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CASE REPORT

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Acupuncture related acute purulent pericarditis masquerading uremic pericarditis

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ABSTRACT

We are reporting a rare case of acupuncture-related acute pericarditis in an old-aged gentleman due to Staphylococcus aureus infection who was successfully managed with drainage of pericardial fluid and broad-spectrum antibiotics. We also reviewed the literature and found cardiac tamponade as the most common acupuncture-related cardiac complication, followed by infective endocarditis, bacterial abscess, and infected myxoma. There was no available literature on post-acupuncture acute pericarditis.

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KEYWORDS
Cardiovascular medicine; interventional cardiology; pericardial disease; acupuncture; uremia

1. Introduction

Many complications associated with acupuncture such as haematoma formation, pneumothorax, and increased risk of viral and bacterial infections have been described in the literature. However, acupuncture related cardiac complications have rarely been reported. Some of the complications are due to needle induced trauma to the pericardium causing cardiac tamponade, while others include migration of skin flora to heart tissues causing infective endocarditis and pericardial abscess. So far, there has been no report of a case of acupuncture-related acute purulent pericarditis although one case of pericardial abscess due to Staphylococcus aureus infection has been reported [1]. We here present such a unique association of acupuncture-related acute purulent pericarditis mimicking uremic pericarditis.

1.1. Case presentation

A 74-year-old male patient presented to the emergency department (ED) with four days of the history of subjective fever, night sweats, and severe chest pain. He recalled his symptoms started with dull, non-pleuritic, nonradiating chest pain on the eve of his acupuncture session for knee arthritis and progressively got worse. In the ED, he was holding his chest due to severe pain. He had a past medical history of the degenerative joint disease (DJD) of knees, hypertension and basal cell skin cancer. His medications included ibuprofen, aspirin, losartan, and omeprazole. He underwent Mohs surgery a month ago before his presentation and was treating his knee DJD with acupuncture with the last session about a week ago. He denied any back pain, abdominal pain, recent sick contacts, intravenous drug abuse, past surgical procedures or skin lacerations. He was haemodynamically stable on his presentation with the temperature of 97.3 F, pulse 94/min, respiratory rate 22/min and oxygen saturation 97% on ambient air. Physical examination showed that he was flushed and diaphoretic. On cardiovascular examination he had normal heart sounds without any murmurs or gallops and rubs. Respiratory examination showed faint wheezes on the bilateral upper lobes without rhonchi or rales. The abdominal and neurological examination was unremarkable.

1.2. Investigations

EKG at presentation showed diffuse ST segment elevation in all leads except in aVR. ST elevation was most prominent in leads I, II, III, aVF, aVL, V4, V5 and V6 as shown in the figure. (Figure 1)

Chest x-ray demonstrated a globular enlarged heart which prompted us to do an urgent echocardiogram (ECHO) to look for hypokinetic wall motion and cardiomyopathies but instead showed large circumferential pericardial effusion without tamponade effect. (Figure 2, 3)

CT scan was performed which also showed thick pericardial fluid collection with a diameter of about 22.5 mm around the heart. (Figure 4)

These findings were substantiated by the MRI. (Figure 5)

The laboratory investigations were significant for raised white blood cell count (19,000), lactic acid 13.2, increased blood urea nitrogen (96 mg/dL) and an elevated creatinine level of 4.93 (mg/

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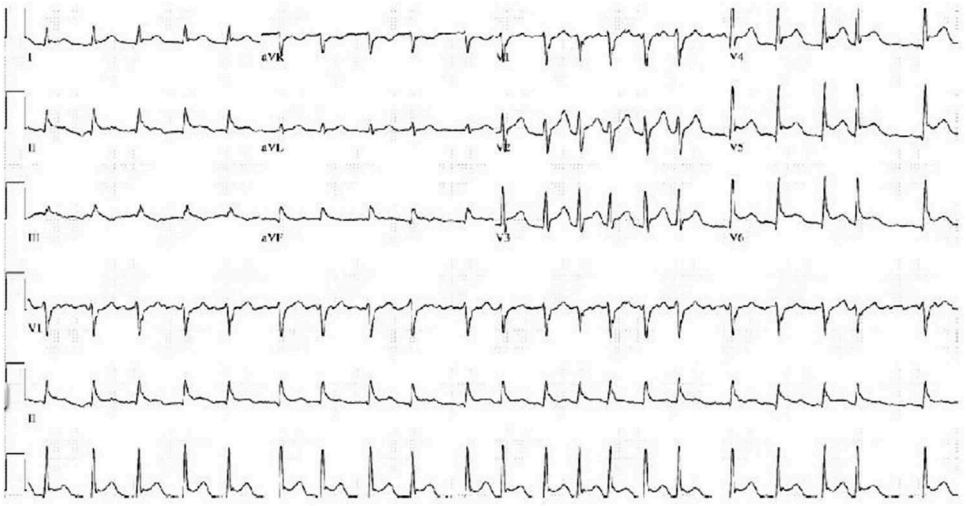

Figure 1. EKG showing diffuse ST elevation except V1, V2 and V3 with ST depression in lead aVR.

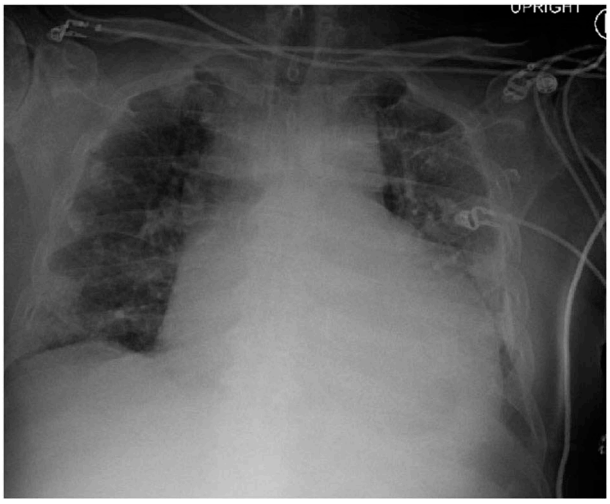

Figure 2. Increased cardiothoracic ratio with globular heart silhouette indicating cardiomegaly due to pericardial effusion.

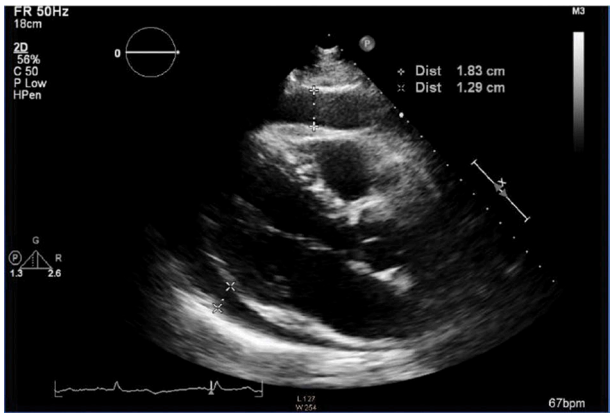

Figure 3. Echocardiography demonstrating fluid in the pericardial cavity with non-collapsing right ventricle during cardiac cycle.

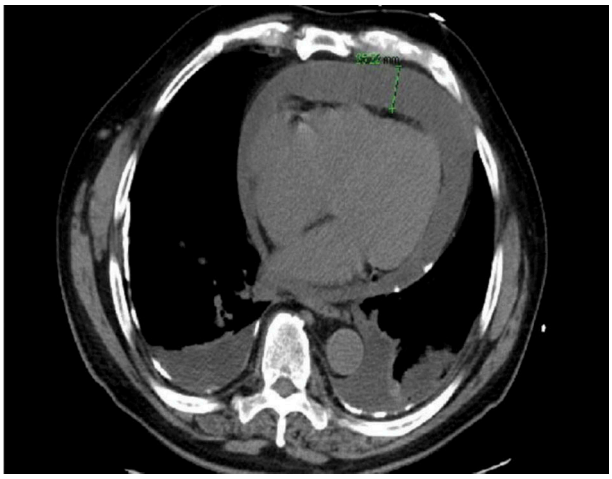

Figure 4. CT scan showing fluid in the pericardial cavity with an effusion of 25.22 mm.

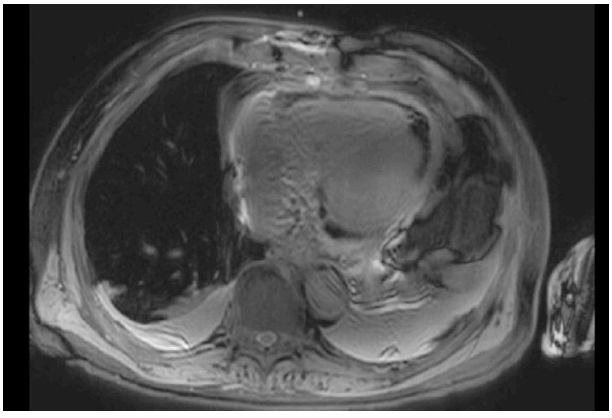

Figure 5. MRI of the heart revealing pericardial effusion and a normal cardiac musculature.

dL). His baseline creatinine was 1.11mg/dL performed only a week ago. All laboratory investigations are summarized in Table 1 (At the end of the file)

Table 1. Laboratory investigations performed on admission.

Laboratory values	Patient's value (normal range)	Chemistry (normal range)	
Hemoglobin (Hb) (g/dl)	11.4 (12–16)	Lactic Acid (meq/L)	13.2 (0.5–2.3)
White blood cells (WBC) (/cmm)	19,200 (4000–12,000)	Glucose (mg/dl)	127 (70–100)
Platelet count (Plt) (/cmm)	72,000 (140,000–400,000)	Sodium (mmol/L)	132 (135–145)
Differential type		Potassium (mmol/L)	4.9 (3.5–5.1)
Neutrophils (%)	76	Chloride (mmol/L)	97 (98–110)
Lymphocytes (%)	4	Phosphorus (mg/dl)	10.2 (2.3–4.7)
Monocytes (%)	6	Blood urea nitrogen (mg/dl)	96 (<23) Baseline: normal
Bands (%)	10	Creatinine (mg/dl)	4.93 (<1.11) Baseline: normal
Chemistry		Bicarbonate (mmol/l)	16 (20–31)
Albumin (mg/dl)	3.4 (3.3–4.7)	AST (Units/L)	123 (4–34)
BNP (pg/ml)	452	ALT (Units/L)	99 (<55)
Cardiac Troponin (ng/ml)	0.21 (<0.10)	ALP (Units/L)	141 (40–150)
CK (U/L)	48 (30–200)	Total bilirubin (mg/dl)	0.5 (0.2–1.2)
ANA	Negative	APTT (seconds)	44 22–35)

1.3. Differential diagnoses

Initially, pericardial effusion and chest pain were thought to be due to the uremic pericarditis and arrangement was made for dialysis, but nephrology argued that acute kidney injury rarely causes uremic pericarditis. Other differentials included trauma and autoimmune and uremic pericarditis but negative trauma workup, ANA levels and normal renal functions a week prior to presentation excluded trauma, autoimmune and uraemia induced pericarditis. Acute coronary syndrome was also among the differentials but static troponin levels, echocardiography, normal interval EKGs with no Q wave formation and clean coronary arteries on catheterization ruled out ischaemia as a possible cause of ST-segment elevation.

1.4. Treatment

Pericardiocentesis was done which revealed 600 ml of cloudy brown fluid which was sent for culture and sensitivity. He was empirically started on Vancomycin and Cefepime. Over the next few days, the patient's condition was getting worse due to progressive purulent fluid accumulation in the pericardial cavity with no tamponade effect. He thus had a subxiphoid pericardiotomy and a drain placed in the pericardial window. Cultures at this time were positive for methicillin-sensitive Staphylococcus aureus (MSSA).

1.5. Outcome and follow-up

The patient was advised to have at least two months course of IV broad-spectrum antibiotics and was discharged home in a stable condition on the 35th day of hospitalization.

2. Discussion

There has been an alarming increase in acupuncture-related adverse events; more than 715 complications including about 50 acupuncture-related deaths were reported in a recent review of 12 prospective studies [2]. We performed a structured computerized search till June 2018, using the standard MeSH terms on four different databases, i.e., Embase, Medline, Scopus, and Cochrane. The initial search revealed 133 articles, after reading the titles for the relevance, 125 items were excluded, three articles had not enough data, and a total of eight articles were selected which reported acupuncture related infective cardiac complications, which have been described in Table 2 [1,3–9]. The analysis was performed using 'IBM SPSS 22 Statistics'.

The mean age of the patients with any cardiac complication was 50 years (15–72 years). About 67% of female patients and 100% of the male patients had a successful recovery. Of the infection-related complications, most common was infective endocarditis (75%, n = 6), while others included infected myxoma and purulent pericardial effusion (one case each). All infective cardiac complications presented with fever with constitutional symptoms like malaise, rigours, and vomiting (100%, n = 8). Interestingly, for infective endocarditis (IE), about 60% patients had earlobe as the site of acupuncture involved while 40% patients including ours had knee, ankle or hip joints

Table 2. Acupuncture-related Infective complications.

S.No	Type of complication	Author, Country, Year	Age	Sex	Acupuncture reason	Outcome
1	Infective endocarditis	Buckley et al, UK, 2011 [3]	15	M	Arthralgia	Recovery
2	Infected left atrial myxoma	Uchino et al, Japan, 2002 [4]	47	F	Ear	Recovery
3	Infective endocarditis	Spelman et al, Australia, 1993 [5]	61	F	Rheumatoid arthritis	Death
4	Infective endocarditis	Scheel et al, Norway, 1991 [6]	59	F	Rheumatoid arthritis	Recovery
5	Infective endocarditis	Lee et al, UK, 1984 [7]	56	F	Rheumatoid arthritis	Recovery
6	Infective endocarditis	Jeffreys et al, UK, 1983 [8]	57	F	Rheumatoid arthritis	Recovery
7	Infective endocarditis	Leavy et al, USA, 2002 [9]	33	M	Rheumatoid arthritis	Recovery
8	Pericardial abscess	Han et al, Korea, 2012 [1]	72	F	Arthralgia	Death

as the site of acupuncture. The most common risk factor for infective endocarditis (IE) was rheumatic heart disease (37.5%, n = 3/8) followed by smoking (25%, n = 2/8). The highest number of patients who survived the cardiac complications had acupuncture performed for non-specific pain and were having associated rheumatic heart disease (17.6% of the patients survived). Other cases who survived the cardiac complications had acupuncture performed for atopic eczema, epigastric pain, traumatic pain and for back pain each reported only once (5.88% each). The mortality was high among females with a valid percentage of 71.4% while it was 28.6% among the male population. (Pearson Chi-Square 0.529, Likelihood ratio 0.524). Of all the cases who died of acupuncture-related cardiac complications (25%), rheumatoid arthritis and arthralgia were found to be the reasons for acupuncture. Interestingly, one case report mentioned an old-aged patient presenting with unusual symptoms of myalgias, was diagnosed with MSSA pericardial abscess after acupuncture at the knee joint. Our case, however, had MSSA associated acute pericarditis followed by pericardial effusion which was never reported in the literature.

Acute renal failure rarely causes pericarditis. However, as with our case, it is evident that chronically elevated urea levels can cause acute pericarditis and therefore should be ruled out by physicians.

Evaluation for purulent pericarditis should be done in patients with signs of sepsis. The common presenting complaint of IE was high-grade fever, chills and rarely the skin stigmata of IE with or without the joint pains. The factors which seemed to attribute to the development of infective endocarditis were lack of antibiotic prophylaxis, unsterilised procedures, migration of skin flora into the heart tissues and a history of rheumatic heart disease and smoking [2]. A prior history of rheumatic heart disease is a direct contributing factor towards developing IE [10]. Patients who had acupuncture performed on earlobes had a high incidence of IE [4,6–8]. These findings could be hypothesized by the proximity of earlobes to the heart muscles and gravity directed increased venous drainage into the heart with respect to the lower limbs, where the incidence of IE was low.

Our case, however, was unique, where the patient had a structurally healthy heart developed infective pericarditis due to MSSA migrating from a very distant acupuncture site (the knee joint). From the discussion, it is evident that acupuncture related cardiac complications can easily be prevented by avoiding unsterilised techniques, deliberate needle embedding or deep penetration of the needle into the skin around the heart [10,11]. Broad-spectrum intravenous antibiotics treat most of the infective complications with or without surgical drainage of the abscess [2]. It could be a reasonable argument that serious post acupuncture complications are rarities compared to its safety and benefits yet it should not distract us from our responsibility to highlight these life-threatening cardiac complications and to try to make it even safer [11,12]. Moreover, a risk-benefit evaluation is essential before adopting acupuncture as a therapy, for instance, it is wise to avoid this procedure in case of mild pain which could be easily managed with medications, rather than risking the patient for developing cardiac tamponade.

3. Conclusions

- Chronically elevated urea levels can cause acute pericarditis. However, it is rare for the acute renal failure to cause pericarditis. Physicians should, therefore, consider for other causes of acute pericarditis in such patients.
- Patients with signs of sepsis, evaluation for purulent pericarditis should include the history of acupuncture among other common causes (IV drug abuse, history of needle sticks, cardiac surgery).
- While being a useful tool for pain alleviation, acupuncture does pose some serious threats, especially when attempted at the hands of inexperienced personnel. Hence, with proper education and training of the acupuncturists, to avoid inserting the needle into some high-risk regions and use of appropriate sterile techniques may decrease the incidence of these complications.
- People opting for acupuncture should be questioned regarding any prior history of valvular heart disease, to minimize the risk of developing infections later on. No guidelines as of now exist recommending antibiotic prophylaxis with heart valve issues seeking acupuncture and may need further studies.

Disclosure statement

No potential conflict of interest was reported by the authors.

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