LRI Children's Hospital

Treatment of SIBO (small intestinal bacterial overgrowth) in children with Intestinal Failure

Staff relevant to:	Clinicians within the UHL Children's Hospital caring for infants, children and young people with intestinal failure who have possible small bowel bacterial overgrowth
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1. Introduction and Who Guideline applies to

Paediatric intestinal failure (IF) has been defined as the inability of the gastrointestinal tract to sustain adequate growth, hydration, and electrolyte homeostasis in children without parenteral nutrition (PN).

Short bowel syndrome (SBS) is the most common cause of paediatric IF. Short bowel may or may not include the presence of an ileo-caecal valve. It is well documented that children without an ileo-caecal valve are at greater risk of bacterial overgrowth.

Small intestinal (bowel) bacterial overgrowth (SIBO) occurs commonly in SBS patients. The excess bacteria colonizing the small bowel induces malabsorption and intolerance by several mechanisms.
Feeding intolerance presenting as vomiting is also a common presenting symptom in SIBO. Symptoms include diarrhoea, steatorrhoea, abdominal pain, bloating, cramping, unexplained acidosis (from accumulation of D-lactate a by-product of bacterial fermentation of undigested carbohydrate that reaches lower GI tract), and weight loss.

This guideline applies to infants, children and young people with IF believed to have SIBO as cause for their symptoms. It is for use by the paediatric gastroenterology team.

Other cases thought to have SIBO who do not have diagnosed IF will need to be discussed with paediatric gastroenterology and microbiology on a case-by-case basis.

2. Guideline Standards and Procedure

History:-

- Diagnosed IF with or without SBS
- Possible other risk factors for IF eg intestinal resection with dilatation, intestinal dysmotility, recent or regular use of IV antibiotics, use of PPI, sepsis or line sepsis felt due to bacterial translocation, lack of ileocaecal valve, lack of enteral feeding
- Symptoms consistent with SIBO for example diarrhoea, steatorrhoea, abdominal pain, bloating, cramping, unexplained acidosis (from accumulation of D-lactate a by-product of bacterial fermentation of carbohydrate), weight loss, feeding intolerance, vomiting

Examination:-

- There are no specific examination findings for SIBO
- May have abdominal distension,
- May have signs of acidosis if more acute or more unwell with D lactic acidosis (can have neurological symptoms of ataxia, fatigue, reduced alertness, weakness) – this is a differential diagnosis of sepsis in these children

Investigation

- If acutely unwell – electrolytes, FBC, CRP, blood culture, stool culture (if presence of diarrhoea),blood gas, if unexplained acidosis, save or send serum for D lactate(1.2ml Serum white top/lithium heparin hand delivered in 30min)– sent away test to Birmingham
- There is no test that is sensitive and specific for SIBO – glucose breath test (glucose is rapidly metabolised by bacteria and shows in exhaled breath) and urinary indicants (a marker of bacterial metabolism) have been used as indicators of SIBO, but the diagnosis is clinical and a trial of treatment is recommended if there is clinical suspicion.

Antibiotic guidance

If acutely unwell, Sepsis needs to be considered and excluded / treated before treating for SIBO

There are no controlled studies of any form of treatment for SIBO but use of antibiotics in various regimes is recognised in all national and international IF centres for children.

It is necessary to treat SIBO as its symptoms can often inhibit weaning of PN which is an essential primary aim for these children, as well as causing significant distress. It can lead to bacterial translocation and sepsis or rarely to acute D-lactic acidosis.

Initial management for SIBO is with probiotics and dietary manipulation (eg CHO reduction) if possible.

Antibiotic treatment is with ORAL antibiotics as below, BNFC will contain the common warnings and side effects but please refer to paediatric pharmacy if in any doubt.

Rifaximin is a synthetic, poorly absorbed antibiotic with good cover for a broad range of bacteria – it has a good evidence base for SIBO and few systemic side effects. Rifaximin is thought to promote antimicrobial resistance in Vancomycin resistant enterococci (VRE), therefore should be avoided in patients with known VRE.

Case by case discussion with paediatric gastro consultant and microbiology consultant would generally be appropriate.

Move down to next step if the previous one is not effective or not tolerated.

Step	Antibiotic choice	Further notes – each step sequentially - if previous fails move to next one.
1	If age 2 and over – Rifaximin 10mg/kg TDS (max 200mg) - round to nearest 50mg	a) for 2 weeks then 2 weeks of probiotics b)cycle 2 weeks rifaximin with 2 weeks probiotics for 2 months and then review and trial off c) 2 months continuous rifaximin treatment then review and trial off
2	Metronidazole 10 mg/kg (max 400mg) twice daily ***OR*** Co-amoxiclav Child 1–11 months 125/31 0.5mL/kilogram BD Child 1–5 years 125/31 0.5 mL/kilogram BD Child 6–11 years 250/62 0.25 mL/kilogram BD	a) For 2 weeks and then stop b) 2 weeks on 2 weeks off for 2 months c) These 2 cycled - 2 weeks of one then 2 weeks of other for 2 months and review
3	Metronidazole + co-trimoxazole 240mg/5ml – 0.2ml/kg BD (6mg/kg of Co-trimoxazole BD) OR Metronidazole + ciprofloxacin 10 mg/kg (max 500mg) twice daily OR Consider Doxycycline + metronidazole Under 8 years - not appropriate due to side effects Child 8–11 years (body-weight < 45 kg) 1.1mg/kg daily Child 8–11 years (body-weight >45 kg) 50 mg daily Child 12–17 years 50mg daily	a) For 2 weeks and then stop b) 2 weeks on 2 weeks off for 2 months c) Any of these 2 combinations cycled - 2 weeks of one then 2 weeks of other for 2 months and review
4	Case by case discussion if all above steps fail	

3. Education and Training

None

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Audit to review Antibiotic regime adherence for SIBO	Discussing results of audit and learning from it	Dr Pande	5 years	Clinical governance meetings/Department meeting

5. Supporting References

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5. Scarpellini E, Giorgio V, Gabrielli M, et al. Rifaximin treatment for small intestinal bacterial overgrowth in children with irritable bowel syndrome. Eur Rev Med Pharmacol Sci 2013; 17:1314.

6. Kimberlin DW, Brady MT, Jackson MA, Long SS. Dose based on usual range recommended for children. In: Red Book, 31st ed, Committee on Infectious Diseases (Ed); American Academy of Pediatrics, Itasca 2018.

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6. Key Words

Small bowel bacterial overgrowth, intestinal failure, short bowel syndrome, gut decontamination

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The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) **Suchandra Pande**	**Executive Lead:** **Chief Medical Officer**
Details of Changes made during review: - Rifaximin is thought to promote antimicrobial resistance in Vancomycin resistant enterococci (VRE), therefore should be avoided in patients with known VRE added to Antibiotic guidance section - Monitoring compliance added - References updated - Guideline Lead updated	

APPENDIX 1: Antibiotic doses - SIBO Drug dosing

Step 1

Rifaximin - 10mg/kg TDS (max 200mg) - round to nearest 50mg

Step 2

Metronidazole - 10 mg/kg (max 400mg) twice daily

OR

Co-amoxiclav - Child 1–11 months 125/31 0.5mL/kilogram twice a day

Child 1–5 years 125/31 0.5 mL/kilogram twice a day

Child 6–11 years 250/62 0.25 mL/kilogram twice a day

Step 3

Metronidazole - 10 mg/kg (max 400mg) twice daily

AND

Co-trimoxazole – All ages 240mg/5ml – 0.2ml/kg BD (6mg/kg of Co-trimoxazole BD)

OR

Metronidazole - 10 mg/kg (max 400mg) twice daily

AND

Ciprofloxacin - All ages - 10 mg/kg twice daily.

Alternative Doxycycline - Under 8 years - not appropriate due to side effects

Child 8–11 years (body-weight up to 45 kg) 1.1mg/kg daily

Child 8–11 years (body-weight 45 kg and above) 50 mg daily

Child 12–17 years 50mg daily