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Short Bowel Syndrome (Causes, Diagnosis, and Treatment)

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Abstract: Short Bowel Syndrome (SBS) is a rare gastrointestinal disorder that significantly impairs nutrient absorption due to a reduction in the length or improper function of the intestine. This syndrome can result from extensive surgeries, congenital diseases, intestinal ischemia, or other factors affecting the structure and function of the bowel. Patients with this syndrome typically face issues such as chronic diarrhea, weight loss, malnutrition, and deficiencies in vitamins and minerals, which can reduce their quality of life.

Management and treatment of SBS require a multifaceted approach, including dietary modifications, the use of specific medications, and, in some cases, corrective surgeries. Total Parenteral Nutrition (TPN) and the use of dietary supplements are among the key therapeutic methods that help compensate for nutritional deficiencies. Additionally, some medications, such as gastric acid inhibitors and intestinal growth hormones, can improve absorption function. In severe cases, intestinal transplantation is considered as the last treatment option.

Early diagnosis and appropriate management of this syndrome can significantly improve patient outcomes and reduce complications associated with malabsorption. With recent advances in medical and surgical treatments, the prospects for improvement and enhanced quality of life for patients with SBS have increased. However, further research is needed to find more effective treatment methods.

Keywords: Short Bowel Syndrome, malabsorption, parenteral nutrition, corrective surgery, intestinal transplantation, malnutrition, pharmacological treatment, nutritional management.

INTRODUCTION

Short Bowel Syndrome (SBS) is a common condition that causes abdominal pain and disturbances in bowel movement, and it appears that psychological and central nervous system disorders may play a role in its development (Mousazadeh *et al.*, 2012: 134).

SBS can significantly impact a patient's quality of life and requires long-term management involving specific dietary regimens, medications, and, in some cases, the use of Total Parenteral Nutrition (TPN). Common symptoms include chronic diarrhea, weight loss, nutritional deficiencies, and gastrointestinal issues. Treatment of this syndrome depends on the amount of remaining bowel, its absorptive capacity, and the overall health status of the individual. Possible treatments include corrective surgeries, medications, and dietary modifications, with the main goal being to improve nutrient absorption and prevent complications related to malnutrition (Rizzolo & Burrell, 2021).

Short Bowel Syndrome (SBS) is a condition that leads to poor absorption of nutrients from the intestine. Typically, in individuals with SBS, water, vitamins, minerals, proteins, fats, calories, and other nutrients are not properly absorbed from food. The extent of nutrient absorption usually depends on which part of the intestine is affected or damaged. This condition is extremely rare, with statistics showing that 3 out of every million people are affected by it.

Short Bowel Syndrome (SBS) is a complex condition that occurs due to the physical loss or dysfunction of a portion of the small or large intestine. As a result, individuals with SBS often have a reduced ability to absorb nutrients such as fats, carbohydrates (sugars), vitamins, minerals, trace elements, and fluids (malabsorption). The specific symptoms and severity of SBS vary from person to person. Diarrhea is common and often severe, which can lead to dehydration, potentially serious and even life-threatening. SBS can result in malnutrition, unintended weight loss, and other symptoms due to the loss of essential vitamins and minerals.

This condition is typically treatable effectively. However, in some cases, SBS can lead to severe and debilitating complications. Treatment usually involves surgery, where half or more of the small intestine is removed (resection). Such surgery is performed to treat intestinal diseases like Crohn’s disease, trauma or injury to the small intestine, or congenital defects.

Over the years, the definition of Short Bowel Syndrome in medical literature has varied, causing confusion. While some medical sources seem to reserve the term "Short Bowel Syndrome" for cases resulting from the surgical removal of part of the small intestine, other sources suggest that this disorder can result from any disease, injury, or condition that impairs the proper function of the intestine.

Factors of Short Bowel Syndrome

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Short Bowel Syndrome (SBS) primarily occurs due to the loss of a large portion of the small intestine, which can result from various congenital or acquired conditions. This condition leads to a reduced ability of the body to absorb nutrients and causes multiple gastrointestinal problems (O'Keefe, 2021).

One of the most significant factors contributing to this syndrome is intestinal resection surgery. This surgery is commonly performed due to diseases such as Crohn's disease, mesenteric ischemia, intestinal obstruction, and intestinal cancers. In some cases, the removal of large sections of the intestine is necessary due to severe trauma or injury caused by accidents (Pironi *et al.*, 2020).

Congenital diseases are also considered as factors in Short Bowel Syndrome. Some infants are born with conditions such as intestinal atresia (failure of parts of the intestine to form), gastroschisis (protrusion of the intestine outside the body during fetal development), and necrotizing enterocolitis, which may require surgery and the removal of portions of the intestine (Goulet & Ruemmele, 2020).

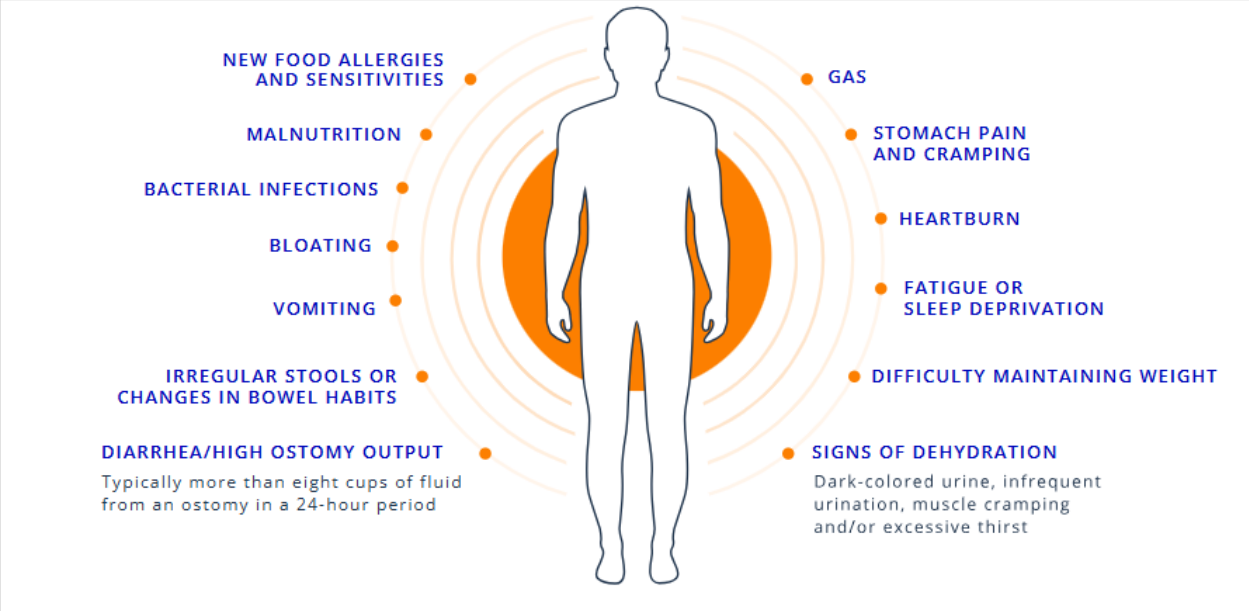
Another contributing factor is impaired blood supply to the intestine, which can lead to necrosis and the need for extensive resection. Mesenteric ischemia (reduced blood flow to the intestine), caused by blood clot formation or decreased blood flow, is one of the most common causes in adults (Jeppesen, 2021).

Intestinal cancers and associated treatments can also lead to the removal of sections of the intestine. Malignant tumors that have spread to various areas of the intestine may require extensive surgeries to remove the affected portions, which can disrupt nutrient absorption (Lal *et al.*, 2020).

In summary, Short Bowel Syndrome can arise from multiple causes, including surgery, congenital diseases, impaired blood supply, and cancer. Early diagnosis and proper management can help improve the nutritional status and quality of life for patients.

Common signs and symptoms of short bowel syndrome (SBS)

When a person has SBS, their body has a hard time absorbing all the nutrients and fluids it needs to function normally. This often comes with a series of unpleasant symptoms.1



Diagnosis of Short Bowel Syndrome

The diagnosis of Short Bowel Syndrome (SBS) is based on clinical evaluation, the patient's medical history, and specialized tests. This syndrome is typically diagnosed in patients who experience severe nutrient malabsorption due to the loss of a significant portion of the small intestine (O'Keefe, 2021).

One of the most important diagnostic criteria is the remaining length of the small intestine after surgery. If the length of the intestine is less than 200 centimeters and the patient suffers from severe malabsorption, the likelihood of SBS is high. Additionally, symptoms such as chronic diarrhea, dehydration, severe weight loss, and malnutrition can also be signs of SBS (Jeppesen, 2021).

Blood tests and biochemical analyses are other diagnostic methods. In SBS patients, a decrease in levels of vitamins (such as vitamin B12, vitamin D, and fat-soluble vitamins), electrolytes (such as sodium,

[1] https://www.shortbowelsyndrome.com/what-is-sbs

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potassium, and magnesium), and essential proteins is typically observed. Furthermore, tests indicating anemia and hypoalbuminemia can also play a role in confirming the diagnosis (Pironi *et al.*, 2020).

Imaging tests such as ultrasound, CT scan, and MRI are used to assess the status of the remaining intestine and to diagnose other related gastrointestinal problems. In some cases, contrast imaging (such as fluoroscopy) helps doctors evaluate intestinal function and nutrient absorption levels (Goulet & Ruemmele, 2020).

Endoscopy and intestinal biopsy can be useful for assessing the health of the intestinal mucosa and detecting associated diseases like Crohn's disease or damage from intestinal ischemia. These methods assist physicians in identifying the underlying cause of malabsorption and selecting appropriate treatment strategies (Lal *et al.*, 2020).

Treatment of Short Bowel Syndrome (SBS)

The treatment of Short Bowel Syndrome (SBS) involves a combination of nutritional, pharmacological, and, in some cases, surgical interventions or bowel transplantation. The main goal of treatment is to improve nutrient absorption, reduce gastrointestinal symptoms, and prevent complications resulting from malabsorption (Jeppesen, 2021).

Nutritional Treatment

One of the key treatments emphasizes the importance of an individual's dietary plan (Ke & Kang, 2024). In the early stages of the disease, many patients require parenteral nutrition (TPN) to meet their nutritional needs. Over time, the diet is gradually transitioned to oral or tube feeding (Pironi *et al.*, 2020).

- **Parenteral Nutrition (TPN):** Used to provide essential calories, proteins, vitamins, and electrolytes for patients who cannot absorb sufficient nutrients from the digestive tract.
- **Oral Nutrition:** A diet low in fiber and moderate in fat is recommended. Additionally, consuming isotonic fluids instead of sugary drinks helps reduce the loss of water and electrolytes (O'Keefe, 2021).
- **Nutritional Supplements:** Patients typically need vitamin B12, vitamin D, iron, and essential fatty acids because these nutrients are less absorbed in the short bowel (Lal *et al.*, 2020).

Pharmacological Treatment

Pharmacological treatment is aimed at controlling diarrhea, reducing nutrient loss, and improving bowel function. Some medications used include:

- **Antidiarrheal medications** (such as loperamide and diphenoxylate-atropine): These are useful in reducing bowel movements and preventing excessive loss of water and electrolytes (Goulet & Ruemmele, 2020).
- **Proton pump inhibitors (PPI):** These medications help reduce stomach acid and improve nutrient absorption.
- **Intestinal growth regulators (such as Teduglutide):** These hormones stimulate the growth of the intestinal mucosa and improve nutrient absorption (Jeppesen, 2021).

Surgical Interventions

In some patients who do not respond adequately to pharmacological and nutritional treatments, surgical options may be considered. These include:

- **Increasing intestinal absorptive surface:** Techniques such as intestinal tissue transfer can increase the absorption surface area.
- **Bowel lengthening:** Procedures like the Serial Transverse Enteroplasty Procedure (STEP) or the Bianchi procedure increase the length of the bowel and enhance absorptive capacity (Pironi *et al.*, 2020).
- **Bowel Transplantation:** In severe cases where the patient is dependent on long-term parenteral nutrition and other treatments are ineffective, bowel transplantation may be performed (O'Keefe, 2021).

Management of Complications and Long-Term Monitoring

Patients with SBS are at high risk for malnutrition, kidney disease, gallstones, and infections related to intravenous catheters, requiring ongoing monitoring. Regular tests to assess electrolyte levels, vitamins, and overall health are essential for effective long-term management (Lal *et al.*, 2020).

By combining these treatments, many patients with SBS can experience improved nutrient absorption, better quality of life, and prevention of severe complications.

CONCLUSION

Short Bowel Syndrome (SBS) is a rare and challenging gastrointestinal disorder that significantly impacts nutrient absorption due to reduced intestinal length or impaired function. This syndrome can result from extensive surgeries, congenital diseases, blood supply disorders, and intestinal cancers. Diagnosing SBS requires thorough clinical evaluation, biochemical tests, and specialized imaging to determine the extent of the disease's effect on digestive function and the patient's nutritional status.

The treatment of SBS requires a multifaceted approach, including dietary adjustments, nutritional supplements, specific medications, and, in some cases, surgical interventions or bowel transplantation. Successful treatment can lead to an improvement in nutrient absorption and reduce the patient's dependency on parenteral nutrition. However, the condition continues

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to present significant challenges for patients and healthcare systems.

Given the complexity of this syndrome, further research into novel therapeutic methods, improving patients' quality of life, and reducing complications from malabsorption is crucial. Early diagnosis and proper management can help patients lead better lives and prevent severe consequences of the disease.

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