Case Report

# Necrotising Fasciitis and Traditional Medical Therapy – A Dangerous Liaison

Yi-Jia Lim,[1] *MBBS, MRCS (Edin), M Med (Ortho)*, Fok-Chuan Yong,[2] *MBBS, FRCS (Glas), FAMS*, Chin-Ho Wong,[1] *MBBS, MRCS (Edin), M Med (Surg)*, Agnes BH Tan,[1] *MBBS, FRCS (Edin & Glas), FAMS*

## Abstract

**Introduction: Necrotising fasciitis is a disease associated with high morbidity and mortality, and multi-focal necrotising fasciitis is uncommon. We present 2 cases of concurrent necrotising fasciitis of contralateral upper and lower limbs. Clinical Picture: Both presented with pain, swelling, bruising or necrosis of the affected extremities. Traditional medical therapy was sought prior to their presentation. Treatment: After initial debridement, one patient subsequently underwent amputation of the contralateral forearm and leg. The other underwent a forearm amputation, but refused a below-knee amputation. Outcome: The first patient survived, while the second died. Conclusion: Traditional medical therapy can cause bacterial inoculation, leading to necrotising fasciitis, and also leads to delay in appropriate treatment. Radical surgery is needed to optimise patient survival.**

**Ann Acad Med Singapore 2006;35:270-3**

**Key words: Amputation, Debridement, Limb**

## Case Reports

*Case 1*

The first case was a 54-year-old lady, with a history of insulin-dependent diabetes mellitus and hyperlipidaemia, who presented with bilateral hand pain and stiffness of 4 days' duration.

She initially sought treatment for her symptoms from a traditional healer, and underwent moxibustion for her right foot pain and acupuncture over the dorsum of her left hand.

She presented to us 3 days later with progressive left hand and right foot and leg pain and swelling, as well as fever. Clinically, she was flushed, hypotensive and tachycardic. She had left hand and forearm swelling, severe tenderness, and bruising (Fig. 1). Her right hand was uninvolved. She also had similar swelling, tenderness and bruising of the right foot extending to the level of the thigh (Fig. 2).

She was diagnosed to have necrotising fasciitis, and was fluid-resuscitated, as well as started on broad-spectrum antibiotics, including intravenous clindamycin. She underwent emergency debridement of her left upper and right lower limbs. Intraoperative findings confirmed necrotising fasciitis of the affected regions. Intraoperative gram staining of the infected tissue showed gram-positive cocci, and she was subsequently started on intravenous immunoglobulin.

Postoperatively, she required ionotropic support and continued intubation in view of her ongoing sepsis and haemodynamic instability.

The next morning, review showed that she had developed duskiness of her left upper limb and right lower limb. In view of her continued sepsis, and impending gangrene of the left upper limb and left lower limb, she underwent a left below-elbow amputation and a right above-knee amputation.

Her condition stabilised postoperatively. Group B *Streptococcus* was cultured from both the upper and lower limb lesions. Her left forearm stump required one further debridement, and subsequently healed well. Her right lower limb stump suffered from wound breakdown, and required multiple debridements prior to closure with split skin grafting.

*Case 2*

The second patient was a 72-year-old gentleman who presented with right upper limb and left lower limb pain for 2 weeks.

He had previously consulted a traditional healer and had been treated with oral medication for 2 weeks. He presented

[1] Department of Hand Surgery
[2] Department of Plastic Surgery
Singapore General Hospital, Singapore
Address for Reprints: Dr Lim Yi-Jia, Department of Hand Surgery, Singapore General Hospital, Outram Road, Singapore 169608.
Email: lim.yi.jia@singhealth.com.sg

Fig. 1. The dorsum of the left hand with swelling and patchy bruising of the skin in Case 1.

Fig. 3. The dorsum of the right hand and distal forearm with necrotic soft tissue in Case 2.

to us 2 weeks after his initial symptoms, with progressively worsening swelling of the affected limbs, difficulty in ambulation, and fever.

On examination, he was alert, but febrile. There was swelling, erythema, bullae and skin necrosis with severe tenderness over the dorsum of the right hand and forearm (Fig. 3), as well as similar findings in the left leg and foot.

He was diagnosed to have necrotising fasciitis of the right upper and left lower limbs, and was started on broad-spectrum antibiotics. He underwent emergency debridement of the affected limbs on the same day. Intraoperatively, there was necrotising fasciitis of the dorsum of the right upper limb from the hand up to the distal forearm, and the dorsum of the left foot up to the proximal calf. *Pseudomonas aeruginosa* and *Acinetobacter baumanii* were cultured from the upper limb, while Group A *streptococcus* and *A. baumanii* were cultured from the lower limb.

In view of progressive, ascending infection, and the presence of an exposed right dorsal wrist joint and exposed multiple extensor tendons, he underwent a right below-elbow amputation on the third postoperative day. A repeat debridement of the left leg was performed in the same sitting.

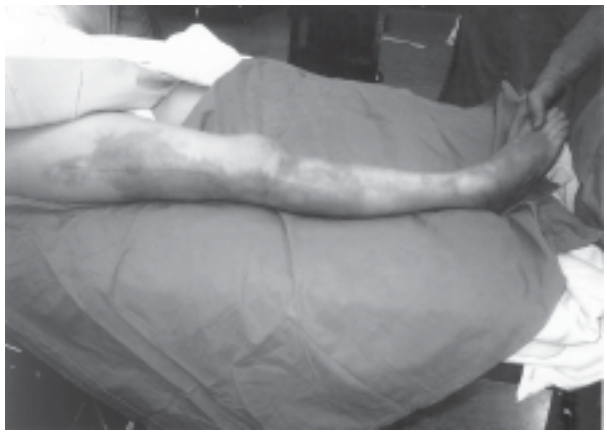

Fig. 2. The lateral aspect of the right lower limb and dorsum of the foot demonstrating extensive bruising in Case 1.

Though his right upper limb infection was finally controlled, his left leg wound condition worsened. Unfortunately, the patient declined further surgery, and the patient passed away from complications of overwhelming sepsis 11 days after admission.

## Discussion

Necrotising fasciitis is an uncommon infection, especially in the upper limb. In Wong et al's series[1] of 89 patients with necrotising fasciitis, lower limb disease was the most common (69.7%), while only 10.1% of all cases were that of upper limb necrotising fasciitis. In Brook and Frazier's series[2] of 83 patients with necrotising fasciitis, 16.9% involved the lower limbs, while upper limb necrotising fasciitis only comprised 6% of all cases. In a series of 46 upper limb infections reported by the Department of Orthopaedic Surgery in the University of Illinois,[3] only 4 patients were initially diagnosed to have necrotising fasciitis. In our own department, we have treated between 3 to 5 cases (average 4.3 cases) of necrotising fasciitis of the upper limb each year over the last 6 years.

The majority of patients with necrotising fasciitis present with a single focus of disease. In the literature, there are few reports of multi-focal necrotising fasciitis.[4-6] Basaran et al[5] reported a case of cryptococcal necrotising fasciitis in a middle-aged renal transplant patient on immuno-suppressive therapy. The patient suffered from bilateral lower limb necrotising fasciitis, which responded to debrided and systemic anti-fungal therapy. Nakamura et al[7] also reported a case of multi-focal necrotising fasciitis involving the face, and the upper and lower limbs in a young lady with no previous morbidity and inciting event. She presented over a period of 3 weeks with low-grade fever, and nodules, erythema, and swelling and pain in the face, right upper limb and thighs, which was initially treated with oral antibiotic therapy. After presentation to

the author, the patient was diagnosed to have necrotising fasciitis, and eventually underwent multiple debridements. The patient eventually recovered. Interestingly, no organisms were isolated despite multiple cultures. Both our patients presented with involvement of contra-lateral upper and lower limbs, which is similar to the 2 case reports mentioned in that the foci occurred in a non-contiguous fashion. Such clinical presentation of necrotising fasciitis is unusual and rare.

Though it is well documented that the risk factors for necrotising fasciitis include diabetes mellitus, chronic alcoholism, immunosuppressed patients, IV drug users, and patients with peripheral vascular disease,[7] necrotising fasciitis also occurs in young, previously healthy individuals.[6,8,9] This is particularly so in group A streptococcus-related necrotising fasciitis. Our first patient was diabetic, while the second had no predisposing risk factors.

What is notable in both patients was that early in their disease presentation, they had sought the help of traditional healers. It is a common practice in the loco-regional context to seek traditional forms of medication, especially in the older and rural populations.[10,11] In Case 1, there was a high possibility of a cause-effect relationship between the use of acupuncture and moxibustion, and the onset of necrotising fasciitis. Saw et al[12] have reported a case of necrotising fasciitis of the lower limb after the use of acupuncture for symptom relief for osteoarthritis. Both moxibustion and acupuncture create small breaks in the skin, which become potential portals of entry for bacterial seeding and pathogenesis. In Case 2, there was no known inciting cause for his disease, although bacterial inoculation in another part of the body may have resulted from bacterial seeding via a haematological route secondary to a break in skin.[13] This may account for the fact that necrotising fasciitis with an unknown preceding event may occur in up to 50% of cases.[1]

Necrotising fasciitis is well-known to be difficult to diagnose, as the early signs of erythema, tenderness, and swelling, with fever, may often be mistaken for superficial infections such as cellulitis.[13] A high index of suspicion is required. According to Wong et al,[1] only 14.6% of 89 cases had initial diagnoses of necrotising fasciitis. The common early diagnoses included those of cellulitis (58.4%) or abscess (18.0%). Patients in the early course of disease may present with only mild symptoms and no systemic toxicity. As such, this may affect health-seeking behaviour adversely, and even upon presentation to medical practitioners, the condition can often be initially misdiagnosed as other less severe conditions. The resultant delay in the institution of appropriate treatment can have grave consequences. While certain traditional forms of medication may be effective in certain conditions, the use of traditional healing methods, particularly in Case 2, led to a delay in appropriate treatment of their conditions, allowing fulminant disease progression.

The polymicrobial nature of necrotising fasciitis in general has been well documented in Brook and Fraziers' analysis of the microbiological profile of necrotising fasciitis, where aerobic, anaerobic, and mixed bacterial growth were all cultured. In Case 1, Group B *streptococcus* was cultured from both the upper and lower limb lesions at the first surgery, while a polymicrobial picture was seen in Case 2. *P. aeruginosa* and *A. baumanii* were cultured from the upper limb, while Group A *streptococcus* and *A. baumanii* were cultured from the lower limb. While the refusal of radical surgery for the lower limb may have contributed to the progressive sepsis and subsequent demise of the second patient, it has also been shown that Group A *streptococci* produce many constituents that contribute to their pathogenicity, including that of surface proteins (e.g., M protein) that inhibit phagocytosis, and streptococcal pyrogenic exotoxins (SPEs) types A, B and C. These induce cytotoxic responses, initiating shock-like symptoms.[14]

Regardless of the stage of disease presentation, the treatment of this condition requires multidisciplinary, aggressive treatment, involving resuscitation, blood pressure support, and early intensive care. Broad-spectrum antibiotics covering gram-positive, gram-negative and anaerobic bacteria should be initiated early. Antimicrobial therapy should then be appropriately tailored to culture and susceptibility results.[15] While high-dose penicillin has traditionally been the drug of choice for necrotising fasciitis, clindamycin has been experimentally shown to be more effective than penicillin against *Streptococcus* spp.[16] Urgent debridement is crucial, as thrombosis of superficial vessels in necrotising fasciitis impairs effective antibiotic penetration to the site of infection and tissue hypoxia impairs the oxidative killing mechanism of leukocytes. This leads to the inevitable accumulation of bacterial load and associated toxins.[17] Urgent, radical and definitive surgery that debrides all necrotic tissue and drainage of all fascial planes via fasciotomy till healthy fascial planes are encountered is essential for life-saving. Early aggressive surgery (within 24 hours of admission) has been associated with increased survival.[1,18] In recent years, the use of adjunctive treatment such as intravenous human immunoglobulin[19] and hyperbaric oxygen[20] has also been investigated.

Given the cultural practices and the continued presence of and reliance on traditional forms of medication in disease treatment in our local population, we believe that there will continue to be cases of advanced necrotising fasciitis with late presentation. We should focus on educating

patients, especially those who are diabetic, to take precautionary measures to avoid trauma to their extremities. They should also be taught to inspect their limbs daily for possible sites of trauma and infection. This is necessary as many diabetics suffer from neuropathy, and may not be aware of any trauma sustained to the extremities in the course of the day. The general population should also be cautioned regarding the use of traditional medical therapy as first-line treatment. This is particularly so when therapy involves invasive procedures, which may lead to bacterial seeding. However, despite these efforts, should patients present with advanced necrotising fasciitis, we suggest that radical and definitive surgery at the outset should include the consideration of primary amputation of the affected limbs. Though the morbidity is great, amputation allows definite control of the septic focus,[21-23] reduced need for repeated general anaesthesia in a septic patient (who may often have multiple comorbidities), as each operation and anaesthetic poses a significant risk to the patient.

In conclusion, in our cultural setting, where traditional medicine is currently practiced, patients may suffer from necrotising fasciitis resulting from such treatment, and those with early necrotising fasciitis who seek such treatment will delay the institution of appropriate treatment. As such, they often present with advanced local disease with systemic sepsis. Our approach should be twofold: The first is the education of patients at risk, and the general population; secondly, we must achieve early and aggressive treatment. The principles of aggressive treatment in resuscitation, antibiotic therapy, and surgery remain. However, in this exceptional group of patients, we suggest that early, or even primary amputation in extremity necrotising fasciitis be considered as a life-saving procedure. This is particularly true in both our patients, where there was bi-focal disease and probably exceptionally high bacterial loads. In necrotising fasciitis, a radical approach to treating these patients will always remain, and the contrasting outcome of both patients emphasize this fact.

***Acknowledgements***

*We would like to thank Dr Gavin CW Kang and Ms Jane Wong in the research of this case report.*

REFERENCES

1. Wong CH, Chang HC, Pasupathy S, Khin LW, Tan JL, Low CO. Necrotizing fasciitis: clinical presentation, microbiology, and determinants of mortality. J Bone Joint Surg Am 2003;85-A:1454-60.
2. Brook I, Frazier EH. Clinical and microbiological features of necrotizing fasciitis. J Clin Microbiol 1995;33:2382-7.
3. Gonzalez MH, Bochar S, Novotny J, Brown A, Weinzweig N, Prieto J. Upper extremity infections in patients with diabetes mellitus. J Hand Surg (Am) 1999;24:682-6.
4. Umbert IJ, Winkelmann RK, Oliver GF, Peters MS. Necrotizing fasciitis: a clinical, microbiologic, and histopathologic study of 14 patients. J Am Acad Dermatol 1989;20:774-81.
5. Basaran O, Emiroglu R, Arikan U, Karakayali H, Haberal M. Cryptococcal necrotizing fasciitis with multiple sites of involvement in the lower extremities. Dermatol Surg 2003;29:1158-60.
6. Nakamura S, Nakayama K, Mikami H, Imai T. Multiple necrotizing fasciitis: its etiology and histopathological features. J Dermatol 1987;14:604-8.
7. Voros D, Pissiotis C, Georgantas D, Katsaragakis S, Antoniou S, Papadimitriou J. Role of early and extensive surgery in the treatment of severe necrotizing soft tissue infections. Br J Surg 1993;80:1190-1.
8. Stevens DL, Tanner MH, Winship J, Swarts R, Ries KM, Schlievert PM, et al. Severe group A streptococcal infections associated with a toxic shock-like syndrome and scarlet fever toxin A. N Engl J Med 1989; 321:1-7.
9. Chelsom J, Halstensen A, Haga T, Hoiby EA. Necrotising fasciitis due to group A streptococci in western Norway: incidence and clinical features. Lancet 1994;344:1111-5.
10. Wee HL, Ho HK, Li SC. Public awareness of diabetes mellitus in Singapore. Singapore Med J 2002;43:128-34.
11. Shahar S, Earland J, Abdul Rahman S. Social and health profiles of rural elderly Malays. Singapore Med J 2001;42:208-13.
12. Saw A, Kwan K, Sengupta S. Necrotizing fasciitis: a life-threatening complication of acupuncture in a patient with diabetes mellitus. Singapore Med J 2004;45:180-82.
13. Green RJ, Dafoe DC, Raffin TA. Necrotizing fasciitis. Chest 1996; 110:219-29.
14. Fontes RA Jr, Ogilvie CM, Miclau T. Necrotizing soft-tissue infections. J Am Acad Orthop Surg 2000;8:151-8.
15. Gozal D, Ziser A, Shupak A, Ariel A, Melamed Y. Necrotizing fasciitis. Arch Surg 1986;121:233-5.
16. Stevens DL, Gibbons AE, Bergstrom R, Winn V. The Eagle effect revisited: efficacy of clindamycin, erythromycin, and penicillin in the treatment of streptococcal myositis. J Infect Dis 1988;158:23-8.
17. Barker FG, Leppard BJ, Seal DV. Streptococcal necrotising fasciitis: comparison between histological and clinical features. J Clin Pathol 1987;40:335-41.
18. McHenry CR, Piotrowski JJ, Petrinic D, Malangoni MA. Determinants of mortality for necrotizing soft-tissue infections. Ann Surg 1995;221: 558-65.
19. Norrby SR, Norrby-Teglund A. Infections due to group A streptococcus: new concepts and potential treatment strategies. Ann Acad Med Singapore 1997;26:691-3.
20. Riseman JA, Zamboni WA, Curtis A, Graham DR, Konrad HR, Ross DS. Hyperbaric oxygen therapy for necrotizing fasciitis reduces mortality and the need for debridements. Surgery 1990;108:847-50.
21. Gonzalez MH. Necrotizing fasciitis and gangrene of the upper extremity. Hand Clin 1998;14:635-45.
22. Gonzalez MH, Kay T, Weinzweig N, Brown A, Pulvirenti J. Necrotizing fasciitis of the upper extremity. J Hand Surg (Am) 1996;21:689-92.
23. Schecter W, Meyer A, Schecter G, Giuliano A, Newmeyer W, Kilgore E. Necrotizing fasciitis of the upper extremity. J Hand Surg (Am) 1982;7:15-20.