SHORT REPORTS

Interhospital spread of a multiply resistant klebsiella

One multiply resistant klebsiella strain, serotype K16, caused infection and cross-infection in at least three hospitals in the London area in 1977-80. Multiple resistance was transferred from it to other bacteria in the hospitals.

Sources of strains, methods, and results

Strains studied were from (1) an outbreak of infection at St Thomas's Hospital in 1977; (2) an outbreak at the Luton and Dunstable Hospital in 1979, affecting at least 48 patients; (3) patients at Hammersmith Hospital in 1980, where a cluster of infections caused by the strain was found during a larger outbreak caused by a different multiply resistant klebsiella. Most isolates were from urine, and two were from blood cultures. No unusual virulence or invasiveness was suggested by the clinical histories.

Identification of strains, sensitivity testing, and methods to characterise plasmids were as described. All the isolates of serotype K16 (table) were identical in biochemical reactions, and all but two carried plasmids of molecular weights 90 and 65 megadaltons (Md). The plasmid of 90 Md carried no antibiotic resistance and was not transferred. The plasmid of 65 Md was transmissible to Escherichia coli K12, belonged to incompatibility group M (IncM), and determined resistance to ampicillin/carbenicillin/cephaloridine, tetracycline, chloramphenicol, sulphamethizole, mercuric chloride, neomycin/kanamycin, gentamicin, streptomycin/spectinomycin, and trimethoprim. Its trimethoprim resistance was transposable from one genetic locus to another. The same plasmid has been found in other plasmid-bacteria.

The 1979 K16 isolates, from Luton, carried a third plasmid, of 40 Md. Its resistances were masked by the 65 Md, IncM plasmid but it was isolated from two gentamicin-sensitive strains that lacked that plasmid. It was IncX, determined resistance to ampicillin, sulphamethizole, streptomycin/spectinomycin, neomycin, and trimethoprim, and had the same transposon as the IncN plasmid, suggesting that transposition had occurred.

On the evidence of serotype, biotype, and the carriage of the 90 Md and 65 Md IncM plasmids we conclude that the same clone of bacteria was responsible for infections in different hospitals. The isolates from Luton had acquired an extra plasmid, whose absence from the 1980 Hammersmith isolates shows that the route of transmission of the strain was not from Luton to Hammersmith.

Four of the K16 strains examined were resistant to nalidixic acid, at least two of them being from patients treated with that drug. As this character can be acquired by a single-step mutation, it does not alter our conclusions on the relation of the strains.

Plasmid transfer between bacteria occurred during the 1979 outbreak. In the 1979 outbreak discussed here, klebsiella strains of serotypes K20, K61, and K62 were found with the same IncM plasmid as the K16 strains, evidence for resistance transfer between bacteria in the hospital.

Comment

The klebsiella strain described here remained stable in its biotype, serotype, and basic plasmid content over four years and was evidently well adapted to its habitat and a successful coloniser. The factors that make some strains successful in this way are not understood. Multiple resistance confers an advantage, but cross-infection occurred not only in patients taking antibiotics. The multiple-resistance plasmid of the K16 strain was transferred to other bacteria during the hospital outbreaks, but the new host-bacteria-plasmid combinations did not spread. This plasmid was therefore not the determining factor, nor was the serotype, since K16 is not one of the commonest in British hospitals. Better understanding of the bacterial factors that permit spread would help in planning preventive measures.

Polygeline compared with plasma protein fraction as the sole replacement fluid in plasma exchange

During plasma exchange the removal of 2-5 litres of plasma from a patient necessitates the use of replacement fluid, usually a human blood protein product. Fresh frozen plasma, although freely available, may cause severe allergic reactions if used repeatedly in the same recipient. Plasma protein fraction is an ideal replacement fluid but is expensive (currently £7.5 per litre). Dextran, polygeline (Haemaccel), and various crystalloid solutions have been used, but only with plasma protein fraction, or fresh frozen plasma, in a variety of volumetric ratios. No previous data on the use of polygeline as sole replacement fluid in plasma exchange have been reported.