

## Necrotizing fasciitis of the upper back presenting with left shoulder pain

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### Abstract

Necrotizing fasciitis is a severe and progressive infection of deep soft tissues which results in destruction of the fascia and overlying subcutaneous fat. We report a case of a 45-year-old diabetic gentleman who initially presented with left shoulder pain, which was treated symptomatically. Upon representation, he had fever and the pain extended to his left upper back. There was a warm, firm and mildly tender purplish swelling on his mid to the left upper back. Blood tests revealed significantly elevated white cell counts and C-reactive protein. A CT thorax showed extensive soft tissue gas within the deep and superficial fascial layers of his left upper back. Necrotizing fasciitis was confirmed intraoperatively. The diagnosis of this condition is often difficult as early symptoms can be mild and non-specific. A high *Laboratory Risk Indicator for NECrotizing fasciitis* (LRINEC) score may be helpful to rule in this diagnosis and guide further management.

### Introduction

Necrotizing fasciitis is a spectrum of infectious disease where there is inflammation and necrosis affecting the subcutaneous tissue and fascia.<sup>1</sup> It is a rapidly progressing condition and necrosis may be widespread, causing extensive destruction of the muscles and skin. There are multiple risk factors and causes for this potentially lethal condition. These include major traumatic wound to minor breaches of skin or mucosa and even non-penetrating soft tissue injury such as muscle strains.<sup>2</sup> Diabetes mellitus is the most common risk factor, followed by immune suppression, end stage kidney disease, liver cirrhosis and use of injection drugs.<sup>3</sup> Early diagnosis of necrotizing fasci-

itis is challenging as the condition may appear like cellulitis or a carbuncle. Definitive diagnosis of necrotizing fasciitis is either by macroscopic examination during surgery or on histological findings of affected tissue.<sup>4</sup> Often being the first port of call for these presentations, it is paramount for primary care physicians to be mindful of this life-threatening condition. This case report describes a middle-age gentleman who presented twice with left shoulder pain and a benign-appearing upper back lesion, fever, significant leukocytosis and C-reactive protein elevation. He was admitted with a provisional diagnosis of a carbuncle but further imaging and surgical intervention subsequently confirmed necrotizing fasciitis of his left upper back.

### Case Report

A 45-year old male bus driver represented to our clinic with a one-week history of persistent left shoulder pain, which had now spread to his left upper back. He also felt feverish and had reduced appetite. He first saw a colleague four days prior with just left shoulder pain. Shoulder examination then revealed a normal-looking joint with no redness, swelling or tenderness. There was a slight pain on abduction and external rotation. There were post-inflammatory depigmented scars seen on the upper back area which were not hot or tender. He was treated symptomatically with simple analgesics and advised to return if the symptoms persisted or increased.

On the latest presentation, his left shoulder pain was dull in nature and was rated at 5 over 10 in severity. He had no associated numbness or pins and needle around the area of concern. Mefenamic acid tablets provided some relief. He had been working continuously for the preceding week. However, he could not recall any history of heavy lifting, trauma, cuts or bites to the area. There was no constitutional symptom, abdominal pain, nausea or vomiting.

He was on metformin and gliclazide for type 2 diabetes mellitus, perindopril and amlodipine for hypertension, and simvastatin for dyslipidemia. The most recent glycated hemoglobinA1c (HbA1c) level from two months ago was 8.1%.

Clinically, he was alert, oriented and non-toxic looking. His temperature was 37.6°C, oxygen saturation was 98% on air, blood pressure was 122/72 mmHg, and pulse rate was 90 beats per minute. His height and weight were 173 cm and 115.8 kg respectively making his body mass index (BMI) 39 kg/m<sup>2</sup>. Capillary blood glucose was 17.2 mmol/L.

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Upon removing his shirt for full shoulder examination, a purplish swelling located on the midline to the left upper back was noticed. It was warm, firm and mildly tender on palpation. There was a punctum seen (Figure 1). Examination of the left shoulder revealed a normal-looking joint, which was not red, hot or tender on palpation. However, its range of movements were slightly limited secondary to pain from his upper back.

Given his history of poor glycemic control and mild fever, initial blood tests were sent urgently. These showed a white cell count (WCC) of 35.00 (normal 4.00-10.00 x10<sup>9</sup>/uL), erythrocyte sedimentation rate (ESR) of 97 mm/hr, C-reactive protein (CRP) of 382.3 mg/L, sodium of 130 (normal 136-145 mmol/L) and venous blood pH 7.44.

The provisional diagnosis of an upper back carbuncle, on a background of poorly controlled diabetes was made. His case was discussed with the general surgeon on duty

who agreed to admit the patient for further management. He was commenced on intravenous ampicillin and sulbactam 3g QID, intravenous fluid and adequate analgesia. Intravenous insulin infusion was initiated to control his blood glucose level.

Ultrasonographic evaluation at the area of concern showed a collection at the subcutaneous tissue, however the depth and extent of it could not be determined due to its large size and the presence of acoustic shadowing from the air within the collection. A contrast-enhanced CT thorax was obtained for further evaluation. This showed features suspicious for necrotizing fasciitis due to presence of extensive soft tissue gas within the fascial layer at the region of the upper back, with associated non-enhanced fascial thickening, fat stranding and overlying skin thickening (Figures 2-4).

Incision and drainage with wound debridement was performed by the surgical team. Intraoperatively, necrotizing fasciitis of the left upper back extending to the midline was confirmed along with an infected sebaceous cyst measuring 2x2 cm.

Postoperatively, the patient's antibiotics was escalated to intravenous meropenem 1g TDS along with optimal analgesia. Tissue, pus and blood culture sent subsequently showed no growth. Acid fast bacilli were also not seen on the sent tissue specimen. The patient had no postoperative complications, had good wound healing and was fit for discharge a week after his surgery. His gliclazide was substituted with dapagliflozin, and he was commenced on a basal-bolus insulin regimen. He will continue to see an endocrinologist for his diabetic care. At the time of writing, he remained well and continued to attend his wound care appointments. His latest HbA1c had decreased to 6.8%.

## Discussion

Early diagnosis of necrotizing fasciitis requires clinicians to have high index of suspicion especially in susceptible patients as it has a high morbidity and mortality rate. The incidence varies from 0.3 to 15.5 cases per 100,000 population throughout the world.<sup>2</sup>

It is a difficult condition to diagnose early as the initial presentation is often non-specific.<sup>5</sup> Commonly, pain or fever will be the earliest symptoms followed by skin changes such as erythema, edema, crepitus or bullae. Necrotizing fasciitis should always be suspected when the presentation is disproportionate to the clinical findings, for example when there is severe pain with

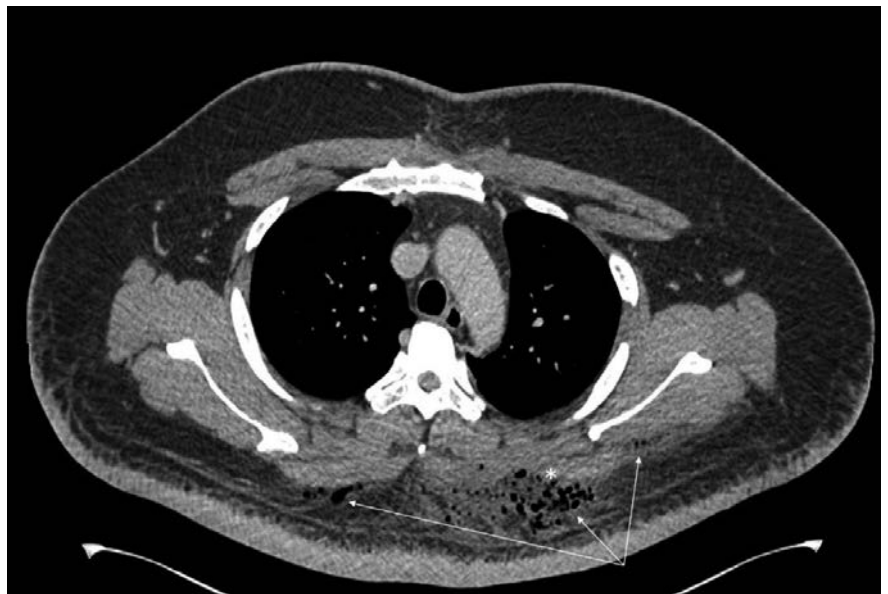
minimal or no skin changes or swelling.<sup>3</sup>

Necrotizing fasciitis rarely affect the upper back as in this patient. The most common areas are lower limbs (52.9%) followed by perineum and genitalia (33.7%), abdomen and groin (11.5%), face and neck (6.35) and finally chest and breast (2.4%).<sup>6</sup> This patient initially presented only with

left shoulder pain, which was treated symptomatically. Thankfully, he followed the safety netting advice given and represented when his symptoms worsened. An important lesson learned here is that adequate exposure is vital when examining patients, as in this case if the patient's upper chest and back was not properly exposed, the sub-



**Figure 1.** The upper back showed a single rounded bump with central tiny blackhead surrounded by hyperpigmentation skin discoloration.



**Figure 2.** Contrast-enhanced axial view CT thorax in mediastinal window, showing bulky, irregular left trapezius muscle (\*) with presence of soft tissue gas within the deep and superficial fascial layers (white arrow). Note the presence of surrounding fat stranding and thickening of the fascia and overlying skin.



the skin findings would have been missed. Even though his upper back skin appearance was not very alarming, blood tests were ordered urgently due to his poor glycemic control and mild fever. These results further guided referral to the surgical team. There is no specific diagnostic test for necrotizing fasciitis. However, a search of the literature found a diagnostic scoring system proposed by Wong *et al.*, named *Laboratory Risk Indicator for NECrotizing fasciitis* (LRINEC).<sup>7</sup> This tool was found to

be useful in detecting necrotizing fasciitis.<sup>7</sup> Parameters included in LRINEC are total white cell count, hemoglobin, CRP, sodium, creatinine and serum glucose. If the LRINEC score is six or more, a diagnosis of necrotizing fasciitis could be ruled in. Utilizing this tool, our patient's LRINEC score would have been 9 (CRP 382.3 mg/L, WCC  $35 \times 10^3$  /uL, haemoglobin 13.4 g/dL and sodium 130 mmol/L). This would have warranted further investigation for necrotizing fasciitis.

Imaging plays a role towards obtaining confirmatory diagnosis of necrotizing fasciitis. Radiography and ultrasound, are neither sensitive nor specific for the diagnosis of necrotizing fasciitis, as it just demonstrates collection, soft tissue inflammation and thickening, which can appear in any soft tissue or musculoskeletal infection. Computed tomography (CT) on the other hand, is superior to evaluate presence of subcutaneous tissue gas, fascial involvement, lack of fascial enhancement, presence of inflammatory changes and its extent of involvement.<sup>8</sup> Even though MRI is highly sensitive due to its remarkable soft tissue imaging capabilities,<sup>9</sup> CT has the advantage of relative rapidity, especially when an emergent evaluation and diagnosis needs to be made.



**Figure 3.** Sagittal reconstruction of the contrast-enhanced CT thorax showing the extent of soft tissue gas within the superficial and deep fascial layers at the upper posterior thoracic regions. There is subcutaneous tissue collection (white arrow) extending to the skin (correlating with the findings on ultrasound).

## Conclusions

Necrotizing fasciitis is a severe and progressive infection of deep soft tissues. Diagnosis is often difficult as early symptoms can be mild and non-specific. A high LRINEC score may be helpful to rule in this diagnosis and guide further management. Computed tomography in the absence of MRI, is the imaging modality of choice for further evaluation of this condition. Urgent surgical debridement and intravenous antibiotics are the mainstay of treatment.

## References

1. Espandar R, Sibdari SY, Rafiee E, Yazdanian S. Necrotizing fasciitis of the extremities: a prospective study. *Strategies Trauma Limb Reconstr.* 2011;6(3):121-5.
2. Stevens DL, Bryant AE. Necrotizing Soft-Tissue Infections. *NEJM.* 2017;377(23):2253-65.
3. Lancerotto L, Tocco I, Salmaso R, Vindigni V, Bassetto F. Necrotizing fasciitis: classification, diagnosis, and management. *J. Trauma Acute Care Surg.* 2012;72(3):560-6.
4. Bakleh M, Wold LE, Mandrekar JN, Harmsen WS, Dimashkieh HH, Baddour LM. Correlation of Histopathologic Findings with Clinical Outcome in Necrotizing Fasciitis. *Clin. Infect. Dis.* 2005;40(3):410-4.
5. Sultan HY, Boyle AA, Sheppard N. Necrotising fasciitis. *BMJ.* 2012; 345:e4274.
6. Shaikh N, El-Menyar A, Mudali IN, Tabeb A, Al-Thani H. Clinical presentations and outcomes of necrotizing fasci-



**Figure 4.** Post operative picture of patient's upper back wound.

- itis in males and females over a 13-year period. *Ann Med Surg (Lond)*. 2015;4(4):355-60.
7. Wong CH, Khin LW, Heng KS, Tan KC, Low CO. The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score: a tool for distinguishing necrotizing fasciitis from other soft tissue infections. *Crit. Care Med*. 2004;32(7):1535-41.
  8. Carbonetti F, Cremona A, Carusi V, Guidi M, Iannicelli E, Di Girolamo M, et al. The role of contrast enhanced computed tomography in the diagnosis of necrotizing fasciitis and comparison with the laboratory risk indicator for necrotizing fasciitis (LRINEC). *Radiol Med*. 2016;121(2):106-21.
  9. Ali S, Srinivasan S, Peh W. MRI in necrotizing fasciitis of the extremities. *The Br J Radiol*. 2013;87(1033):20130560.