

15-13 Outbreaks

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Multistate outbreak of Toxic Anterior Segment Syndrome Due to an Intrinsically Contaminated Balanced Salt Solution

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Background:

Every year, about 1.35 million cataract extractions are performed in the United States making it the most common therapeutic surgical procedure among Americans over 65 years old. Toxic anterior segment syndrome (TASS), a rare complication of cataract surgery, is a sterile inflammatory reaction of the anterior chamber of the eye. Commonly reported causes include failure to properly re-process ophthalmic surgery equipment and improperly prepared ophthalmic medications. In October 2005, CDC received reports of an outbreak of TASS at an ophthalmology surgery center.

Objective:

To investigate the source and magnitude of a national outbreak of TASS.

Methods:

We performed national case finding through electronic communications networks and via reports to a national TASS referral center. A case was defined as a patient diagnosed with TASS by the treating ophthalmologist from July 7, 2005 through November 30, 2005. We collected information on the procedures, details of instrument re-processing and products used during cataract surgery as well as clinical findings and patient outcomes. We tested solutions used in procedures for endotoxin using a kinetic assay.

Results:

A total of 112 case patients from seven centers were identified as having TASS during the outbreak period. The median age was 74 (range 27-91) years; 79% were above the age of 65 years; 59% were female. Overall, the common presenting symptoms and signs were blurred vision (60%) and anterior segment inflammation (49%) or cell deposition (56%). Treatment included topical steroids (78%), topical antibiotics (83%) and topical non-steroidal anti-inflammatory drugs (75%). Full recovery was reported in all but 2 case patients; the median time to resolution of symptoms of 8 (range 1-35) days. There were no reports of significant breaches in sterile technique or instrument re-processing procedures at reporting centers. Of the 112 case-patients, 103 (92%) had been exposed to one brand of a balanced salt solution (BSS) used during cataract surgery as an intraocular irrigating solution. Samples obtained from 14 different lots of the BSS solution were tested for endotoxin; 5 (36%) had levels that exceeded the allowable limit of 0.5 EU/mL. Samples of other products including pre- and post-operative drops and viscoelastics were also tested, and none had more than 0.5 EU/mL of endotoxin. Based on the findings of this investigation, the BSS product was withdrawn from the market resulting in a termination of the outbreak.

Conclusions:

This is the first known report of an intrinsic endotoxin product contamination of a BSS solution which led to a nationwide outbreak of TASS. Healthcare epidemiologists should be aware of TASS and its common causes. Ophthalmology clinics performing cataract surgery should document the type and lot numbers of products used during surgical procedures to facilitate investigations of adverse outcomes such as TASS.

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Rapid Control of an Outbreak of TASS (Toxic Anterior Segment Syndrome) in Cataract Patients in an Outpatient Surgical Setting (OPSS)

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Background:

TASS (Toxic Anterior Segment Syndrome) is an inflammatory condition of the anterior segment of the eye that can result from surgical trauma, retained lens material, bacteria, or sterile toxic substances. We investigated a cluster of TASS cases among uncomplicated cataract surgery patients at an OPSS.

Objective:

To determine the cause(s) of the outbreak, evaluate risk factors, and to prevent further cases.

Methods:

Using our case definition, we reviewed all operative records and medical information for all operations performed between February 15 and March 16, 2006. To be classified as a case of TASS all suspected cases were examined by one experienced ophthalmologist. Clinical, risk factor, operative information was entered on a standardized case report form. A case control (CC) study was performed to identify potential causative factors. Steam, water, instruments, products were cultured for bacteria and tested for heavy metals, sulfates, endotoxin, and other chemicals. Cleaning, and disinfection procedures and the ventilation systems functioning were reviewed. Cases were observed.

Results:

Of the 85 uncomplicated cataract operations performed during the time period investigated, 11 TASS cases were identified (13%). The CC implicated a Phaco handpiece (OR 7.27, p=0.002), Provisc (OR 4.89, p=0.01) and a particular lens model (OR 4.33, p=0.08). Some associations may have been confounded by surgeon preferences. Cultured buffer solutions (lot numbers associated with cases) did not grow organisms. Review of cleaning processes revealed several issues. The enzymatic cleaner used to clean the cataract instruments' was not diluted sufficiently and deionized water was not used for the process. Ultrasound of the instruments was not being performed daily. All autoclaves were functioning appropriately. Steam and water associated with one autoclave demonstrated elevated copper levels of 3.2 and 3.58 respectively (<1.3 mg/L - potable water). The pH of the water feeding the autoclave was >10. Endotoxin levels were elevated on several Phaco handpieces tested - 44.40 EU/device (<20 EU/device current USP recommendation). Control measures included removing products implicated by the CC, resterilizing equipment off site, reservicing sterilizers and revising sterilization and disinfection policies. No cases of TASS have occurred at this location since this cluster.

Conclusion:

Multiple potential factors contributed to this cluster of TASS. Control required a multidisciplinary response. Importantly national disinfection and sterilization guidelines are being proposed.

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The ORION Statement: A CONSORT Equivalent for Infection Control Studies- Guidelines for Transparent Reporting of Outbreak Reports and Intervention Studies of Nosocomial Infection

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Background:

The quality of infection control research must be robust enough to influence (inter) national policy & practice. Two systematic reviews, one on isolation practices for MRSA and one on interventions to change antibiotic use, found major methodological weaknesses & inadequate reporting in most studies.

Objective:

To produce guidelines to improve standards of research & publication in infection control studies & outbreak reports, promote transparency of reporting, facilitate synthesis of evidence, and provide a framework for reviewers, editors & grant assessment panels to assess papers & grant proposals.

Methods:

The authors of the two reviews modified previous guidelines for publication of MRSA studies, to make them relevant to all nosocomial organisms and to interventions to change antibiotics use. They adapted the CONSORT statement for reporting of randomised control trials, to incorporate the wide variety of interventions, settings, designs & statistical issues relevant to infection control studies, not captured by CONSORT. Consensus agreement was reached through email & phone conversations. This was followed by public consultation with learned societies, journal editors & researchers. The revised statement, designed especially for the most common quasi-experimental designs (outbreak reports & interrupted time series with/without control groups) was submitted to critical academic review by a leading journal and revised again. A strategy for dissemination, enforcement, revision & evaluation was developed.

Results:

A 22 item checklist was produced with explanatory text emphasising transparent reporting & use of appropriate statistical techniques. A summary table was recommended for description of the population, setting, and precise nature & timing of all interventions. A graphical summary of main results was also recommended. Dissemination of ORION by joint publication, conference presentations, workshops, and open access to its website (www.idrn.org/orion.php) is being allied to MSc & postgraduate diploma teaching in infectious diseases, infection control & pharmacy. It has been welcomed by the Infection Control Nurses Association, endorsed by the Association of Medical Microbiologists, and posted on their website & that of the British Society for Antimicrobial Chemotherapy, who will use it to assess grant applications & publications in their journal. Feedback through the website & postgraduate teaching will be stored for a revision meeting in 2 years. Evaluation will be by electronic search for ORION citations and through a controlled before & after study comparing adopter and non-adopter journals.

Conclusions:

ORION should be adopted by journals & research councils. A SHEA presentation is important to disseminate ORION & encourage North American input into its revision.

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Risk factors, including antibiotic use, at hospital level for outbreaks with *Clostridium difficile* PCR ribotype 027

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Background:

After reports on outbreaks of severe *Clostridium difficile*-associated disease (CDAD) in Canada, the USA and the UK, epidemics of this strain (PCR ribotype 027, toxinotype III) were reported in The Netherlands since June 2005. National surveillance to detect 027 cases and to monitor the incidence was started and laboratories were asked to send strains for typing to a reference laboratory in case of an increased incidence of CDAD.

Objective:

Fluoroquinolone and cephalosporin use were recognized as a risk factor at patient level for CDAD due to

type 027 in several studies. This study aimed at identifying risk factors at hospital level for outbreaks with type 027.

Methods:

All hospitals with known transmission of type 027 (9, group A), all with sporadic cases (6, group B) and a random selection without known type 027 (21, C) were contacted. Quarterly data for 2004-2005 were collected on CDAD-incidence, inpatient use in daily defined doses (DDD) of antibiotics (AB) known to be associated with CDAD (fluoroquinolones, clindamycin, cephalosporins, penicillins including β -lactamase inhibitors, macrolides and carbapenems), hygienic and other preventive measures.

The first 6 quarters were deemed the 'pre-epidemic' phase. In the last 2 quarters of 2005, the 'epidemic' phase, almost all 027 outbreaks took place. We analysed the association of AB use and hygiene policy with the incidence with multilevel linear regression.

Results:

Data from 7 (A), 5 (B) and 12 (C) hospitals were available for analysis.

Mean pre-epidemic incidence in affected hospitals was 3.6 per 10,000 patient days, in group B hospitals 3.2 and in unaffected hospitals 2.3. During the epidemic phase this was 5.4, 3.3 and 2.8, respectively.

Pre-epidemically the unaffected hospitals had a significantly higher total use of the investigated AB (3776 DDD/10,000 patient days (pd)) than the A and B hospitals (3291 and 3325 respectively). Group A hospitals significantly reduced their use of fluoroquinolones (from 615 to 416) whereas the use in unaffected hospitals increased from 791 to 994 DDD/10,000 pd.

In multivariate analysis giving special instructions to visitors of diarrhoea patients (regression coefficient (r.c.) -1.9), wearing an apron when caring for diarrhoea patients (r.c. -2.7) and being an academic hospital (r.c. 1.6) were significantly associated with the CDAD incidence. The use of carbapenems tended to a positive association (r.c. 3.1, $p=0.13$).

Conclusions:

Hospital wide use of most antibiotics known to be a risk factor for CDAD at patient level such as fluoroquinolones, are not associated at institution level with higher incidences of type 027-associated CDAD. Possibly, investigation at ward-level might correlate better. Wearing an apron and giving special instructions to visitors in case of diarrhoea appeared to be protective.

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An outbreak of VanB Vancomycin Resistant *Enterococcus faecium* in a cardiovascular surgical unit

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Background:

Vancomycin-resistant enterococci (VRE) have emerged as important nosocomial pathogens. An outbreak of *vanB Enterococcus faecium* occurred in the cardiovascular surgery unit of our 1100 bed tertiary-care teaching hospital. The outbreak was declared on June 1, 2006. The index case was admitted to the unit May 3-10, 2006 and admission screening for VRE, as required by our hospital protocol, was not done. The index case and a secondary case were both identified following readmission screening on May 23. A unit prevalence screen done May 29 identified 5 new cases.

Objective:

To describe the epidemiology of the outbreak and to demonstrate that nosocomial transmission of VRE can be terminated by implementation of infection control strategies.

Interventions:

The unit was closed to new admissions. Patients and staff caring for them were divided into three cohorts, based on VRE status and exposure risk. Contact precautions were used for VRE cases and their contacts. Dedicated equipment was assigned to each cohort. Education sessions and pamphlets were given to staff, patients and visitors; staff education emphasized Routine Practices and Contact

Precautions. Hand hygiene audits were carried out by infection control, unit educator and unit nursing staff. Environmental cleaning was enhanced and environmental samples were obtained from rooms of VRE cases after 2-step terminal cleaning. Weekly prevalence screening for VRE was done on all patients on the unit for the duration of the outbreak. Positive patients and their contacts were electronically flagged. Laboratory detection of VRE was by conventional culture and direct PCR for *vanA* and *VanB1/2,3* genes.

Results:

A total of 349 rectal swabs for VRE from 189 patients were obtained during the outbreak. 22 patients were positive for *vanB* gene by direct PCR; of these 13 cases were culture confirmed, 9 remained culture negative. All *vanB* VRE isolates were identical by pulsed-field gel electrophoresis. 2 patients were coincidentally positive for *vanA* gene both by direct PCR and culture. 298 environmental swabs were collected; 4 were positive for VRE. The outbreak was declared over after two and a half months, following 3 negative prevalence screens and 44 days after identification of the last case.

Conclusions:

We believe this outbreak occurred because of missed admission screening for VRE. Consistent compliance with screening protocols on admission, with application of contact precautions for colonized patients, is essential for outbreak prevention. Although PCR allows rapid identification of VRE cases, for this outbreak interpretation of results was complicated by false positive results, likely due to the *van B* gene in anaerobic flora. Consistent hand hygiene, contact precautions, cohorting and thorough environmental cleaning are necessary for outbreak containment.

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Morbidity and Mortality Caused by an Outbreak of Adenovirus Type 4 Infection in a Long Term Care Facility for the Elderly

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Background:

Healthcare associated outbreaks linked to adenoviruses generally cause self-limited upper respiratory infections or conjunctivitis in healthy children and adults. More severe illness though, including viral pneumonia, has been reported in immuno-compromised patients. Historically, adenovirus type 4 has been rare in non-military populations.

Objective:

To describe an outbreak of adenovirus type 4 infection in a long-term care facility (LTCF) for the elderly associated with acute respiratory disease (ARD) and increased mortality.

Methods:

We observed and recorded clinical signs and symptoms of residents during a respiratory outbreak on a unit. A case was defined as a LTCF resident with clinical manifestation of ARD (i.e., cough, sore throat, rhinorrhea, dyspnea) and a nasopharyngeal (NP) aspirate that grew adenovirus in viral culture. A probable case included residents with the same clinical symptoms but without a positive culture. NP aspirate cultures were confirmed by monoclonal fluorescent antibody testing. Viral serotype was determined by PCR sequence analysis of hexon gene HVR1-6.

Results:

Twenty-four of 40 residents (60%) in one LTCF unit showed signs and symptoms of ARD. Etiology of the outbreak was delayed due to negative rapid antigen testing for viral respiratory pathogens (by direct immunofluorescence assay of nasopharyngeal aspirates). Recurrent episodes of ARD occurred in 8 individuals; fever ≥ 100.8 F was seen in 14/24 (58%) and conjunctivitis in 4/24 (17%) residents. Chest x-rays were read by radiology as pneumonia in 6/12 (50%) individuals. Four of 24 (17%) residents had adenovirus identified by culture. Three of these 4 residents (75%) died from respiratory illness. One

additional death occurred in a resident with ARD who had no diagnostic tests performed. All residents with ARD had similar clinical symptoms. The outbreak lasted seven and one-half weeks and resolved after intensive infection control measures, including droplet and contact precautions, were implemented.

Conclusions:

Adenovirus type 4 can be a cause of severe morbidity and mortality in elderly individuals without obvious immuno-suppression. Rapid antigen testing may not identify adenovirus as the causative organism during an outbreak resulting in a delay in implementing appropriate control measures. Identification of adenovirus is important because control measures differ from those used for other important respiratory viral pathogens (e.g., influenza).