



Management of Methicillin Resistant *Staphylococcus aureus* Infection of Endogenous Origin in an Electrical Burns Patient - A Case Report

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Case Study

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ABSTRACT

Methicillin Resistant *Staphylococcus aureus* (MRSA) poses a major problem and plays a vital role in nosocomial infections. Management of MRSA infection becomes cumbersome in healthcare settings due to its extension of resistance towards much class of antibiotics and it is purely based on antibiotic susceptibility. Nasal carriage of MRSA is a recognized risk factor for subsequent endogenous infection. We hereby report a case of MRSA infection in burns patient of endogenous origin and recovered by antibiotic therapy with 2% mupirocin. MRSA is frequent confront in the burn's ward where the patients have more colonized and infected than other group of patients. Disturbances in the skin barrier and immunological variations are recorded among burn patients. Surveillance of microbial entities, its epidemiology and following the strict infection control practices lessen the frequency of such infection but very dangerous to control the outbreak situations.

Keywords: MRSA; Electrical burns; management.

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1. INTRODUCTION

Staphylococcal infection largely observed in various health care settings with high morbidity and mortality. Serious issues reported with Staphylococcal infections like sepsis, endocarditis, osteomyelitis and other infections [1]. The pathogenic species of *Staphylococcus aureus* (*S. aureus*) is well reported in more cases where it showed multiple antibiotic resistance leads to severe shock to death. Mortality in burns patient is found to be higher due to infection. Antimicrobials against *S. aureus* may respond in various cases but failure in antibiotic action also observed while using penicillin, methicillin, nafcillin. Methicillin resistant *S. aureus* (MRSA) was first reported in 1961, found to be increasing now a days; that extend their resistance to other routine antibiotics. It is challenging to the health care professionals to treat the issue of antimicrobial resistance by increasing the length of stay of hospitalization, unawareness of using the universal safety precautions, prolonged usage of medical devices including the prosthesis [2]. This can be curtailed by initiating and practicing infection control practices. Timely detection of MRSA and management in burns individuals added its significance in clinical environment to conquer and reduce the spread this kind of infections [3].

2. Presentation of Case

A 27 year old male sustained electrical burns in January 2013. He was conservatively managed in a private hospital at Madurai and brought to our hospital for further management. On General Examination, patient was conscious, oriented, afebrile, not anaemic, not jaundiced, on normal diet, bowel and bladder habits were normal, not a known case of diabetic mellitus/ hypertensive, pulse rate 100/minute and blood pressure 150/100mm/Hg. On local examination, it was diagnosed as 30-40% third degree burns with eschar present over left thigh and leg, lateral aspect of abdomen and back, left upper limb and axilla.

Initially the patient was treated with Injection (Inj) Cefaperazone+ sulbactam 1.5gm intravenously (IV) daily; along with supportive drugs and surgery. Tangential escharectomy and wound debridement was done under spinal anaesthesia. In the post operative condition, he was treated with Inj. Metronidazole 500mg IV thrice daily for five days; Inj. Amoxicillin + clavulanic acid 1.2gm IV twice daily for five days along with supportive drugs. Further the wound was not healed. A request received from the surgery ward to Microbiologist for the etiological determination.

Pus specimen was taken from the site of wound aseptically and processed by routine microbiological procedures. *Staphylococcus aureus* was isolated in culture. Antibiotic susceptibility pattern was performed by Kirby - Bauer disk diffusion method where the isolate was found to be sensitive to vancomycin alone and resistant to other groups of antibiotics includes co-trimoxazole, penicillin (ampicillin), macrolides (erythromycin, azithromycin), aminoglycoside (amikacin, gentamicin), cephalosporins (cefotaxime, ceftriaxone, ceftioxin) and drugs with β lactamase inhibitors (amoxicillin+clavulanic acid, piperacillin+tazobactam), linezolid and teicoplanin.

The isolate was confirmed as MRSA by performing oxacillin screen agar and ceftioxin disk diffusion method. The patient was isolated and treated with Inj. vancomycin 1gm IV twice daily for seven days under strict aseptic precaution but the wound was not healed.

Endogenous origin of MRSA was suspected and swabs were taken from both anterior nares, left and right axilla, left and right groin and from the site of wound.

MRSA were isolated from wound site and from both anterior nares. The bacterial culture was negative for *S. aureus* from both the axilla and groins. Antibiotic susceptibility pattern of all the three isolates was similar to that of the *S. aureus* previously isolated from the wound site. All the three isolates of *S. aureus* (from the wound site and from both anterior nares) were sent to National referral centre (Moulana Azad Medical College, New Delhi) for phage typing and identified as Phage group III - 47. Decolonization of MRSA was done with 2% mupirocin for 7 days period on both wound site and anterior nares.

Patient was readmitted on June 2013 for slit skin graft (SSG). Swabs were taken from wound site, left and right anterior nares and were culture negative for *S. aureus*. Under spinal anesthesia, SSG was taken from right thigh and applied over wound at left thigh. Post operatively the patient was managed with Inj. Cefotaxime 1gm IV twice daily for 7 days and Inj. Metronidazole 500mg IV thrice daily for 7 days. Post operative period was uneventful, SSG has been taken up well and patient was dehospitalized on 12th post operative day.

3. DISCUSSION

MRSA, like MSSA, can be isolated from wounds that are apparently healing normally. Although it is unlikely that any attempt would be made to eliminate MSSA in such a situation, a more aggressive approach may be adopted with MRSA because of the potential risk that colonisation may progress to a hard-to-treat clinical infection. Such wounds also represent a serious risk of cross-infection [4]. In our study, MRSA was isolated from the electrical burn patient. In burns, breaching skin barriers provide a suitable site for bacterial multiplication and are more persistent richer sources of infection than any other surgical wounds, mainly because of the larger area involved and longer duration of patient stay in the hospital [5].

For this reason, special attention to hospital infection should be paid in burn's unit by early interventions should be performed in order to improve the quality of treatment. Antibiotics are frequently administered at random, without obtaining the results or without respect to the principles of rational antibiotic therapy. On the other hand, the usage of antibiotics is one of the main risk factors for nosocomial infections.

Excessive use of antibiotics stimulates the development of antibiotic resistant bacteria, increases treatment costs and causes side effects. This can be avoided by rational use of antimicrobials, i.e. only when necessary, with a careful choice of the suitable drugs [6]. The usage of antibiotic solutions and ointments for wound dressings is not recommended, since antibiotics mixed with the wound secretions and pus lose their effectiveness, their concentration in the wound becomes insufficient, which in turn stimulates the development of the resistant types of microbes. Therefore, for the dressings and cleansing of festering wounds, antiseptic rather than antibiotic solutions and ointments should be used, including chlorhexidine, silver sulphadiazine, povidone-iodine, etc. Antibiotics are only prescribed if the causative agent is found to be sensitive to antibiotics, starting with lower generation antibiotics, and in the presence of the symptoms of wound infection, leukocytosis, or elevation of C-reactive protein.

4. CONCLUSION

During surgery, in case of medium to severe burns, a single dose of oxacillin may be recommended. MRSA infection is more severe than MSSA, and it prolongs the duration of the treatment [7]. In nosocomial scenario, nasal carriage of MRSA also plays an important role in spreading the infection among the exposures, thus screening is mandatory followed by decolonization with mupirocin ointment [8] and chlorhexidine wash. In this investigation, the patient treated successfully with mupirocin.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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