



## A STUDY OF OUTCOMES FOLLOWING INFRAPOPLITEAL ANGIOPLASTY IN PERIPHERAL ARTERIAL DISEASE

### Surgery

<b>L. Subrayan*</b>	Assistant Professor, Department of Vascular Surgery, Villupuram Medical College, Villupuram, Tamilnadu – 605601 *Corresponding Author
<b>D. Ashok Kumar</b>	Associate Professor, Department of Vascular Surgery, Stanley Medical College, Chennai.
<b>B. Deepan Kumar</b>	Assistant Professor, Department of Vascular Surgery, Stanley Medical College, Chennai.

### ABSTRACT

**Introduction:** Objective of the study is to evaluate the efficacy of infra popliteal angioplasty as a method of limb salvage in these patients.

**Methods:** Patients diagnosed to have tibial disease subjected to angioplasty were analysed with respect to age, sex, associated co morbidities and procedure manner.

**Results:** In this study a total of 20 patients were enrolled after exclusion criteria. The mean age was 64 years. Of the associated co morbidities 90% (18/20) of them were diabetic patients. The immediate patency was 80% . AFS (amputation free survival ) was 85%

**conclusions:** This study shows that tibial angioplasty is a safe and less morbid procedure in Critical limb ischemia patients with associated severe co morbidities with results comparable with bypass procedures.

### KEYWORDS

Diabetic foot, Endovascular interventions, Tibial angioplasty

### INTRODUCTION:

Peripheral vascular disease with chronic lower extremity ischemia is the most common cause of walking disability. Hence it is important that the extent of local and systemic disease, the degree of functional impairment related to peripheral vascular disease and the identification of modifiable risk factors plays an important role in comprehensive treatment plan<sup>1,2</sup>.

Critical limb ischemia (CLI) is the severe form of Peripheral vascular disease and approximately 1%. It may also cause numbness and when associated with diabetes it becomes more difficult to assess how much ischemia is responsible for the neuropathic changes<sup>3,4</sup>.

Though incidence is more in males, women with PVD (Peripheral vascular disease) experience a faster functional decline than men. Coronary disease is estimated to be present in nearly half of these patients of PVD. Due to this strong association there is a high mortality rate from MI (Myocardial Infarction) and stroke among PVD patients. Diabetes, hypertension, dyslipidemia chronic renal insufficiency and tobacco usage in any form are the commonly recognized risk factors. Hypercoagulable states and hyperhomocystenemia are the other common recognized risk factors Lida and colleagues reported treatment outcomes after endovascular therapy on 465 limbs with CLI and isolated below-the-knee lesions. They identified diabetes as one of the factors associated with major amputation<sup>5,6,7</sup>.

### MATERIAL & METHODS:

This is an observational study done in Patients diagnosed to have tibial disease and subjected to angioplasty were studied for pulses, ulcer healing, pain reduction and ABI . Patients with CLI (Critical Limb Ischemia) from January 2015 to December 2015 who were admitted in department of vascular surgery, Government Stanley medical college, Chennai, Tamil Nadu were included . TAO (Thrombo Angitis Obliterans), arteritis and previous bypass or angioplasty patients were excluded . All were subjected to tibial angioplasty.

The outcomes were analysed with respect to age, sex, associated co morbidities Also as per procedure it was analysed if there was significance to angiosomes, type of procedure The immediate results, time period to ulcer healing ,symptom relief and amputation free survival was studied.

**Procedure:** All the patients had an antegrade approach of tibial angioplasty. 18 G needle, 5Fr sheath, 0.035 wire were used. Balkan sheath placed above trifurcation preop angiogram done. Lesion crossed by .014 wire. Angioplasty done with 2, 2.5, or 3mm with length 80, 120 & 200 mm .Single vessel plasty up to ankle was done.

**Follow Up:** ABI and flow recorded and monitored daily till discharge , then weekly for 1 month and 15 days once for next 3 months.

### RESULTS

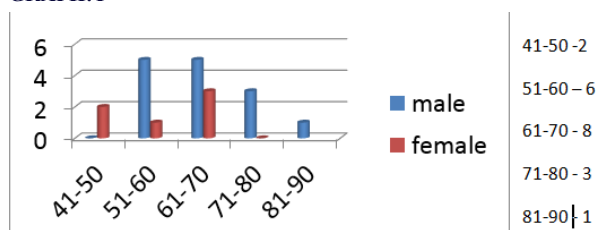
#### SEX

In our study a total of 20 patients were enrolled after exclusion criteria. There were 14 males and 6 female patients

#### AGE GROUPS

These patients were categorized to different age groups. the mean age was 64 yrs, 13% of the patients belonged to more than 60 years age group while 7 % belonged to the 5<sup>th</sup> decade as shown in graph I.

#### GRAPH: I



#### COMORBIDITIES:

Of the associated co morbidities eleven patients had systemic hypertension while 18 of them were diabetic patients.

#### SYMPTOMS:

On analyzing the symptoms 13% of these patients had history more than 2 months while rest of 7% had more than 2 months duration.

#### ANGIOSOME CONCEPT:

On analysis of procedure method 14 % ( 13 ) of our patients had plasty done as per angiosome and 6%(7) of them. Among the twenty patients 65% (13) had a ATA angioplasty while 25% (5) had Peroneal plasty and 10%(2) had PTA angioplasty. Various angioplasty of arteries is shown in figure 1.

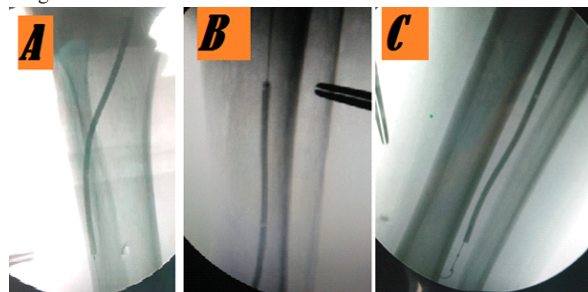


FIGURE 1: VARIOUS TIBIAL ARTERIES ANGIOPLASTY

A) ANTERIOR TIBIAL ANGIOPLASTY

## B) POSTERIOR TIBIAL ANGIOPLASTY C) PERONEAL TIBIAL ANGIOPLASTY

### TYPE OF PROCEDURE:

Similarly 19 of our patients underwent endoluminal angioplasty while 1 patient had a sub intimal angioplasty.

### ABI

The mean pre operative ABI was 0.53 and mean post op ABI WAS 0.8 respectively and shown in table I.

**TABLE: I**

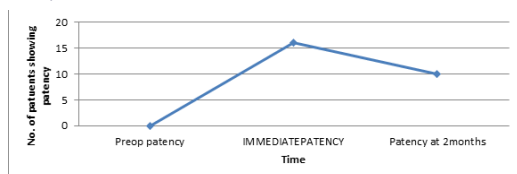
ABI ( ANKLE BRACHIAL INDEX)	MEAN	MEDIAN	STANDARD DEVIATION
PREOPERATIVE	0.53	0.60	0.18
POST OPERATIVE	0.78	0.80	0.16
WILCOXAN TEST , p=0.01			

This ABI increase was found to be statistically significant.

### PATENCY

The immediate patency was 80% but at the end of two months, only 50% patients had a good flow.

**GRAPH: II**



The increase in patency from pre op status was significant. But the drop in patency rates after 2 months was not statistically significant as shown in graph II.

An analysis was made to know the significance between age groups and patency. There was no correlation between age and patency. Similarly there was no significance between ulcer healing and angiosome based angioplasty procedures.

There were 3 major amputations(below knee), 5 minor amputations and 4 fore foot amputations.

The MALE (major adverse limb event) was 3.

While the MACE (major adverse cardiac event) was nil.

There was no POD (peri operative death).

The AFS (amputation free survival) was 85%. The OS (overall survival) was 95%.

### DISCUSSION:

In our study the AFS was 85% and there was nil MACE and MALE events recorded. The OS was 95% with no POD. The immediate patency was 80% and patency at 2 months duration was 50%. In our study there were different age groups involved from the 5<sup>th</sup> decade to 8<sup>th</sup> decade. There were more number of patients in the 7<sup>th</sup> decade followed by the 6<sup>th</sup> decade. On statistical analysis there was no significance between age and patency.

Among the twenty patients enrolled there were 14 male and 6 female patients and there was no statistical significance with respect to sex. Diabetes was associated with 18 patients and systemic hypertension was associated in 11 patients but on statistical analysis there was no significance.

The type of procedure done on these patients was studied. Nearly (95%) of these patients underwent endoluminal procedure while only one of these patients underwent a subintimal procedure. The ABI increase from pre op status to post op status was found to be statistically significant. The increase in patency after angioplasty was significant. But the decrease in patency after 2 months was not found to be statistically significant.

The BASIL trial (bypass vs angioplasty in severe ischemia of leg) was the landmark trial done to identify factors favoring bypass surgery vs angioplasty in infrainguinal patients. In the BASIL trial the immediate

failure was 27% while in our study it is 20%. The AFS was 71% at end of 3 years while in our study it is 85% at the end of 3 months.

Our study being a small number and short follow up might account for the marginally higher AFS rates. Randon et al study published in 2009 analysed angioplasty alone with angioplasty and stenting the PTA alone group had a success rate of 76% but the results were not statistically significant.

The DEBATE-BTK study was done to identify patency rates between PTA and PTA with drug eluting balloons. The PTA alone group had a patency rate of 45% at end of 1 year.

Our study was comparable to the DEBATE BTK study in terms of patency rates.

The ACHILLES trial randomized CLI patients to either the Cypher DES (Cordis Corporation, Bridgewater, NJ) or percutaneous transluminal angioplasty (PTA) to identify the patency rates for CYPHER DES. The patency rates were 49% for the PTA alone arm. The DESTINY trial randomized patients to the Xience DES (Abbott Vascular, Santa Clara, CA) versus the MultiLink Vision BMS (Abbott Vascular). Primary patency rates at 1 year were 85% versus 54%. In this study also the patency rate of 54% is well comparable with our study<sup>8,9</sup>.

The Giles et al study was done to analyse the significance of task classification based angioplasty in infra popliteal angioplasty. In that study the limb salvage rate was 84% at 1 year which is comparable with 85% in our study. The patency rate was 53% at end of 1 year<sup>10</sup>. Our study is well comparable with patency rates of GILES et al study. SAYED et al study was published in 2013 which was done to analyse revascularization based on angiosome concepts. The study concluded that there was no significance between angiosome based treatment and non angiosome based procedures. Our study also concludes that there is no significance between angiosome based procedures and amputation and patency<sup>11,12</sup>.

### CONCLUSION.

This study shows that angioplasty is a safe and less morbid procedure in Critical limb ischemia patients. Though the patency rates are less in comparison to bypass they are sufficient for ulcer healing. ABI increase post procedure is significant for successful outcome. Though there might be a drop in patency from immediate status it is not significant statistically. Angioplasty being a lesser morbid procedure it is feasible in patients with associated severe co morbidities. The limb salvage rates and overall survival are comparable with bypass procedures in short term. There is no correlation between angiosome based procedures and patency or amputation rates.

### REFERENCES:

1. Rutherford's vascular surgery, 9th edition, vol -1,2
2. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006;3:e442.
3. Global status report on noncommunicable diseases 2010. Geneva: World Health Organization; 2011.
4. Boulton AJ, Vileikyte L, Ragnarson-Tennvall G, Apelqvist J. The global burden of diabetic foot disease. *Lancet* 2005;366:1719-24.
5. Boulton AJ. The diabetic foot: from art to science. The 18th Camillo Golgi lecture. *Diabetologia* 2004;47:1343-53.
6. Prompers L, Schaper N, Apelqvist J, Edmonds M, Jude E, Mauricio D, et al. Prediction of outcome in individuals with diabetic foot ulcers: focus on the differences between individuals with and without peripheral arterial disease. The EURODIALE Study. *Diabetologia* 2008;51:747-55.
7. Jeffcoate WJ, Chipchase SY, Ince P, Game FL. Assessing the outcome of the management of diabetic foot ulcers using ulcer-related and person-related measures. *Diabetes Care* 2006;29:1784-7.
8. Age-adjusted hospital discharge rates for nontraumatic lower extremity amputation (LEA) per 1,000 diabetic population, by level of amputation, United States, 1993-2009. Atlanta, Ga: Centers for Disease Control and Prevention (CDC); National Center for Health Statistics, Division of Health Interview Statistics; 2012.
9. Frykberg RG, Zgonis T, Armstrong DG, Driver VR, Giurini JM, Kravitz SR, et al. Diabetic foot disorders. A clinical practice guideline (2006 revision). *J Foot Ankle Surg* 2006;45(Suppl):S1-66.
10. Ortegón MM, Redekop WK, Niessen LW. Cost-effectiveness of prevention and treatment of the diabetic foot: a Markov analysis. *Diabetes Care* 2004;27:901-7.
11. Nabuurs-Franssen MH, Huijberts MS, Nieuwenhuijzen Kruseman AC, Willems J, Schaper NC. Health-related quality of life of diabetic foot ulcer patients and their caregivers. *Diabetologia* 2005;48:1906-10.
12. Prompers L, Huijberts M, Schaper N, Apelqvist J, Bakker K, Edmonds M, et al. Resource utilisation and costs associated with the treatment of diabetic foot ulcers. Prospective data from the Eurodiale Study. *Diabetologia* 2008;51:1826-34.