

# **RESEARCH ARTICLE**

#### ANALYSIS OF TIBIAL ANGIOPLASTIES - A SINGLE INSTITUTION STUDY

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# Abstract

Peripheral arterial occlusive disease (PAOD) is increasing in India. Infragenicular (below the knee) PAOD is a challenging condition which is difficult to treat. Apart from traditional open bypass surgery endovascular techniques provide an option of treatment with low patient morbidity and equivalent outcomes. We present our institutional experience in treating such conditions with traditional outcome pointers which can help clinicians in choosing the right option for their patients. We did a retrospective analysis of patients who underwent tibial angioplasties and evaluated demographics and outcomes. Patency rates at 1 month and 6 months were 78.57% and 57.14%. The overall limb salvage rate was 69.64%.Ulcer healing was better with good run off and number of tibial vessels intervened.

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#### **Introduction:-**

Peripheral arterial occlusive disease (PAOD) is on an increasing trend in our country owing to rampant tobacco usage, high prevalence of diabetes among other factors. The consequences which range from loss of livelihood due to amputations and mortality cause immense socioeconomic burden on the populace it affects. Angioplasties have been an attractive option for managing PAOD because they avoid the morbidity associated with surgeries. Tibial disease (infragenicular PAOD) is a challenging scenario with limited treatment options and guarded outcomes. We present our experience on tibial angioplasties as a single institution study.

#### Aim of the study:-

The primary aim was to determine the patency rates at 1 month and 6 months and determine the limb salvage rate at the end of 6 months. Secondary analysis included determining if the number of vessels treated and the quality of distal run off affected wound healing rates.

#### **Materials And Methods:-**

The study was done from Jan 2016 to June 2019 at Rajiv Gandhi Government General hospital, Chennai on 112 patients. Data was mined from case records, insurance records and follow up was done during OP visits and phone questionnaires. Demographics and patient characteristics were analyzed.

Patients underwent angioplasty after obtaining informed consent. Our institution protocol to prevent CIN was followed. Majority of the patients were administered local anesthesia for the procedure. The treatment plan was decided post DSA and run off was calculated using SVS run off scores. Patients underwent Doppler USG at the time of discharge, one month later and after 6 months. Limbs salvaged were those which did not undergo above

knee/below knee amputations. Reduction of more than 50% of the greatest length of the ulcer with healing edges was necessary to be considered as a healing ulcer.

#### **Results:-**

The mean age of the patients was 67. 68% (n=76) were males and 32% (n=36) were females. Type 2 Diabetes was the most common co morbidity encountered (71%). More than half (51%) were smokers. The distribution of other co morbid conditions is displayed in Fig-1. 77.7% of patients had Rutherford class 5 CLI (FIg-2). 48.21% of patients had intermediate and 37.5% had good run off scores (Fig-3).56.25% of patients had angioplasty of more than one tibial vessel.

Of the 34 patients who underwent a major amputation, 15(44.11%) had angioplasty of more than one tibial vessel.

The limb salvage rate at six months was 69.64% (78/112). Patency at 1 month was 78.57% (88/112). Patency at six months had dropped to 57.14% (64/112). At six months about 77% (86/112) of ulcers were healed or were showing signs of healing. The impact of SVS scores on ulcer healing is given in Fig-7.

We found out that patients with poor SVS scores had a 50% ulcer healing rate and those who underwent angioplasties of more than one tibial vessel also had a better ulcer healing (67.44% vs. 32.55%) than those who underwent angioplasties of one vessel only.

#### **Discussion:-**

The sample size in our study was heterogeneous and the distribution of co morbid conditions present was also well represented. SVS run off scores were chosen to gauge the adequacy of distal run off in accordance with SVS guidelines. The fact that most of the patients in our study presented with severe ischemia is indicative of the level of awareness of the general populace about PAD. Tibial angioplasties are procedures which require perseverance and demand one to be facile with angiographic techniques. The technical success rate was high (>85%).

Analyzing patients who had major amputations, those with poor SVS run off scores and CKD were more likely to undergo a major amputation. The number of vessels intervened didn't affect the limb salvage rates.

SVS scores clearly correlated with ulcer healing. 85.7% (36/42) of ulcers with a good run off score showed healing, 77.77% (42/54) of ulcers with an intermediate run off score showed healing and 50% (8/16) of ulcers with poor run off scores showed healing.

Patency of the procedure performed didn't necessarily correlate with good ulcer healing. The patency at 6 months had fallen from 78.57% to 57.14% in spite of which the declared ulcer healing rate was achieved. Recruitment of collaterals from the segment that underwent angioplasty might have improved local tissue perfusion. The effect of appropriate wound debridement, mitigating the effects of co morbidities also played a role.

Complications were low (< 5%). Groin hematomas were the most commonly encountered complication. Dissection were seen in five patients and were managed conservatively as they were not flow limiting. Four patients needed renal replacement therapy post procedure and two patients had myocardial infarction.

The following can be considered to be weaknesses of the study- a short follow up period, definitions for ulcer healing were liberal, 29% had proximal procedures SFA/Popliteal angioplasties which might have had some bearing on the final results.

#### **Distribution of comorbidities**



Fig 1:-





Fig 2:-



Fig 3:-

## Number of vessels intervened





### **Major amputations**



Fig -5:-



Wound healing and Number of vessels intervened



Ulcer healing and SVS scores



#### Fig-7:-

## **Conclusion:-**

Limb salvage doesn't exclusively depend on the number of vessels intervened. Poor SVS run off scores and CKD adversely affect limb salvage rates. Ulcer healing seems to be better with increasing number of vessels intervened and good SVS scores.

Angioplasty of tibial arteries will continue to play a major role in revascularization of infragenicular diseases particularly in patients who are at a high risk for undergoing open revascularization procedures. As advancements occur in the hardware used and refinements in the quality of the techniques occur, one can expect even better limb salvage rates.

Further areas of interest include the effect of calcium on the outcome of angioplasties and improvements in the management of complications which are partly covered by DES.

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