SALMONELLA SENFTENBERG OSTEOMYELITIS

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KEY WORDS :

Introduction

Since its first isolation in 1928, by Kauffman in Senftenberg Hospital, Berlin, Germany, *Salmonella enterica* serovar *senftenberg* (1,3,19,:g,[s], t:) has been implicated in outbreaks of neonatal gastroenteritis and septicaemias as well as in nosocomial infections in many countries of the world [1]. In India the first outbreak of neonatal septicaemia and meningitis due to multidrug resistant *S senftenberg* was reported in 1985 [2,3] often with mortality upto 20% (4). This organism is known to cause nosocomial infection in adults as well particularly when immunocompromised [5]. The present case report is a case of burn who developed osteomyelitis of tibia by this rare strain.

Case Report

34-year-old serving soldier sustained 55% flame burn, on 15 June 1997. After a brief period of emergency treatment in a civil hospital, he was admitted to Command Hospital, Southern Command, Pune on 19th June 97. On admission he was of average built, wt 64 kg, general condition satisfactory. Pulse 80/minute, good volume, BP 110/66 mm of Hg, febrile with temperature 103-104 F, hepatomegaly 4 cm below coastal margin, firm and non tender. Other systems were apparently normal. He had superficial partial thickness burn on both upper limbs including hands, both lower limbs, face and neck. He was treated with supportive measures, blood transfusion, and antibiotics. His feet were kept elevated with tibial skeletal traction with Steinman pin in each tibia. He had developed burn wound infections with *Proteus vulgaris*, *S aureus*, *P aeruginosa*, *Klebsiella pneumoniae* and *Proteus mirabilis* and UTI with *E coli* during his stay in the hospital from 19th June 97 to November 97. He had received parenteral antibiotics e.g. ampicillin, ciprofloxacin, gentamicin, flagyl, amikacin, norfloxacin, and chloramphenicol. After multiple sittings of split skin grafts he apparently recovered and was sent on sick leave to his home town in Aurangabad, Maharashtra. He reported back in Jan 98 with purulent discharge from a sinus from the lower end of tibia with extrusion of bone chips. There was restricted movement of left ankle joint and the left dorsalis pedis was not felt. X-ray of the lower end of left tibia was suggestive of acute osteomyelitis

with a small sequestrum. The wound was saucerized and the bony tissue was sent for culture. The isolated organism was identified as *Salmonella senftenberg* by standard morphological, biochemical methods [6]. Serotyping of the organism was done using polyvalent 'O' and 'H' antisera. Further typing was carried out by group and phase specific monofactor antisera supplied by Wellcome/Murex diagnostics Ltd by using slide and tube agglutination using Dreyer's technique [7]. Since this was an unusual organism, the invasiveness had been tested by slide agglutination of the organism with patient's serum which was strongly positive. The antibiotic sensitivity test was carried out with Stokes' disc diffusion method using NCTC 6571, *Staph aureus* [8]. The organism was found to be resistant to ampicillin, sulphamethoxazole, chloramphenicol, ciprofloxacin, norfloxacin, ofloxacin, gentamicin, netilmicin and cefotaxime but sensitive to amikacin. His blood for Widal test showed raise in TO 1:120, AO 1:30, BO 1:30.

After saucerization and combination antibiotic therapy with ciprofloxacin and gentamicin parenterally, the granulation tissue was well developed and the infection was arrested.

Discussion

We have reported a case of acute osteomyelitis of tibia in a patient of 55% burns. It is well known that there is suppression of immunity in burn cases. In addition to the culture media provided by the burn tissue the patient with large burn is predisposed to infection due to depression of non specific, humoral and cellular immune response [9]. Circulating levels of immunoglobulins are inversely proportional to the extent of burn. Increase in suppressor T cell activity with decrease in number and function of T Helper cells and defects in the monocytes have been reported. Production of tumour necrosis factors and disorder of neutrophil function appears to be a major predisposing factor for development of sepsis [10].

The main source of *S senftenberg* has been reported to be intestinal tract of poultry and a nosocomial outbreak in an American hospital has been attributed to contamination of kitchen wares from deli turkey [11]. But in this case it was unlikely to be the source as this

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patient did not come in contact with chicken or other poultry during his sick leave. The endogenous source of this infection was ruled out by negative stool culture from the patient for *S. senftenberg*. The infection could not be attributed to the nosocomial source as there was no similar infection from the same ward or the same hospital both in relation to time and space. However in other Indian nosocomial out-breaks by multidrug resistance (MDR) *S. senftenberg*, the source had been identified from the intravenous stand switch board and electric extension cord from a paediatric ward [1] where it caused neonatal septicaemia and meningitis. In a large statistical study by CRI Kasauli, out of total of 571 *S. senftenberg* recovered at this centre from 1969 to 1993, 78% per cent were from human source, 6.5% from animal source and 15% from other sources [2]. In a state wise distribution of *Salmonella* isolates, Maharashtra had contributed 21% of all salmonellae out of which 49% were *S. senftenberg* strains. This highlights that almost 1 in every 2 salmonella isolates was *S. senftenberg*.

There is paucity of literature on osteomyelitis caused by *S. senftenberg*. Most of the morbidity in the children particularly when they are effected with haemoglobinopathies, trauma and surgery, connective tissue disorders or lymphomas, 47% are likely to develop chronic osteomyelitis [12]. *S. senftenberg* has not been reported from these cases. This strain is peculiar in that it has infected an adult and caused acute osteomyelitis in a burn case. The organism was MDR and possibly has acquired R plasmid which has been reported in MDR strains [11]. The local factors contributing to the infection were the nail through the tibia which provided a contiguous infective source, trauma to the bone and less oxygen tension locally due to reduced blood supply. The debridement, saucerisation

associated with removal of sequestrum and combination antibiotic therapy had helped arresting the infection. But it is difficult to predict the outcome, whether it will lead to complete cure or recurrence.

REFERENCES

1. Kumar S, John PC, Sharma NC, Sokhey J, Singh H. *Salmonella senftenberg*: Epidemics in India and present status. Indian Pediatrics 1994;31:1491-5.
2. Narang P, Chaturvedi P, Bhatia BD, Dubey AP, Mathur NB. A nosocomial outbreak in pediatric ward due to *Salmonella senftenberg*. Indian J Med Microbiol 1985;3:183-9.
3. Shrivastava L, Gupta R, Ram Murthy DV, Joseph AT. Investigation of nosocomial outbreak of *Salmonella senftenberg* in neonatal wards. Indian J Med Microbiol 1989;7: 65-8.
4. Panigrahi D, Rath RK, Narang A. *Salmonella senftenberg* outbreak in the neonatal wards of Nehru Hospital, Chandigarh. Indian J Med Microbiol 1990;8:128-32.
5. Fule RP, Saoji AN. Nosocomial infection due to *Salmonella senftenberg* (case report). Indian J Med Sci 1991;45:61-2.
6. Old DC. *Salmonella*. In: Parker MT, Duerden BI. Eds. Topley and Wilson's Principle of Bacteriology, Virology and Immunity; 8th Ed. London, Edward Arnold: 1990;469-93.
7. Edward PR, Edwing WH. Identification of Enterobacteriaceae. 3rd Ed. Minneapolis. Burgess Publishing Company: 1972;146-258.
8. Stokes EJ, Ridgway GL, Wren MWD. Clinical microbiology. 7th Ed. Boston: Edward Arnold 1993:251-2.
9. Arturson G, Hogman CF, Johansson SGO, et al. Changes in immunoglobulin levels in severely burned patient. Lancet 1969; 1:546-8.
10. Alexander JW, Ogle CK, Stennett JD et al. A sequential prospective analysis of immunologic abnormalities and infection following severe thermal injury. Ann Surg 1978;188:809-16.
11. Paul B, L'Ecuyer, Diego J, Murphy D, Trovillion E, Jones M et al. Nosocomial outbreak of gastroenteritis due to *Salmonella senftenberg*. CID 1996;23:734-42.
12. Ortiz-Neu C, Marr JS, Cherubin CE, Neu HC. Bone and joint infections due to salmonella. J Infect Dis 1978;138:820-8.