF, Din NU, Ali G, Salahuddin F, Mumtaz A. **Management of brachial artery pseudoaneurysms in intravenous drug abusers.** Cureus. 2020 Dec; 12(12).
- Ilic A, Stevanovic K, Pejic S, Markovic M, Dimic A, Sladojevic M, Davidovic L. **Vascular injuries in intravenous drug addicts—a single-center experience.** Annals of vascular surgery. 2020 Aug 1; 67:185-91.
- Asif A, Ayub S, Komal A, Noor S, Jalal U. **Prevalence of human immunodeficiency virus and Hepatitis (B & C) among drug users in a tertiary care public hospital.** Pakistan journal of medical sciences. 2019 Mar; 35(2):459.
- Degenhardt L, Peacock A, Colledge S, Leung J, Grebely J, Vickerman P, Stone J, Cunningham EB, Trickey A, Dumchev K, Lynskey M. **Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: A multistage systematic review.** The Lancet Global Health. 2017 Dec 1; 5(12):e1192-207.
- Lewis JD, Enfield KB, Sifri CD. **Hepatitis B in healthcare workers: Transmission events and guidance for management.** World journal of hepatology. 2015 Mar 27; 7(3):488.
- Mansour J, Zulfiqar M, Umer A, Zurcher KS, Heeger A, Menias CO. **Abdominal Imaging Manifestations of Recreational Drug Use.** RadioGraphics. 2020 Nov; 40(7):1895-915.
- Becker D, Béguin M, Weiss S, Wyss TR, Schmidli J, Makaloski V. **In situ reconstruction of infected groin pseudoaneurysms in drug abusers with biological grafts.** European Journal of Vascular and Endovascular Surgery. 2019 Oct 1; 58(4):592-8.
- Saini NS, Luther A, Mahajan A, Joseph A. **Infected pseudoaneurysms in intravenous drug abusers: Ligation or reconstruction?.** International Journal of Applied and Basic Medical Research. 2014 Sep; 4(Suppl 1):S23.
- Magar DT, Shrestha K, Chapagain D, Shrestha K, Thapa S. **Outcome of ligation of peripheral arterial pseudo aneurysm with or without revascularization in intravenous drug abuser.** Int J Surg. 2020; 4:337-40.
- Jamil M, Usman R, Afzal M, Malik NI. **Optimal primary surgical management of infected pseudoaneurysm in intravenous drug abusers: Ligation or reconstruction?.** Pakistan Armed Forces Medical Journal. 2017 Oct 30; 67(5):788-91.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Sehrish Siddique	Author (Manuscript writing and data collection).	
2	Muhammad Haroon Anwar	Co-Author (Literature review).	
3	Tayyab Mumtaz Khan	Co-Author (Data analysis).	
4	Naeem Zia	Co-Author (Proof Reading)	