

## Bowls and bacteria

By D. H. M. JOYNSON

Department of Microbiology, Morriston Hospital, Morriston, Swansea, Wales

(Received 24 October 1977)

### SUMMARY

An episode of nosocomial infection with *Klebsiella aerogenes* in a surgical ward, in which six patients were infected, is described. The cause of the outbreak was identified as being contaminated washing-bowls. It is recommended that each patient should have his own bowl, which should be disinfected after use, dried and stored upside-down.

### INTRODUCTION

It is recognized that many patients admitted to hospital acquire some form of infection during their stay (Williams, Blowers, Garrod & Shooter, 1966; Feingold, 1970; Alder, Burk & Finland, 1971), resulting in considerable morbidity and mortality. The nature of the infection depends upon several factors – the type of patient, the length of time in hospital, operative procedures etc.

This communication reports the investigation of an episode of nosocomial infection, the findings and the recommendations made to prevent such an occurrence.

### THE OUTBREAK

The site of the outbreak was a male surgical ward of 10 beds dealing mainly with genito-urinary cases. The first indication of a cross-infection problem was the isolation of identical microorganisms from the wound swabs of two patients. Within a week, the incriminated bacterium was also isolated from the post-operative wounds of another two patients, the urinary tract of a fifth ( $> 10^5/\text{ml}$ ) and in a sixth patient from both the wound and urinary tract, the latter at a concentration of  $< 10^5/\text{ml}$ .

#### *The micro-organism*

This was a Gram-negative non-motile rod producing large smooth mucoid colonies on MacConkey agar. It was identified by standard biochemical tests (Cowan & Steel, 1974) as being *Klebsiella aerogenes*, but was unusual in that it was urease negative. This biochemical feature and the bacterium's antibiogram (sensitive to Gentamycin, Naladixic acid, Nitrofurantoin and resistant to Ampicillin, Tetracycline, Trimethoprim, Sulphafurazole and Cephaloridine) were used initially as the epidemiological markers in tracing the source of the outbreak. Capsular typing, performed later on 11 surviving strains, demonstrated that all

except two of the strains of *K. aerogenes* examined were capsular (K) type 21. The two exceptions were non-typable.

#### *Investigation of possible sources*

Much epidemiological information about nosocomial infections can be deduced without lifting a swab.

The operations on these six patients were performed by different surgeons on different days. Though the same operating theatre was involved, post-operative patients also went to other wards where no infections with this particular micro-organism had occurred.

These findings suggested that the source of the infection was in the ward and an environmental survey was therefore performed.

#### RESULTS

Within the ward, only the floor around the infected patients was contaminated with this particular strain of *K. aerogenes*.

Sampling in the sluice room abutting the ward, however, revealed the micro-organism to be present in the sink, in one of two buckets and on a mop, but the most heavily contaminated articles were found to be the washing-bowls. Examination of 22 such bowls demonstrated the presence of bacteria in twelve and, in six of these, the same *K. aerogenes* was isolated. Other organisms found in the bowls included *Enterobacter cloacae*, *E. agglomerans*, *Pseudomonas aeruginosa* and a different strain of *K. aerogenes*.

These plastic washing-bowls were old, had roughened surfaces and were not allocated to individual patients. After use they were rinsed and stacked face up, allowing a small volume of water to remain in the bowl.

It was concluded that the probable sequence of events initiating this episode was the introduction of a particular strain of *K. aerogenes* into the ward by a patient with a chronic infection, or as a result of antibiotic use (Montgomerie *et al.* 1970). The microorganism was then disseminated by contaminated washing-bowls to other patients and to the ward environment, ensuring its survival.

#### ACTION TAKEN

The outbreak ceased on stopping admissions and cleaning and disinfecting the ward, sluice room and equipment.

The infected patients were treated with appropriate chemotherapy. One patient died of causes unrelated to his infection but the other five responded to treatment and were, in due course, discharged home.

New plastic washing-bowls were obtained, allocated to individual patients and, after use, thoroughly washed, disinfected, dried and stacked upside-down.

To date there have been no further cases in the ward.

I should like to thank Dr R. W. S. Harvey for his helpful comments and Dr M. W. Casewell, St Thomas's Hospital Medical School, London, for typing the strains of *K. aerogenes*.

## REFERENCES

- ALDER, J. L., BURK, J. P. & FINLAND, M. (1971). Infection and antibiotic usage at Boston City Hospital. *Archives of Internal Medicine* **127**, 460.
- COWAN, S. T. & STEEL, K. J. (1974). *Manual for the Identification of Medical Bacteria*. 2nd edition. Cambridge University Press.
- FEINGOLD, D. S. (1970). Hospital-acquired infections. *New England Journal of Medicine* **283**, 1384.
- MONTGOMERIE, J., DOAK, P. B., TAYLOR, D. E. M., NORTH, J. D. K. & MARTIN, W. J. (1970). Klebsiella in faecal flora of renal-transplant patients. *Lancet* ii, 787.
- WILLIAMS, R. E. O., BLOWERS, R., GARROD, L. P. & SHOOTER, R. A. (1966). *Hospital Infections*. London: Lloyd-Luke.