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A Genuine Medical Discontent: A Case Report of Methicillin-Sensitive Staphylococcus aureus in a Previously Healthy Man who Sustained 35% Total Body Surface Area Burns with Non-Inhalation Injury, and Died Due to the Complications of the Disease Process

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Abstract: *Introduction:* Shack fires are very common at the informal settlements around South Africa - leading to an increase in number of victims of burn injuries.

Case History: A 32 year old with no known past medical history sustained 35% Total Body Surface Area (TBSA) partial thickness and full thickness burns to the chest, back, head and both arms due to a shack fire. Seven days after admission, the patient's developed infective endocarditis and acute aortic regurgitation. Despite the appropriate antibiotic treatment of Piptaz and cloxacillin administered for five days after the infection was detected, the patient died due to complications of the disease process.

Discussion: Infections in burn patients are often acquired after admission to the hospital.Delayed diagnosis results are noted to cause higher rates of mortality.This can be accelerated by bacterial infections in patients sustaining burn injuries.

Keywords: *aortic regurgitation, burn injuries, cloxacillin, endocarditis, MSSA, MRSA, sepsis.*

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I. Introduction

Shack fires are very common in informal settlements in South Africa. Burn patients are at high risk of infection on the damaged skin impairing humoral and cellular immunological response. Notwithstanding medical advances made in the treatment, control and management of infection over the years, there still remain challenges and complications in burn wound infections causing morbidity or mortality[1, 2]. In South Africa, a gap in reporting burn-related injuries or complications in adults is identified in literature. The paper presents a rare reported case of a burn patient with infective endocarditis and aortic regurgitation due to MSSA bacteremia in South Africa.

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II. Case Report

A 32 year old male, with no known past medical history was referred to the burn unit (the ward) with a history of 35% total body surface area (TBSA) partial thickness/full thickness burns to the chest, back, head and both arms due to a shack fire. Upon admission the patient had a flamazine dressing applied at the prior public hospital to all of the burned area and he was continued on daily flamazine dressing at the ward with no skin scrubbing done. The patient was in a stable condition with no complaints and ambulatory. On the second day of admission the patient was noticed to develop have an isolated temeperature spike to 38.6C and was initiated on Piperacillin-Tazobactam (Piptaz) empirically based on the assumption of hospital acquired infection and a blood culture was sent.The Patient was scheduled for debridement one week later due to the long waiting list for theatre.On day seven of admission the patient was taken to the operating theatre for debridement and skin grafting. He was intubated in the operation room without difficulty, a central line was placed. The patient received fentanyl, propafol, cisatracurium, valium prior to his operation in the morning. His vital sign was heart rate 100, blood pressure 110/80 mmHg, respiratory rate 14, temperature 37.8°C and SAT 99%. After 15 minutes of intubation, his blood pressure dropped, the electrocardiographic (EGC) monitor showed a ventricualar fibrillation rhythm, and the patient was noted to be pulseless on palpation. He was defibrillated with 150 joules of electricity. Chest compressions commenced immediately and the patient had 2 cycles of chest compressions with 1mg of adrenaline given. There was a return of spontaneous circulation at a rate of about 80 beats/minute with sinus rhythm. He received neostigimine, glycopyrrolate as a reversal. The operation was aborted. In the afternoon, he was extubated and was assessed to be in a stable

condition and fully conscious then transported to burn intensive care unit (ICU).

Cardiac enzymes were performed and the results showed a high level of troponin I. The patient was seen by the cardiologist on call in same day, who felt that the patient clinically had pericarditis and VF. His recommendation was to treat the patient for sepsis and the patient was booked for transesophageal echo. The following day the blood culture results identified methicillin-sensitive

staphylococcus aureus, and cloxacillinwa treatment. Other investigations,
such as full blood count and electrolytes werenormal.

A chest Xray was normal. Five days post operation (day 12 in the hospital), while in the burn ICU, the patient developed respiratory distress with tachypnea and shortness of breath requiring intubation and ventilation. The patient was placed on a pressure controlled ventilator and given sedatives. A new soft diastolic murmer was noted. Chest Xray at this time showed multi-lobar pneumonia. The same day a transesophageal echo performed by Cardiology revealed acute severe aortic regurgitation and Infective endocarditis on the aortic valve as well as cords of the mitral valve. Treatment for infective endocarditis was intiated with cloxacillin, gentamycin and Piptaz with a plan for aortic valve repair at 6 weeks. The following day he developed cardiac arrest and died after 13 days of admission.

III. Discussion

Staphylococcus aureus (S. aureus) is a pathogen that causes a multitude of diseases that include skin and soft tissue infections, endocarditis and pneumonia. S. aureus is highly prevalent in South Africa as elsewhere worldwide [3, 4] and is often seen in patients with significant burns [1, 5, 6]. Both methicillin-resistant (MRSA) and methicillin-susceptible (MSSA) bacteremia can cause infections and sepsis that can lead to death in burn patients [7]. The rate of infections that cause morbidity and/or mortality is positively correlated with TBSA in two studies[5, 7,] however a study by Fadeyibi et al found no relationship[2]. In South Africa high rates of MRSA above 25% isolates from clinical samples are reported for MRSA[3, 8,] but not in the case of MSSA. However, one study from Western Cape revealed that the majority of S. aureus isolates were MSSA at one hospital[9]. S. aureus bacteremia in burn patients has been shown to cause infective endocarditis and aortic regurgitation[1, 6, 10.] In this case study S. aureus was susceptible to all lactam antibiotics (cloxacillin, erythromycin, clindamycin and cotrimoxazole) except penicillin/ampicillin, parallel to other South African studies [3, 4.] Cloxacillin is highly effective for treatment of endocarditis due to MSSA [10,] as well as continued [6] weeks treatment with appropriate antibiotics[1.] Despite this appropriate antibiotic treatment of Piptaz and cloxacillin administered for five days after admission, the patient died. Delayed diagnosis results are noted to cause higher rates of mortality[6].

The patient had a central line which was removed 7 days after insertion then the tip of central line sent for culture and it was negative. Positive blood culture (MSSA) results identified on day 7 suggest that the patient acquired the infection in the ward after admission but prior to central line placement. In addition to positive blood culture, a fever with a new diastolic murmer is indicative of endocarditis seen on mitral and aortic valves. Possible source of the bacteremia could be attributed to the loss of the skin barrier following burn injury (natural defence barrier to infections) and making the patient prone to hospital acquired infection. Manipulation of wounds can be also a source of bacteremia that caused endocarditis[1, 6]. Presumably, the patient acquired MSSA infection prior to going to the operating theatre (based on the timing of the positive blood cultures) and developed infective endocarditis resulting in severe aortic regurgitation. It was postulated that the severe aortic regurgitation led to the cardiovascular collapse that ended in the death of the patient.

This study demonstrates that there is need to increase prevention measures to reduce external sources of infection on patients in hospital environment. Strict adherence to high hygienic standards by staff in patient handling in dressing wounds could minimise infection transmission and thereby decrease mortality.

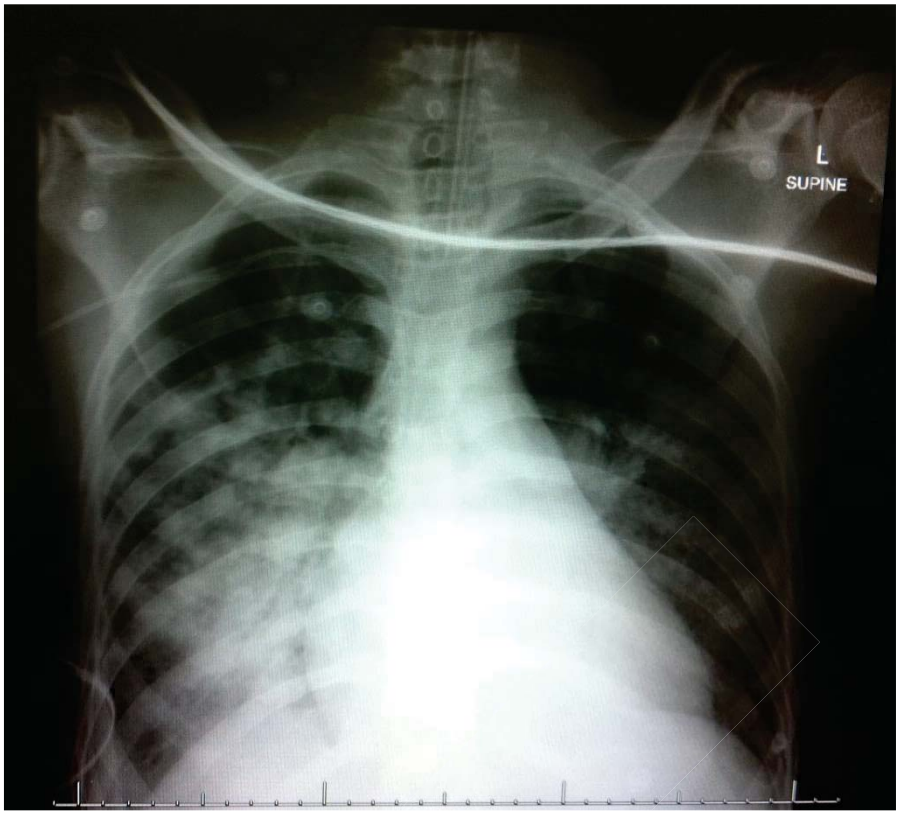

Figure 1: Chest Xray showing multi lobar pneumonia

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