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CASE OF DISSEMINATED STAPHYLOCOCCAL INFECTION

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Abstract :

Staphylococcus aureus is the most virulent of the many staphylococcal species and remains a major cause of morbidity and mortality despite the availability of numerous effective antistaphylococcal antibiotics. It is a pleuripotent pathogen causing disease through both toxin mediated and non toxin mediated mechanisms. The organism is responsible for infections that range from minor skin and soft tissue infections to life threatening systemic infections.Sepsis is suspected in a patient who presents with fever or hypothermia, leucocytosis or leucopenia, tachypnoea and tachycardia with a suspected or proven microbial etiology. Of the former four features, if two or more are present, then it suggests Systemic Inflammatory Response Syndrome (SIRS).Here we present a case report of an adolescent male who presented to us with features of this Systemic Inflammatory Response Syndrome (SIRS). In addition, patient was found to have polyarthritis, pleuropulmonary, cutaneous and cardiac involvement. Laboratory studies helped to clinch the Staphylococcal etiology responsible for this florid presentation. With prompt recognition and appropriate intensive medical management patient was revived from this fatal infection in about a period of three weeks and discharged with complete recovery.

Keyword :staphylococcus aureus, SIRS, sepsis, polyarthritis.

***Case Report*:**

A 15 year old male presented to our hospital with seven day history of high grade, continuous fever along with five day history of polyarthritis. Joint pain and swelling had initially started in right knee, then involved left ankle and in another 3 days both elbows. Patient also gave history of breathlessness at rest, left sided chest pain, cough with expectoration for three days. There was no history of hemoptysis, skin rash, vomiting, abdominal pain, distension, altered sensorium, seizures, and hematuria.

There was no past history of recurrent infections, prior sore throat or cardiovascular illness in the past. No history of drug intake or IV drug abuse. No history of consanguinity or relevant family history. On examination, patient was conscious, toxic, febrile and tachypnoeic at admission. There was no cyanosis, clubbing, significant lymphadenopathy, pedal oedema.

Vitals were as follows*:* Pulse- 124/min, BP- 100/60mm Hg, RR- 36/min, and Temp- 102°F.

Joint examination- Right knee, Left ankle and both elbows were swollen, tender, inflamed and extremely limited in motion.

System Examination -

Chest examination revealed tachycardia, pericardial rub and crepitations in left mammary, axillaryand infraaxillary regions. Abdomen and central nervous system examination was normal. His fundus was also normal.

In the background of fever, polyarthritis, chest signs of pericardial rub, a diagnosis of acute rheumatic fever was entertained and patient was treated in intensive care with oxygen, antipyretics and aspirin in rheumatic fever dose.

Meanwhile his investigations revealed: TC- 13000 cells/L, DC - P86% L12%E1% M1%,Hb- 9gm/dl, ESR- 50mm in 1 hour, Peripheral smear- leucocytosis with shift to left, Sugar- 86mg/dl, Urea- 41mg/dl, Creatinine- 0.7mg/dl, ASO titre- normal, liver function test- normal, HIV- Nonreactive, ECGsinus tachycardia.

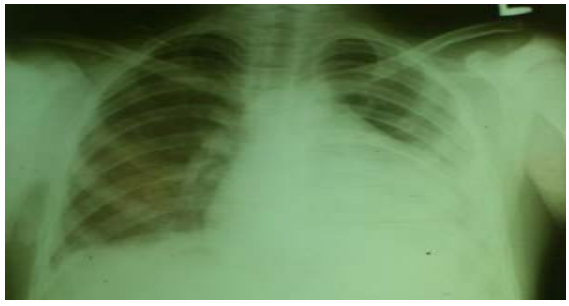

Fig 1 - Chest X Ray

Chest X ray revealed ill defined nodular lesions in right lower zone, left upper zone with enlarged cardiac shadow and left pleural effusion.

Echocardiography- moderate pericardial effusion with normal valves and chambers and normal LV systolic function.

USG abdomen- no significant abnormality detected.

Blood cultures, sputum culture and throat swab were sent.

Course of the illness:

Even after 2 days of aspirin, polyarthritis did not subside and patient remained toxic. So diagnosis was revised and possibility of SIRS due to an infectious etiology considered due to presence of more than two criteria of SIRS (Tachycardia>100/min, tachypnoea>20/min, temp> 38°C and leucocytosis > 12000cells/L). Aspiration of joints done revealed evidence of pus. Multiple clusters of gram positive cocci were found in the smear of joint fluid.

Patient also developed abscesses in forearms, right chest wall and right thigh. Abscess drainage was done under aseptic precautions.

Antibiotic treatment was initiated with ampicillin and cloxacillin pending culture reports. Patient's chest signs showed no improvement.

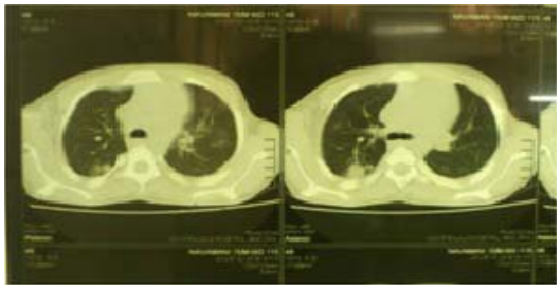

Fig 2 - CT Chest(Feeding vessel sign)

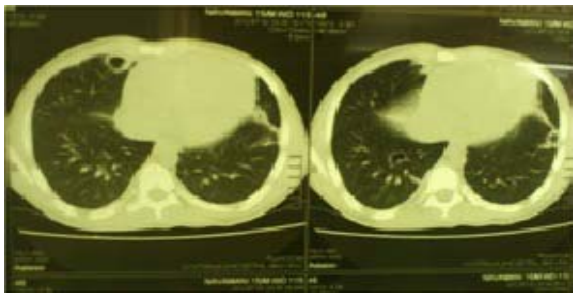

Fig 3 - CT Chest(pulmonary nodules with cavitation)

CT chest was done - Multiple well defined nodules scattered in both lungs, few of them showed central cavitation and feeding vessel sign. Features consistent with *Septic Pulmonary Emboli*.

In consideration of the patient's toxic condition with no response to initial empirical antibiotics, a higher antibiotic (inj Meropenem) was started. Within two days of initiation, patient started to respond, respiratory distress and chest signs decreased, joint pain/swelling started to reduce and the abscess began to heal.

Culture reports were received. Blood culture (Non Enteric) showed significant growth of staphylococcus aureus with sensitivity to ciprofloxacin and amikacin.

Pus culture from the abscess and sputum culture also had staphylococcus grown with sensitivity to ciprofloxacin, cefotaxime, amikacin and resistance to cloxacillin. With these reports, patient was started on appropriate antibiotics. He became afebrile and started showing signs of recovery. In a week's time his abscess, polyarthritis, pericardial effusion, pulmonary infection subsided and he was discharged in good health.

Thus, ours is a case of a previously healthy adolescent with no predisposing factors presenting with full blown staphylococcal sepsis, which is a rare entity in this era of availability of numerous antibiotics and sophisticated therapeutic modalities.

DISCUSSION:

Staphylococci are perhaps one of the most successful human pathogens. They normally colonise skin and mucous membranes but readily enter breaches in these natural barriers, especially if foreign material - e.g. soil, plastic cannulae, prosthetics - is present [2].

Staphylococcal bacteremia/sepsis:

Staphylococcus aureus is the main cause of staphylococcal infections. They are particularly dangerous if they gain access to the blood stream, having the potential to cause disease in many sites2. Staphylococcal aureus bacteremia may be complicated by sepsis, endocarditis, vasculitis or metastatic seeding. The more commonly seeded tissues are bones, joints, kidneys and lungs [1].

Recognition of these complications by clinical and laboratory diagnostic methods alone is often difficult. Comorbid conditions that are frequently seen in association with *S. aureus* bacteremia and that increase the risk of complications include diabetes, HIV infection, and renal insufficiency. Other host factors associated with an increased risk of complications include presentation with communityacquired *S. aureus* bacteremia (except in injection drug users), lack of an identifiable primary focus, and the presence of prosthetic devices or material [1].

Clinically, *S. aureus* sepsis presents in a manner similar to that documented for sepsis due to other bacteria. The well-described progression of hemodynamic changes beginning with respiratory alkalosis and clinical findings of hypotension and fever—is commonly seen. The microbiologic diagnosis is established by positive blood cultures. **Infections caused by Staph.aureus:**

Respiratory – pneumonia, lung abscess, Empyema. Cardiac - Endocarditis, pericarditis. CNSMeningitis, Brain abscess (neurosurgical infections in particular). Bone and Joint- Osteomyelitis, Septic Arthritis. Intestinal- Enterocolitis. Bloodstream- Septicemia, metastatic abscesses. Skin- wound infections, boils, styes, carbuncles, abscesses. Multisystem- Toxic shock syndrome. Staphylococcal infections are diagnosed by Gram's stain and microscopic examination of infected tissue.

Groups at Increased Risk of Infection

Diabetes combines an increased rate of *S. aureus* colonization and the use of injectable insulin with the possibility of impaired leukocyte function. Individuals with congenital or acquired qualitative or quantitative PMN defects are at increased risk of *S. aureus* infections; these include neutropenic patients (e.g., those receiving chemotherapeutic agents), individuals with defective intracellular staphylococcal killing (e.g., chronic granulomatous disease), and persons with Job's syndrome or Chédiak-Higashi syndrome. Other groups at risk include individuals with skin abnormalities and those with prosthetic devices.

Anti-microbial treatment:

For complicated infections, parenteral therapy is necessary 1, 3. For joint infections, a critical component of therapy is the repeated aspiration or arthroscopy of the affected joint to prevent damage from leukocytes. The combination of rifampin with ciprofloxacin has been used successfully to treat prosthetic-joint infections, especially when the device cannot be removed.

The choice of empirical therapy for staphylococcal infections depends in part on susceptibility data for the local geographic area. Increasingly, vancomycin (in combination with an aminoglycoside or rifampin for serious infections) is the drug of choice for both community- and hospital-acquired
Infections [1] .

For susceptible strains, penicillin remains the drug of choice. Penicillin-resistant isolates are treated with semisynthetic penicillinase-resistant penicillins (SPRPs), such as oxacillin or nafcillin. Cephalosporins are alternative therapeutic agents for these infections. The carbapenem imipenem has excellent activity against methicillin-sensitive *S. aureus* (MSSA) but not MRSA.

Conclusion:

So, we are reporting this case of ours for his life threatening presentation with sepsis from which he was revived with early identification and management. Staphylococcal sepsis with septic polyarthritis as in our case is an uncommon clinical entity. Only few cases are reported in world literature5. Healthy adolescent males with no immunodeficiency, drug abuse, immunosuppressant drug intake presenting with disseminated infection has been reported in earlier studies across the world4, 6. Ours is also one such patient where one requires high degree of suspicion of sepsis, after which administration of appropriate antibiotics according to microbiological cultures and sensitivity aid in early recovery.

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