

From a Traditional Treatment to a Major Amputation: A Zootherapy-Induced Necrotizing Soft Tissue Infection

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Abstract

Necrotizing soft tissue infections (NSTIs) are rapidly progressive and often life-threatening clinical conditions. If not diagnosed early, they can lead to serious outcomes such as sepsis, vascular complications, and limb loss. This case presents a necrotizing soft tissue infection (NSTI) that is rarely reported in the literature in Turkey; it developed after a zootherapy intervention, was complicated by arterial occlusion, and resulted in an above-knee major amputation. A 90-year-old male patient did not adhere to the recommended medical treatment after an ankle sprain and instead applied raw sheep lung to the injured area for six days. Following this traditional zootherapy attempt, he returned with widespread erythema, edema, foul-smelling discharge, and signs of systemic inflammation. His Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score was calculated as 8, and he was managed under the presumptive diagnosis of NSTI. In addition to antibiotic therapy, wound care was administered; however, on the eighth day, an acute arterial occlusion developed, and the patient was referred to a tertiary care center. Despite all treatments, no clinical improvement was achieved and an above-knee amputation was performed. Traditional practices such as zootherapy can cause rapidly progressing infections and irreversible clinical outcomes, especially in elderly individuals with comorbid conditions. In this context, increasing healthcare professionals' sensitivity to traditional treatment practices and raising public awareness about the potential risks of these interventions are of great importance for early intervention and the prevention of complications.

Keywords: Amputation, necrotizing soft tissue infection, traditional treatment, zootherapy

Introduction

In communities where health literacy is low or access to healthcare services is limited, non-evidence-based traditional treatment methods are frequently used (1). Many of these interventions, applied after traumatic injuries and lacking sterile conditions, can lead to serious complications such as soft tissue infections and tissue necrosis (2).

Necrotizing soft tissue infections (NSTIs) are severe infections that spread rapidly through the skin, subcutaneous tissue, fascia and, in some cases, muscle, and despite their rarity, they carry high mortality rates. The disease often begins with nonspecific clinical findings such as fever, localized pain, and erythema; this can delay diagnosis and result in delayed treatment. NSTIs are associated with serious complications such as rapid clinical deterioration, sepsis, multiorgan failure, and limb loss. Therefore, early diagnosis, prompt initiation of broad-spectrum antibiotic therapy, and urgent surgical debridement are crucial for improving prognosis (3).

Zootherapy is a traditional practice defined as the direct application of animal organs, tissues, or secretions to the body for therapeutic purposes. Although these methods have been used for centuries in some regions, their lack of scientific validity and failure to adhere to sterilization practices can set the stage for serious infections (4). Practices such as applying animal organs directly to injured tissue are rarely reported in the literature, but such interventions can increase the risk of secondary bacterial contamination in affected tissues (5). Particularly in elderly individuals with comorbid diseases, these infections may follow a refractory course and can lead to severe outcomes such as sepsis, vascular complications, or even amputation (6). The potential for non-sterile traditional practices to cause serious infections has also been demonstrated by cases such as necrotizing fasciitis after wet cupping therapy (7) and soft tissue infections following catgut acupuncture using animal-derived threads (8).

In this case, we present a rare and severe clinical scenario of widespread cellulitis, soft tissue necrosis, arterial occlusion, and ultimately a major amputation that developed following

the application of non-sterile sheep lung tissue after an ankle injury. The case highlights the devastating complications that zootherapy, a practice outside of modern medicine, can cause, especially in elderly individuals with comorbid conditions. To our knowledge, this case is one of the few reported in Turkey of a necrotizing soft tissue infection arising from an animal tissue-based zootherapy practice, and it provides a unique contribution to the literature.

Case Report

A 90-year-old male patient presented to the emergency department after an ankle sprain. Physical examination and radiological evaluation revealed no bone pathology (Figure-1). No open wound was observed at the trauma site, but a minimal superficial abrasion was present on the skin. A plaster splint was applied, and elevation and cold compresses were recommended. However, after discharge, the patient did not follow medical advice: he removed the splint and wrapped raw sheep lung directly around the injured area, continuing this practice for six days. This traditional remedy, believed to relieve pain and swelling, falls under the concept of zootherapy, wherein animal tissues are used for healing.

Six days later, the patient presented again to the emergency department with widespread erythema, edema, increased local warmth, foul-smelling discharge, and signs of systemic inflammation in the left foot and lower leg (Figure-2,3). His medical history included hypertension, type 1 diabetes mellitus, chronic obstructive pulmonary disease (COPD), and coronary artery disease (CAD). Laboratory findings were as follows: C-reactive protein (CRP) 180.4 mg/L, white blood cell count (WBC) $19.65 \times 10^3/\mu\text{L}$, glucose 244 mg/dL, creatinine 1.07 mg/dL, sodium 132 mmol/L, and hemoglobin 14.5 g/dL. Based on these results, the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score was calculated to be 8. The combination of a widespread inflammatory response following raw animal tissue contact, a history of diabetes, rapidly worsening local infection signs, and a high LRINEC score pointed to a strong possibility of NSTI. In light of the clinical and laboratory findings, along with the history of zootherapy, management was initiated under the presumptive diagnosis of NSTI.

CT angiography of the lower extremity was performed to evaluate potential vascular complications. Imaging revealed diffuse atherosclerotic plaques at the level of the terminal aorta and left iliac artery, approximately 50–60% stenosis in the left iliac arterial system, and significant subcutaneous edema in the left lower leg and foot. Consultations were obtained from the infectious diseases and cardiovascular surgery departments. The cardiovascular surgery team did not recommend any interventional procedure and opted for medical management. The patient was admitted to the infectious diseases department for further treatment.

During hospitalization, only blood cultures were obtained; no samples were taken from the wound site, a significant shortcoming in the management. The lack of wound culture prevented definitive identification of the

causative microorganism and limited targeted therapy. The blood culture grew coagulase-negative staphylococci, which was interpreted as contamination from skin flora. Empiric broad-spectrum antibiotic therapy with meropenem, tigecycline, and amikacin was initiated. Simultaneously, wound care was performed by the plastic surgery team.

On the eighth day of hospitalization, physical examination revealed coolness, pallor, and loss of peripheral pulses in the left foot. A repeat CT angiography showed maintained flow in the posterior tibial artery but no flow in the anterior tibial and dorsalis pedis arteries. The findings were consistent with an acute arterial occlusion (Figure-4). The patient was transferred to a higher-level center for advanced wound care and possible revascularization procedures.

At the referral center, despite all medical and interventional treatments, no clinical improvement was achieved. With progressive ischemia and tissue necrosis, an above-knee amputation of the left lower extremity was performed. However, because the amputation was performed at another institution, the microbiological or histopathological examination results of the removed tissues were not accessible to us. Therefore, the histological nature of necrosis could not be determined.

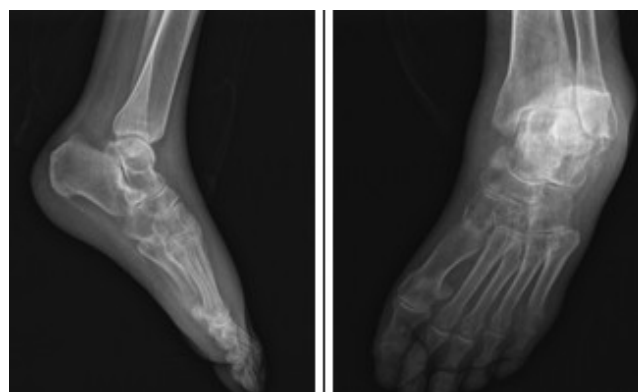


Figure 1. Radiological image with no bone pathology



Figure 2. Plantar view of the affected foot showing extensive erythema, necrotic changes, and purulent foci



Figure 3. Lateral view of the same foot demonstrating diffuse edema, ecchymosis, and ulcerated lesions



Figure 4. CT angiography with acute arterial occlusion

Discussion

Traditional practices like zootherapy, involving the use of animal products for treatment, persist especially in rural communities. However, because such practices lack sterile conditions, they can predispose individuals to infectious complications. According to the World Health Organization's report on traditional and complementary medicine, the

uncontrolled use of animal tissue-based interventions can lead to severe allergic reactions, toxicity, and life-threatening infections (1). This case illustrates a rare clinical scenario characterized by a rapidly progressive NSTI that developed after the traditional application of raw sheep lung.

Although the skin integrity appeared to be intact after the trauma, the presence of minimal dermabrasion and direct contact with raw animal tissue created a suitable biological environment for a severe infection to develop. The literature has reported that such traditional practices can result in complications like granulomas, cellulitis, abscesses, and, albeit rarely, necrotizing fasciitis (7,8). Furthermore, comorbid conditions such as diabetes, advanced age, and peripheral vascular disease are defined risk factors for the development of NSTI (2,9). The LRINEC score is a laboratory scoring system widely used in the diagnosis of NSTI, comprising six parameters (C-reactive protein, leukocyte count, hemoglobin, sodium, creatinine, and glucose levels). A score of ≥ 6 indicates significant risk, and a score ≥ 8 indicates a high-risk level (10). In this patient, the presence of these predisposing factors, along with a high LRINEC score of 8, strongly supported the likelihood of NSTI.

Although the CT angiography did not detect typical radiological signs of necrotizing fasciitis, such as gas accumulation or fluid collections along the fascial planes, this is not sufficient by itself to rule out NSTI. The literature indicates that imaging modalities play an adjunct role in NSTI diagnosis; however, particularly in the early stage, these findings may not always be detectable (11,12). Therefore, in cases suspected of NSTI, clinical evaluation, the presence of comorbidities, and laboratory-based scoring systems like LRINEC are prioritized as key determinants in the diagnostic process. Indeed, in the present case, despite inconclusive radiological findings, the patient's clinical course, associated risk factors, and high LRINEC score prompted treatment under the presumptive diagnosis of NSTI, and the subsequent severe vascular complications and invasive nature of the infection validated this approach.

The fact that only blood culture was obtained in this case can be considered a significant limitation. Not performing deep tissue sampling or obtaining a wound culture hindered precise identification of the pathogen and made it more difficult to guide antibiotic selection. Current literature shows that in patients with suspected NSTI, obtaining a wound culture early in the course both increases diagnostic clarity and allows for targeted therapy (13,14). Despite this deficiency, the empiric broad-spectrum antibiotic regimen initiated in our patient appears to have been appropriate and in line with combinations recommended in the literature (2,15).

The arterial occlusion observed in our patient is one of the serious vascular complications that can develop during NSTI. This occlusion typically arises from the inflammatory reaction in infected tissue, endothelial damage, and local edema compressing the arterial lumen. Although the main mechanism of vascular occlusion in NSTI is inflammation and pressure from surrounding tissues, on rare occasions septic thrombophlebitis

or direct microbial invasion of the arterial wall can occur. On CT angiography, arterial narrowing or occlusion is usually associated with local vascular edema and perivascular inflammation. This situation impairs distal tissue perfusion, contributing to ischemia and necrosis (2,12,16). In our patient, the inflammation and local edema caused by the infection compressed the arterial lumen, leading to an arterial occlusion. This occlusion compromised distal perfusion and led to further progression of ischemia and necrosis. The ensuing vascular insufficiency and spread of infection rendered conservative treatment and revascularization attempts ineffective; consequently, an above-knee amputation was required. This sequence of events demonstrates that vascular complications in NSTI play a critical role in disease progression and treatment success.

This case draws attention to the severe outcomes that can result from traditional treatment methods like zootherapy. Diagnosing serious infections such as NSTI can be difficult. Especially in regions where traditional practices are prevalent, an incomplete or misleading patient history can delay the diagnostic process. This necessitates enhancing healthcare workers' awareness of traditional treatment practices and improving their traditional sensitivity. Additionally, community education and public health initiatives regarding the risks of these practices are vitally important for the prevention of infections and timely intervention (17). An approach in emergency care that is traditionally sensitive and aware of traditional practices will expedite diagnosis and improve the quality of patient care.

Conclusion

Traditional practices lacking a scientific basis can lead to severe infections and irreversible complications, especially in older individuals with underlying chronic diseases. As seen in the presented case, a necrotizing soft tissue infection that developed after contact with raw animal tissue was accompanied by serious vascular complications such as arterial occlusion and resulted in a major amputation. This underscores the need to increase clinicians' awareness of traditional treatment practices and the importance of early diagnosis and rapid intervention in similar cases. Moreover, the public should be informed about the risks of such practices and preventive strategies should be developed from a public health perspective.

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