Acta Scientific Orthopaedics (ISSN: 2581-8635)

Volume 3 Issue 2 February 2020

Case Report

The Second Lower Limb Amputation in A Diabetic Amputee: A Case Report and Review of the Literature

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DOI: 10.31080/ASOR.2020.03.0137

Received: December 27, 2019

Published: January 10, 2020

Abstract

Background: Diabetes-related lower limb amputations constitute a significant health burden due to its attendant morbidity and mortality in developing countries. There have been, however, few reports of such cases in the literature. Diabetes foot care in resource-constrained settings, especially those of sub-Sahara Africa, is afflicted by several current challenges. The rarity of bilateral amputation from complicated diabetic foot syndrome suggests reporting this unexpected clinical event. This communication equally reviews current updates in the literature that are leading to stratified diabetic foot care in contemporary African settings.

Case Presentation: We report an unanticipated event of second contralateral lower limb amputation. This clinical scenario was mainly in a 65-year-old Cameroonian male diabetic amputee. Incidentally, the index patient was successfully optimized and underwent a right below-knee amputation with an excellent postoperative outcome.

Conclusions: Interestingly, from this case report and corroborated by other studies, peripheral vascular disease is critical as a lead factor in bilateral extremity amputation compared with its influence in foot ulceration in diabetes. Besides, the peripheral occlusive arterial disease is more closely associated with diabetic bilateral amputation than neuropathy or level of foot care knowledge. The role of foot check for neuropathy impact identification of at-risk diabetic foot is confirmed from several other studies. However, this brings to the fore, type of Identification is needed relatively early in the course of diabetes. A unique foot care program and strategies for patients with diabetic foot syndrome are much sorted after in our contemporary African settings.

Keywords: Diabetes; Diabetic Foot Syndrome; Foot Care Program; Amputation; Sub-Saharan Africa

Introduction

Diabetes-related lower limb amputations (DLLA) constitute a significant health burden due to its attendant morbidity and mortality in developing countries [1]. Even though the incidence of DLLA has decreased over the last twenty years in most developed countries, the situation in developing countries, especially those of sub-Saharan Africa (SSA), is presumably pathetic [1].

"Diabetes foot care in low socioeconomic communities, especially those of SSA, is afflicted by several prevailing challenges including i) inherent organizational deficits, ii) fragmentation of care, iii) inadequate allocation of resources, and iv) unwavering attention to achieving glycemic targets" [1-3]. Interestingly, "these factors have contributed to an increasing burden of diabetic foot complications, according to 'the International Working Group on the Diabetic Foot' (IWGDF)" [1-3]. "The IWGDF submitted that diabetic foot syndrome (DFS) and related gangrene are a public health concern worldwide, being implicated in an estimated 50% to 70% of all non-traumatic amputations on the lower limb and with over a million annual amputations" [1,4,5]. Besides, "DFS precede lower extremity amputations in about 85% of patients; but, with a paucity of data on the epidemiology in Cameroon and the SSA in general"

[1,5-7]. We are reporting the occurrence of unanticipated second leg amputation in an otherwise well-controlled diabetic amputee patient. This communication equally reviews current updates in the literature that are leading to stratified diabetic foot care in contemporary African settings.

Case presentation

A 65-year-old man of Bamileke origin in the Western region of Cameroon, previously a known case of Type-II Diabetes Mellitus and was well-controlled on oral hypoglycemic drugs (OHDs) (Metformin 500 mg, tid and Glibenclamide 5mg, bid) for about 15years. He was admitted with complete wound dehiscence of a right below-knee amputation (BKA) done six months earlier at a private hospital in Yaoundé. Besides, he had a past medical history of left above-knee amputation (AKA) of the (contralateral lower limb). There were no other associated co-morbidities like hypertension, heart disease, or HIV.

BMI was 26 (overweight range: 25 - 29.99kg/m2), and the baseline parameters were essentially normal. He had a sinus tachycardia of 92 beats/ minute, pyrexia 37.6 °C, non-invasive blood pressure (BP) 140/85 mmHg, and pulse oximetry SpO2 at 99% in room air. The local examination of his left lower extremity revealed a healed scar on the AKA stump. The right lower limb has a right BKA stump with an ulcer that measured 6cm x 6cm; the resected ragged end of the right tibia-bone was palpable on the floor. Also, there was a minimal slough, no discharge, patchy granulation, and very feeble pulsation of the right popliteal artery on deep palpation (Figure 1). Laboratory tests were noted for raised leucocyte counts (14,000cells/ul), and hemogram was 8.2gm/dl. The fasting blood sugar ranged between 140mg/dl and 180mg/dL, and fasting lipid profile was typical, while the mean serum hemoglobin (Hb) A1C was 5.9.

Figure 1: Bilateral Amputation (Pre-Op Photo).

Otherwise, physical and neurological examinations were unremarkable. Routine 12-lead electrocardiograms, blood biochemistry, chest X-ray posterior and anterior view, were normal. Doppler scan showed thick vessel wall and partially obstructed the right popliteal artery. He was commenced on insulin therapy as part of his treatment. Also, immediately on admission, broad-spectrum parenteral antibiotic therapy (intravenously administered ceftriaxone one gm., 12 hourly and intravenously administered metronidazole 500mg eight hourly), as well as anticoagulation therapy (subcutaneous Lovenox 40 mg daily), was initiated. The following day, extensive wound debridement was performed. Three days later, cultures were positive for mixed aerobic (Gram-positive cocci, commonly streptococci) and anaerobic (Pseudomonas species essentially) bacteria. Although he was hemodynamically stable equally had transfusion with three pints of blood. The daily wound dressing was continued for one week. He subsequently had a right BKA with the uneventful outcome (Figure 2) and was maintained on an aggressive post-amputation rehabilitative program. He was discharged home on the eighteen postoperative days. He is to continue on a diabetic diet and oral hypoglycemic agents and with an uneventful postoperative period. The patient came for routine follow-up visits at the 2nd, 4th, and 8th week in the postoperative period showed satisfactory clinical status.

Figure 2: Bilateral Amputation (Post-Op Photo).

Discussion

Short overview of DFS

In this study, a critical review of our index patient showed that the significant risk factors for bilateral lower extremity amputations are the prolonged use of OHD. Besides, a Doppler sonographic report suggesting peripheral occlusive arterial disease (POAD). The overall diagnosis is that of complicated diabetic foot syndrome (DFS) with POAD.

DFS describes collectively as a spectrum of clinical conditions that evolve in the feet of a diabetic patient from complex interac-

tions of several diabetic-related complications [8-11]. DFS, in many instances, is a primary reason for hospital admissions in diabetic patients [8,12]. "The complex clinical entities include the following i) feet deformity, secondary to motor and autonomic neuropathy [8,9,13]; ii) loss of protective sensation and impaired vision increase the susceptibility for minor feet trauma, which results in diabetic foot ulceration with or without subsequent infection [8,13,14]; POAD is a major cause of impaired ulcer/wound healing and gangrenous diabetic foot [8,10]; Impaired immunity related to chronic hyperglycemia and subsequent superadded infections will result in diabetic septic foot" [8,15,16].

"The ultimate goal of diabetic foot care is the prevention of disease progression to more complex stages by early detection of the foot at risk and evidence-based management. In so doing, ensure functionally intact feet with healed wounds and to minimize the need for subsequent major lower-extremity amputations," [8,9,17-19].

Disease burden of DFS

"Although diabetes mellitus (DM) prevalence is rising globally, Sub-Saharan Africa appears to be the worst-hit [20,21]. For instance, Nigeria has witnessed more than a 100% increase in the prevalence of the disease in the last two decades, from 2.2% in 1997 to nearly 6% in 2015" [20,22]. Globally, "an estimated 0.8% and 10% of all DM patients suffer from DFS. The annual rate of new DFS cases is between 2.2% and 5.9%; Germany is on top of the list among the European countries with its rate of over 60,000 amputations per year" [23].

"The available works of the literature suggest that Africa has the second-highest worldwide prevalence of DFS among people with diabetes of 7.2% (95%CI: 5.1–9.3) [24,25]. There is a lack of Population-based incidence of DFS estimates in Cameroon. However, two Cameroonian authors using hospital-based audits gave prevalence figures of DFS and related lesions in their studies as 13%," [26,27]. "Approximately 70% of all amputations are performed on patients with DM. There are global variations in the reported estimates of DLLA [1,28]. These observed variations probably occur from the differences in study design and population; others include severities of DFS, the standard of medical care, and accesses to care" [1,2,29,30].

Etiopathophysiology [31]

"DFS has a multifactorial etiopathophysiology which allows one to relate with the multidisciplinary team approach recommended for this clinical entity. Once an early detection of risk factors is made, it becomes relatively easy to prevent the occurrence of diabetic ulcers [31,32]. The major etiopathological factors involved in the development of DFS lesions are i) peripheral neuropathy, ii) peripheral vascular disease, and iii) unrecognized repetitive trauma" [31,32]. "Peripheral arterial occlusive disease (PAOD) is four times more prevalent in people with diabetes than non-diabetics patients. The common vessel that experience arterial occlusion is the posterior tibial, and peroneal arteries. In many instances, the dorsalis pedis artery is not implicated. Hypertension, hyperlipidemia, and smoking are additional risk factors for developing PVD among patients with DM," [31,33]. "The presence of lower extremity ischemia is characterized by a presence of some clinical parameters with showing evidence of occlusion even when non-invasive vascular tests are carried out. The symptomatology covers claudication, described as pain occurring at rest or during the night in the arch or forefoot, absent pulsations of popliteal or posterior tibial arteries, a dry shiny skin that is also thinned out, loss of hair on the leg and foot, as well as thickened nails. The patient may equally experience peripheral neuropathy as additional complications affecting the lower extremities of patients with DM, contributing to the development of foot lesions; This complication occurs in up to 58% of patients with longstanding disease" [31,33]. "Motor neuropathy leads to foot deformities; which results in the weakness and atrophy of the intrinsic muscles of the foot. There is also a distortion of the stability of the foot arch, especially when the patient is walking" [31,33].

Moreover, "there is an unopposed action of the extrinsic muscles resulting in equinous deformity of the foot as well as hindfoot varus deformity. This development confirms that motor neuropathy is, therefore, implicated in the development of the joint deformities, the so-called Charcot's osteoarthropathy" [31,33]. Eventually, "these events lead to a loss of protective sensation, in the face of foot abnormalities, exposes patients to undue sudden or repetitive stress that leads to ulceration. In the diabetic foot, autonomic neuropathy has several common manifestations. For example, denervation of dermal structures leads to decreased sweating. This autonomic neuropathy causes dry skin and fissure formation, which predisposes the skin to infection," [31,33]. The novel diabetic foot care program relies on i) reducing or eliminating the pressure, ii) resolving infection, iii) correcting ischemia, and iv) maintaining an environment that promotes wound healing [31,34].

Determinants of DFS [35-37]

Furthermore, in Cameroon, for instance, the current level of evidence for this correlation adopts the social-ecological model (SEM)

to assess the determinants of the health condition [35-37]. The SEM incorporates an interactive framework of individual, interpersonal, community, and societal aspects and how they all contribute to diabetic foot complications.

Individual Level Determinants [35-37]

Poverty

In Cameroon and other countries in SSA, "patients do out of pocket payment for healthcare services. Once there is no money, no consultation, and no diabetic testing, therefore, no knowledge of diabetic status, and no treatment of diabetic complications when they arise. Consequentially, poverty constitutes a major contributor to undiagnosed diabetic conditions. Most families of diabetic patients are unable to afford the regular expenses incurred in the hospital" [35-37].

Educational status

"The majority of citizens in Cameroon are still uneducated, with a disproportionate effect in rural communities. This low literacy level equally impacts the knowledge of DFS and related complications in particular. For example, a reduced level of awareness of diabetic health status and increased exposure of the body to risk factors such as smoking, unhealthy eating, obesity, and lack of physical exercise result ultimately into unwanted outcomes" [35-37].

Poor health-seeking attitude

There is a general lassitude to seeking medical attention, which is rooted in ignorance. "Majority wait until the pain becomes intolerable before seeking remedies. Others are addicted to traditional medicines, which often disappoint the users. Some delay in seeking healthcare is propagated by financial lack. Some diabetic patients develop a fear of losing their legs or toes, decline amputations. Some even die untreated, and others return to the hospital for either a BKA or AKA, procedures more severe than the previously recommended toe amputation. Lack of footwear can also precipitate diabetic foot complications in Cameroon. Most villagers walk for miles daily bare-footed, and this increases the likelihood of a cut, wound or infection; consequently, increasing the risk of diabetic foot complications for lack of proper medical attention" [35-37].

Interpersonal level determinants

The index patient in this case report and the majority of our patients are residents of rural communities with a low level of education and lack of knowledge of diabetes. "When one case of diabetic foot is undiagnosed, others do not feel the need to seek medical attention for subsequent cases because they do not understand the gravity of the situation. The role of person to person information dissemination in most communities in the northwest region of Cameroon is significant. With the popularity of traditional medical practitioners (TMPs), their accessibility and affordability, they are easily recommended by members of the social network. Some cases of diabetic foot complications only reach medical facilities after unsuccessful attempts by TMPs, and the condition becomes unbearable" [35-37].

Community level determinants

The Northwest Region of Cameroon can only boast of one diabetic clinic. "Lack of healthcare centers in the rural communities of Cameroon is a major cause of the high morbidity rate for DFS. Some patients cannot afford the cost of transportation to similar clinics with the other regions. Moreover, it is worthy of note that healthcare centers in Cameroon do not perform routine population screening for diabetes. The low physician density makes the situation even worse. With such low physician to patient ratio, doctors have to see hundreds of patients each day, and not enough time is spent with patients to determine foot complications. Most community hospitals do not have a permanent doctor on staff, and as a result, people cannot get frequent healthcare. These community factors prevent people from getting early diagnosis of their diabetic status, and as such, conditions remain undiagnosed until foot complications develop" [35-37].

Societal level determinants

Cameroon lacks a national health insurance system that can subsidize the cost of healthcare services to patients from low-income families. "Even those who are sick and have access to health centers are plagued by the cost of medical services. The absence of an insurance system has crippled society as many patients cannot afford consultation, procedures, prescribed medications, and even hospitalization. Furthermore, the majority of the medical doctors in Cameroon migrate out of the country in search of greener pastures and to further their education, never to return home to serve their country. This emigration of doctors is highly encouraged by families involved, but the consequences are detrimental to the nation's economy and healthcare infrastructure. The absence of highly qualified doctors in Cameroon destroys the healthcare infrastructure. Diabetic patients can, therefore, not receive adequate care because there are no attending physicians at local healthcare facilities" [35-37].

Risk assessment model [23,38]

Identification of various risk factors

The Clinical Practice Guidelines by the German Diabetes Association suggest "usage of a risk assessment model for direct Identification of various risk factors for the development of DFU for early

intervention and prevention of complications. Patients with diabetes have foot lesions. They are a result of a multi-factor process with the following causative factors: 1) Inappropriate footwear; 2) neuropathy (sensory, motor, autonomic); 3) Peripheral vascular (arterial) disease (PVD); 4) Limited joint mobility (LJM); 4) foot deformities; 5) psychosocial constellation" [23,24,38].

Regular foot examination

In the clinic, the physician or nurse, the feet and footwear of all people with diabetes should be examined periodically (Table1a). "Each examination should cover the following points, as a minimum: 1) The clinical history must be targeted at (burning or stabbing pain, paraesthesia, feelings of numbness, absence of all sensation). 2) The examination of both feet: skin status (integrity, turgor, formation of sweat), musculature, deformities, mobility, skin temperature, etc. 3) Foot inspection or testing for neuropathy; this involves a check of sense of touch with a 10g Semmes-Weinstein monofilament and/or vibration sensation with a Rydell-Seiffer tuning fork. 4) The peripheral pulses on the feet covering (posterior tibial and dorsalis pedis arteries), 5) Measurement of Ankle Brachial Pressure Indices (ABIs), especially if foot pulses cannot be felt" [23,24].

Grade	Classification or Description
0	No lesion, possibly foot deformation or cellulitis
1	Superficial ulceration
2	Deep ulcer up to the joint capsule, tendons or bones
3	Deep ulcer with abscess formation, osteomyelitis, infection of the joint capsule
4	Limited necrosis in the forefoot or heel area
5	Necrosis of the entire foot

Table 1a: Classification According to Wagner [40].

"The German Diabetes Association's evidence-based guideline Diagnosis, Therapy, Progress Control and Prevention of Diabetic Foot Syndrome recommends the following additional examinations: A) Measurement of arterial occlusion pressure over the dorsalis pedis and posterior tibial arteries, B) Determination of the brachial-ankle index (ABI)" [23,24].

"A simple and quick diabetic foot assessment tool, designed to be completed in 60 seconds, can be accessed at http://www.healthychange.ca/assets/files/Inlow_Tool_2010.pdf., [23,24,39]. The patients are subsequently counseled against the background of ensuring preventive measures and inspecting the patient's feet at routine follow-up visits. Medical personnel can help the patient develop and maintain good foot-care habits," [23,24].

Definitive diagnosis

"The definitive diagnosis of DFS is made in accordance clinical presentations, and then the lesion should be classified per the extent of destroyed tissue and the presence of an infection and ischemia (classification according to Wagner [40], Wagner-Armstrong classification" [33,41], Table 1b and Table 2).

Grade	Application to Diabetic Foot Care
Wagner 0	Periodic check of the feet.
Wagner 1 and Wagner 2	Focus on pressure relief and local wound care.
Wagner 3	Infection control. Usually, with systemic antibiotic therapy; Small osteomyelitic foci are healed; larger foci generally have to be resected. X-ray findings usually lag behind the actual state of the bone. If the clinical findings improve, continuation of antibiotic therapy can also be guided by blood inflammation parameters. Normally, even small processes require an antibiotic therapy of 6 or more weeks duration.
Wagner 4 and Wagner 5	Treatment is primarily focused on keeping the amputation line as distal as possible and preventing proximal extension of infection. If the patient has PAD, an angiography should be performed before each amputation

Table 1B: Application of The Wagner Classification [40].

Management of diabetic foot ulcers

The best evidence-based approach supports multidisciplinary team care. The various challenges associated with the management of DFU have been highlighted [42]. "Management of DFU includes optimal blood glucose control, prevention through education, an inspection of the feet, and treatment with the necessary steps to prevent complications. There must be a set objective of reducing the rate of amputations by more than 50%, and then the following multidisciplinary, multi-factor approach to treating diabetic foot ulcers will have to be adopted. These include: 1) Metabolic optimization and treatment of underlying medical diseases; 2) Infection control; 3) Debridement of devitalized tissue; 4) Effective relief from pressure; 5) Local wound treatment; 6) Therapy of vascular diseases; 7) Education of patients" [23,24].

Wagner Grade Armstrong Stage	0	1	2	3	4	5
A	Pre or post ulcerative foot	Superficial wound	Wound up to the level of tendons or capsule	Wound Up To the level Of bones And joints	Necrosis of parts of foot	Necrosis of entire foot
B	with infection	with infection	with infection	with infection	with infection	with infection
C	with ischemia	with ischemia	with ischemia	with ischemia	with ischemia	with ischemia
D	with infection and ischemia	with infection and ischemia	with infection and ischemia	with infection and ischemia	with infection and ischemia	with infection and ischemia

Table 2: Wagner-Armstrong Classification [33, 41].

Possibilities for describing diabetic foot syndrome (DFS) using the combined Wagner-Armstrong classification.

Meanwhile, "alternative supports are in the form of 'Adjuvant Therapies.' For example, the use of hyperbaric oxygen and stem cell therapy, etc., should be reserved for patients at Wagner stage >3. Especially after all possibilities of revascularization have been exhausted and with the threat of extremity amputation," [23,24].

Metabolic optimization

"The goal is to improve the microcirculation and to prevent DFS disease progression by blocking pathological glycation. In most cases, adequate treatment of prevailing associated morbidities which ultimately impact on immune-competency, sufficient hemoperfusion, and sufficient tissue oxygenation in the long run" [23,24].

Antibiotic therapy

DFS carries with them a significantly associated infection, the rate which is estimated at 58% in western countries, especially at the time of first presentation [23,24]. "There is a lack of data on infection rates from Africa. For these reasons, antibiotic therapy is an important component of the management of diabetic foot ulcers. The choice is commonly based on clinical experience and local preferences. The initial choice of antibiotic therapy is thus set aside once there is wound culture/sensitivity result" [23, 24].

"Our local experience is guided by deep tissue samples, often obtained by debridement that is proven microbiologically useful. While the Superficial wound swabs are often misleading as wounds are frequently colonized by non-pathogenic strains, only Mild infection can be treated with oral antibiotics for 1 to 2 weeks using flucloxacillin, erythromycin, clindamycin, or amoxicillin/clavulanate. More severe infections require IV antibiotics for 2 to 4 weeks. If osteomyelitis is suspected, 4-6 weeks treatment is needed" [23,24]. "Antibiotics should provide broad-spectrum cover directed toward Staphylococcus aureus, Streptococci, gram-negative aerobes, and anaerobic bacteria. More severe infections may require ceftriaxone, ciprofloxacin, and metronidazole. Combinations of antibiotics may be needed to achieve adequate coverage. Osteomyelitis should be excluded in all infected foot ulcers. A simple test is to pass a sterile probe into the base of the wound, and if the probe touches straight to bone, then osteomyelitis should be suspected" [23,24].

Wound debridement

Wound debridement is technically a vital prerequisite for the effectiveness of other therapeutic interventions.

Mechanical debridement

"The complete removal of necrotic tissues within the wound bed and possibly from the wound edges. As part of the management protocol debridement, adequate tissue perfusion is critical. Anesthesia is usually not required due to the patient's neuropathy, and strictly aseptic conditions are usually not necessary, due to pre-existent microbial contamination" [23,24].

Biomechanical debridement

"Evidence-based options are available for liquefaction of wound layers and necrotic tissue. The debridement is induced by enzymat-

ic degradation with proteases in maggot secretions (fly larvae). A novel approach to debridement is the application of medicinal maggot therapy, which has been successfully described in a cohort of DFU patients in Egypt," [23,24,43].

Pressure relief

"In neuropathic ulcers, abnormal pressures in the foot are a key factor in the development and impaired healing of DFU. Pressure can be relieved by the use of plaster casts, therapeutic footwear where the insole is designed to remove pressure on points of ulceration, strict bed rest, use of crutches or wheelchair, and orthoses; Periodical callus removal is required for pressure relief" [23,24,44].

Local wound treatment

"Multiple stages of wound care are generally recognized as appropriate for chronic, non-ischemic wounds. The dressing applied in an individual case should be selected based on the amount of discharge, whether or not the infection is present, and the cost-effectiveness criteria. The wound surface must be cleaned thoroughly a teach change of dressing" [23,24].

Limb salvage

"Lower extremity amputation is no longer considered as the gold standard but now undertaken only as a last resort. Limb salvage is the primary goal of modern limb surgery [45-48]; especially in facilities where such services are available, a practice which reliably evolved from recent advances in microvascular surgery and clinical oncology," [45-48]. "Recent evidence-based practice from Therapy of Vascular Diseases supports the use of the following options, including revascularization interventions, both operative and endoluminal that are indicated, especially when there is poor wound healing for DFUs, or in the imminent danger of amputation. Percutaneous angioplasty is to be preferred when both revascularization procedures are feasible; usually, there is poor wound healing with inadequate blood supply" [23].

Amputation

Major amputation (above or below the knee) is a last resort and should rarely be needed to manage a diabetic foot ulcer. "Debridement may require the removal of necrotic and infected tissue resulting in the minor amputation of one or more toes or part of the forefoot, but these will leave the patient with a viable foot on which they can still walk, avoiding the devastating personal and economic implications of amputation. This toe-amputation is especially important where artificial limbs are in poor supply for practical and economic reasons" [23,24,49,50].

Organization of healthcare services

The frequency of occurrence of amputations is significantly decreased when the care of the patient is shared by a multidisciplinary team of general practitioners, diabetologists, vascular specialists (vascular Surgeons, angiologists, and interventional radiologists), surgeons, diabetic educators, shoemakers and podiatrists [23].

Preventive medicine approach

Preventive care is critical so as to eliminate ulcers and invariably amputations. "The preventive measures include Identification of high-risk patients (history of foot lesion or amputation and clinical examination including monofilament and pulse palpation). In addition to the above: 1) Periodic examination of feet and footwear; 2) Appropriate footwear; 3) Focused care as a means of treatment of other pathological changes in the foot; 4) Podiatric management; 5) Education of all persons involved; 6) Psychosocial care;" [23,51].

Besides, "the interval between examinations should take account of the patient's risk profile. Mechanical factors play an essential role in the occurrence of diabetic foot ulcers. In the process of walking, repeated impacts of increased pressure and shear forces on foot lead to injuries; In such situations, the most important cause of lesions is inappropriate footwear" [23,51]. However, "from other works of literature, the main associations with the second amputation were vascular. Therefore the need for appropriate vascular intervention is required for these patients, whether it is surgical or pharmacological. The past and present smoking were remarkably prevalent in all patients, and smoking cessation is important for such patients. Other factors, such as dyslipidemia, high HbA1c, and smoking, are critical for PVD and peripheral neuropathy and, consequently, lower-limb foot problems in diabetes" [52-56].

Key panel message

From the study, it was evident that diabetes foot care in low socioeconomic communities, especially those of SSA, is afflicted by several current challenges, including:

1. The health care systems are burdened with organizational deficits.
2. Most times, there is the fragmentation of care with the inadequate allocation of resources.
3. There is unwavering attention by the care team at achieving glycemic targets.
4. There is an outright lack of awareness of foot care and related matters among patients and even health care providers.

5. There is a shortage of well-trained healthcare personnel for both general diabetes care or specialist treatment.
6. In most health facilities, there is insufficient infrastructure, including shortages of medications and dressings.
7. There is an enormous problem with transportation, and patients equally had to travel long distances to the clinic.
8. There is a delay among patients in seeking timely medical care, or among untrained health care providers in referring patients with severe complications for specialist opinion;
9. In most of the healthcare facilities in SSA countries, there is a lack of multidisciplinary team approach.
10. There is a lack of political might by the government to support training programs. Especially for health care professionals, especially in the area of diabetology and podology.
11. As part of administrative bottle-neck, there is an outright lack of surveillance activities.

Recommendations

1. There must be in place sustainable training programs for health care professionals, which primary focus on the management of the complicated diabetic foot.
2. There is advocacy for an aggressive public health program that targets information dissemination to patients and all other health care professionals.
3. We also advocate most of our healthcare providers to take full advantage of the highly successful Step by Step program.
4. The desired government support for holistic diabetes care, for us to make the required giant stride diabetes and diabetic foot care to bring amputation rates to zero.
5. In SSA countries where there are existing training programs, we need to update the undergraduate and postgraduate curricula for doctors, nurses, and clinical officers, so such required training in diabetes is part of mainstream clinical education.

Conclusion

In conclusion, POAD is more closely associated with diabetic bilateral amputation than neuropathy or level of foot care knowledge. From the case report and corroborated by other studies, PVD is critical as a lead factor in bilateral extremity amputation compared with its influence in foot ulceration in diabetes. The role of foot check for neuropathy impact identification of at-risk diabetic foot is confirmed from several other studies. However, this type of Identification is needed relatively early in the course of diabetes.

A unique foot care program and strategies for patients with unilateral amputation are much sorted after; Consequentially, placing much emphasis on peripheral vascular assessment to identify patients at risk and those that are likely to benefit from timely intervention.

Declaration

Acknowledgments

Not applicable.

Funding

This case report has not been granted any financial and non-financial assistance from the public or non-public sources declared.

Availability of Data and Materials

Not Applicable.

Disclosures

Not Applicable.

Author's Contributions

The author did the conception, design, coordination, drafting, reading, and approval of the final manuscript.

Ethical Approval

Not Applicable.

Consent for Publication

A written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written permission is available for review by the Editor-in-Chief of this journal.

Competing Interests

None declared.

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