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Case Report

A Case Series on co-existence of MRSA and Mycobacterium tuberculosis infection in tertiary care hospital

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ABSTRACT

Community-acquired Methicillin-resistant Staphylococcus aureus (CA-MRSA) usually emerges after a viral infection and causes severe disease in immunocompetent individuals. Concurrent infection with tuberculosis (TB) is generally very rare.Methicillin-resistant Staphylococcus aureus (MRSA) is a major nosocomial pathogen. Indiscriminate and increased use of systemic antibiotics is the reason for emergence of MRSA. Tuberculosis is the major infectious disease found in India and is still in phase to be eliminated. Concurrent infection of Tuberculosis with MRSA strain is rare to found in clinical settings. Here we report three cases of coinfection of MRSA in tuberculosis patients in different clinical samples and having different case history.

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Introduction

Methicillin, cloxacillin and flucloxacillin are penicillinase-stable beta-lactam antibiotics. Staphylococcus aureus strains which are resistant to these drugs are referred to as methicillin-resistant Staphylococcus aureus (MRSA). Few strains of MRSA have been reported to spread very rapidly these are known as "epidemic" strains or EMRSA.1Currently MRSA prevalence has increased due to emerging drug resistance and hospital infection spread. 2The estimated CA-MRSA prevalence is approximately 0.51–0.64 per 1,00,000. Mortality in CA-MRSA pneumonia is significantly higher than in methicillin-sensitive strains and has been reported as 56–63%. 3 Concomitant infection with tuberculosis is generally very rare in immunocompetent patients.

Our cases is the report of the coexistence of community-acquired MRSA and tuberculosis in an immunocompetent patient in different samples and case scenario. Tuberculosis (TB) remains the leading infectious disease causing human mortality and morbidity having significant risks to human health.4 Gaining an understanding of the current status of drug resistance in TB holds immense importance in evaluating and adjusting strategies for TB prevention, control, and treatment. MDR-TB prevalence is increasing so it is very important to diagnose these patients plus the coinfection one those with HIV or tuberculosis timely. Prompt diagnosis and accurate management is necessary for better outcome.

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Case 1

A 32 year old male patient came to OPD at our hospital with complaint of fever, cough and sputum since 15 days. He also complained of anorexia, weight loss and weakness. He look lethargy and his respiratory rate was slightly increased. Sputum sample collected was send to microbiology lab for bacterial and tubercular growth. The chest X-ray performed shows bilateral pleural effusion figure 2. The colony on sheep blood agar shows white, opaque, golden brown coloured colony with haemolysis.

The gram stain of the colony shows gram positive cocci in clusters with catalase and coagulase positive test. On nutrient agar colony produced typical golden-yellow coloured colony as seen in figure 1.

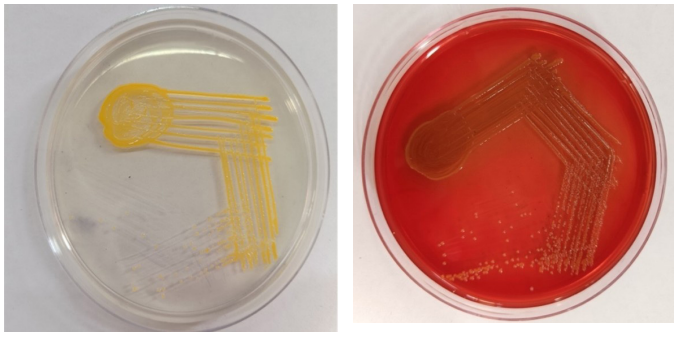


Figure 1: Staphylococcus aureus colonies on nutrient agar and 5% sheep blood agar

The antibiotic sensitivity performed by Kirby-Baeur disk diffusion shows cefoxitin resistant according to latest CLSI guideline. So treatment of MRSA was started with vancomycin, isoniazid, rifampicin, pyrazinamide and ethambutol. The Cartridge based nucleic acid amplification (CBNAAT) shows rifampicin sensitive tuberculosis. The AFB slide shows 3 plus grade positive stain for mycobacterium. The case was notified on NIKSHAY id portal and patient followed till smear and culture negative for tuberculosis.

OUTCOME- Patient improved.

Case 2

A 72 year old man came to OPD at our hospital with pus discharging from the hip joint where the person was operated past one month for fracture of left femur due to road traffic accident. Patient is known case of MDR-TB taking treatment for past three months. The patient also complaint of mild grade fever on and off. The pus sample sent to microbiology lab was sub-cultured on 5% sheep blood agar plate which shows white opaque, convex, smooth colony on gram stain shows gram positive cocci in clusters. Tube coagulase was positive and the antibiotic sensitivity performed shows methicillin resistant Staphylococcus aureus species according to latest CLSI guidelines. Vancomycin along with cotrimoxazole was given for 14 days for the treatment of the isolate. Patient was followed till pus culture came sterile.

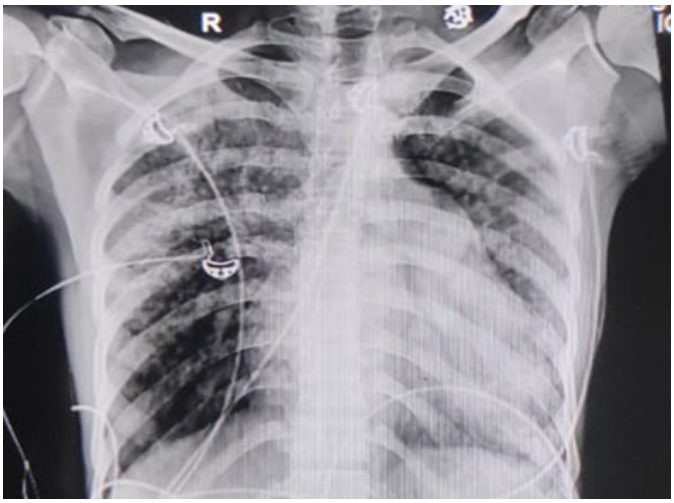


Figure 2: Chest X-ray showing bilateral opacities and diffuse infiltrates.

OUTCOME- Patient improved.

CASE 3

A 61 year old woman was admitted to hospital due to high grade fever and evening rise of temperature since one month. She also complaint of weight loss, anorexia, vomiting. Her blood culture sent to microbiology lab shows golden-yellow opaque beta haemolytic colony. Gram stain shows gram positive cocci in clusters. Diagnosis of pneumonia due to bacterial infection was made and treatment was given accordingly but patient showed no improvement. Her chest X-ray was performed which shows bilateral pleural effusion in the lungs. Figure 3. Her blood picture shows increased lymphocytes and TB gold test performed known as Quantiferon assay shows positive for tuberculosis. Diagnosis of miliary tuberculosis was made. The drug susceptibility was performed and treatment was given with rifampicin, isoniazid, pyrazinamide and ethambutol along with pyridoxine as supplement. Her condition worsen and shows no improvement since 30 days post admission. She develop breathlessness was shifted on ventilator support but did not improved and succumbed to infection.

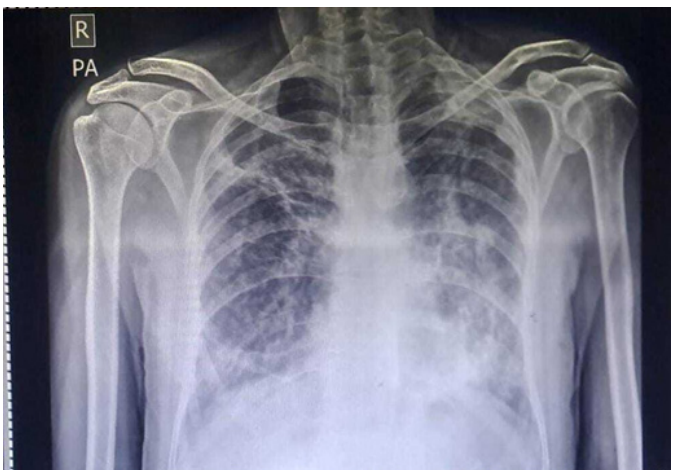


Figure 3: Chest X-ray showing bilateral pleural effusion due to pneumonia

OUTCOME- Fatal

DISCUSSION

We report three cases of concomitant infection of MRSA coincidently found to be tuberculosis infected. Pnuemonia found in patient shows plueral effusion and bilateral opacities. Comorbidities such as impaired cough reflex and muco- ciliary clearance, impaired local and humoral immunity, alcohol use and smoking, chronic obstructive pulmonary disease (COPD), congestive heart failure, chronic kidney disease, liver disease, and immunodeficiency conditions constitute a predisposition for the development of community-acquired pneumonia. [5] Sometimes people infected with flu can also weaken T-cell immunity and awake the latent tuberculosis or HIV infection if previously were infected.[6]

Multidrug resistance has been reported in CA-MRSA strains, but in general, these organisms are more drug- sensitive than similar hospital-acquired infections.[7]The burden from staphylococcal infections in Africa is overshadowed by the common diseases HIV/AIDS, tuberculosis, and malaria. 8Similarly in our Indian literature also coinfection of viral and bacterial are common in tuberculosis patients. Pus discharge from site of fracture is also common due to staphylococcal strain infection can occur due to improper dressing and surgical site infection.

Acute complications of bacterial pneumonia may include necrotizing pneumonia, pleural effusion and empyema which may be due to hospital acquired or community or due to coinfections of other diseases. [9]Multidrug resistance is increasingly being in reported in CA-MRSA strains also, although, these organisms are easy to be treated in similarity to hospital-acquired infections.[10] Most studies have shown MRSA isolates to be resistant to cotrimoxazole, erythromycin, gentamicin, ciprofloxacin, penicillins and cephalosporins. [11] However resistant to vancomycin and linezolid is still rare and left treatment option for these strains.[12] In our case also patient responded to the treatment for MRSA however one case was fatal that is because of tuberculosis infection.

MDR-TB is also increasing it is utmost important to notify each case on nikshay id for tuberculosis so that no case is missed. Extrapulmonary tuberculosis is difficult to diagnose and missed leading to complications. Our case series shows two cases of extrapulmonary tuberculosis so were hidden or diagnosed late. Public awareness for tuberculosis and their programs should be updated for successful elimination of this vulnerable disease from our country.

CONCLUSION

This case series reports to aim at creating an awareness among public about the possibility of MRSA infection in high-risk patients, especially those on steroids and immunosuppressive therapy. Screening in high risk contacts and hospital infection control is utmost important and of primary care. To prevent drug resistant more awareness among public and surveillance program is required for implementation. Screening for coinfections is also important especially those having family history.

CONFLICT OF INTEREST

Authors have no conflict of interest

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All authors contributed equally in drafting the manuscript.

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