Thumb Abscess In An Uncontrolled Diabetic Mellitus: A Brief Case Study

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Abstract

Background: Diabetes mellitus, a highly common metabolic condition in India and globally, presents a significant disease burden to the healthcare system. In addition to a myriad of potential complications, the high risk of infections is a particular area of concern. In an uncontrolled diabetic patient, even a small injury or trauma raises the possibility

of developing a severe, fast-spreading infection. Infections in patients with diabetes are at the risk of progressing to an organ damage as well. Case Findings: We present a case report of a 58-year-old diabetic man, who was admitted to the surgical ward of a local tertiary care hospital. He presented with fever, thumb swelling and pain, along with erythema and pus discharge. These signs and symptoms were presented preceding an untreated rat bite during the last 10 days. Diagnosis, Interventions and Outcomes: Based on the history, physical examination and altered lab parameters, the clinician concluded it to be a case of abscess. After an initial pus collection, he was started on an antibiotic treatment; following which, an incision and drainage of the abscess was performed. An uncontrolled hyperglycemia was also managed by dose escalation and slight changes in the preexisting regimen. Timely antimicrobial and antihyperglycemic treatment, along with an efficient pus drainage proved to be beneficial in this case. Conclusion: Although the patient was vitally stable, it is likely for such conditions to take longer healing times, necessitating a focused care approach.

KEYWORDS: Diabetes mellitus; Abscess; Diabetic infection; Uncontrolled diabetes; Infection management.

Introduction

The frequency and risk of infections in diabetes are quite high, owing to a hyperglycemic pathogenesis [1]. This significantly increases the morbidity and mortality associated with the infection, marking it a major area of concern [2]. In diabetes, the metabolic derangement promotes an environment causing damaged inflammatory processes, making the patient susceptible to serious infections, which otherwise might be harmless. Moreover, people who have long-term diabetes frequently have microvascular and macrovascular disorders, which results in insufficient blood flow to the tissues and increased vulnerability to infections [3]. Research data has showcased skin, soft tissues, respiratory and urinary tracts to be the most commonly affected sites. Although any skin surface can be affected, foot infections are the most commonly observed [4]. Furthermore, when diabetic neuropathy-related decreased sensitivity causes injuries to go undetected, the

skin's ability to act as a barrier against infections may be compromised [5].

For the treatment of mild infections, the use of first-generation cephalosporins or penicillinase-resistant synthetic penicillins has shown promising results. However, care must be taken when selecting antibiotics due to the rising incidence of community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA) [6-8]. Compared to individuals without diabetes, persons with diabetes do not appear to have higher rates of CA-MRSA [9]. Complicating wounds such as cutaneous ulcers, necrotizing infections are frequently caused by a variety of microorganisms, including streptococci, enterococci, S. aureus, Enterobacteriaceae, and anaerobes. For diabetic individuals, getting radiographs for soft tissue infections is essential to identifying distinctive necrosis [10]. Gram stains and surface cultures offer limited benefit [11]. For necrotizing infections or those with abscess formation, surgical debridement and drainage is a crucial procedure [12]. Figure 1 diagrammatically showcases the primary pathological changes leading to an enhanced susceptibility to infections in diabetes patients.

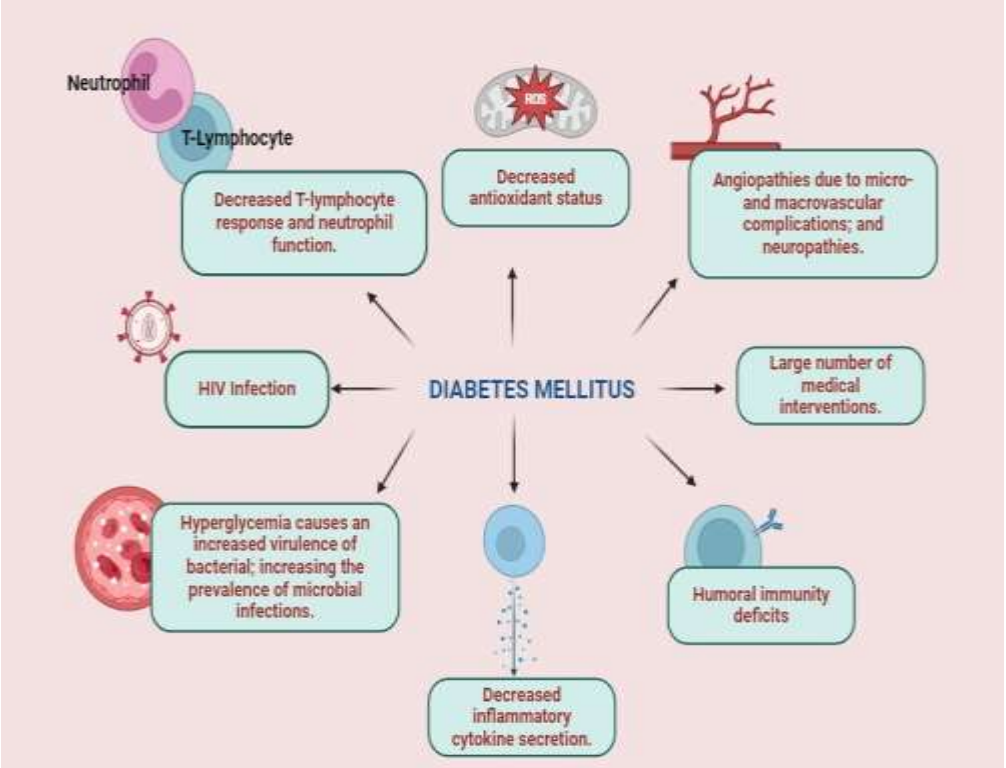

Figure 1. Pictorial representation of the etiological conditions supporting the pathogenesis of microbial infections in diabetes mellitus.

Clinical Presentation

A male patient, aged 58, with a body mass index of 25.7, comes in with a medical history that of type II diabetes mellitus. Notably, the patient has been taking care of this illness for the last ten to twelve years. He has previously used Ayurvedic remedies in place of pharmaceuticals. The patient's surgical history includes procedures such as a hemorrhoidectomy that was done five years ago and a fistula operation that was done seven years ago. His extensive medical history offers a framework for comprehending his current clinical presentation, highlighting the necessity for a sophisticated strategy to address the interactions between Ayurvedic treatments, diabetes management, and the effects of prior surgeries on his general health. Upon admission, the patient complained of left thumb swelling and pain that had persisted for the previous ten days when he was admitted. The patient's history of a rat bite to the left thumb and the beginning of symptoms were related. Prior to this episode, the patient had no symptoms. He then gradually began to swell, hurt, and developed a fever. Notably, there was heat and pus discharge on the left thumb. These signs point to a localized inflammatory reaction that may have been caused by the rat bite. To treat the infection and lessen the discomfort, a complete evaluation and the necessary medical intervention was required.

Results from diagnostic tests supported the patient's clinical presentation. Subcutaneous edema was seen on the ultrasound of the small parts at the local location, together with thickening and edematous changes in the skin above. The echocardiography, meanwhile, yielded normal findings. Haematological parameters indicated an inflammatory response with an elevated white blood cell count, primarily neutrophils. Among the other noteworthy lab results was an increased HbA1c level of 10.2%, suggestive of poorly managed diabetes. The liver function was reflected from the SGPT level, which was out of the normal, laboratory suggested reference range. Furthermore, electrolyte abnormalities were demonstrated with a normal potassium level and a slightly lower sodium level. The patient's higher blood glucose levels (246 mg/dL) highlighted the necessity for comprehensive care that addresses both the viral component and glycemic control.

Taking into account the patient's reported complaints, medical history, and clinical manifestations, along with the results of diagnostic tests, including the ultrasound of small parts, the

conclusive diagnosis for this case was a left thumb abscess. The localized swelling, pain, and redness, coupled with the presence of pus discharge and subcutaneous edema observed in the ultrasound, collectively supported the identification of abscess. The laboratory findings, particularly the elevated white blood cell count, further underscored the inflammatory nature of the condition.

Therapeutic Interventions

After being admitted, the patient complained of left thumb swelling, discomfort, redness, and pus discharge; a left thumb abscess was eventually identified. Levofloxacin was started following pus collection at the suggestion of an orthopedic specialist. An incision and drainage of the abscess treatment was carried out the next day. Concerns about uncontrolled sugar levels were addressed by ongoing medical management, which included checking blood glucose levels five times a day (BBF, BL, AL, BD, AD). Subsequent adjustments included the addition of a combination of Vildagliptin plus Metformin (50/500mg) and an increase in Basalog (14 U subcuatenously). This comprehensive treatment plan integrated both procedural intervention and medication adjustments, reflecting a multidisciplinary approach to address the left thumb abscess and manage associated factors such as uncontrolled diabetes. The treatment plan has been summarized in Table 1. Under Table 2, a day-wise therapy administration has also been depicted.

Table 1: Representation of the treatment plan administered to the patient during is hospital stay.

Generic Content	Dose	Route	Frequency
Cefoperazone /Sulbactam	1.5 gm	IV	1-1-1
Levofloxacin	500 mg	IV	1-0-0
Pantoprazole /Domperidone	40/30mg	P/O	1-0-1
Diclofenac/Paracetamol	50/500mg	P/O	1-0-1
Diclofenac	75mg	IV	1-0-1
Tramadol	50mg	IV	1-1-1
Fluconazole	200 mg	P/O	1-0-0
Trypsin/Chymotrypsin	1,00,000 AU	P/O	1-1-1
Levofloxacin	500 mg	P/O	1-0-0
Insulin Glargine	12 U	S/C	HS

Human Insulin	BBF- 6U BL- 8U BD- 8U	S/C	1-1-1
Vildagliptin /Metformin Hydrochloride	50 /500 mg	P/O	1-0-1
Protein Powder		P/O	1-1-1

Table 2: A summarized day-wise therapeutic plan administered to the patient.

Agent	**1**	**2**	**3**	**4**	**5**	**7**	**8**	**9**	**10**	**11**	**12**
Cefoperazone /Sulbactam	✓	✓	✓	✓	✓						
Levofloxacin	✓	✓	✓	✓							
Pantoprazole /Domperidone	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Diclofenac/Paracetamol	SOS										
Tramadol	✓	✓	✓	SOS							
Fluconazole			✓	✓	✓	✓	✓	✓	✓	✓	✓
Trypsin/Chymotrypsin					✓	✓	✓	✓	✓		
Levofloxacin					✓	✓	✓				
Insulin Glargine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Human Insulin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vildagliptin /Metformin Hydrochloride							✓	✓	✓	✓	✓
Protein Powder					✓	✓	✓	✓	✓	✓	✓

Discussion

An abscess is buildup of pus that affects different anatomical parts of the human body. This illness can present in a variety of ways, such as cutaneous abscesses or cases that arise close to internal organs [13]. Notable symptoms to look out for when inspecting a skin abscess include redness and swelling. When an infection is present, a complete course of treatment entails drug delivery in addition to abscess drainage and excision of all affected tissues. An additional issue in the case of a diabetic patient is their weakened immune system, which might result in the development of an untreated thumb abscess from a rat

bite. Because of the patient's diabetes, a lengthy natural healing phase is expected, requiring careful and constant wound care with frequent dressing changes [14-15]. In addition, the patient's high blood sugar levels necessitate ongoing RBS testing in order to guarantee the best possible care for his diabetes.

The patient in the current study was administered a combination of antibiotic and antifungal agents, along with anti-inflammatory agents. His diabetes mellitus was also managed with a combination of insulin glargine and human actrapid insulin, in addition to a DPP4 inhibitor and a biguanide. A broad-spectrum antibiotic, Cefoperazone/Sulbactam was selected to treat bacterial infections linked to the abscess. Another antibiotic that worked on a variety of bacterial infections was Levofloxacin. Dopamine-related gastrointestinal symptoms and potential acidity were treated with Pantoprazole and Domperidone. Diclofenac and Paracetamol worked together to reduce pain and inflammation by having analgesic and anti-inflammatory properties. For pain alleviation, centrally acting analgesic tramadol was also used. In an immunocompromised state, any fungal infections are usually treated with the antifungal drug Fluconazole, which was also the case here. Insulin Glargine and Human Insulin were used to manage the diabetic patient's blood sugar levels [16-17].

Insulin resistance was addressed with Vildagliptin/Metformin hydrochloride, which also enhanced insulin secretion. In the case of the thumb abscess, protein powder administration was intended to promote tissue repair and general recovery, both of which are essential for successful wound healing. The patient’s hospital stay was uneventful and he was discharged after receiving 12 days of treatment. On discharge, he was prescribed with a further oral antibiotic treatment, antihyperglycemic regimen and counselling on the importance of regular blood sugar home monitoring and infection control.

CONCLUSION

Although the patient's vital signs remained stable, the specific combination of diabetes and the abscess increases the risk of a lengthy healing period, necessitating a targeted and sophisticated care plan. With innate difficulties associated with diabetes, like a weakened immune system and reduced wound-healing mechanisms: a prolonged period of recovery is expected. This emphasises how important it is to monitor

closely and use customised interventions to reduce the risk of problems. The prolonged healing time is closely associated with the complex physiological environment associated with diabetes, where high blood sugar levels impair the body's capacity to fight infections as well as the normal course of tissue repair processes. In order to address the complexities of abscess management in the diabetic context and ensure the best possible outcomes for patients, it is essential that a greater focus be placed on individualised and attentive care.

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Authors Contribution

All authors are contributing in the concept of study design, implementation and manuscript writing, revision and to prepare the final draft of manuscript.

Conflict of interest statement

Authors declare they do not have any conflict of interest.

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Data Availability

Upon request the corresponding author will provide the data of study.

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