Skin and Soft Tissue Infection: Frequency of Aerobic Bacterial Isolates and Their Antimicrobial Susceptibility Pattern

Sir,

In recent years, skin and soft tissue infections (SSTIs), particularly due to multidrug-resistant pathogens is increasingly being encountered in clinical setting. SSTIs may range from simple uncomplicated superficial infections such as folliculitis, cellulitis, abscesses to deeper complicated infections such as necrotising fasciitis and diabetic foot. Complicated SSTIs contribute to longer hospital stays, increase in the cost of medical care and have a significant role in the development of antimicrobial resistance also.1 This retrospective study was carried out on 313 non-repeat pus samples over a period of one year from March 2004 – March 2005, to analyze the bacteriological profile and antimicrobial susceptibility pattern of skin and soft tissue infections in our hospital setting.

Bacterial pathogens were identified according to the standard microbiological methods and antimicrobial susceptibility testing was done by Kirby Bauer Disc Diffusion test as per recommendations of CLSI.3

Of the 313 samples, 231 (73.81%) were culture positive, while 82 (26.19%) samples were culture negative. Among the 231 positive cultures, the number of bacterial isolates obtained was 248. Therefore, 17 samples/patients had polymicrobial infection (2 types of growth). Ninety-six bacterial isolates were obtained from cases of abscesses, 84 from diabetic foot, 39 from necrotising fasciitis and 21 bacterial isolates were obtained from cases of abscesses, 84 from diabetic foot, 39 from necrotising fasciitis and 21 bacterial isolates were from cellulitis. Of the remaining isolates, four were from Fournier’s gangrene, three from furuncle and one from Bartholin cyst. *Staphylococcus aureus* was the commonest isolate (30.64%), followed by *Escherichia coli* (24.20%), *Pseudomonas aeruginosa* (16.94%), *Klebsiella pneumoniae* (9.67%) and *Proteus vulgaris* (5.24%). Others being *Acinetobacter calcoaceticus baumannii complex* (*Acinetobacter cbc*), *Streptococcus pyogenes*, *Enterococcus faecalis* and *Citrobacter* species. Though the organisms found are similar to other studies from India1 and from outside,4 the isolation pattern and resistance percentages showed variation.

In this study, amongst the various superficial SSTIs like folliculitis, furuncles, cellulitis and abscesses, *S. aureus* was the commonest organism isolated. In the patients with diabetic foot infection, there was a predominance of *E. coli*. Other common pathogens isolated were *Ps. aeruginosa* and *P. vulgaris*. Anandi et al5 stated that the *Pseudomonas sp.* and *Proteus sp.* carry a special role and are responsible for continuing and extensive tissue destruction in diabetic foot. *E. coli*, *Ps. aeruginosa* and *K. pneumoniae* were the organisms more commonly isolated from patients of necrotising fasciitis. However, no isolate of *Streptococcus spp.* was found. The bacteriology of these infections has undergone a major change since they were first described.6 They were originally attributed to beta-hemolytic streptococci but lately these infections have become polymicrobial and increasingly Gram negative bacilli are being implicated as causative agents as has been seen in the study by Singh et al6 also.

Among *S. aureus* strains, 23.08% were found to be methicillin resistant *S. aureua* (MRSA). This rate is almost similar to the study by Anandi et al (20.83%).6 However, all the isolates were sensitive to vancomycin and linezolid. The resistance shown to various antibiotics by MRSA was – 67.3% to ceftriaxone, 31.7% to gentamicin, 25.5% to ciprofloxacin, 23.2% to erythromycin, 22.4% to amoxicillin and 19.5% cephalaxin. Comparatively lower rate of resistance was seen in methicillin sensitive *S. aureua* (MSSA). They showed 63.74% resistance to ceftriaxone, 27.75% to gentamicin, 19.96% to ciprofloxacin, 19.88% to erythromycin, 15.7% to amoxicillin and 14.78% to cephalaxin. This high level resistance seen to ceftriaxone in *S. aureus* strains could be due to overuse of ceftriaxone in our community and over the counter sale of this common antibiotic. All *Streptococcus* strains were susceptible to routinely used antibiotics.

Amongst the gram-negative bacilli, highest resistance was seen to ciprofloxacin (68.42%), gentamicin (60.41%) and tobramycin (66.67%). Also in the beta-lactam group of antibiotics, resistance percentage was around 50%. Resistance to third generation cephalosporins was – ceftazidime (48.23%), cefotaxime (53.84%), ceftriaxone (54.16%) and cefuroxime (53.84%). This could be due to increasing extended spectrum beta lactamase (ESBL) expression in Gram negative bacteria. However, these gram-negative bacilli were sensitive to imipenem (98%) and the combination drug ceftoperazone /sulbactam (84.10%). Imipenem and combination of beta-lactam / beta-lactamase inhibitor are the drugs of choice for treatment of infection due to such multidrug resistant organisms.

Various nonfermenters (*Ps. aeruginosa* and *Acinetobacter cbc*) also showed high level of resistance which varied from 90% resistance to ciprofloxacin, 83.33% to augmentin, 78.37% to gentamicin and 56.09% to cefepime. This high rate of resistance observed in present study could be due to the fact that ours is a tertiary care hospital with widespread usage of broad-spectrum antibiotics, leading to selective survival advantage of pathogens. Mohanty et al has also reported high resistance in GNB and nonfermenters isolated from SSTIs.1

In conclusion, we summarize that continued surveillance of susceptibility patterns is required to detect the burden of antibiotic resistance in various groups of organisms, to reduce the morbidity and
mortality in SSTIs.

Varsha Gupta, Priya Datta, Nidhi Singla
Department of Microbiology, Government Medical College and Hospital, Sector 32, Chandigarh 160031, India.
Received : 2.4.2006; Revised : 9.10.2007; Accepted : 28.2.2008

REFERENCES


4. Sader HS, Jones RN, Silva JB. Skin and soft tissue infections in Latin America medical centers: four-year assessment of the pathogen frequency and antimicrobial susceptibility patterns. Diagn Microbial Infect Dis 2002;44:281-8
