

Management of Brachial Artery Pseudoaneurysms in Intravenous Drug Abusers

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ABSTRACT

Aim: To assess the outcomes of ligation and excision of brachial artery pseudoaneurysm without revascularization in IV drugs users.

Place & duration of study: From Jan 2021 to Jan 2022 at the department of Surgery of Doctors Hospital & Medical Centre Lahore.

Methodology: A retrospective observational study was conducted at the surgery department of Doctors Hospital & Medical Centre Lahore for 1 year. Intravenous drug abusers, aged between 18-65 years diagnosed with brachial artery pseudoaneurysm were included in the study whereas pseudoaneurysm was caused due to arteriovenous fistula, hemodialysis, and trauma or in patients who had undergone revascularization were excluded from the study. The data were processed using SPSS 20.0.

Results: A total of 15 intravenous drug users were enrolled in the study. The mean age of the participants was 33.4±5.4 years, and the mean period of addiction was 1.9±2.5 years. Majority of patients (65%) presented with an affected right arm. The most common presentations were: bleeding pseudoaneurysm (73.3%), oozing pulsatile mass (20%), and infected pulsatile mass (6.6%). Following the intervention, limb salvage was achieved in all patients. Ischemia was reported in none of the patients.

Conclusion: The excision and ligation of the pseudoaneurysm can be an effective treatment option for the pseudoaneurysm of a brachial artery caused due to drug addiction.

Keywords: The brachial artery, pseudoaneurysm, intravenous drug users, drug addiction

INTRODUCTION

The intake of illicit drugs is on a significant rise which is significantly affecting the youth and the skilled population. According to a report published by the United Nations Office on Drugs and Crime (UNODC), about 35 million people are drug abusers, globally¹. In this regard, Pakistan is a leading drug-affected state with around 7.8 million affected people². Intravenous drug addiction has become a challenging health and social issue. Mostly intravenous drug addicts die of overdose, trauma, infections such as human immunodeficiency virus, hepatitis C, trauma, and multiple vascular complications^{3,4}. A false aneurysm (arterial aneurysm) differs from a true aneurysm as in it the patient lacks all 3 normal components of the arterial wall. It results due to recurrent trauma to the vessel wall which leads to hematoma formation in the surrounding tissues⁵.

Although femoral artery pseudoaneurysm is the most reported complication of intravenous drug addiction, brachial artery involvement is also common⁶. This form of aneurysm presents as an infected, pulsatile, painful, and expanding mass that might or might not affect the peripheral neurovascular system⁷. Conventionally, brachial artery pseudoaneurysm is treated through ligation, excision, and debridement (if an infection develops in surrounding tissues)⁷. However, surgical intervention is found to have more desirable outcomes as it eliminates the need for construction⁸. Our national literature lacks enough studies on the efficacy of treatment approaches, besides surgical intervention, utilized for brachial artery aneurysms.

Therefore, the present study is designed to assess the outcomes of ligation and excision of brachial artery pseudoaneurysm without revascularization in IV drugs users.

METHODOLOGY

This retrospective observational study was carried out after IRB permission in the Surgery Department of Doctors Hospital Lahore for 1 year from January 2021-January 2022. The patients aged between 18-65 years, presenting in the emergency department

with pulsatile mass near or at cubital fossa with a history of intravenous drug abuse were consecutively included in the study. Whereas, cases in which pseudoaneurysm resulted due to an arteriovenous fistula, hemodialysis, or trauma, or those who had pulsatile mass at a place other than cubital mass were excluded from the study. Similarly, patients who had undergone primary revascularization were excluded from enrollment. All patients were informed of study objectives and their informed consent was sought. Similarly, ethical approval was taken from the ethical committee of the hospital. After confirming the brachial artery pseudoaneurysm, all enrolled patients were administered general anesthesia. The patients were laid in a supine position with the affected upper limb held in an abducted position. A curvilinear incision was made on cubital fossa. Hemostasis was maintained through proximal and distal suture ligation followed by pseudoaneurysm excision. The wound was allowed to heal under general precautions. All patients were kept under supervision for 72 hrs. Patients were assessed of treatment outcomes majorly threatened ischemia, amputation rate, limb salvage rate, and mortality. Moreover, baseline demographic data, drug addiction history, and clinical presentation were also noted.

SPSS version 22 was used for statistical analysis. The quantitative data were presented as mean± SD whereas qualitative data was analyzed as the frequency with percentages.

RESULTS

A total of 15 patients qualified for the study. Out of the 11 (73%) were male and 4(26.6%) are female. The mean age of the participants was 33.4±5.4 years. and the mean period of addiction was 1.9±2.5 years. Majority of patients 10(65%) presented with an affected right arm while 5(35%) patients had an affected left arm. The most common presentations were: bleeding pseudoaneurysm 11(73.3%), oozing pulsatile mass 3(20%), and infected pulsatile mass 1(6.6%). All patients underwent a similar protocol of ligation and excision of brachial artery pseudoaneurysm. 2 patients required debridement of surrounding tissues due to the development of infection (Table 1). However, revascularization wasn't carried out in any of the cases. Following the intervention, limb salvage was achieved in all patients (100%). Ischemia was reported in none of the patients (Table 2).

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Table 1: Baseline demographic data (N=15)

Variable	Data
Age, years (mean \pm SD)	33.4 \pm 5.4 years
Gender	Male
	Female
Upper limb affected,	Right
	Left
Comorbidities	Hepatitis B
	Hepatitis C
	HIV
Presentation	Bleeding pseudoaneurysm
	Oozing pulsatile mass
	Infected pulsatile mass
History of addiction, years (mean \pm SD)	1.9 \pm 2.5

Table 2: Outcome of study treatment (N=15)

Outcomes	Data n, (%)
Limb salvage	15 (100%)
Ischemia	0 (0%)
Amputation	0 (0%)
Mortality	0 (0%)

DISCUSSION

Pseudoaneurysm is mostly caused by therapeutic or diagnostic vascular interventions, trauma, and intravenous drug addiction⁹. Drug injections as a cause of pseudoaneurysm are frequently discussed in the literature; however, treatment of femoral artery pseudoaneurysm through revascularization, arterial puncture closure, thrombin injection, ligation followed by debridement (if required) has mostly remained the subject of discussion¹⁰⁻¹². Although the cubital fossa most preferred site for injecting illicit drugs, post-injection brachial artery complications are reported in few studies⁽¹³⁾. In chronic drug abusers, recurrent injections through arterial route by under non-sterile conditions and trends of cross-sharing of needles augment the vertical transmissions of transmission of infective agents such as Hep B, C, and immunodeficiency virus and occurrence of pseudoaneurysm. The above-explained study observed an increase in the frequency of cases affected by brachial artery pseudoaneurysm when compared with previous studies where femoral artery involvement is more common. Besides upsurged frequency, infective diseases were reported in all the enrolled patients.

Our study reported male preponderance in drug addiction. However, the male proportion (65%) is lesser than a previous Pakistan-based study that found 93.5% of male patients in their study with peripheral vascular complications⁽¹⁴⁾. The results of our study, therefore, predict a significant increase in the frequency of female drug addicts. The most common presentation in our study was ruptured pseudoaneurysm (65%). This result complies with an earlier study that reported 70% of patients with this presentation; however, only 2 patients with brachial artery pseudoaneurysm were included in the study¹⁵.

In intravenous drug users, recurrent needling results in fibrosis of vasculature and damage to surrounding tissues which makes the achievement of treatment efficacy more challenging. Although various treatment methodologies have been evaluated, no consensus could be built to standardize a treatment protocol. Major treatment plans of brachial artery pseudoaneurysm include ultrasound-guided compression, percutaneous thrombin administration, endovascular stenting, revascularization (primary or secondary), or simple ligation and excision^{16,17}. We have chosen the last treatment scheme and all patients underwent a similar protocol of excision and ligation followed by debridement if required. All patients in our study achieved limb salvage with no report of amputation or threatened ischemia. These are also varified by Sui et al., who evaluated the same treatment protocol

and followed the patients for a mean time duration of 38.7 months¹⁸.

This study has provided a promising treatment protocol for the management of brachial artery pseudoaneurysm resulting from intravenous drug addiction. However, the validity of the results could have been improved if a longer follow-up period was selected which is the limiting factor of the study.

CONCLUSION

The excision and ligation of the pseudoaneurysm can be an effective treatment option for the pseudoaneurysm of a brachial artery caused due to drug addiction.

Conflict of interest: Nil

Contribution of authors: IMF: conceived, designed and did statistical analysis, RFE: did data collection and manuscript writing IM: did review and final approval of manuscript, FI: did editing of manuscript

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