Surgical Management of Chronic Non-Healing Diabetic Foot Ulcer – A case study

1) Dr.WINSTON DUNN

2) 2nd year PG Scholar

3) Dr.NATHALIE JOHN

4) Professor and HOD

5) Dr.BUCIO PITTY

6) 2nd year PG Scholar

Department of PG and Ph.D studies in Shalyatantra, JSS Ayurveda Medical College and Hospital, Mysuru-28

Introduction

Diabetic Foot Ulcer (DFU) is one of the most common complication seen among the patientswith Diabetes Mellitus (DM). It is often the result of uncontrolled blood glucose levels (7,8,9), peripheral neuropathy, improper foot care and or vascular disturbances. It is estimated that nearto 15% of the patients with DM develop DFU in their lifetime(1). Any sort of negligence inattending DFU might end up in infection, gangrene, amputation and even death (2). However,amputation of the limb is one of the common treatment methodology employed especially duringchronic non healing progressive ulcers.Approximately 50-70% of the lower limb amputationsare due to DFU(2).

CaseDetails

A 55 years old male patient was presented as out patient to the Dept. of Shalyatantra (167345/47420) on 07/07/2023 with the complaint of non healing wound in the left heel and brownish discharge from the dorsum of the same foot since 1month.

History

As per statement of the patient, he met with an injury to the left foot approximately 8 months back and the wound was sutured at a local hospital. 2 months later, blisters were seen over the dorsum of the affected foot along with blackish discoloration of the skin which eventually led to discharge from the lesion and cavity formation.

ClinicalFindings

CNS: Conscious, welloriented

CVS: S1, S2 heard and no abnormal sounds

RS: NVB Sheard

P/A: O/I No scar marks

No discolouration

Distension++

O/P: Hard and rigid

Non tender

Fluid Thrill test-Negative

Shifting dullness – Positive

On auscultation mild bowel sounds werepresent

BP: 120/80mmofHg

O/E of Left foot:

O/I7*4* 3cm wide wound in the heel region

Investigations:

HB%:9.4g/dL

WBC:29800cells/Cumm

DLC

Neutrophils: 92

Lymphocytes:06

Eosinophils: 01

Monocytes: 01

HIVCARD: Negative

HBsAgCARD: Negative

FBS: 120mg/dL

ALP:568U/LA

LT:21U/L

AST: 23U/L

Total Protein:6.8g/dLSerum

Albumin: 3.8 g/dLSerum

Globulin: 3.0 g/dL

TotalBilirubin:2.2 mg/dL

Direct Bilirubin: 1.0 mg/dL

A/GRatio:1.2:1

Urea:54mg/dL

Creatinine:0.9mg/dLCholesterol

Total:193mg/dLHDL

Cholesterol:40mg/dLLDL

Cholesterol:93mg/dLVLDL

Cholesterol:60

Triglycerides:300mg/dL

Clotting Time: 5.00 minutes

Bleeding Time: 2.30 minutes

Diagnosis:

Infected Diabetic Foot Ulcer

Treatment:

The wounds were thoroughly cleaned and upon detailed examination and counseling withthe patient, considering the risks involved, it was decided to go for amputation of the leg as the tissues were completely devitalized, necrosed and infected.

Surgical Procedure:

Pre-Operative:

1. The anaesthetic and surgical procedures were completely explained to the patient along with the risks involved and consent was taken.
2. Nil by Mouth (NBM) was advised for 06 hours before the procedure.
3. Pre-operative analgesics and antibiotics (Inj,Piperacillin and Tazobactam – 4.5g) were given half an hour before the surgery along with prophylactic administration of Tatanus Toxoid (0.5mL)
4. Aseptic Preparation of the surgical site was done.

Operative: Below-Knee Amputation

1. Spinal Anaesthesia was achieved.
2. A skin incision was made at 10-12 cm from the tibial tubercle.
3. Tourniquet was inflated upto 200 mmhg
4. Muscles and Fascia dissected up to the level of tibia and fibula.
5. Tibial and peroneal nerve bundles were identified and severed after injecting with 1% lidocaine.
6. All blood vessels including anterior and posterior tibial arteries were ligated and severed.
7. The tibial and fibular shafts were cut using oscillating saw.
8. The bleeding was arrested by cautery and ligation after releasing the tourniquet.
9. A drain was placed and muscles, fascia, subcutaneous tissues were sutured and skin was apposed by surgicalstaples.
10. Wound dressed using povidone ointment.

Post-Operative:

1. NBM for 6hours.
2. Post operative pain management was done using Inj. Tramadol- 100mg.
3. Intravenous Fluid Therapy using DNS and NS at the dose rate of 100ml/hr.
4. Urinary Catheterization was done.
5. Vitals were monitored for 12 hours.

FollowupTreatment:

1. Pain Management using Inj.Tramadol–100mg, every 12 hours for 5days.
2. Antibiotics (Inj,Piperacillin and Tazobactam–4.5g and oral Metronidazole–400mg) continuedfor10days.
3. Blood Glucose level was continuously monitored and 18 units of Biphasic Insulin was administered every 12 hours for 3days.
4. Supportive medications like Trypsin, Chymotrypsin,Vitamin C, and Zinc were given to facilitate wound healing.
5. Oral Ayurvedic Medications:
    1. Tab Nishamlaki(1-1-1)beforefood for25 days.
    2. Tab Asanadikashaya(20mL-0-20mL)after foodfor25days.
    3. Tab Amalaki(1-0-1)afterfoodfor 20days.
6. Wound dressing and bandaging was done on daily basis for 19 days and skin staples wereremovedafter30days.
7. Patient recovered completely and discharged.

Advise on discharge:

1. Tab. Nishamlaki(1-1-1)beforefood for25 days.
2. Tab. Asanadikashaya(20mL-0-20mL)after foodfor25days.
3. Tab. Amalaki(1-0-1)afterfoodfor 20days.

Chronic Non-Healing wounds at dorsum and heel

Intra-Operative

Post-Operative

Completely Healed Wound

Discussion:

During management of DFU, debridement accounted for 74.8%, below knee amputation accounted for 20.3% and above knee amputation accounted for 6.9% (10, 11). In present case, at first, wound was managed conventionally as a salvage procedure to save the limb. However,wound closure at the earliest possible is the main goal pertaining to management of DFU (5, 6).The level of amputation is mainly decided based on the viability of the soft tissue and in the present study, below knee amputation was employed at the level of 12 to 18cm from the tibial tubercle(3). Kayssiet.al performed a retrospective cohort study of 5342 adult patients (68% male,32% female; mean age, 67 ± 13years) who underwent lower-extremity amputation in 207 Canadian hospitals and the most common indication for amputation was diabetic complications (81%), followed by cardiovascular disease (6%) and cancer (3%) (12). Wound dehiscence, hematoma and or seroma formation can occur in 12% to 34% of below knee amputation patients(4).

Conclusion:

Surgical management along with integrated approach of using both allopathic and ayurvedic medications yielded better outcome while treating the present case of DFU. Below knee amputation provides a good window for the patient to choose artificial limb to lead a balanced life.

References

1. Leone S, Pascale R, Vitale M, Esposito S. [Epidemiology ofdiabeticfoot]InfezMed.2012;**20Suppl1**:8–13.[PubMed][GoogleScholar][Reflist]
2. Snyder RJ, Hanft JR. Diabetic foot ulcers--effects on QOL,costs, and mortality and the role of standard wound careand advanced-care therapies. Ostomy WoundManage. 2009;**55**:28–38. [PubMed] [GoogleScholar] [Reflist
3. PinzurMS,GottschalkFA,PintoMA,SmithDG.,AmericanAcademyofOrthopaedic Surgeons. Controversies in lower-extremity amputation. J BoneJoint SurgAm.2007May;89(5):1118-27.[PubMed][Reference list]
4. Morisaki K, Yamaoka T, Iwasa K. Risk factors for wound complications and 30-day mortality after major lower limb amputations in patients with peripheralarterialdisease.Vascular.2018Feb;26(1):12-17.

5. Markowitz JS, Gutterman EM, Magee G, Margolis DJ. Risk ofamputation in patients with diabetic foot ulcers: a claims-basedstudy.WoundRepairRegen.2006;**14**:11–17.
6. PatoutCA,BirkeJA,HorswellR,WilliamsD,CeriseFP.Effectiven ess of a comprehensive diabetes lower-extremityamputation prevention program in a predominantly low-income African-American population. DiabetesCare.2000;**23**:1339–1342.
7. AlaviA,SibbaldRG,MayerD,GoodmanL,BotrosM,ArmstrongD G,WooK,BoeniT,AyelloEA,KirsnerRS.Diabeticfootulcers:Part II.Management. JAmAcadDermatol.2014;**70**:21.e1–2124;quiz21.e1-2124.
8. BoweringCK.Diabeticfootulcers.Pathophysiology,assessme nt, and therapy.Can FamPhysician.2001;**47**:1007–1016.
9. McMurry JF. Wound healing with diabetes mellitus. Betterglucose control for better wound healing in diabetes. SurgClinNorthAm.1984;**64**:769–778.
10. NatherA,Bee CS,HuakCY,Chew JL,LinCB, NeoS, SimEY.Epidemiology of diabetic foot problems and predictive factors for limbloss.JDiabetesComplications.2008;22(2):77–82.
11. Hamann H, Cyba-Altunbay S. Bestimmung der Amputationshöhe[Determining the amputation level]. Langenbecks Arch ChirSuppl II VerhDtschGesChir.1989:627-30.
12. Kayssi A, de Mestral C, ForbesTL, Roche-Nagle G. ACanadian population-based description of the indications forlower-extremity amputations and outcomes. *Can J Surg*. 2016Apr.59(2):99-106.