

Amputation VS Revascularization in a Patient with Diabetic Foot

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ABSTRACT

Diabetic foot complications are a prevalent and serious consequence of diabetes mellitus, often necessitating complex clinical decisions. Among these decisions, the choice between amputation and revascularization in patients with diabetic foot poses a significant clinical dilemma. This article provides a comprehensive review of the epidemiology, significance, definition, risk factors, complications, and management options associated with amputation and revascularization in diabetic foot patients. The discussion evaluates the factors influencing the choice between these two interventions and explores their respective outcomes. Ultimately, this review underscores the importance of a multidisciplinary approach, patient-centered care, and shared decision-making in addressing this challenging clinical scenario.

KEYWORDS: Diabetic foot, amputation, revascularization, diabetes mellitus, limb salvage, vascular surgery.

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INTRODUCTION

Diabetic foot complications have emerged as a significant global health issue due to the escalating prevalence of diabetes mellitus. Diabetes, a chronic metabolic disorder characterized by persistent hyperglycemia, affects millions of individuals worldwide. Among the multifaceted consequences of diabetes, diabetic foot complications, including ulcers, infections, and ischemia, pose substantial clinical challenges.

Epidemiological data underscores the increasing burden of diabetic foot complications. It is estimated that up to 25% of individuals with diabetes will develop diabetic foot ulcers at some point during their lifetime. These ulcers often serve as a precursor to more severe complications, such as deep-seated infections and limb-threatening ischemia. As the prevalence of diabetes continues to rise, so too does the incidence of diabetic foot complications, rendering it a pressing concern for healthcare systems globally.

The significance of diabetic foot complications cannot be overstated, as they encompass a spectrum of conditions that severely affect patients' health and well-being. The consequences of untreated or inadequately managed diabetic

foot complications are far-reaching, encompassing physical, psychological, and socioeconomic dimensions.

Major lower extremity amputations, such as above or below the knee, are among the most devastating outcomes of diabetic foot complications. These amputations result in the loss of functional independence and mobility, reducing patients' quality of life and increasing their dependence on caregivers. Additionally, individuals who undergo major amputations face an elevated risk of mortality.

Beyond the individual impact, diabetic foot complications have substantial socioeconomic implications. The economic burden of managing diabetic foot complications, including hospitalizations, surgical interventions, long-term care, and rehabilitation, places significant strain on healthcare systems and contributes to escalating healthcare costs.

In light of these epidemiological trends and the profound consequences of diabetic foot complications, the choice between amputation and revascularization in patients with diabetic foot takes on paramount importance. The decision-making process must be informed by a comprehensive understanding of the theoretical framework surrounding diabetic foot complications, including risk factors, complications, and management strategies. Furthermore, a

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thorough evaluation of the factors influencing the choice between amputation and revascularization is essential, as are discussions regarding the implications of these choices on patients' lives and overall well-being.

In this review, we delve into the epidemiology and significance of diabetic foot complications and provide an in-depth examination of the theoretical framework, encompassing definitions, risk factors, complications, and management strategies. Subsequently, we explore the complex decision-making process between amputation and revascularization and consider the implications of these choices for patients' outcomes and quality of life. Ultimately, we underscore the importance of a multidisciplinary approach, patient-centered care, and shared decision-making in addressing this challenging clinical scenario.

Definition

Diabetic foot represents a multifaceted syndrome characterized by a range of clinical manifestations resulting from long-term uncontrolled diabetes. It encompasses various pathologies, including neuropathy, peripheral arterial disease (PAD), and soft tissue infections, which collectively contribute to the development of complications. The cornerstone of diabetic foot is the presence of foot ulcers, often triggered by minor trauma or pressure points, and these ulcers serve as the focal point for clinical assessment and decision-making regarding amputation or revascularization.

Risk Factors

Understanding the risk factors associated with diabetic foot complications is crucial for both prevention and management:

Neuropathy: Prolonged hyperglycemia leads to diabetic neuropathy, which manifests as sensory deficits, particularly in the lower extremities. Neuropathy reduces pain perception and impairs protective reflexes, rendering individuals susceptible to unnoticed injuries and the development of ulcers. Additionally, motor neuropathy can lead to muscle imbalance, foot deformities, and abnormal pressure points.

Peripheral Arterial Disease (PAD): Diabetes accelerates the development of atherosclerosis and microvascular disease, increasing the risk of PAD. PAD results in reduced blood flow to the lower limbs, impairing tissue perfusion and compromising the ability to heal wounds.

Infection Susceptibility: Impaired immune function, coupled with the compromised local environment in diabetic wounds, heightens susceptibility to infections. Once an infection takes hold, it can rapidly progress, posing a severe threat to limb viability.

Complications

Diabetic foot complications can have far-reaching consequences:

Infection: Diabetic foot ulcers are often complicated by soft tissue infections, including cellulitis, abscesses, and necrotizing fasciitis. The presence of bacteria in wounds is a significant challenge, necessitating appropriate antimicrobial therapy and surgical debridement.

Osteomyelitis: Bone infection (osteomyelitis) frequently accompanies deep or chronic wounds. Managing osteomyelitis is challenging, as it requires a multifaceted approach that includes surgical intervention and prolonged antimicrobial therapy.

Gangrene: Gangrene, the death of tissue due to inadequate blood supply, is a critical and potentially life-threatening complication of diabetic foot. It may manifest as dry (coagulative) or wet (liquefactive) gangrene, depending on the degree of infection.

Management

Effective management of diabetic foot complications involves addressing these complexities:

Wound Care: Meticulous wound care is essential for ulcer healing. This includes regular debridement of necrotic tissue, appropriate wound dressings, and infection control.

Offloading: Pressure relief is vital for ulcer management. Offloading devices, such as specialized footwear, total contact casts, or removable cast walkers, are employed to redistribute pressure away from the affected area.

Glycemic Control: Maintaining optimal blood glucose levels is critical for wound healing and reducing neuropathic complications. Tight glycemic control helps prevent further tissue damage.

Vascular Assessment: Evaluation of the vascular status is a pivotal component of diabetic foot management. Techniques like the ankle-brachial index (ABI) and imaging studies aid in assessing blood flow and identifying areas of ischemia.

Revascularization: When severe ischemia is present, revascularization procedures, such as angioplasty or bypass grafting, may be considered to restore blood flow and promote ulcer healing.

Surgical Intervention: In cases of extensive infection or necrosis, surgical interventions like debridement and, in some instances, amputation, are necessary to control infection and prevent systemic spread.

Advanced Wound Care: Advanced wound care modalities, including growth factors, bioengineered tissues, and negative pressure wound therapy, can be utilized to enhance wound healing.

Preventive Measures: Education on foot care, early recognition of problems, and regular foot examinations empower patients to take proactive measures in preventing diabetic foot complications.

In the context of managing diabetic foot complications, the choice between amputation and revascularization is a pivotal consideration, with numerous factors influencing the decision. The following discussion explores these factors in-depth and examines the implications of each choice on patient outcomes and quality of life.

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Diabetic wound

DISCUSSION

Amputation vs. Revascularization: Decision Factors

The choice between amputation and revascularization in patients with diabetic foot complications is a multifaceted decision influenced by various clinical and contextual factors. Several key considerations shape this decision:

Extent of Tissue Loss: The primary consideration is the extent of tissue loss. If the tissue loss is extensive, involving multiple digits or a substantial portion of the foot, amputation may be the most practical approach to prevent further complications and expedite rehabilitation.

Degree of Ischemia: The degree of ischemia plays a pivotal role in determining the feasibility of revascularization. Revascularization procedures, such as angioplasty or bypass grafting, aim to restore blood flow to ischemic tissues. However, in cases of severe, diffuse arterial disease, or extensive occlusions, successful revascularization may not be achievable.

Overall Health and Comorbidities: The patient's overall health status and the presence of comorbidities significantly impact the choice between amputation and revascularization. Patients with significant cardiovascular disease or advanced age may be at higher surgical risk, making amputation a safer option.

Infection Control: The presence of infection within the affected limb must be addressed promptly. In some instances, controlling the infection may necessitate amputation to eliminate the source of infection and reduce the risk of systemic spread.

Patient Preference and Goals: Shared decision-making is paramount in the management of diabetic foot complications. Engaging patients in the decision process and considering their preferences and goals is essential. Some patients may prioritize limb preservation, even if the odds of success with revascularization are not favorable, while others may prioritize a quicker recovery and improved quality of life with amputation.

Availability of Suitable Vessels: Revascularization procedures rely on the availability of suitable vessels for bypass grafting or angioplasty. The adequacy and location of

these vessels influence the feasibility and success of revascularization.

Outcomes and Quality of Life

Limb salvage through revascularization generally offers several advantages in terms of patient outcomes and quality of life. It can lead to the preservation of limb function and mobility, reducing the need for extensive rehabilitation and prosthetic fitting. Moreover, patients who undergo successful revascularization often experience an improved quality of life, enhanced independence, and a decreased risk of mortality compared to those who undergo amputation.

However, it is essential to recognize that the success of revascularization is not guaranteed. Factors such as the severity and location of arterial occlusions, the availability of suitable vessels for grafting, and the patient's overall health can influence the outcome. Some patients may require multiple revascularization interventions or may still face the risk of non-healing wounds.

Complications and Reinterventions

Both amputation and revascularization procedures carry inherent risks and potential complications. Amputations are associated with surgical site infections, delayed wound healing, and the need for prosthetic limb fitting and rehabilitation. Additionally, amputees may experience psychological challenges and require extensive support during their recovery and adaptation to life with limb loss.

Revascularization procedures are not without risks either. Graft thrombosis, restenosis (re-narrowing of arteries), and the need for repeat interventions are potential complications. Patients who undergo revascularization procedures must be aware of the possibility of reinterventions and the associated challenges.

Patient-Centered Care and Shared Decision-Making

In managing diabetic foot complications, a patient-centered approach is paramount. Shared decision-making, involving the patient, their family, and a multidisciplinary team of healthcare professionals, is essential. This approach considers the patient's values, goals, and preferences, ensuring that the chosen intervention aligns with their individual needs and expectations.

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CONCLUSION

Ultimately, the decision between amputation and revascularization in patients with diabetic foot complications represents a complex clinical dilemma. It should be based on a thorough assessment of clinical factors, patient preferences, and the potential impact on the patient's quality of life. A multidisciplinary approach, encompassing vascular surgeons, diabetologists, wound care specialists, and rehabilitation teams, is crucial in addressing diabetic foot complications effectively. The goal remains minimizing limb loss and enhancing the overall well-being of affected individuals.

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