Blind Loop Syndrome

**Synonyms:** stasis syndrome, stagnant loop syndrome, small intestinal bacterial overgrowth (SIBO) syndrome

In blind loop syndrome a portion of the small intestine becomes bypassed and thus cut off from the normal flow of food. This may lead to malabsorption and small intestinal bacterial overgrowth (SIBO) syndrome. It may also be associated with short bowel syndrome.

**Pathophysiology**

Obstruction to the normal passage of food through the affected segment leads to ineffective bile salt digestion of fats and fat-soluble vitamins. The stagnant food ferments, with associated bacterial overgrowth.\[^1\]

**Small intestinal bacterial overgrowth**\[^2,3,4\]

- SIBO should be suspected in the presence of irritable bowel syndrome (IBS)-like symptoms and/or malabsorption syndrome occurring in the presence of disorders predisposing to SIBO development.
- Predisposing conditions include functional dyspepsia, achlorhydria (eg, gastric atrophy or chronic administration of proton pump inhibitors), chronic pancreatitis, cystic fibrosis, immunodeficiency, hypothyroidism, intestinal obstruction and/or stagnation (eg, adhesion, strictures, tumours), diverticular disease, coeliac disease and liver disease.
- SIBO is often a recurrent disorder, depending on the nature of any predisposing condition.
- The most common diagnostic tool is represented at present by a hydrogen breath test. However, the gold standard for diagnosis of SIBO is aspiration and direct culture of the jejunal aspirate.
- Management is with antibiotic treatment and management of any underlying cause. Many different antibiotics have been advocated but there is no consensus regarding the most effective antibiotics or duration of treatment.
- In addition to antibiotic treatment, prebiotics or probiotics have been studied:
  - Prebiotics alter gut bacteria indirectly by favoring growth of certain bacterial species.
  - Probiotics are postulated to enhance gut barrier function, decrease inflammatory response, stabilise gut flora and potentially modulate visceral hypersensitivity.
  - There is no strong evidence for the use of prebiotics or probiotics for treating SIBO.

**Medical problems resulting from blind loop syndrome**

- Fat malabsorption - eg, steatorrhoea, sight impairment (from vitamin A deficiency), osteoporosis (from vitamin D deficiency).
- Inflammation of the small intestine wall leads to malabsorption of protein and carbohydrates.
- Vitamin B12 deficiency resulting in a macrocytic anaemia.
- Iron deficiency.
- Vitamin K deficiency causing easy bruising and spontaneous bleeding.

**Aetiology**

- Surgery - eg, Billroth’s operation II, Roux-en-Y procedure, gastric bypass for obesity.
- Inflammatory bowel disease - eg, Crohn’s disease.
- Scleroderma.
- Intestinal duplication.
- Diverticulosis of the small intestine.
- Diabetes mellitus.
- Radiation enteritis.

**Presentation**

- Loss of appetite, and early satiety.
- Dyspepsia.
- Diarrhoea and steatorrhoea.
- Bloating, flatulence.
- Weight loss.
- Nausea.

Abdominal examination may reveal cachexia, abdominal distension and evidence of vitamin and mineral deficiencies.

**Investigations**

SIBO can be diagnosed by:\[^5\]
Culture of jejunum aspirate for bacterial counts.
14C-D-xylose breath testing.
Non-invasive hydrogen breath testing using glucose or lactulose; or
14C-glycocholic acid breath testing.

Bloods may reveal:
- Macrocytic anaemia (due to vitamin B12 deficiency).
- Hypocalcaemia.
- Iron deficiency.
- Raised INR (due to vitamin K deficiency).

Abdominal imaging including:
- Abdominal X-ray.
- Abdominal CT scan.
- Barium studies.

Other specialised investigations may include:
- D-xylose breath test.
- Faecal fat test.
- Bile acid breath test.

Management
The treatment of SIBO syndrome usually includes the eradication of bacterial overgrowth with a repeated course of antimicrobials, correction of associated nutritional deficiencies and, when possible, correction of the underlying predisposing condition.\(^5\)

- The underlying cause should be corrected if possible - eg, surgical correction.
- In many cases surgery is not an option and therapy has two aims:
- **Tackle bacterial overgrowth:**
  - Antibiotics are used and may be required for long periods of time.
  - The most common antibiotics used are the tetracyclines - eg, oxytetracycline; however, it is estimated that up to 70% will fail to respond to this.
  - There have been some promising results with rifaximin, which is a non-absorbable antibiotic; however, this is not more superior to metronidazole, which should be used as an alternative if there is lack of success with the tetracyclines.\[6\]
Development of resistance is a problem and antibiotics may need to be changed frequently.
Probiotics help in animal studies but their role in humans with bacterial overgrowth is yet to be established. [7]

Nutritional supplements - can involve any of the following:
- May require nutritional support in hospital or primary care.
- Vitamin B12 injections.
- Oral iron supplements.
- Oral calcium and vitamin D supplements; other vitamin supplements.
- Medium-chain triglycerides (are more readily digested).

Complications
- Malabsorption leading to malnutrition and vitamin deficiencies.
- Intestinal infarction.
- Complete intestinal obstruction.
- Intestinal perforation.

Prognosis
This will depend on the cause, severity and associated complications.

Further reading & references

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