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## Staphylococcal septicaemia complicated with purulent pericarditis in an infant: A case report

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**Abstract:** Purulent pericarditis is a rare complication of sepsis. It is almost exclusively a complication from an underlying condition rather than a primary infection. *Staphylococcus aureus* is the commonest aetiological agent. Its diagnosis requires a high index of suspicion especially in the presence of persistent fever and signs of cardiac tamponade in spite of appropriate antibiotic use. A case of purulent pericarditis in an in-

fant is here presented to illustrate the importance of a high index of suspicion and simple investigations in its diagnosis in resource limited practice. In addition, the importance of prompt treatment with drainage of the abscess and use of appropriate antibiotics to achieve a good prognosis is shown.

**Key words:** Staphylococcus, Purulent pericarditis

### Introduction

Pericardial abscess has been a rare complication of sepsis in both adults and children.<sup>1,2</sup> The diagnosis is usually suspected when fever persists with the development of cardiac tamponade.<sup>3</sup> *Staphylococcus aureus* is the commonest causative factor incriminated in the pathogenesis of purulent pericarditis.<sup>3,4</sup> In Nigerian children *Staphylococcus aureus* accounted for 44% of non-tuberculous causes of infective pericarditis.<sup>5</sup> Staphylococcal septicemia can occur in the absence of any identified portal of entry or presence of an infective focus.<sup>6</sup> There is evidence that purulent pericarditis has been under diagnosed in the pediatric age group, secondary to non-specific presentations in childhood and limited cardiac diagnostic equipment in developing countries like Nigeria.<sup>2,4,5</sup> There is a paucity of recent studies of purulent pericarditis in infants.

This study presents a one year old girl who was initially managed as a case of severe staphylococcal septicemia with congestive cardiac failure and severe anaemia. However, with worsening respiratory signs, further investigation revealed purulent pericarditis for which she was managed with appreciative response.

### Case Presentation

U.P. was a one year old girl from a semi-urban area in southern Nigeria, who presented with a five days history of limping and painful swelling of the left ankle. She was taken to a traditional bone setter who massaged the ankle for three days. With worsening of symptoms and progressive interference with walking, she was taken to a patent medicine dealer. At the patent medicine store the swelling was incised and about 50mls of sanguino-purulent fluid was drained and she was treated with vita-

min C and Ampiclox syrup. Other associated symptoms were high grade continuous fever; frequent loose stools; pallor of the hands and feet and progressively worsening fast breathing in the absence of cyanosis. A day before presentation in the paediatric emergency unit she developed a painful swelling of the left shoulder and upper left chest wall.

There was no history suggestive of sickle cell disease. She was predominantly breastfed for four months, after which bottle feeds were introduced. Family diet was introduced at age eight months and feeding frequency was 3-4 times. Immunizations were adequate for age and developmental milestones were appropriate.

She was the second in a monogamous family of two children. Her family lived in a three room apartment, drank borehole water, and used water-closet toilet. Mother was 30 years old and father 32 years old. Both parents had secondary level of education.

Examination findings revealed an acutely ill child, febrile, severely pale (PCV 12%), but acyanosed and anicteric. Her weight was 8kg (80% of expected), occipito-frontal circumference 45cm, and length of 77cm. The left shoulder and left sternoclavicular region were swollen, tender, firm and with differential warmth. There was a diffuse left leg swelling with a circumference of 19cm compared with the right leg that was 15cm (measured 10cm from the left patella). The left leg was shiny, tender, and soft, with differential warmth with three incision wounds discharging purulent fluid from its anterior surface.

The chest wall was asymmetrical with swelling of the left hemi thorax. She was dyspnoeic and tachypnoeic, with increased cardiac dullness and crepitation. She had a pulse rate of 148 beats per minute; apex beat was at the 4<sup>th</sup> left intercostal space, mid-clavicular line; and the

first and second heart sounds only were heard and normal. The liver was palpably enlarged by 12cm, firm and tender.

The initial diagnoses were bronchopneumonia with congestive cardiac failure, pyomyositis of the left leg, and Septic arthritis of the left sternoclavicular and shoulder joint. She was transfused with 120mls of settled cells and intravenous gentamycin and ceftriaxone were commenced.

The following investigation results were obtained: left leg X-ray showed increased soft tissue swelling with no bony involvement. Diagnostic needle aspirations of the left shoulder joint and left leg yielded 400mls and 12mls of purulent aspirate respectively. Culture results of the aspirates yielded *Staphylococcus aureus* sensitive to gentamycin, cloxacillin and ciprofloxacin. Blood culture yielded no growth. However, full blood count showed polymorphonuclear leukocytosis (Total WBC:  $23.4 \times 10^9/l$ ; neutrophils: 65%) with neutrophilic left shift and toxic granulations. Haemoglobin genotype was AA and HIV serology was negative. Chest X-ray showed globular heart with cardiothoracic ratio of 71%. (Fig 1)

Fig 1



Treatment included; Elevation of the left lower limb with application of above-knee Plaster Of Paris backslab. In addition, antibiotics were changed to intravenous ampicillin-cloxacillin, for six weeks, and subsequently replaced with ciprofloxacin.

On the 17<sup>th</sup> day of admission, she became restless, with worsening respiratory distress and cyanosis. Oxygen therapy was commenced and urgent echocardiography revealed massive concentric pericardial effusion measuring 28mm, with normal ventricular function. (Fig 2) Bedside subxiphoid pericardiocentesis performed for relief yielded 300mls of purulent aspirate. Culture of the pericardial aspirate was negative. Under-water seal transthoracic tube pericardiostomy was inserted on the 19<sup>th</sup> day of admission with drainage over 11 days.

Fig 2



She was discharged home after 38 days stay in the hospital, with normal vital signs and chest examination findings. In addition, the left shoulder and leg swellings had resolved. (Fig 3) Investigation results showed normal FBC with PCV of 34% and normal cardiac silhouette on post-pericardiostomy chest X-ray.

Fig 3: Post-operative picture of Child with Purulent pericarditis showing swollen left leg, arm and Pericardiocentesis scar



## Discussion

Bacterial pericarditis often is not readily apparent as it is almost exclusively a complication from an underlying condition rather than a primary infection as seen in the index case.<sup>2</sup> The underlying condition in our index case was pneumonia, pyomyositis and arthritis, which is similar to earlier reports in which pneumonia and osteomyelitis were the major underlying conditions.<sup>3,4</sup> In addition, the presence of hepatomegaly in our case corroborated a previous report where it was an important diagnostic sign.<sup>3</sup> However, the etiology of hepatomegaly is likely multifactorial with cardiac failure and septicaemia playing a role. The negative blood culture result in spite of a positive joint aspirate culture was probably due to the pharmacokinetics of antibiotics with a more prolonged course of antibiotic administration needed to allow for bone and joint penetration. Hence the blood culture was negative due to early onset of action of antibiotics, while the joint aspirates which needed a more prolonged course of antibiotics came back positive. However, the pericardial aspirates were negative, probably as a result of prolonged antibiotic use before the aspirate was cultured. These findings were similar to that obtained in a study among Omani infants in which not all of their pericardial aspirate culture yielded isolates.<sup>7</sup> The Children with negative cultures had received antibiotics prior to the collection of samples. In contrast, a study of Zimbabwean children had a 72% yield of bacteria from the pericardial aspirate.<sup>3</sup>

Furthermore, the worsening respiratory distress and appearance of cyanosis in the index case seemed to be a pointer to the development of cardiac tamponade which is the most frequent complication of purulent pericarditis.<sup>3,7,8</sup> However the absence of engorged neck veins and impalpable peripheral pulses expected in cardiac tamponade was not surprising as an earlier report showed a prevalence of 34%.<sup>5</sup>

In addition, her chest X-ray revealed a globular heart. However, the presence of a globular heart on chest X-ray reflects an effusion of at least 250mls volume, which maybe present without pathologic effects and thus a globular heart is not diagnostic of a tamponade effect. Therefore, an echocardiography is an invaluable noninvasive means to evaluate a patient when tamponade is suspected.<sup>8</sup> The use of appropriate antibiotics combined with transthoracic pericardiostomy resulted in a complete resolution of symptoms.

## Conclusion

In resource limited settings with limited diagnostic cardiac gadgets, a high index of suspicion, diligent physical examination and simple investigations are essential for the diagnosis of purulent pericarditis in children. The use of appropriate antibiotics and pericardiostomy gives a good outcome in children with purulent pericarditis.

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