

BACKGROUND

Intussusception (IS) is the most common cause of bowel obstruction in infants and young children with a peak incidence at 4 to 10 months of age [1]. It occurs when one segment of the bowel becomes enfolded within another segment. If this obstruction is not relieved, the vascular supply to the bowel becomes compromised resulting in bowel ischaemia and death. The symptoms and signs in children presenting with IS reflect this underlying pathophysiology. Intestinal obstruction, results in vomiting, abdominal distension, and abnormal or absent bowel sounds. The IS and associated oedema may be identified as a mass on abdominal examination. Obstruction to the venous return or arterial supply of the intestine may result in rectal bleeding or the classic "red current jelly" stool. Occasionally patients present in shock due to severe vascular compromise of the intestine, and, if untreated, IS may be fatal [1]. The diagnosis of IS is confirmed on air/liquid contrast enema, ultrasound or surgery. If diagnosis is by ultrasound, this should include the demonstration of an intra-abdominal mass by abdominal ultrasound with specific characteristic features (target sign or doughnut sign on transverse section and a pseudo-kidney or sandwich sign on longitudinal section) that are proven to be reduced by hydrostatic enema on post-reduction ultrasound. IS is treated by air or hydrostatic reduction enema under x-ray or ultrasound guidance, or by surgery. About 10% of patients require an intestinal resection due to vascular injury to the intestine [1].

Rotavirus infection is the leading cause of severe dehydrating gastroenteritis responsible for >500,000 deaths per year in children <5 years of age worldwide [2]. The development of a rotavirus vaccine for the children of the developing world is an important component of the UN Millennium Development Goals. There was great optimism when the first oral rotavirus vaccine was licensed in the U.S. (Rotashield®, Wyeth). The vaccine was highly efficacious for the prevention of severe diarrhoea and hospitalisation due to rotavirus infection [3-5]. However, Rotashield® was withdrawn 9 months after introduction due to an uncommon association with IS [6-8]. This was a major setback in efforts to reduce the global burden of rotavirus disease. Although the risk of development of IS associated with receipt of Rotashield® vaccine is estimated to be <1 in 12,000 vaccine recipients it has had important implications for clinical trials of other rotavirus vaccine candidates. Alternate rotavirus vaccines (Rotarix®, GSK and Rotateq®, Merck) have been shown to be safe and effective in clinical trials of >65,000 infants however their safety and performance outside the clinical trial setting in a range of potential clinical or epidemiological scenarios has not been demonstrated [9, 10]. Therefore, post-marketing (or post-licensure) surveillance will be an important tool for the detection of rare or unexpected vaccine related adverse events. Both the Rotarix® and Rotateq® vaccines have recently been incorporated into the National Immunisation Program (NIP) as federally funded vaccines. Universal immunisation against rotavirus is currently being discussed with WHO and other relevant bodies. As these vaccines are introduced it is important to monitor for IS to establish if there is any temporal association with receipt of a rotavirus vaccine and IS in Australian children. Investigation of possible risk factors for IS may provide an insight into the aetiology of IS in unvaccinated and vaccinated infants.

The Australian Paediatric Surveillance Unit (APSU) was established in 1993 to provide information about rare paediatric diseases in Australia. It is a Unit of the Royal Australasian College of Physicians, Division of Paediatrics. It is partially supported by a grant from the Department of Health and Aging, Commonwealth of Australia and an NHMRC Enabling Grant. Between 1993 and 2004, the APSU monitored 34 uncommon childhood conditions. A comprehensive list of the studies conducted through the APSU since inception are documented on the website www.apsu.org.au. The APSU provides a unique mechanism to conduct surveillance on rates of intussusception following introduction of a universal rotavirus vaccine program in Australia.

HYPOTHESIS

Rotavirus vaccines (Rotarix and Rotateq) recently introduced into Australia are not associated with a significant increase in the incidence of IS in infants ≤ 24 months of age.

STUDY AIMS

1. To document the incidence of acute IS in infants ≤ 24 months
2. To document any temporal relationship between the development of IS and receipt of a rotavirus vaccine or other vaccines
3. To describe the clinical presentation, diagnosis, management and short term outcome of IS

STUDY METHODS

Each month all clinicians (paediatricians, paediatric surgeons, paediatric radiologists, emergency room physicians) in Australia will be sent either a reply-paid report card or an e-mail 'card' listing conditions currently being studied through the APSU. Clinicians are asked to report children newly diagnosed with any of the conditions listed. Investigators conducting the IS study at RCH are informed weekly of new cases reported by APSU contributors. The IS investigators will then send a brief questionnaire to the clinician requesting further de-identified information.

The data will be collected by the IS study investigators with the assistance of local investigators in each state (Vic – Prof Julie Bines; NSW – Dr Robert Booy; QLD – Dr Michael Nissen; NT – Dr Vikki Krause; WA – Dr Peter Richmond; SA – Dr Michael Gold; Tas – Dr Sean Beggs) and stored and analysed at the Study Centre at RCH. Investigators at RCH (Professor Julie Bines, Dr Jim Buttery, Dr Margie Danchin) are responsible for collation, analysis and publication of this data, and for reporting study findings annually to the APSU. A dedicated and secure computer database will be established to manage data. A 2 year period of surveillance is proposed to account for any season variability in the natural incidence of intussusception.

CASE DEFINITION

Please report all cases of newly diagnosed case acute intussusception in a child aged ≤ 24 months where intussusception is confirmed on air/liquid contrast enema, ultrasound or surgery. If diagnosis is by ultrasound, this should include the demonstration of an intra-abdominal mass by abdominal ultrasound with specific characteristic features (target sign or doughnut sign on transverse section and a pseudo-kidney or sandwich sign on longitudinal section) that are proven to be reduced by hydrostatic enema on post-reduction ultrasound.

Virological Testing

Due to previous studies identifying 40% of IS cases positive for adenovirus in their stool [12], for best clinical practise a stool sample is to be collected for each patient and sent to your local laboratory to be tested for adenovirus and rotavirus. De-identified copies of the results should be sent with the completed questionnaire in the reply paid envelope provided.

Analysis

Data will be analysed with the assistance of the APSU, Co-investigators and CEBU at MCRI/RCH. Group data analysis will be provided annually to the APSU for publication in the Annual Report. It is anticipated that data will be presented at scientific meetings and published in scientific journals.

INVESTIGATOR CONTACT DETAILS (*Principal Investigator and contact person)

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