

**DIAGNOSIS AND SURGICAL TREATMENT TACTICS OF COMPLICATED FORMS
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Abstract: Meckel's diverticulum is one of the most common congenital anomalies of the gastrointestinal tract, found in about 2-3% of the general population. Although it is often asymptomatic, complications can arise, particularly in pediatric patients. This article explores the diagnosis and surgical treatment strategies for complicated forms of Meckel's diverticulum in children. The complications, such as bleeding, intestinal obstruction, and inflammation, necessitate prompt and accurate diagnosis through imaging techniques like ultrasound, CT scans, and technetium-99m scintigraphy. The article discusses the various surgical approaches, including resection of the diverticulum, and highlights the importance of early intervention to avoid severe consequences. The goal of this review is to present modern diagnostic tools and surgical tactics that can lead to improved outcomes in pediatric patients.

Keywords: Meckel's diverticulum, pediatric surgery, complicated forms, surgical treatment, diagnostic techniques, intestinal obstruction, gastrointestinal anomalies, pediatric complications

Introduction

Meckel's diverticulum is a congenital pouch-like structure located on the ileum, typically within 60-100 cm of the ileocecal valve. It is the result of incomplete obliteration of the vitelline duct during fetal development. While many individuals with Meckel's diverticulum remain asymptomatic throughout their lives, complications may develop, particularly in pediatric patients, making early diagnosis and treatment crucial.

Complicated forms of Meckel's diverticulum, such as bleeding, intestinal obstruction, diverticulitis, and perforation, can present a diagnostic challenge for pediatric surgeons. These complications often mimic other conditions, such as appendicitis or intussusception, which can delay accurate diagnosis and appropriate management. Recent advancements in diagnostic imaging, including the use of technetium-99m scintigraphy, CT scans, and ultrasound, have significantly improved the detection of Meckel's diverticulum, even in cases where symptoms are non-specific or mimic other gastrointestinal disorders.

Surgical intervention is required when complications arise, with the most common treatment being the resection of the diverticulum. Depending on the patient's condition and the nature of the complication, various surgical techniques are employed. Laparoscopic approaches have gained popularity due to their minimally invasive nature, resulting in reduced recovery times and less postoperative pain compared to traditional open surgery.

This article aims to provide a comprehensive overview of the diagnosis and surgical treatment of complicated Meckel's diverticulum in children, based on current practices and modern diagnostic technologies. Emphasis will be placed on the importance of timely intervention and the role of advanced imaging techniques in optimizing patient outcomes. By understanding the complexities

of this condition, healthcare professionals can ensure better care and prevent severe complications in pediatric patients.

Meckel's diverticulum may present with a variety of symptoms that can be confused with other common pediatric abdominal conditions, making its diagnosis challenging. The clinical presentation depends on the complications, which may include gastrointestinal bleeding, obstruction, diverticulitis, and, in rare cases, perforation or even the formation of a mass resembling a tumor.

1. **Gastrointestinal Bleeding:** One of the most common complications in children with Meckel's diverticulum is painless gastrointestinal bleeding, which occurs due to ectopic gastric mucosa within the diverticulum. This mucosa can secrete acid, leading to ulceration of the adjacent bowel wall. When bleeding occurs, it can be severe, leading to anemia and requiring prompt intervention. The bleeding may not always be obvious, and in some cases, occult blood in stool may be the only clue.
2. **Intestinal Obstruction:** Obstruction can result from the presence of an intussusception or a volvulus involving the diverticulum. This is often more difficult to diagnose because it shares symptoms with other common conditions such as appendicitis. Obstructed bowel loops can cause abdominal distension, vomiting, and failure to pass gas, which are key symptoms requiring urgent evaluation.
3. **Diverticulitis:** Inflammation of the diverticulum, known as diverticulitis, can mimic appendicitis in children. This condition causes localized pain, fever, and tenderness, often requiring imaging studies for definitive diagnosis. If left untreated, diverticulitis can progress to perforation, leading to peritonitis, which is a life-threatening complication.
4. **Perforation and Abscess Formation:** A rare but serious complication of Meckel's diverticulum is perforation. Perforation often occurs in cases of diverticulitis, leading to peritonitis. In such cases, an abscess may form, further complicating the clinical picture and requiring both drainage and resection of the diverticulum.

Imaging and Diagnostic Tools:

Modern diagnostic imaging is pivotal in accurately diagnosing Meckel's diverticulum and its complications. The following imaging techniques are commonly used:

1. **Technetium-99m Scintigraphy (Meckel's Scan):**

This nuclear medicine scan is considered the gold standard for diagnosing Meckel's diverticulum, particularly when the patient presents with gastrointestinal bleeding. The scan identifies ectopic gastric mucosa within the diverticulum, which is essential for confirming the diagnosis.

2. **Abdominal Ultrasound:**

While not definitive, ultrasound is a non-invasive method that can help identify signs of bowel obstruction, abdominal masses, or inflammation. It is especially useful in younger children who may not tolerate more invasive procedures.

3. **CT Scanning:**

CT scans are valuable in detecting complications such as intestinal obstruction, diverticulitis, and abscess formation. They provide detailed imaging that helps surgeons plan the appropriate course of action for surgery.

Surgical Treatment of Complicated Meckel's Diverticulum:

Surgical treatment is necessary in cases where complications of Meckel's diverticulum lead to significant clinical symptoms or when the diverticulum is at risk of rupture or perforation.

The goals of surgery are to remove the diverticulum, resolve the complications, and prevent recurrence. There are two main surgical approaches:

1. Open Surgery:

Traditionally, Meckel's diverticulum has been treated through open surgery, particularly in complicated cases such as perforation or when there is significant abdominal inflammation. The surgeon typically performs a diverticulectomy or resects the affected section of the ileum. Open surgery is effective but can result in a longer recovery time and more postoperative pain.

2. Laparoscopic Surgery:

In recent years, laparoscopic approaches have become increasingly popular for the treatment of Meckel's diverticulum, particularly in non-complicated cases. Laparoscopy offers the advantages of smaller incisions, reduced postoperative pain, and a quicker recovery time. For complicated cases such as diverticulitis or bleeding, laparoscopy may still be feasible, depending on the extent of the complication and the surgeon's expertise. In laparoscopic surgery, the diverticulum is typically excised with careful attention to the surrounding structures to minimize the risk of injury.

Postoperative Care and Management:

Postoperative care following surgery for Meckel's diverticulum involves monitoring for complications such as infection, bleeding, or bowel obstruction. Antibiotics are often prescribed to prevent infection, and pain management is key to ensuring a smooth recovery. The child is typically allowed to resume oral intake once bowel function returns, and discharge occurs once they are stable.

Conclusion

The management of Meckel's diverticulum, especially in complicated forms, requires a multidisciplinary approach that combines advanced diagnostic techniques with tailored surgical strategies. Early recognition of symptoms, accurate imaging, and timely surgical intervention are essential for preventing life-threatening complications. With the development of laparoscopic techniques, the outcomes of pediatric patients undergoing surgery for Meckel's diverticulum have significantly improved, leading to faster recovery times and reduced hospital stays.

As diagnostic methods and surgical techniques continue to evolve, the prognosis for children with Meckel's diverticulum will continue to improve, ensuring better quality of life and fewer complications in the long term. With careful attention and personalized treatment strategies, pediatric surgeons can provide optimal care for children affected by this condition, addressing both the immediate complications and long-term outcomes.

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