Brief Reports

Disseminated Staphylococcal Disease

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Staphylococcal infection continues to be a common cause of serious progressive skin, soft tissue and post traumatic infection in community(l) The information regarding disseminated staphylococcal disease (DSD) is scanty in the pediatric literature(2-4) and this prompted us to report our experience.

Subjects and Methods

Ten patients diagnosed as disseminated staphylococcal disease on the basis of isolation of *Staphylococcus aureus* from blood and two anatomically different sites, were studied from hospital records. The details of history, physical and laboratory findings, hospital course and outcome were recorded.

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Results

Over a period of 2 years (June 1992 to June 1994), 10 patients were diagnosed to be suffering from DSD in the Pediatric wards of our institution. The age of the patients varied from 2 years to 12 years; 8 cases were above 5 years. Male to female ratio was 1.5. Seven patients were from urban and 3 were from rural background. None of the subjects had history of repeated infections in the past. All acquired infection in the community. Two patients gave a history of admission in another hospital for the present illness before coming to our center. All patients at onset of illness had moderate to high grade fever. The mean duration of fever was 4.8 (±1.68) days. The other symptoms at onset of illness included pain abdomen (n=4), pain chest (n=2), joint swelling (n=2), joint pain (n=2) and boil over chest (n=l).

Empyema with underlying pneumonia was present in 6 (60%) patients and 2 cases had only pneumonia. Pericardial effusion

was documented by echocardiography in 5 (50%) patients which was confirmed by pericardiocentesis in all. Skin rash of variable nature was present in 8 subjects. Liver was enlarged in 7 (70%) and multiple liver abscesses could be identified in 4 (40%) cases. Bacterial peritonitis was present in one patient, large joint involvement was present in 8 (80%). Other physical findings are summarized in *Table I.*

Investigations revealed a total leukocyte count (TLC) varying from 5060 to 22000/ mm^3 per cubic milliliter with polymorphs ranging from 68% to 90%. Abnormal liver and renal functions were documented in 4 and 2 cases, respectively which returned to normal during the hospital course itself. Cultures yielded *Staphylococcus aureus* from blood and pus from various sites. Sensitivity was tested for vancomycin in 18 isolates and all were sensitive to it. Eighty per cent of the isolates were sensitive to cloxacillin, ciprofloxacin, amikacin and netilmycin. Only half were sensitive to penicillin. About 80% were resistant to cotrimoxazole, tetracycline and erythromycin. Serum immunoglobulins done in 4 patients were normal. Dinitrocholorobenzene test for T cell function and nitroblue tetra-zolium test for polymorph function were normal in the 2 cases in which these were performed.

TABLE I- *Physical Findings in Disseminated Staphylococcal Disease.*

Physical findings	Frequency No. (%)
Pneumonia and/or empyema	8 (80)
Pericardial effusion	5 (50)
Skin rash	8 (80)
Vascular	2
Erythematous	2
Urticarial	1
Bullous	2
Pustular	1
Hepatomegaly	7 (70)
Liver abscess	4 (40)
Ascites	1 (10)
Brain abscess	2 (20)
Brain abscess and meningitis	2 (20)
Joint and extremity involvement	8 (80)
Arthritis single joint	3 (30)
Arthritis multiple joints	5 (50)
Soft tissue, subcutaneous abscess	3 (30)
Retinitis	2 (20)
Iliopsoas abscess	1 (10)
Palmar space abscess	1 (10)
Thyroid abscess	1 (10)
Parotid abscess	1 (10)

The average stay of these patients in hospital was 32 days. All the subjects initially received cloxacillin and an aminoglycoside. Five cases ultimately received vancomycin, quinolones and aminoglycosides; two of these patients died. The remaining patients responded to cloxacillin and aminoglycoside. Apart from antibacterial therapy, these children required drainage of pus.

Out of 10 patients, 2 died and 8 were discharged. The 2 patients who died did not differ from the survivors with respect to age, sex, nutritional status, socio-economic background and sensitivity pattern of the organisms isolated.

Discussion

DSD can involve multiple organs because of hematogenous spread. In our patients, apart from other organs, eyes were involved in two subjects and parotid and thyroid glands were involved in one case each. Involvement of eyes, parotid and thyroid has not been reported earlier(2-4). Paterson *et al*.(3) observed toxic shock syndrome in 13 out of 38 patients. In our

patients, peripheral circulatory failure was seen in one patient preterminally and we attributed it to sepsis. Involvement of various organs even after initiation of antibiotics has been observed in relation to staphylococcus infection(4,5). The patients remained febrile for long periods probably due to occult pus collections. A daily thorough search for abscess may help in planning of appropriate intervention. The percentage of band cells in peripheral blood smear correlates well with the presence of deep seated abscesses(3,6).

No predisposing factors could be identified in the present study and in an earlier report(3). However, predisposing factors were reported in 20% of patients in a series(2). DSD in adults occurs most of the time due to some predisposing factors such as diabetes, chemotherapy for neoplasia and steroid therapy(7). Any specific virulence factor responsible for DSD is not described in literature. Amongst the host factors, little evidence exists to suggest major role of either humoral or cell mediated host defenses(8).

In the present study the sensitivity of the isolates to penicillin and erythromycin was 50% and 20%, respectively. The difference in sensitivity may be because of different frequency of their use in clinical practice and different mechanisms for development of resistance(9). The drug of choice to begin with will include cloxacillin with an aminoglycoside in this part of the world.

We could not find any correlation between organ involvement and mortality. The mortality in DSD reported in literature varies from 19 to 27% and is high in immunocompromized patients(2,3). Steroids or intravenous gammaglobulins do not alter the outcome of these patients(l0).

Our initial patients were confused with collagen vascular diseases due to multisystem involvement. Demonstration of pus from the site of involvement distinguished DSD from collagen vascular disease.

In conclusion, DSD is a multisystem disease which may involve almost all the organ systems and is associated with high mortality in our setting.

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