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RESEARCH ARTICLE

LOWER EXTREMITY ARTERY ANEURYSMS AND THEIR MANAGEMENT-AN INSTITUTIONAL EXPERIENCE

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Abstract

Objective: To study the clinical presentation, etiology and outcomes of Lower extremity aneurysms management at a teritiary care centre.

Methodology: This is a retrospective study covering a period of 5 years from june 2018 to july 2023 conducted at the Institute of Vascular Surgery, Madras Medical College, Chennai. Case sheets were retrieved and reviewed from CMCHS database.

Inclusion criteria: Patients with true aneurysms and pseudoaneurysms involving lower limb who were managed by surgery or endovascular means were included in the study.

Exclusion Criteria: Pseudoaneurysms related to dialysis and Iliac artery aneurysms Results There were 23 patients who presented with aneurysms of the extremities that fell in the inclusion criteria. Of these 14 patients were male and 09 were female. Children (<18 years) constituted 14.2 % of patients. Youngest- 7-month-old boy- Right PFA Pseudoaneurysm Oldest - 72yrs old male- Left PFA Pseudoneurysm • Major vessels involved were SFA-8/23(34.7%) and common femoral artery 5/23(21.7%.). Complications developed in 4 of the 23 cases (17.4%), which included recurrent pseudoaneurysm, surgical site infection, post- operative hematoma and surgical site infection ending up in AK amputation. Limb salvage rate was- 95.6% Amputation rate- 4% (1 patient).

Conclusion: Extremity artery aneurysms are uncommon. Majority are pseudoaneurysms. Results of both open surgery and endovascular management are excellent.

Introduction:-

The most common cause of non-mycotic peripheral arterial aneurysms is atherosclerosis and all peripheral aneurysms are uncommon when compared to aortic aneurysms. In descending order, the relative frequency of these aneurysms is popliteal, femoral, subclavian or axillary, and carotid. Atherosclerotic peripheral aneurysms are frequently associated with synchronous aortic, iliac, or splanchnic aneurysms. Reports on distal aneurysms involving the, deep femoral, and tibial or peroneal arteries are limited to small series or case reports. Although true

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aneurysms have been reported in these areas, for the most , tibial, and peroneal aneurysms are secondary to trauma or are mycotic in origin.1-3 Age and sex distribution of peripheral aneurysms are dependent on cause.

Atherosclerotic aneurysms tend to occur primarily in men older than 50 years of age, and aneurysms caused by trauma are also more common in men, but occur at a younger age. Dent at al.(1)found that of those with a common femoral aneurysm, 95% had a second aneurysm, 92% had an aortoiliac aneurysm, and nearly 60% had bilateral femoral aneurysms. Conversely, the incidence of femoral and popliteal aneurysms in patients with an abdominal aortic aneurysm is low and ranges from 3.1% to 14%.(2). Unlike aortic aneurysms, which tend to rupture, peripheral aneurysms most commonly thrombose or give rise to distal arterial emboli and since there are rarely warning signs before embolization, the mere presence of a peripheral aneurysm often suggests the need for repair. The two primary objectives of treatment are exclusion of the aneurysm and restoration of arterial continuity, and in most cases, both objectives can be achieved. In the rare cases that is not surgically accessible, exclusion alone may be required Additional considerations include relieving associated compressive symptoms from the aneurysm and minimizing the risk of late aneurysm expansion.

Methodology:-

This is a retrospective study covering a period of 5 years from june 2018 to july 2023 conducted at the Institute of Vascular Surgery, Madras Medical College, Chennai.

Case sheets were retrieved and reviewed from Insurance schemes database.

Inclusion criteria:
Patients with true aneurysms and pseudoaneurysms involving lower limb who were managed by surgery or endovascular means were included in the study.

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Discussion:-

The femoral artery is the most common location for pseudoaneurysm, with various causes including iatrogenic, anastomotic, traumatic, and mycotic origins being frequently encountered. The increasing incidence of pseudoaneurysms is primarily attributed to the expanded utilization of catheter-based interventions in cardiovascular disease treatment, with pseudoaneurysms being reported in approximately 0.2% of all femoral arterial access procedures. Longer procedures, larger-bore catheters, thrombolytic or anticoagulation therapy, and the use of multiple catheters are considered risk factors for pseudoaneurysm development. Additionally, intravenous drug misuse and the increased use of arterial closure devices following needle cannulation contribute to the rising incidence of infected femoral pseudoaneurysms..

Conventional recommendations for the treatment of femoral aneurysms include all symptomatic aneurysms of any size, aneurysms with intramural thrombus, aneurysms greater than 2.5 cm, aneurysms that show growth with surveillance, and those that change their baseline pulseexam, indicating embolization.(3),(4)

Aside from trauma and rare degenerative and congenital disorders, popliteal aneurysms are almost exclusively atherosclerotic in origin.(5)&(6)

These aneurysms account for about,70% of peripheral aneurysms, occurring in about 1% of men aged 65 to 80 years old, with a 20-to-1 male-to-female ratio.(7)&(8).

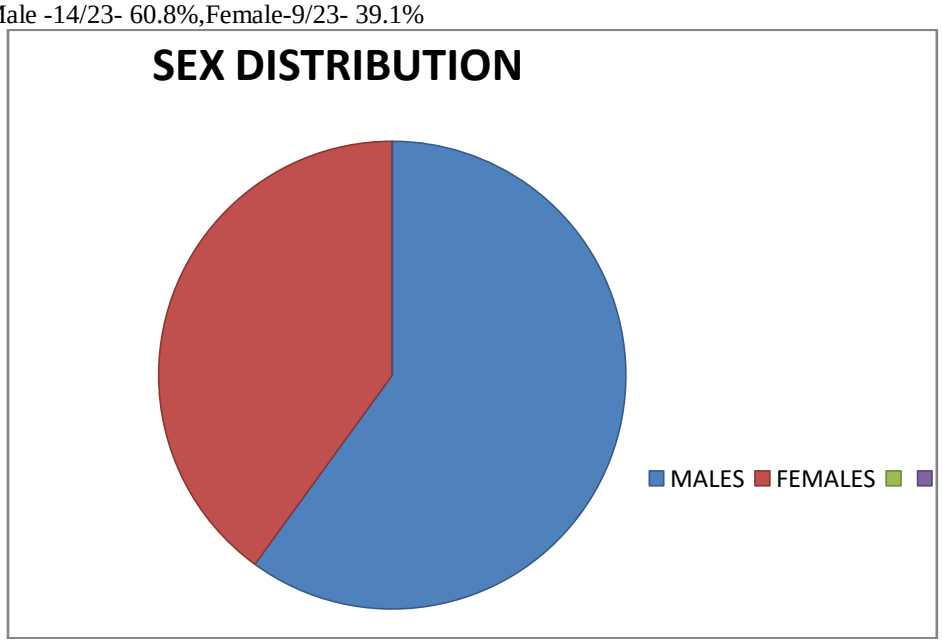
Popliteal aneurysms are primarily atherosclerotic in etiology, with occasional causes including trauma, cystic degeneration of the adventitia, entrapment, and infection.Current recommendations for repair of popliteal aneurysms include aneurysm size 1.5 to 2.0 cm with thrombus, all aneurysms of 2 cm or greater in size, all symptomatic aneurysms, and those with evidence of occult distal embolization. This recommendation is based on the high incidence of thromboembolic complications associated with these lesions, as detailed earlier, and the low morbidity and mortality associated with repair.(9)

Patients with peripheral aneurysms are also at high risk for the development of future peripheral aneurysms. Dawson showed that in patients with a popliteal artery aneurysm, new peripheral aneurysms were detected in 32% of these patients after 5 years and in 49% of these patients after 10 years.(10).

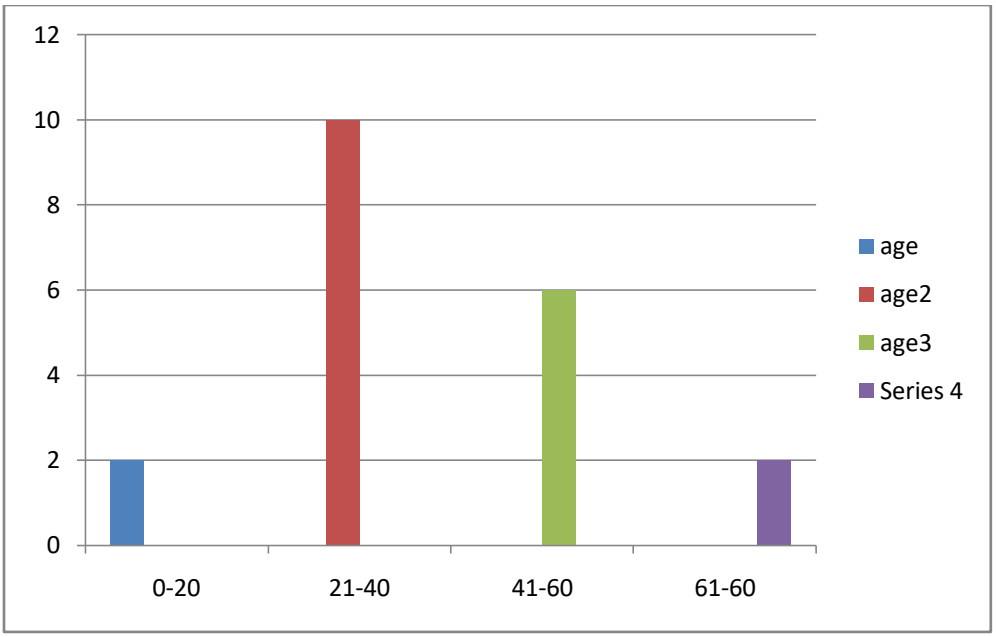
Aneurysms of the tibial and pedal arteries are also uncommon. Although a small proportion are degenerative in etiology, most are pseudoaneurysms that arise following trauma or infection or as a delayed complication of balloon catheter embolectomy.(11-13)Tibial artery aneurysm has also been reported in association with polyarteritis nodosa.(14).they may present as a painful mass or with digital or calf ischemia secondary to thromboembolism. Small, asymptomatic aneurysms may safely be observed, Repair is indicated for aneurysms two times the size of normal, adjacent artery, or for any symptomatic aneurysms, particularly those associated with pain and ischemic symptoms. If the remaining tibial vessels are healthy, ligation of the aneurysm or percutaneous embolization are acceptable. In the presence of diabetes or concomitant atherosclerosis in the remaining infrageniculate vessels, however, ligation or excision with saphenous vein bypass is recommended. Both ligation in the presence of adequate collateral circulation and repair are successful in the treatment of tibial aneurysms.(12)

Results:-

Total cases- Male -14/23- 60.8%,Female-9/23- 39.1%

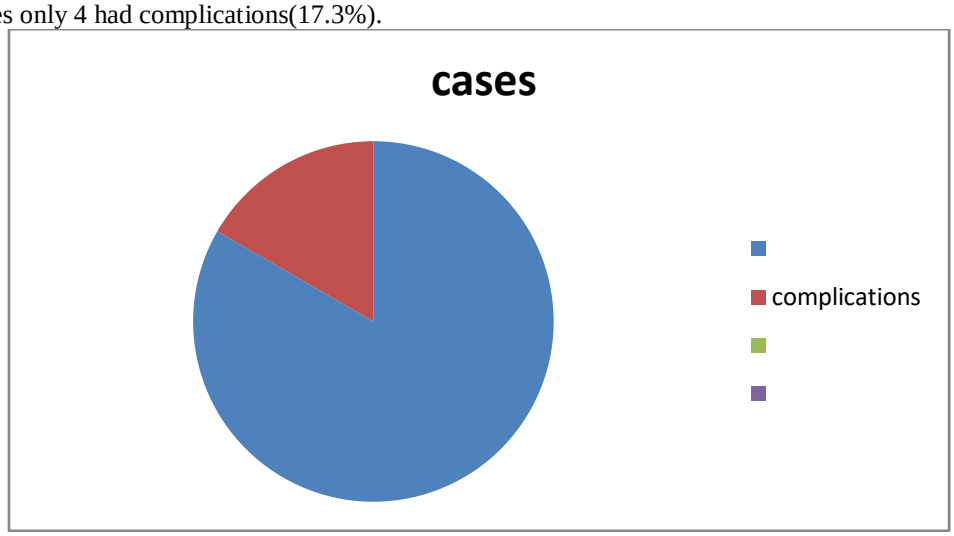


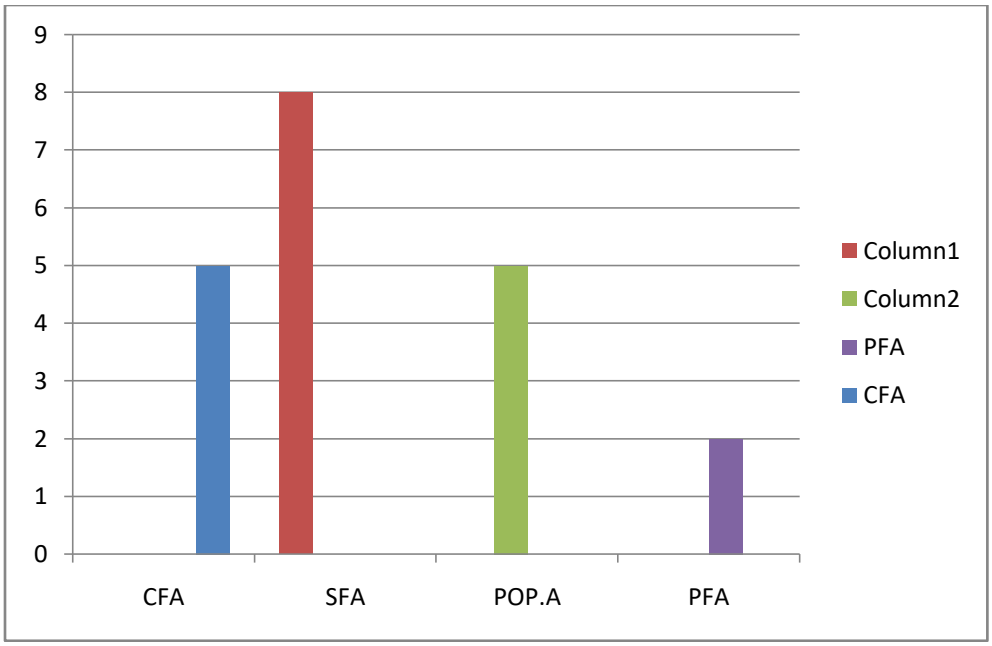
Age Distribution



- 0-20Y- 2/23(8.6%)
- >20-40Y- 11/23(47.8%)
- >40-60Y- 8/23(34.7%)
- >60-80Y- 2/23(8.6%)

Complications –
Out of 23cases only 4 had complications(17.3%).

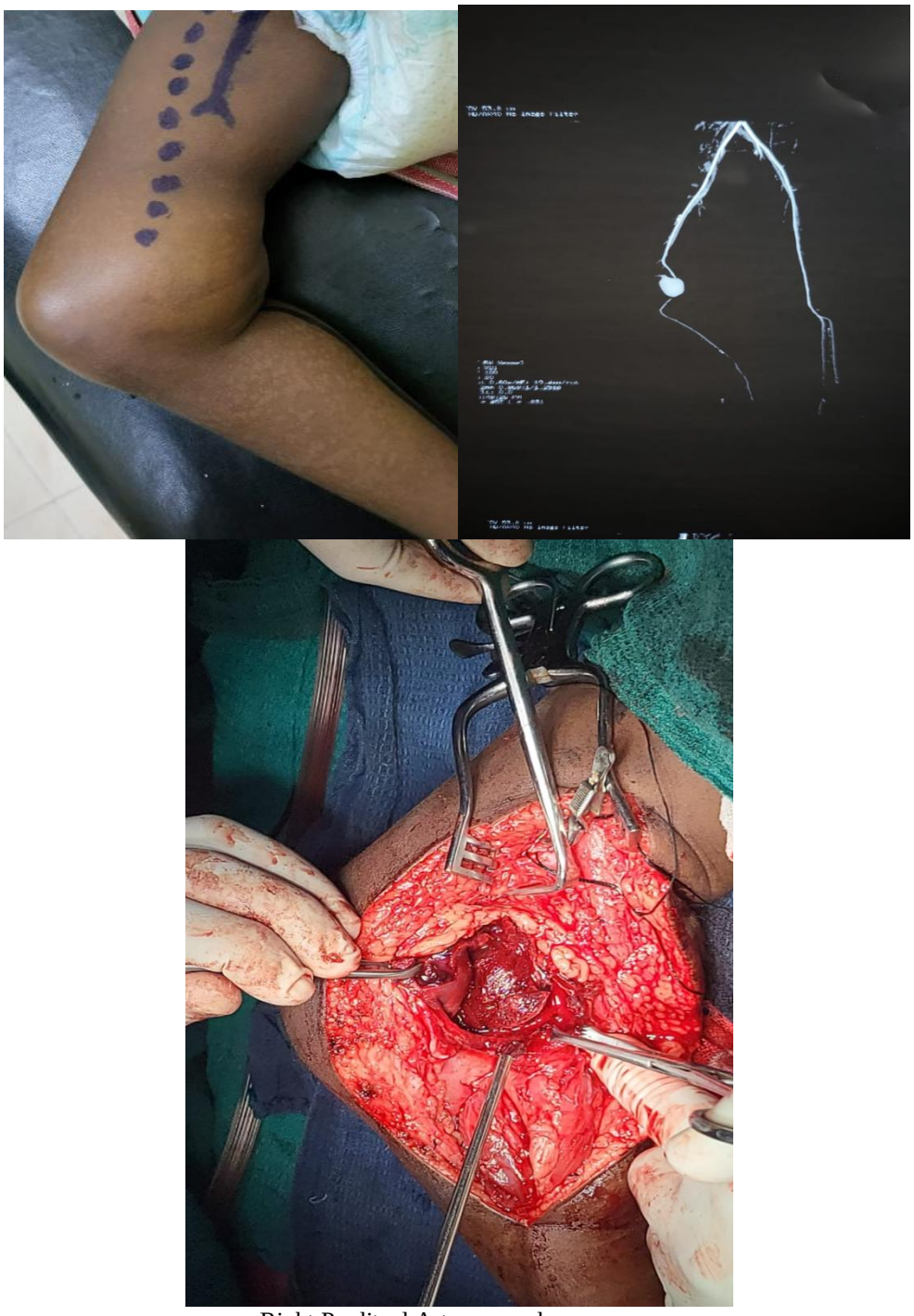




- CFA -5/23(21.7%)
- SFA-8/23(34.7%)
- Popliteal artery- 5/23(21.7%)
- PFA- 2/23(8.6%)
- TP trunk-1/23(4.3%)
- PTA- 2/23(8.6%)

ARTERY INVOLVED	NUMBER OF CASES	ETIOLOGY	MANAGEMENT	COMPLICATIONS
CFA	5 (right-4,left-1) 5 pseudoaneyrysms	• Coronary angiogram-2/5(40%) • Coronary angioplasty & stenting-1/5(20%),RHD S/P AVR & S/P MVR -1/5(20%) • Unknown-1/5(20	• Pseudoaneurysm excision + primary closure of CFA rent-2/5(40%). • Pseudoaneurysm excision +vein patch repair-1/5(20%). • Pseudoaneurysm excision + EIA to distal CFA RGSV interposition graft -1/5(20%) • Unknown- 1/5(20%) •	• 1 • Recurrent pseudoaneurysm involving distal anastomosis-pseudoaneurysm excision + EIA to SFA interposition graft with IIA.
SFA	8(right -8) -pseudoaneurysms-7 Aneurysms-1	-Coronary angiogram – 4/8(50%) -P Popliteal artery pseudoaneurysm excision + GSV Interposition graft – 1/8 (12.5%)	• Pseudoaneurysm excision + primary closure of SFA rent – 3/8(37.5%) • Pseudoaneurysm excision + vein patch closure of SFA rent – 2/8 (25 • Pseudoaneurysm excision + primary closure of rent + proximal SFA to	• 1 • wound debridement to raw area of thigh

		-Central venous catheter insertion- 1/8 (12.5%) -Idiopathic- 1/8(12.5%)	distal SFA synthetic graft bypass(dacron) – 1/8 (12.5%) • Aneurysm resection + SFA to SFA RSV interposition graft – 1/8(12.5%) • Pseudoaneurysm excision + SFA Ligation + SFA to Proximal popliteal RGSV bypass – 1/8(12.5%)	
• **3)POPLITEAL ARTERY**	• 5 (Right- 1, Left- 4) • Pseudoaneurysms-3 • Aneurysms-2	• S/P arthroscopic ACL/PCL repair-1 Tibial occlusion S-P Distal popliteal artery to peroneal artery bypass – 1 • Arthrotomy knee for septic arthritis – 1 • Atherosclerotic- 2	• Popliteal artery ligation + distal SFA to distal PA RGSV bypass – 1 • Pseudoanurysm excision + popliteal artery to popliteal artery RSV Bypass – 1 • Pseudoaneurysm excision + primary repair of PA rent -1 • Popliteal artery exclusion bypass – proximal popliteal artery to ATA RGSV bypass – 1 • Popliteal artery open endoaneurysmoraphy /Distal SFA--distal popliteal RSV graft bypass-1	1(20%)- surgical site infection
• **PROFUNDA FEMORIS ARTERY** •	• 2 • Left- 1, Right – 1 • (Aneurysm – 1, Pseudoaneurysm- 1)	CFV Central venous catheter insertion – 1	• PFA aneurysm ligation + excision – 1 • Pseudoaneurysm excision + PFA ligation – 1	NIL
• **TP TRUNK** •	• 1 • R side (Pseudoaneurysm)	• RTA / Tibia fracture / S-P Intramedullary nailing	• Pseudoaneurysm excision + primary repair of rent	NIL
• **POSTERIOR TIBIAL ARTERY** •	• 2 • Right – 1, Left - 1 • Pseudoaneurysm – 2	• Unknown – 2	• Pseudoaneurysm excision + primary closure of rent in PTA -1 • PTA ligation-1	• 1 • Hematoma- evacuated •



Right Popliteal Artery pseudoaneurysm

Conclusion:-

Given the high rate of complications, early operative intervention with autologous saphenous vein is recommended whenever possible and Careful monitoring of all patients with peripheral aneurysms is indicated given the high prevalence of additional aneurysms. Peripheral Artery aneurysm's that are larger than 2-2.5cm and symptomatic should be considered for repair for medically fit patients .The decision to perform open or endovascular repair of Peripheral Artery aneurysm's should be individualized .

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