



## CASE REPORT

# Acupuncture Induced Multiorgan Failure

Nageswar Bandla<sup>1\*</sup>, Andreea Mihai<sup>2</sup> and Stephen Lord<sup>3</sup>

<sup>1</sup>Consultant in Critical Care, University Hospitals of North Midlands NHS Trust, United Kingdom

<sup>2</sup>Specialty Registrar in Acute Medicine, University Hospitals of North Midlands NHS Trust, United Kingdom

<sup>3</sup>Specialty Registrar in Critical Care, University Hospitals of North Midlands NHS Trust, United Kingdom

\*Corresponding author: Dr. Nageswar Bandla, Consultant in Critical Care, University Hospitals of North Midlands NHS Trust, United Kingdom



## Summary

Dating back to 100 BC, acupuncture has been performed safely for centuries for a wide range of medical conditions. Although a technically invasive procedure, reports of adverse incidents in the medical literature are thankfully very rare. We present a case of acupuncture induced multi-sensitive *Staphylococcus aureus* (MSSA) bacteraemia and septic shock, resulting in multiorgan failure and a prolonged intensive care stay. This case report serves to remind clinicians that although the overall risk of acupuncture is reported as very low, this relatively benign intervention can result in serious morbidity for our patients.

## Background

According to the British Acupuncture Council, traditional acupuncture dates back to the first known book of Chinese medicine in 100 BC. It has wide ranging applications in healthcare, particularly in treatment of musculoskeletal pain [1]. Very few case reports exist in the literature depicting complications of acupuncture, and although technically invasive, serious complications are vanishingly rare. This case reports presents a rare case of multiorgan failure secondary to acupuncture, highlighting the fact that this apparently benign intervention can lead to life threatening complications.

## Case Presentation

A 78-year-old immunocompetent female presented to the emergency department following an acupuncture session in the community by a chartered physiotherapist for the treatment of mechanical back pain. She received acupuncture to the dorsum of both her hands and her right foot 48 hours prior to admission

to hospital. At presentation, the patient was cerebrally agitated, profoundly hypotensive, hypoxemic and had evidence of significant acute kidney injury (AKI) on the background of no known renal disease. Clinical examination revealed fluctuant erythematous swelling of the dorsum of both hands and a tracking cellulitis from her right foot up to her knee joint. Further examination of her knee joint demonstrated a tender effusion and there was clinical suspicion of acute septic arthritis. Each area of erythema had spread proximally from the known acupuncture sites she received in the community.

## Investigations

She presented with a severe acute kidney injury with a creatinine of 223 micromoles/litre and an eGFR of 17 ml/min/1.73 m<sup>2</sup> and evidence of an infective process with raised inflammatory markers (CRP of 477 and a WCC of 28.2). Her initial radiological investigations included an urgent CT head, chest, abdomen and pelvis which demonstrated a left lower lobe segmental collapse and consolidative process, with evidence of left renal perinephric fat stranding. A subsequent renal ultrasound was unremarkable. A transoesophageal echo ruled out a vegetative lesion and confirmed a structurally normal heart.

A multi-sensitive *Staphylococcus aureus* (MSSA) was isolated at presentation from her blood cultures, knee aspirate and pus swabs sent from her hand washout, and she subsequently had repeated MSSA growth in 4 further blood culture samples and her sputum, demonstrating disseminated disease.



**Citation:** Bandla N, Mihai A, Lord S (2021) Acupuncture Induced Multiorgan Failure. Int J Crit Care Emerg Med 7:130. doi.org/10.23937/2474-3674/1510130

**Accepted:** December 08, 2021; **Published:** December 10, 2021

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## Differential Diagnosis

Vasodilatory shock is a relatively common complication of many underlying disease processes seen in the intensive care unit. With the clear history of recent acupuncture and visible track marks on examination, the diagnosis of severe cellulitis complicated by septic arthritis was fairly certain. However, given the swollen appearance of her extremities an important differential to exclude was a necrotising soft tissue infection (NSTI). This diagnosis can be supported or refuted with imaging, with CT being the modality of choice. A CT in this context would demonstrate locules of gas present in the soft tissues. Imaging should never delay surgical exploration if the clinical index of suspicion is high, and the diagnosis of NSTI can be definitively excluded with surgical exploration, observing dull tissue planes which are easily separated in the presence of a suppurative exudate. The perinephric fat stranding was felt to be secondary to seeding of the kidneys from the underlying bacteraemia, ultimately causing pyelonephritis and the consolidative process secondary to aspiration from a low GCS state at presentation. Isolating an MSSA bacteraemia should prompt investigation to rule out infective endocarditis by way of transthoracic or transoesophageal echocardiography. Furthermore, back pain should prompt neuroaxial, abdominal and pelvic imaging to rule out discitis, vertebral osteomyelitis and a psoas abscess respectively.

## Treatment

Given her profound vasodilatory shocked state she was quickly referred by the emergency department to critical care for consideration of vasopressors and renal replacement therapy, with peripheral metaraminol being commenced in the resuscitation department. She was promptly accepted by critical care, and on arrival to the intensive care unit she quickly deteriorated with severe hypotension, agitation and worsening hypoxemia. Her conscious status dropped (GCS-7) and she required intubating with an urgent rapid sequence induction, and subsequent central venous catheter insertion and rapid titration of vasopressors. She was commenced on empirical anti-microbial therapy (Flucloxacillin, Co-amoxiclav and Clarithromycin). A bedside needle aspiration of her right knee revealed a supportive effusion and she was taken for an emergency washout of her knee joint and the dorsal aspects of both hands were incised, washed out and laid open.

Given the multiple cultured isolates demonstrating MSSA and the degree of vasodilatory shock her antibiotic cover was changed to Flucloxacillin and Clindamycin.

She had persistent vasodilatory shock and required vasopressor for prolonged periods. She was commenced on continuous veno-venous haemodiafiltration (CVVHDF) from day 2 of her critical care stay and eventually weaned from renal replacement therapy via

sustained low efficiency dialysis (SLED) after 39 days. Her stay was complicated by repeated ventilatory associated pneumonia episodes resulting in a slow ventilatory wean necessitating a temporary percutaneous tracheostomy. The tracheostomy was removed after 34 days of ventilatory support.

## Outcome and Follow-Up

As a consequence of the degree of her multi organ failure, she inevitably fell victim to critical illness weakness, resulting in an ITU stay of 53 days and a total of 71 days in hospital. Her illness was further complicated, as after 6 days of hospital discharge she was readmitted with a healthcare associated pneumonia requiring a further 16 days in hospital. This patient suffered multiorgan failure secondary to a disseminated MSSA infection following acupuncture. This resulted in a serious health burden from which she is still recovering to this day.

## Discussion

Despite its widespread use in both traditional and alternative medicine there are very few complications reported in the medical literature. There are over 360 acupuncture sites on the body, with the majority of complications being related to direct damage to the underlying organ beneath each site. Examples of such injury include pneumothorax [2] and cardiac tamponade [3] via needle insertion on the anterior thorax and a fatal case of peritonitis following needle insertion on the lower abdomen [4]. Despite the invasive nature of acupuncture reports of local or disseminated sepsis in immunocompetent patients are very rare. One case study reported a patient who developed necrotising fasciitis following antecubital fossae acupuncture, requiring widespread surgical debridement in order to gain source control [5]. To the authors knowledge, this is the only other case of multiorgan failure secondary to sepsis following acupuncture in the medical literature. With a documented complication rate of 0.55 per 10000 [6] it is a safe intervention, however as this case represents, it has the potential to cause significant injury.

## Learning Points/Take Home Messages

- Acupuncture is a relatively benign intervention and complications of it are vanishingly rare.
- Given its invasive approach there is the possibility of significant harm, via direct damage to underlying structures or introduction of infection.
- Necrotising soft tissue infections (NSTI) are an important differential to exclude when managing patients with severe cellulitis and vasodilatory shock.
- Multi-sensitive *Staphylococcus aureus* (MSSA) bacteraemia warrants echocardiography to

exclude a vegetative process, and any patient with back pain should have imaging to exclude osteomyelitis of the vertebrae, discitis and psoas abscess.

- Critical illness can have devastating long-term implications for patients, often taking months to years to recover, with a large proportion never achieving functional baseline.

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