Journal Watch

Journal Watch presents a brief description of articles recently published in other journals and thought to be of relevance or interest to the AIC readership. Readers are encouraged to refer to the full article for complete information.

Possible transmission of variant CJD by blood transfusion

Human prion diseases include sporadic Creutzfeldt-Jakob disease (CJD), the cause of which is unknown, hereditary forms of the diseases associated with prion gene mutations, variant CJD (vCJD) linked to a bovine spongiform encephalopathy (BSE) found in cattle, and iatrogenic cases due to transmission via human pituitary growth hormones, human dura mater grafts, corneal grafts and neurosurgical devices. There is no evidence of CJD transmission related to blood transmission, although this may not apply to vCJD.

Llewelyn *et al.*, using a surveillance system set up between the national CJD surveillance unit and the national blood services in the United Kingdom (UK), identified matches between recipients or donors of blood components and vCJD cases from 1980 to 2003.

48 individuals were identified as receiving blood components from 15 donors who later became vCJD cases. One recipient received a transfusion of red cells in 1996, donated 3.5 years before the donor developed symptoms of vCJD; the donor died in 2000 of pathologically confirmed vCJD. The recipient developed symptoms of vCJD in 2002, 6.5 years after the transfusion, and died 13 months after onset of illness.

Llewelyn *et al.* comment that, although it is statistically unlikely that this case occurred by coincidence, it could have been due to past dietary exposure to the BSE agent. They conclude that this case raises the possibility that the infection was transmitted by transfusion.

Editorial Note: To date there has not been a case of vCJD in Australia and, according to the Infection Control Guidelines for Infection Control in the Health Care Setting 2004, the transmission risk in Australia during health care delivery is extremely remote. Furthermore, Australia has placed restrictions on blood donors by screening out those that may have been exposed to the vCJD agent overseas.

Llewelyn C, Hewitt P, Knight R, Amar K, Cousens S, Mackenzie J & Will R. Possible transmission of variant Creutzfeldt-Jacob disease by blood transfusion. The Lancet 2004; 363:417-421.

Model for testing decontamination procedures for transmissible spongiform encephalopathies

Several studies have demonstrated that the prion protein that causes transmissible spongiform encephalopathies is resistant to many of the conventional chemical and physical procedures used for processing of medical devices.

A study by Yan *et al.* applied an animal model, using hamsters and steel wires contaminated with infectious brain materials, to test prion protein decontamination procedures.

Following sterilisation, the steel wires were contaminated by immersion for 1 hour in freshly prepared brain from hamsters with scrapie. The dried wires were then treated with the different agents according to manufacturers' instructions and implanted into the hamsters' thalami. Hamsters that subsequently developed definite signs of scrapie were euthanased.

Results supported previous studies and demonstrated that the prion proteins bound to the steel wire were resistant to most conventional reprocessing procedures, including autoclaving, enzymatic, fixative and acidic treatments. Greater reductions in infectivity were achieved when oxidising and alkaline agents were used. Alkaline agents were the most successful for reducing infectivity.

Yan Z, Stitz L, Heeg P, Pfaff E & Roth K. Infectivity of protein bound to stainless steel wires: model for testing decontamination procedures for transmissible spongiform encephalopathies. Infection Control & Hospital Epidemiology 2004; 25(4):280-283.

Surveillance of infections in long-term care

The authors report on the results of two annual 1-day prevalence surveys in long-term facilities for elderly persons in Norway. The aim of the surveys was to determine the magnitude and distribution of nosocomial infections in these institutions.

The surveys recorded the four most common nosocomial infections – urinary tract infections, lower respiratory tract infections, surgical-site infections and skin infections, as well as antibiotic use.

All long-term care facilities were invited to participate in the four surveys in 2002 and 2003. The total prevalence of the four recorded nosocomial infections varied between 6.6 and 7.3% in the four surveys.

Nosocomial infections occurred most frequently in the urinary tract (50%), followed by infections of the skin (25%), the lower respiratory tract (19%) and surgical sites (5%).

The prevalence of nosocomial infections was highest in rehabilitation and short-term wards, whereas the lowest prevalence was found in special units for persons with dementia.

In all the surveys, the prevalence of the four recorded nosocomial infections was higher than the prevalence of patients receiving antibiotics.

The authors conclude that one in 14 residents of long-term care facilities in Norway has, at any one time, one of the four most common nosocomial infections and that urinary tract infections accounted for half of the infections. They also found that the prevalence of antibiotic use is low compared with what is reported in other countries.

This study highlights the need for nosocomial infection surveillance in this population and a need to implement infection control measures.

The authors suggest that prevalence surveys are an easy and relatively cheap surveillance tool and therefore could be useful in identifying the burden and distribution of infections and high-risk areas.

Eriksen HM, Iversen BG & Aavitsland P. Prevalence of nosocomial infections and use of antibiotics in long-term care facilities in Norway, 2002 and 2003. Journal of Hospital Infection 2004; 57:316-320.

SARS coronavirus survival on surfaces

During the 2003 outbreak of severe acute respiratory syndrome (SARS), 21% of cases worldwide were in health care workers. Transmission was believed to be mainly by direct physical contact with ill persons or by large-droplet spread. However, this did not explain the possible route of transmission in many cases, and either airborne spread or fomite spread after contact with contaminated surfaces were suspected.

This study, conducted in one hospital in Thailand and another in Taiwan, sought to provide experimental evidence for the role of environmental contamination of surfaces in the transmission of SARS coronavirus (SARS CoV). The authors used reverse-transcriptase polymerase chain reaction (RT-PCR) and viral culture to test swab samples from various hospital surfaces both within infected patients' rooms and elsewhere in the hospital. Elaborate precautions were taken to minimise the possibility of cross-contamination of surfaces during sample collection.

Twenty-six of 94 swab samples tested positive for viral RNA, but all cultures showed no growth. Twelve of 43 swabs from infected patients rooms and 10 of 47 swabs from other parts of the hospital, including the computer mouses at two nursing stations, were positive. Specimens from areas with patients in the most infectious stage of the illness (days 5-15 after onset) were more likely to be RNA positive than were specimens from elsewhere in the hospital.

These findings are consistent with observations from previous work with human coronaviruses that these agents can survive on dried inert surfaces and are consistent with proposals that contaminated surfaces might contribute to spread.

The authors contend that this could explain transmission to health care workers who used appropriate barrier and airborne precautions when working directly with patients but not when working in other parts of the hospital, and it could explain some transmission to persons without close contact exposures to patients with SARS. They also noted, however, that all cultures were negative, possibly indicating that what was detected was non-infectious viral genome.

Dowell SF, Simmerman JM, Erdman DD, Wu J-S et al. *Severe Acute Respiratory Syndrome coronavirus on hospital surfaces. Clinical Infectious Diseases 2004; 39:652-7.*

Chlorhexidine dressings for prevention of bloodstream infection

The use of alcoholic chlorhexidine for skin preparation prior to venous catheterisation is a well-established intervention for the prevention of IV catheter-related bloodstream infection (CR-BSI). This study looks at the cost-benefit and the effectiveness of using chlorhexidine gluconate dressings on the catheter exit site in reducing local infections and CR-BSI.

The authors have used a randomised, controlled trial and decision analysis to determine the averted CR-BSI treatment cost per patient attributable to the intervention. The study was conducted in several hospitals in the Philadelphia area, USA. The trial results have not yet been published, but this study uses the data from the trial to explore the potential financial implications.

The results showed an overall cost-benefit, which persisted in sensitivity analyses varying the baseline rate of CR-BSI, incremental cost of treating CR-BSI, and overall number of catheters used. The use of chlorhexidine dressings produced an average averted treatment cost per patient receiving a catheter of between US$238 and US$965.

The authors used this data to estimate the potential annual net benefit to the US hospital system, which ranged from $275 million to approximately $1.97 billion. Preventable mortality analyses showed potential decreases of between 329 and 3,906 deaths annually as a result of nation-wide use of chlorhexidine dressing.

Editorial Note: The baseline CR-BSI rate of between 5% and 6.12% and CR-BSI treatment costs of between US$8,000 and US$25,000 used in the sensitivity analyses appear high by comparison with local and some other international data. It would remain to be seen if the same cost-benefit could be achieved with this intervention in the Australian situation.

Crawford AG, Fuhr JP & Rao B. Cost-benefit analysis of chlorhexidine gluconate dressing in the prevention of catheter-related bloodstream infections. Infection Control & Hospital Epidemiology 2004; 25:668-674.