

Intussusception and air enema reduction

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Background

- Intussusception is the invagination of a proximal segment of bowel into the distal bowel lumen. The commonest occurrence is a segment of ileum moving into the colon through the ileo-caecal valve.
- It may occur at any age but commonly occurs in the 2 month to 2 year age group with a peak incidence at 5 to 9 months.
- **It is a surgical emergency**

Assessment

History:

- **Intermittent pain** which is colicky, severe and may be associated with the child drawing up the legs.
- Episodes typically occur 2-3 times/hour and may increase over the next 12-24 hours
- During these episodes the child may have **pallor and lethargy** which may be the predominant presenting signs
- **Vomiting** is usually a prominent feature (but bile stained vomiting is a late sign)
- **Bowel motions**
 - blood and/or mucus
 - classic “red currant” jelly stool is a late sign
- **Diarrhoea** is quite common and can lead to a misdiagnosis of gastroenteritis
- There may be a preceding respiratory or diarrhoeal illness, or recent immunisation.

Examination – findings may be absent:

- **Pallor, lethargy** - may be intermittent, and the child may look well in between episodes
- **Abdominal mass** - sausage shaped abdominal mass palpable in about two thirds of children (most often in RUQ).
- **Distended abdomen**
- **Hypovolaemic shock**

Investigations

Blood tests

- FBC and U&E's / Blood gas and glucose
- Blood group and save

Consider Plain abdominal X-ray:

- A normal AXR does not exclude intussusception
- Signs of intussusception on a plain X-ray may include:
 1. Target sign - 2 concentric circular radiolucent lines usually in the right upper quadrant
 2. Crescent sign - a crescent shaped lucency usually in the left upper quadrant with a soft tissue mass
- The AXR may also show features of small bowel obstruction

Ultrasound scan

- **Diagnostic investigation of choice** (sensitivity: 98-100%)
- Intussusception may be seen as
 1. Target or doughnut sign- round mass with alternating hypo- and hyper-echoic areas
 2. Pseudokidney- longitudinal or oblique image that simulates a kidney due to inner hyperechogenicity
- Large volume of free fluid suggests perforation (consider AXR if not already performed)
- Ultrasound can also exclude a pathological lead point
- Colour doppler may suggest bowel necrosis (air enema reduction less likely to be successful)

Management

Initial Management (*before* USS in radiology *if*: strong suspicion of intussusception or clinically unstable patient)

- Secure / check IV access
- Initial resuscitation - 20mls/kg fluid bolus of 0.9% sodium chloride
- NG tube insertion - and then on free drainage

If intussusception is confirmed at RACH or referring hospital:

- Liaise with nurse in charge and senior CED clinician re: logistics of moving child directly to fluoroscopy room or returning to CED while personnel assemble
- Complete 'initial management' steps as above if not already done so
- Consider informing theatre team +/- anaesthetist before attempting reduction
- Ensure nurse from CED with APLS training accompanies child
- Ensure on call surgical registrar is present
- Obtain "Emergency Intussusception Box" from theatres
- Provide continuous monitoring
- Ensure that oxygen, appropriate bag/valve mask and suction is available and working in the fluoroscopy room
- Give IV Cefuroxime and Metronidazole (see BNFC for doses. Consider higher doses in sepsis). IgE mediated penicillin allergy (anaphylaxis) - use IV teicoplanin, gentamicin and metronidazole
- Prescribe and prepare IV morphine and naloxone (see [next page](#) for doses)

- Get written consent for air enema reduction including perforation and requirement for laparotomy
- **Complete check list and place sticker in notes**

See Air Enema procedural instructions & check list in appendix 1.



If Intussusception reduced:

- Admit level 8
- NBM and IV maintenance fluids
- Leave NG tube in place
- Analgesia

If intussusception not reduced:

- Discuss with on call paediatric surgical consultant
- Consider re-attempt with air reduction - after discussion with radiologist, and admit level 8
- Otherwise, return to CED, and organise theatres asap

If there is perforation:

- Urgently place a wide bore cannula into the abdomen- from emergency intussusception box
- It is likely that ventilation and oxygenation will be compromised until this occurs
- Put out a paediatric medical emergency call on 2222
- Assess vital signs and manage according to APLS guidelines.
- **When stable**, under guidance from emergency team, organise urgent transfer to paediatric theatres, or CED resuscitation area.
- Transfer fully monitored with APLS trained Clinician

Drug doses

Morphine sulphate (age > 1 month): **100 micrograms / kg** intravenous injection over at least 5 mins

Naloxone: **100 micrograms / kg** (max per dose 2 mg). Can be repeated at 1 minute intervals to a maximum of 2 mg.

Appendix 1.

Air Enema Intussusception Reduction Procedure:

- Absolute contraindications: Pneumoperitoneum.
- Minimum team present in fluoroscopy room: Paediatric Radiologist, Paediatric Surgeon, Radiographer and Nurse.
- A Foley catheter is inserted in the rectum and the buttocks are taped tightly together.
- Air introduction is done under fluoroscopic guidance, the images need to include the entire abdomen and ensure there is no free air prior to, during or at the end of the procedure.
- As a general rule, the 2003 BSPR draft guidelines are followed which state the rule of 3, which is 3 attempts of 3 minutes each, with sustained pressures between 80 and 120 mm Hg. However, this is left at the discretion of the Paediatric Radiologist conducting the procedure as these guidelines are yet to be updated and the ACR guidelines differ in that up to 3 separate 5 minute attempts can be allowed. Please note our local machine cannot exceed a pressure of 120 mm Hg.
- If the air enema reduction is successful, air can be seen to reflux into the small bowel.
- The main complication is pneumoperitoneum which can be seen radiographically. A large bore cannula is then to be inserted in the left lower quadrant of the abdomen to relieve the pressure.
- If the intussusception reduction has been unsuccessful but has significantly progressed, careful consideration should be made of a delayed repeat attempt in a few hours. This is to be discussed between the Paediatric Radiologist and the Paediatric Surgical Consultant.

Air Enema Intussusception Reduction WHO Checklist

- Team introduced
- Written consent obtained
- Patient has IV access and is well hydrated
- Antibiotics and morphine have been administered
- Naloxone available
- Wide bore cannula available
- Oxygen bag/mask
- Resuscitation trolley is in the room
- Person in charge of inserting cannula in left flank in case of tension pneumoperitoneum
- Person in charge of 2222 call if required