

Subject Area: Vascular surgery

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Tibial angioplasty in diabetics

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Abstract

Background

Diabetics are prone to develop serious complications such as nephropathy, retinal detachment, and others, and among such complications lies the devastating serious complication of diabetic foot, whether ulceration or diabetic foot infections up till gangrene. This could be attributed to either one or all of the following etiological factors: peripheral vascular disease, peripheral neuropathy, and/or infection owing to impaired immunity.

Patients and methods

We enrolled 88 diabetic ischemic patients with tibial artery disease confirmed by Duplex. Their mean age was 67 years (54 males and 34 females). Patients were subjected to ipsilateral antegrade transluminal or subintimal tibial angioplasty. The procedure and its complication and alternatives were explained to the patients, and a written informed consent was signed.

Results

A total of 54 males and 34 females, with mean age of 67 years, were recruited. Patients were categorized as Rutherford 3 (three patients), 4 (seven patients), 5 (54 patients), and 6 (23 patients). In two patients, failed crossing of the lesion resulted in major amputation. Minor amputation rate after successful revascularization was 48.2% of patients and healed completely. One case was complicated by pseudoaneurysm. No mortalities were encountered in our series. Follow-up by Duplex assessment revealed a rate of freedom from occlusion of 68% and secondary patency of 80% at 1-year follow-up.

Conclusion

Successful tibial angioplasty could result in limb salvage and reduction of limb amputation rate in diabetics with otherwise controlled risk factors.

Keywords: Balloon angioplasty, diabetic foot, diabetics, tibial vessels diseases

INTRODUCTION

Ischemia, infection, and peripheral neuropathy are a serious triad known in diabetics to impose a major risk of limb loss [1].

Among diabetics, the commonest cause of hospitalization is diabetic foot lesions [2]. Almost 85% of nontraumatic amputations are diabetics, and 80% of those are owing to active foot lesions [3].

From 0.03 to 0.5% of patients with diabetic foot require amputation [4]; moreover, the cumulative rate of mortality at 1 year after major amputation is around 30.7% [5].

Sharkawy and EL Samadony[6] highlighted the importance of correction of six etiological factors to enhance limb

salvageability, that is, blood quality (hemoglobin), quantity (revascularizing), associated comorbidities, lesions in the bones, preceding foot surgeries, and loss of tissue. Angioplasty as a first strategy is well known and implemented in management of peripheral arterial disease, especially in diabetics, where surgeries and bypass are kept as plan B, given the comorbidities of surgery in diabetics, and it is always still valid in case of the remote possibility of failure of endovascular particularly with the new availability of various endovascular tools [7].

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PATIENTS AND METHODS

A total of 88 diabetic ischemic patients with tibial artery disease confirmed by Duplex were enrolled in the study. Their mean age was 67 years (54 males and 34 females). All patients were subjected to ipsilateral antegrade transluminal or subintimal tibial angioplasty. The procedure and its complication and alternatives were explained to the patients, and a written informed consent was obtained.

Inclusion criteria

(1) Controlled diabetics patients with tibial vessels disease were included.

Exclusion criteria

The following were the exclusion criteria:

- (1) Charcot joint.
- (2) Severe noncompensated anemic patients.
- (3) Renal impairment.
- (4) Noncorrected hypoalbuminemia.
- (5) Autoimmune vasculitis.

The procedure started by antegrade ipsilateral Duplex-guided puncture and vessel access followed by crossing the lesion by hydrophilic guidewire 0.014 supported by a hydrophilic catheter (CXI, Rubicon, or Trailblazer), then balloon angioplasty using tibial balloons of 2–3 mm diameter with length equivalent to the length of the lesion or slightly longer. Check angiography is performed, then achievement of hemostasis by local compression, followed by intraoperative Duplex to rule out of hematoma.

All patients were heparinized during the procedure and put on dual antiplatelet for 6 months after angioplasty, and also, we routinely injected intraoperative nitroglycerin intra-arterial at the end of the operation.

Follow-up Duplex was performed at 1 week, 1 month, 3 months, 6 months, and 1 year to assess primary and

secondary patency rates as well as freedom of occlusion at 1 year.

RESULTS

A total of 54 males and 34 females, with a mean age of 67 years were included. Patients were categorized as Rutherford 3 (three patients), 4 (seven patients), 5 (54 patients), and 6 (23 patients). In two patients, failed crossing of the lesion resulted in major amputation. Minor amputation rate after successful revascularization was 48.2% and healed completely. One case was complicated by pseudoaneurysm and was managed successfully by ultrasound-guided compression.

Success was defined by at least one direct vessel continuity to the foot preferably the angiosomal supply to the lesion area without significant residual stenosis (Fig. 1).

No mortalities were encountered in our series. Follow-up by Duplex assessment revealed freedom from occlusion in 68% and secondary patency of 80% at 1-year follow-up.

DISCUSSION

The etiopathogenesis of diabetic foot in diabetics is multifactorial involving ischemia and peripheral neuropathy and infection and is augmented by other factors such as foot biomechanics and weight-bearing areas and repeated traumas.

Vascular surgeons are enrolled to perform the cornerstone procedure in the management of diabetic foot that is foot revascularization before, and to heal foot lesions, amputations or tissue loss [8]. Literature confirmed the importance of revascularization in the context that below-knee revascularization reduces the rate of nonhealing, minor and major amputation, as well as limb salvage [9]. Ferraresi *et al.* [10] correlated between diabetes mellitus as an important predisposing risk factor in infragenicular atherosclerotic lesions.

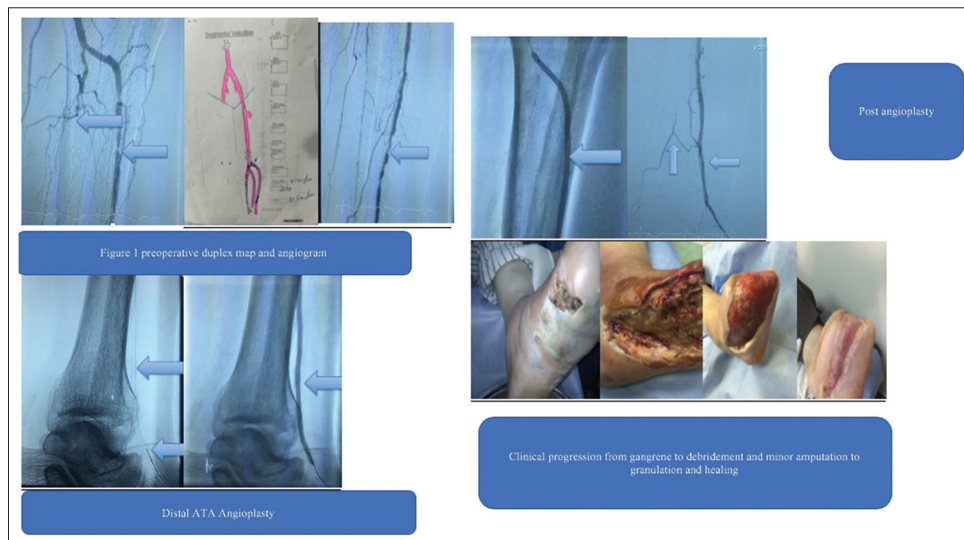


Figure 1: Preoperative Duplex map and angiogram. Distal ATA angioplasty. Post angioplasty. Clinical progression from gangrene to debridement and minor amputation to granulation and healing.

In the context of angiosomal theory, it is always preferable to select the anterior tibial artery for forefoot ischemic lesions or select the posterior tibial artery for calcaneal lesion whenever possible [11].

However, in case of failure to negotiate both vessels owing to either repeated intraluminal and/or subintimal attempts to cross the lesion, then peroneal artery is the only choice where it gives off the lambda branches where the posterior perforating branch joins the plantaris communis and the anterior perforating branch joins the dorsalis pedis artery [12].

One last but not the least crucial factor for limb salvage in diabetic patients with diabetic foot apart from tibial revascularization and correction of the other etiological factors as clearly demonstrated is combining the PTA and adequate professional surgical management to the foot lesions (before and/or after revascularization with meticulous close follow-up).

CONCLUSION

Tibial angioplasty is considered the first line of treatment of occlusive disease affecting the tibial vessels in diabetics to decrease morbidity and mortality in high-risk surgical patients.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Pandele GI, Dima-Cozma C. Epidemiology and pathophysiology of peripheral arterial disease (PAD). In: Textbook of Peripheral Vascular Interventions 2008 Jun 2 (pp. 23-26). CRC Press.
- Centers for Disease Control and Prevention. *National diabetes statistics report: estimates of diabetes and its burden in the United States*. Atlanta, GA: US Department of Health and Human Services; 2014.
- National Institute of Diabetes and Digestive and Kidney Diseases. *National diabetes statistics fact sheet: general information and national estimates on diabetes in United States, 2005*. Atlanta, GA: US Department of Health and Human Services; 2005.
- Lazzarini PA, Hurn SE, Fernando ME, Jen SD, Kuys SS, Kamp MC, Reed LF. Prevalence of foot disease and risk factors in general inpatient populations: a systematic review and meta-analysis. *BMJ open*. 2015;5.
- Aljarrah Q, Allouh MZ, Bakkar S, Aleshawi A, Obeidat H, Hijazi E, Al-Zoubi N, Alalem H, Mazahreh T. Major lower extremity amputation: a contemporary analysis from an academic tertiary referral centre in a developing community. *BMC surgery*. 2019;19:170.
- Sharkawy M, EL Samadony A. Color-coded etiological keys: A simple survey tool towards amputation-free limb survival in diabetic foot lesion. *J Diabetes Investig* 2016; 7:413–419.
- Lepantalo M, *et al*. Chapter V: diabetic foot. *Eur J Vasc Endovasc Surg* 2011; 42:60–74.
- Redlich U, Xiong YY, Pech M, Tautenhahn J, Halloul Z, Lobmann R, Adolf D, Ricke J, Dudeck O. Superiority of transcutaneous oxygen tension measurements in predicting limb salvage after below-the-knee angioplasty: a prospective trial in diabetic patients with critical limb ischemia. *Cardiovascular and interventional radiology*. 2011;34:271-9.
- Meloni M, Izzo V, Giurato L, Gandini R, Uccioli L. Below-the-ankle arterial disease severely impairs the outcomes of diabetic patients with ischemic foot ulcers. *Diabetes research and clinical practice*. 2019;152:9-15.
- Ferraresi R, Centola M, Ferlini M, Da Ros R, Caravaggi C, Assaloni R, Sganzeroli A, Pomidossi G, Bonanomi C, Danzi GB. Long-term outcomes after angioplasty of isolated, below-the-knee arteries in diabetic patients with critical limb ischaemia. *European Journal of Vascular and Endovascular Surgery*. 2009;37:336-42.
- DeRubertis BG, Faries PL, McKinsey JF, Chaer RA, Pierce M, Karwowski J, *et al*. Shifting paradigms in the treatment of lower extremity vascular disease: a report of 1000 percutaneous interventions. *Ann Surg* 2007; 246:415–422.
- Grziani L, Silvestro A, Bertone V, Manara E, Andreini R, Sigala A, *et al*. Vascular involvement in diabetic subject with ischaemic foot ulcers: a new morphological categorization of disease severity. *Eur J Endovasc Surg* 2007; 33:453–460.