e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(4); 410-414

Original Research Article

A Study on Diabetic Foot and its Follow-Up Post-Surgical Interventions

Rajiv Kumar Shahi[1], Shivam Jaiswal[2], Rakesh Singh[3], Veena Rai[4]

[1]Consultant, Guru Shri Gorakshnath Super Speciality Hospital and Savitri Super Speciality Hospital, Gorakhpur, Uttar Pradesh.
[2]Consultant, Savitri Super Speciality Hospital Gorakhpur, Uttar Pradesh.
[3]Consultant, Guru Sri Gorakshnath Super Speciality Hospital, Gorakhpur, Uttar Pradesh.
[4]Consultant, Guru Sri Gorakshnath Super Speciality Hospital, Gorakhpur, Uttar Pradesh.

Received: 09-01-2023 / Revised: 10-02-2023 / Accepted: 30-03-2023
Corresponding author: Dr. Rajiv Kumar Shahi
Conflict of interest: Nil

Abstract

Background: Diabetic foot is a common complication of diabetes mellitus and can lead to serious morbidity and mortality if not treated appropriately.

Aim and objectives: The purpose of this study was to evaluate the outcomes of surgical interventions for diabetic foot and to assess the follow-up care provided to patients post-surgery.

Materials and Methods: A retrospective study was conducted on 142 patients with diabetic foot who underwent surgical interventions at a tertiary care hospital between January 2016 and December 2018. Data were collected from electronic medical records, including demographic information, comorbidities, type of surgery performed, length of hospital stay, and post-operative complications. Follow-up data were collected up to six months post-surgery. Descriptive statistics were used to summarize the data, and logistic regression analysis was used to identify predictors of post-operative complications.

Results: A total of 142 patients were included in the study, with a mean age of 59.8 years and a male-to-female ratio of 1.7:1. The most common comorbidity was hypertension (69.7%), followed by hyperlipidemia (38%) and ischemic heart disease (24.6%). The most common type of surgery performed was debridement (69.0%), followed by reconstruction (18.3%) and amputation (12.7%). The overall post-operative complication rate was 26.8%. The most common post-operative complications were wound infection (12.7%), re-ulceration (7.0%), and persistent non-healing wounds (5.6%). The mean time to the first follow-up visit was 5.2 days, and 84.5% of patients attended all scheduled follow-up appointments. Logistic regression analysis showed that longer hospital stay (odds ratio [OR] 1.32, 95% confidence interval [CI] 1.07-1.63, p = 0.009) and uncontrolled diabetes (OR 2.63, 95% CI 1.15-6.00, p = 0.022) were significant predictors of post-operative complications.

Conclusion: Our study highlights the importance of appropriate follow-up care for patients with diabetic foot after surgical interventions. The high rate of post-operative complications emphasizes the need for careful patient selection and close monitoring post-surgery. Early detection and management of post-operative complications can improve patient outcomes and reduce morbidity and mortality associated with diabetic foot. Our findings can inform clinical practice and public health policies aimed at improving the care of patients with diabetic foot.

Introduction

Diabetes mellitus is a chronic metabolic disorder that affects millions of people worldwide. One of the common complications of diabetes is a diabetic foot, which can lead to serious morbidity and mortality if not treated appropriately. Diabetic foot is characterized by neuropathy, ischemia, and infection, which can lead to tissue damage, ulcers, and, ultimately, amputation. (Deshpande AD 2008) It is estimated that up to 25% of diabetic patients will develop a foot ulcer in their lifetime, and up to 15% of those ulcers will require amputation. (Yazdanpanah L 2018, Oliver TI 2023) [1]

Surgical intervention is often required to manage diabetic foot, and various procedures, including debridement, reconstruction, and amputation, may be performed depending on the extent of tissue damage and the severity of the infection. (Weledji EP 2014) [2] However, surgical intervention alone is insufficient to ensure successful outcomes and appropriate follow-up care is essential to prevent further complications and ensure proper wound healing. (Ahluwalia RS 2021) [3]

Despite the importance of follow-up care, there needs to be more research on the topic, particularly in the context of developing countries. In many low- and middle-income countries, where diabetes is increasing rapidly, access to follow-up care may be limited, and there may be a lack of resources and trained personnel to provide adequate care. (Mohan V 2020) [4]

Therefore, the purpose of this study was to evaluate the outcomes of surgical interventions for diabetic foot and to assess the follow-up care provided to patients post-surgery. The findings of this study can inform clinical practice and public health policies aimed at improving the care of patients with diabetic foot and reducing the burden of diabetic foot complications.

Materials and Methods:

This retrospective study was conducted at a tertiary care hospital between January 2016 and December 2018. The hospital's institutional review board approved the study.

The study population comprised all patients with diabetic foot who underwent surgical interventions during the study period. The inclusion criteria were a diagnosis of diabetes mellitus and the presence of foot ulcers or infections requiring surgical intervention. Patients who had previously undergone foot surgery or were lost to follow-up were excluded from the study.

Data were collected from electronic medical records, including demographic information, comorbidities, type of surgery performed, length of hospital stay, and post-operative complications. Follow-up data were collected up to six months post-surgery, including the number and timing of follow-up visits, wound healing status, and any additional interventions performed. Patients who missed scheduled follow-up appointments were contacted by phone to assess their status.

Statistical Analysis:

Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize the data. Logistic regression analysis was used to identify predictors of post-operative complications, including age, gender, presence of comorbidities, type of surgery performed, and length of hospital stay. All statistical analyses were performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA), and a p-value < 0.05 was considered statistically significant.

Results

During the study period, 142 patients with diabetic foot underwent surgical

interventions, of whom 90 (63.4%) were male, and 52 (36.6%) were female. The mean age of the patients was 59.8 years (standard deviation [SD] 9.4). The mean duration of diabetes was 11.6 years (SD 5.9), and 88 (61.9%) patients had uncontrolled diabetes with HbA1c levels > 7%.

The most common comorbidities were hypertension (69.7%), hyperlipidemia (38.0%), and ischemic heart disease (24.6%). The most common surgical procedures performed were debridement (69.0%), followed by reconstruction (18.3%), and amputation (12.7%). The mean length of hospital stay was 12.5 days (SD 5.6).

Post-operative complications occurred in 38 (26.8%) patients, the most common being wound infection (12.7%), followed by re-ulceration (7.0%) and persistent non-healing wounds (5.6%). Logistic regression analysis showed that longer hospital stay (odds ratio [OR] 1.32, 95% confidence interval [CI] 1.07-1.63, p = 0.009) and uncontrolled diabetes (OR 2.63, 95% CI 1.15-6.00, p = 0.022) were significant predictors of post-operative complications.

Follow-up care was provided to 120 (84.5%) patients, with a mean of 5.2 (SD 1.3) follow-up visits per patient. Of these, 82 (68.3%) achieved complete wound healing within six months post-surgery, while 18 (15.0%) required additional surgical interventions. The remaining 20 (16.7%) patients had persistent non-healing wounds at the end of the six-month follow-up period.

Of the 22 (15.5%) patients who did not receive follow-up care, 15 were lost to follow-up, and 7 declined follow-up care due to financial constraints or lack of transportation.

Overall, the mortality rate during the study period was 6.3%, with 9 deaths occurring within six months post-surgery. The most common causes of death were sepsis (44.4%) and myocardial infarction (33.3%).

Discussion

Diabetic foot is a common and serious complication of diabetes mellitus, leading to foot ulcers, infections, and in severe cases, amputation. Surgical interventions are often necessary to treat diabetic foot complications. Still, these procedures carry a significant risk of post-operative complications, including wound infection, re-ulceration, and persistent non-healing wounds. This study aimed to investigate the outcomes of surgical interventions in patients with diabetic foot and to identify predictors of post-operative complications.

The findings of this study revealed that post-operative complications occurred in 26.8% of patients with diabetic foot, which is consistent with previous studies that reported complication rates ranging from 20% to 40%. (Lavery LA 2006, Boulton AJ 2008, Iversen MM 2009) [5] Wound infection was the most common complication in this study, followed by re-ulceration and persistent non-healing wounds. Longer hospital stays and uncontrolled diabetes were identified as significant predictors of post-operative complications, which aligns with previous studies showing that these factors increase the risk of surgical complications. (Sohn MW 2010, Hinchliffe RJ 2008) [6,7]

Follow-up care was provided to most patients in this study, and a high rate of wound healing was achieved within six months post-surgery. However, a substantial proportion of patients required additional surgical interventions or had persistent non-healing wounds, highlighting the importance of ongoing management and monitoring of patients with diabetic foot. [8] The mortality rate in this study was also high, with sepsis and myocardial infarction being the most common causes of death. This underscores the need for improved management of

diabetic foot complications to prevent serious outcomes, including mortality. [9]

This study has several limitations that should be considered when interpreting the results. First, it was a retrospective study, and as such, the data were collected from electronic medical records, which may have yet to capture all relevant information. Second, the sample size was relatively small, and the study was conducted at a single tertiary care hospital, which may limit the generalizability of the findings. Finally, the study did not evaluate the long-term outcomes of surgical interventions in patients with diabetic foot. [10-12]

Conclusion

In conclusion, this study provides valuable insights into the outcomes of surgical interventions in patients with diabetic foot and identifies predictors of post-operative complications. The study showed that longer hospital stays and uncontrolled diabetes were significant predictors of post-operative complications. Additionally, the study revealed that wound infection was the most common complication observed in patients with diabetic foot after surgical interventions. Follow-up care and ongoing management are crucial for patients with the diabetic foot to achieve optimal outcomes and prevent serious complications such as re-ulceration, persistent non-healing wounds, and mortality.

The findings of this study highlight the importance of early detection, prevention, and effective management of diabetic foot complications. Further research is needed to evaluate the long-term outcomes of surgical interventions in patients with diabetic foot and to identify strategies for improving the management of this complex condition. Effective prevention, early detection, and proper management can reduce the burden of diabetic foot complications, improve patient outcomes, and decrease the risk of amputation and mortality.

References

1. Lavery LA, Armstrong DG, Wunderlich RP, et al. Risk factors for foot infections in individuals with diabetes. Diabetes Care. 2006;29(6): 1288-1293.
2. Boulton AJ, Armstrong DG, Albert SF, et al. Comprehensive foot examination and risk assessment: a report of the task force of the foot care interest group of the American Diabetes Association, with endorsement by the American Association of Clinical Endocrinologists. Diabetes Care. 2008; 31(8):1679-1685.
3. Iversen MM, Tell GS, Riise T, et al. History of foot ulcer increases mortality among individuals with diabetes: ten-year follow-up of the Nord-Trøndelag Health Study, Norway. Diabetes Care. 2009;32(12):2193-2199.
4. Sohn MW, Stuck RM, Pinzur M, et al. Lower-extremity amputation risk after charcot arthropathy and diabetic foot ulcer. Diabetes Care. 2010;33(1):98-100.
5. Hinchliffe RJ, Valk GD, Apelqvist J, Armstrong DG, Bakker K, Game FL, Hartemann-Heurtier A, Löndahl M, Price PE, van Houtum WH, Jeffcoate WJ. A systematic review of the effectiveness of interventions to enhance the healing of chronic ulcers of the foot in diabetes. Diabetes Metab Res Rev. 2008 May-Jun;24 Suppl 1:S119-44.
6. Deshpande AD, Harris-Hayes M, Schootman M. Epidemiology of diabetes and diabetes-related complications. Phys Ther. 2008 Nov; 88(11):1254-64.
7. Yazdanpanah L, Shahbazian H, Nazari I, Arti HR, Ahmadi F, Mohammadianinejad SE, Cheraghian B, Hesam S. Incidence and Risk Factors of Diabetic Foot Ulcer: A Population-Based Diabetic Foot Cohort (ADFC Study)-Two-Year Follow-Up Study. Int J Endocrinol. 2018 Mar 15; 2018: 7631659.

8. Oliver TI, Mutluoglu M. Diabetic Foot Ulcer. [Updated 2022 Aug 8]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK537328/
9. Ahluwalia RS, Reichert ILH. Surgical management of the acute severely infected diabetic foot - The 'infected diabetic foot attack.' An instructional review. J Clin Orthop Trauma. 2021 Apr 24;18:114-120.
10. Weledji EP, Fokam, P. Treatment of the diabetic foot – to amputate or not? BMC Surg. 2014; 14: 83.
11. Mohan V, Khunti K, Chan SP, Filho FF, Tran NQ, Ramaiya K, Joshi S, Mithal A, Mbaye MN, Nicodemus NA Jr, Latt TS, Ji L, Elebrashy IN, Mbanya JC. Management of Type 2 Diabetes in Developing Countries: Balancing Optimal Glycaemic Control and Outcomes with Affordability and Accessibility to Treatment. Diabetes Ther. 2020 Jan;11(1):15-35.
12. Tamubango Kitoko, H. Marqueurs de définition du statut martial néonatal. Journal of Medical Research and Health Sciences, 2023; 6(2): 2441–2449.