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RESEARCH ARTICLE

FISTULOPLASTY FORFAILING AVF - AN INSTITUTIONAL EXPERIENCE

Dr. Ramya Mch[1], Prof. Dr. Jayachander Mch[2], Dr. Collins Ephreme Noble[3] and Dr. R. Venkateshwar[3]

1. Assistant Professor, Institute Of Vascular Surgery, MMC, Chennai.
2. Professor, Madras Medical College, Chennai.
3. MCH Vascular Surgery Post Graduate, Madras Medical College, Chennai.

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Abstract

Introduction: Failing AVF can be salvaged by open surgical technique, percutaneous encdovascular or hybrid methods. In this study our institutional experience on balloon fistuloplasty is described. The objective is To investigate the effectiveness of endovascular balloon angioplasty to preserve the patency of failing hemodialysis arteriovenous fistulas (AVF).

Materials And Method:

1. Period Of Study - 3 YEARS AUG 2019 TO AUG 2022
2. Total No Of Patients – 20
3. Study method – retrospective observational study

Results: In a total of 20 patients 16 cases (80%) were successful with immediate restoration of optimal flow rate during dialysis.At the end of 6 months – 8 were successful. 5 had failed fistuloplasty, 3 – expired.

Conclusion: Fistuloplasty is a minimally invasive percutaneous procedure with established safety and efficacy to restore the normal function of AVF.Most common site is Cephalic V puncture sites. It is advised to follow Rope Ladder technique to avoid AVF failure.

Introduction:-

Failing AVF can be salvaged by open surgical technique, percutaneous encdovascular or hybrid methods.

In this study our institutional experience on balloon fistuloplasty is described

Obtectives:-

1. To investigate the effectiveness of endovascular balloon angioplasty to preserve the patency of failing hemodialysis arteriovenous fistulas (AVF).
2. In this study we report on the management of AVF failure through Balloon angioplasty in our institution and its outcome.

Methods:-

This is a retrospective study conducted in Institute of Vascular surgery, MMC Chennai over a period of three years from August 2019 to August 2022.

Corresponding Author:- Dr. M. Ramya MCH
Address:- Assistant Professor, Institute Of Vascular Surgery, MMC,Chennai.

1. Total of 20 patients were included in this study.
2. We performed angioplasties using plain non-compliant balloons.
3. No drug eluting balloons or stents.
4. Patients were followed up for 6 months for access failure.

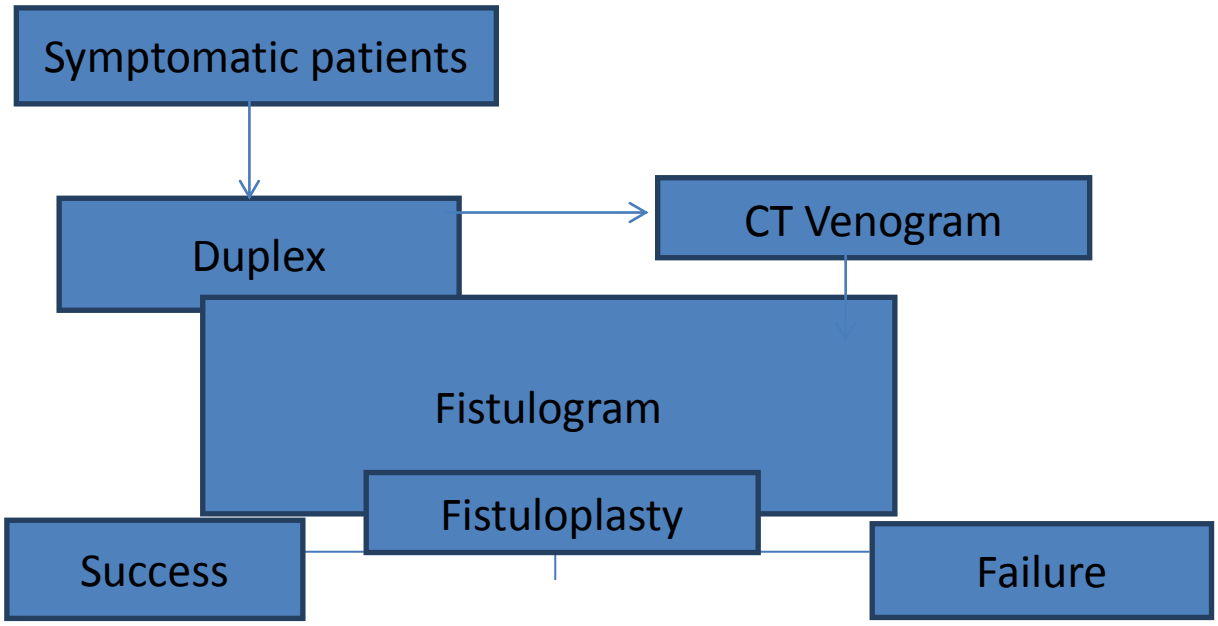
Detection Of Access Failure
1. Reduced thrill
2. Collateral Veins or Edema
3. Access Bleeding
4. Assessment During Dialysis

Duplex Ultrasound :
Peak systolic velocity ratio of ≥2 was the criteria for diagnosing stenosis ≥50%

Angiographic Indicators :
Stenosis was defined as 50% luminal narrowing compared with the normal vascular segment located adjacent to the stenosis.

Methodology:-

All symptomatic patients were made to undergo duplex screening. If peripheral vein and artery stenosis is not noted then central vein stenosis is suspected and they were made to undergo CT Venogram. Then fistulogram was done and proceeded with fistuloplasty with balloon.



Inclusion Criteria
1)Mature AVF with reduced thrill.
2)Reduced dialysis flow rates.
3)Doppler study showing outflow vein stenosis.

Exclusion Criteria
1)immature fistulas with poor thrill
2)Cellulitis in AVF limb

Results:-

- Total CKD patients – 20.
- Male – 13 and Female – 7 .

- HTN – 7 DM and HTN – 7 DM – 3
- RCF – 12 BCF – 7 BBF – 1
- Access :
  - Radial A – 6 Cephalic V - 5
  - Brachial A – 6 Basilic V – 3
- Failure - 2.
  - 1 day – 1 due to thrombosis – lytic therapy – failed – new AVF
  - 15 days – 1 due to restenosis – new AVF
- Abandoned procedure – 2 RCF
  - Tight venous stenosis in CV could not be negotiated.
- 16 cases (80%) were successful with immediate restoration of optimal flow rate during dialysis.
- At the end of 6 months – 8 successful.
- 5 – failedfistuloplasty, 3 – expired.

Sites Of Stenosis

SVC AND INNOMINATE VEIN 5% - 3 yrs old RCF –access through Basilic V
AXILLARY VEIN AND BASILIC VEIN5% - 9 monold BBF – RA
CONFLUENCE OF RT AND LT BRACHIOCEPHALIC V 5% - 1 yrold RCF – Basilic V
PERI ANASTOMOTIC VENOUS AND ARTERIAL 5% - 1 yrold RCF – BA – **Abandoned**
SUBCLAVIAN V5% - 10 yrsold BCF - Basilic V
RADIAL ARTERY 5% - 2 yrsoldRCF, BA
CEPHALIC VEIN70% -
8 monold RCF - CV
8 monold– RCF - CV
2 yrsold BCF – RA
14 monoldRCF – BA
3 monoldBCF - RA
3 yrsoldBCF - RA
7 monoldBCF - RA
3 monoldRCF - CV - **Failed**
3 yrsoldBCF - RA
6 monoldRCF – BA
5 yrsoldRCF–BA – a**bandoned**
9 monoldRCF – CV-**failed**
1 yr - BCF – RA
11 mon – RCF – BA

Discussion:-

- The two factors that lead to endothelial injury:
  - Shear stress from turbulent blood flow,
  - Mechanical trauma from venipuncture
- Stenosis most commonly either at the juxta-anastomotic site and the outflow vein (70%-85%).
- In 15% to 30% stenosis develops in the feeding artery and anastomosis.
- Balloon angioplasty is the primary treatment of AVF and AVG stenotic lesions (KDOQI).
- We reviewed various studies for success rates of percutaneous transluminal angioplasty in AVF dysfunction :
- In Beathard GA et al, there was 94% success rate and 6 % failure rate for fistuloplasty.
- Kanterman et al. reported decreasing patency rates for repeated dilation of a venous stenosis.
- In GillanIrani et al study, there was no significant difference in anatomic success rate between the Drug eluting Ballon PTA and Conventional PTA groups.
- In Andrew R. Forauer et al study, between 1 minute and 3 minute inflation balloon angioplasty, success rates in the 1- and 3-minute inflation groups were 75% and 89%, respectively.
- Several studies have demonstrated that angioplasty is efficacious with advantages compared to the conventional surgical treatment such as
- a shorter time needed to perform the procedure and less discomfort, and lower infection rates.
- It enables dialysis immediately after the procedure

- The current study confirms these findings and suggests this therapeutic approach as best option for stenosis of arteriovenous fistulae.
- All Patients were kept on Subcutaneous Heparin up to 48 hours post procedure and discharged with Aspirin for 2 weeks.
- Post procedure Doppler was performed to document increase in the volume flow of the fistula.
- Procedure is considered success if flow rate is more than 400ml/ mt

Conclusion:-

1. Fistuloplasty is a minimally invasive percutaneous procedure with established safety and efficacy to restore the normal function of AVF.
2. Most common site is Cephalic V puncture sites. It is advised to follow Rope Ladder technique to avoid AVF failure.
3. Following fistula first approach can prevent CV stenosis.
4. Careful patient selection is required for increasing the success rate of the procedure. Repeat sessions of angioplasty can be offered for re-stenosis to further increase the lifespan of fistulas.

Conflict Of Interest

Nil.