CORRESPONDENCE

Invasive β -haemolytic streptococcal infections in a tertiary care hospital in northern India

β -Haemolytic streptococci cause a wide spectrum of clinical diseases. Pharyngitis and associated complications are the most common clinical presentations for group A streptococci (GAS). Invasive GAS infections have increased world-wide during the past decade despite the organism remaining sensitive to penicillin and other commonly used β -lactam antibiotics [1, 2]. Group B streptococci (GBS) are a leading cause of infection in neonates and pregnant women and have also been recognised as a cause of invasive diseases in children and non-pregnant adults [2, 3]. Group C (GCS) and group G (GGS) streptococci are commensals of the pharynx, skin, gastrointestinal tract and female genital tract; the 'large colony'-forming strains resemble GAS in terms of their virulence [2]. The paucity of information on the spectrum of β -haemolytic streptococcal disease in developing countries prompted a retrospective study of the prevalence and spectrum of invasive and non-invasive infections due to β -haemolytic streptococci in a 1500-bed tertiary care hospital in an urban setting which caters for patients from rural and urban areas of northern India.

Hospital records of all patients with β -haemolytic streptococci isolated from various body sites during a 5-year period (Jan. 1996–Dec. 2000) were examined. Samples received in the laboratory were classified into the following groups: sterile body fluids, soft tissue, respiratory and genital tract samples, and intravascular (i.v.) devices. The sterile body fluids included blood, cerebrospinal, peritoneal, pleural, pericardial and synovial fluids, and lung aspirates. Specimens of urine and stool were excluded from the analysis. Multiple samples taken from one patient were included in their respective groups and analysed as separate samples. Samples were processed for the isolation of various pathogens and β -haemolytic streptococci were identified according to standard protocols [4]. Serological groups of the streptococcal isolates were determined with the 'Meritec Strep' co-agglutination kit (Meridian Diagnostics, OH, USA). An isolate which was resistant to bacitracin (0.04 U disk) and produced a negative CAMP test and did not agglutinate with the available antisera (A, B, C, G, F) was designated as a presumptive non-groupable streptococcus. Antimicrobial sensitivity of β -haemolytic streptococci was determined by the NCCLS disk diffusion method [5].

Invasive streptococcal infection was defined by the isolation of β -haemolytic streptococci from a sterile body site [3]; isolations from all other specimens were considered to be non-invasive. A total of 219 934

samples was received in the clinical bacteriology laboratory during the study period, excluding stool and urine samples (129 042 sterile body fluids, 39 288 soft tissue, 45 292 respiratory and 2213 genital tract samples, and 4099 from i.v. devices). β -Haemolytic streptococci were isolated from 529 samples (2.4/1000 specimens, 95% C.I. 2.2–2.6), of which 271 (51%) were from hospitalised patients; 225 (43%) isolates were from invasive infections and 304 (57%) from superficial infections. Amongst patients with infection due to β -haemolytic streptococci, 348 (66%) were male; 10 (2%) were <1 year old, 33 (6%) 1–4 years, 73 (14%) 5–14 years, 302 (57%) 15–44 years, 95 (18%) 45–64 years and 16 (3%) >65 years. GAS accounted for the majority (344; 65%) of isolates followed by GGS (69; 13%), GBS (45; 9%) and GCS (9; 2%). A total of 62 (12%) isolates was non-groupable, which emphasised the need for further characterisation. A gradual decrease in the streptococcal isolation rate was observed during this study (Fig. 1). A seasonal variation in β -haemolytic isolation was observed, with 265 (50%) of the cases being detected during the winter months (Dec.–Feb.).

Of the 225 isolates from invasive sites, 20 were from sterile body fluids and 205 from soft tissues. Bacteremia was the most common presentation (13 of 20) amongst patients with isolates from sterile body fluids; the other specimens being cerebrospinal (2), peritoneal (2), pleural (1) and synovial (1) fluids and a lung aspirate. GAS were isolated from 13 sterile sites. Seven patients (35%) with sterile site infections were 15–44

Fig. 1. Isolation of β -haemolytic streptococci from invasive (□) and non-invasive (■); total (▨).

years old and all had underlying medical or surgical conditions. Three patients presented with toxic shock syndrome and two had underlying systemic lupus erythematosus with nephritis [2, 6]. Of the other 205 isolates from invasive infections, 111 (54%) were from soft tissues, 69 (34%) from surgical patients and 25 (12%) from patients with pemphigus vulgaris. An increasing incidence of GAS soft tissue infections has also been reported in many other studies, which may be due to changes in the distribution of M-types or resurgence of unique clones with enhanced virulence potential [1, 2]. GAS tissue infections usually affect the healthy adult population with apparently no predisposition and operative procedures are major risk factors for bacteraemia in such patients [7].

All 529 streptococcal isolates were sensitive to penicillin but 2 (*c.* 1%) of 344 isolates of GAS were resistant to erythromycin. Resistance to penicillin has not been reported in GAS until recently and the prevalence of erythromycin resistance has been reported to vary from 1.3 to >45% in other studies in India and western countries [8, 9].

In conclusion, invasive streptococcal infections in India occur mainly in patients with underlying diseases. The life-threatening nature of these infections and emergence of antimicrobial resistance warrant continued monitoring of these infections. As neither the population served by the laboratory nor the specimen collection practices have changed, the decline in respiratory isolates could have been due to an increase in empirical antimicrobial treatment of respiratory infections. Although GBS were isolated from 45 samples, no cases of severe neonatal infection were encountered. A very low incidence of neonatal septicaemia due to GBS has also been reported in a South Indian study. This could be due to high prevalence of maternal antibodies or low rate of colonisation, or could reflect

microbiological screening or culture techniques for GBS [10]. This highlights and emphasises the need for definitive streptococcal surveillance studies combined with epidemiological typing in specific areas.

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References

- Schwartz B, Facklam RR, Breiman RF. Changing epidemiology of group A streptococcal infection in the USA. *Lancet* 1990; **336**: 1167–1171.
- Ruoff KL. Streptococcal diseases. In: Collier L, Balows A, Sussman M (eds) *Topley & Wilson's microbiology and microbial infections*, 9th edn, vol 3: Bacterial infections. London, Arnold, 1998: 257–275.
- Tyrrell GJ, Senzilet LD, Spika JS *et al.* Invasive disease due to group B streptococcal infection in adults: results from a Canadian population-based, active laboratory surveillance study – 1996. *J Infect Dis* 2000; **182**: 168–173.
- Collee JG, Miles RS, Watt B. Tests for the identification of bacteria. In: Collee JG, Fraser AG, Marmion BP, Simmons A (eds) *Mackie and McCartney. Practical medical microbiology*, 14th edn. New York, Churchill Livingstone, 1996: 131–149.
- National Committee for Clinical Laboratory Standards. Performance standards for antimicrobial disk susceptibility test, 6th edn. Approved standard M2-A6. Ianova, PA, National Committee for Clinical Laboratory standards, 1997.
- McCormack JM, Crossley CA, Ayoub EM, Harley JB, Cunningham MW. Poststreptococcal anti-myosin antibody idio-type associated with systemic lupus erythematosus and Sjögren's syndrome. *J Infect Dis* 1993; **168**: 915–921.
- Stevens DL. The flesh-eating bacterium: What's next? *J Infect Dis* 1999; **179**: S366–S374.
- Verma A, Sharma V, Singh T, Goyal A. Prevalence, group pattern, T pattern and seasonal variation of beta haemolytic streptococci in and around Shimla. *J Commun Dis* 1995; **27**: 27–31.
- York MK, Gibbs L, Perdnean-Remington F, Brooks GF. Characterization of antimicrobial resistance in *Streptococcus pyogenes* isolates from the San Francisco Bay area of Northern California. *J Clin Microbiol* 1999; **37**: 1727–1731.
- Kuruvilla KA, Thomas N, Jesudasan MV, Jana AK. Neonatal Group B streptococcal bacteraemia in India: ten years' experience. *Acta Paediatr* 1999; **88**: 1031–1032.