

## A Case of a Child with Undescended Left Testis Presenting with Acute Right Scrotal Swelling

A 6-month-old male infant with a history of undescended left testis, presented to the emergency department with acute onset of right scrotal swelling associated with vomiting. There was no history of scrotal trauma and neither was there associated fever. On examination, tense right inguinoscrotal swelling was observed associated with erythema and tenderness. Bilateral testes were not palpable. The abdomen was soft and not distended. Imaging study of an ultrasound scrotum was performed to investigate his right scrotal swelling.

What do the ultrasound images in Figure 1 and intra-operative photographs in Figure 2 show? What is the diagnosis of the right inguinoscrotal swelling?

- A. Testicular torsion
- B. Epididymo-orchitis
- C. Torsion of the testicular appendage
- D. Incarcerated inguinal Littre's hernia
- E. Acute hydrocele

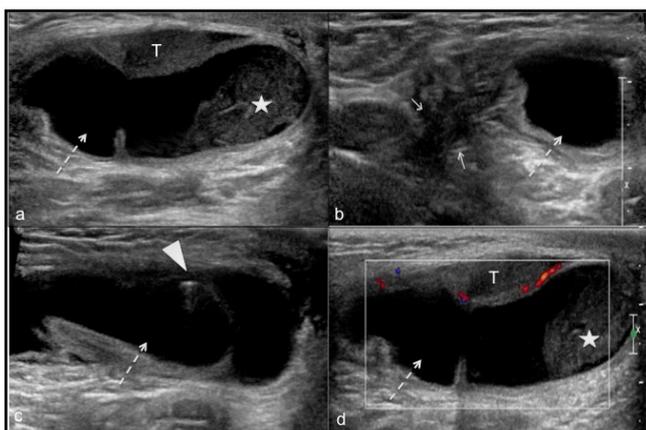


Fig. 1 (a,b,c,d). Ultrasound images of the patient's right scrotum reveal a dilated loop of bowel (dashed arrow) extending from a narrow opening (arrow) in the right inguinal canal to the right scrotum adjacent to the normal appearing right testis (T). Intraluminal gas (arrowhead) and debris (asterisk) are seen within the bowel loop. Intramural vascularity of the bowel wall is preserved. Appearance is consistent with an obstructed right inguinal hernia containing a loop of bowel.

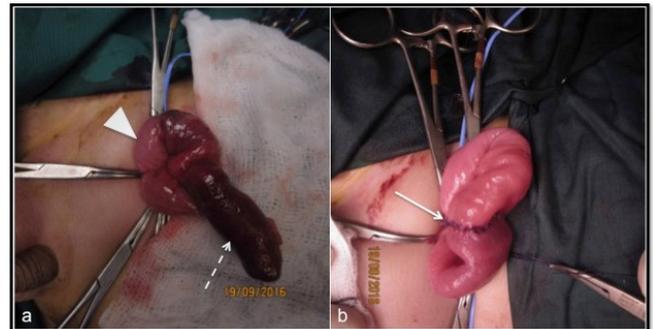


Fig. 2. (a, b). Intra-operative photographs reveal the Meckel's diverticulum (dashed arrow) attached to the adjacent small bowel (arrowhead) within the right inguinal hernia sac and small bowel anastomosis post-diverticulectomy (arrow).

### Findings and Diagnosis

The ultrasound images reveal a large tubular cystic structure (dashed arrow) extending from a narrow opening (arrow) in the right inguinal canal into the right scrotum adjacent to the normal appearing right testis (T). Intraluminal gas (arrowhead) and dependent debris (asterisk) are seen within the cystic structure (Figs. 1a,b,c). The overall appearances are suggestive of an obstructed right inguinal hernia containing a loop of bowel. Intramural vascularity of the bowel wall is preserved (Fig. 1d). Serum investigations showed elevated platelet count (587 x 103/uL [150-450]) and elevated total white blood cell count (17.8 x 103/uL [6.0-17.5]) with neutrophilia (11.8 x 103/uL [1.5-8.5]). Serum C-reactive protein level, electrolytes and liver function tests were normal. Urinalysis reveal elevated white blood cells (18uL [0-10]).

An attempt was made to reduce the right inguinal hernia by the patient's bedside, which was successful. Shortly after, there was recurrence of the right inguinal hernia. The patient subsequently underwent a right inguinal herniotomy. Intraoperatively, a note was made of a Meckel's diverticulum (dashed arrow) seen within the right inguinal hernia sac which appeared congested with borderline viability (Fig. 2a). Small bowel resection and diverticulectomy was performed followed by small bowel anastomosis (arrow)

Answer: D

and right inguinal herniotomy (Fig. 2b). Postoperatively, the patient made a rapid and uneventful postoperative recovery. Histology of the specimen revealed presence of a diverticulum within sections of the resected small bowel with submucosal haemorrhage. Ganglion cells were seen suggesting the presence of a Meckel's diverticulum (MD). Overall findings confirmed the diagnosis of an incarcerated right inguinal Littre hernia (LH).

## Discussion

LH is the protrusion of a MD through a potential abdominal opening.<sup>1</sup> LH was described 1700 by French surgeon Alexandre de Littre for the first time as an “ileal diverticula in the inguinal hernia” after autopsy findings of 2 patients. Johann Friedrich Meckel described diverticula of the distal ileum in 1809 and suggested their congenital origin.<sup>2</sup>

MD is a true diverticulum in that it contains all tissue layers of the bowel. Embryologically, MD is the persistent part of the omphaloenteric duct through which the midgut communicates with the umbilical vesicle until the fifth week. It arises from the antimesenteric border of the ileum, usually located 30 cm to 90 cm from the ileocaecal valve. It usually measures 3 cm to 6 cm in length and 2 cm in diameter.<sup>1</sup>

MD occurs in about 2% of the population and may present at any age, but most commonly before the age of 2.<sup>3,4</sup> Its incidence is found to be equal in male and females, but complications occur more frequently in males.<sup>5</sup> It is the most common congenital anomaly of the gastrointestinal tract that is generally asymptomatic and only manifests in a specific way when complications occur. Only about 1% to 4% of patients with MD develop complications of haemorrhage, inflammation, obstruction or perforation.<sup>6</sup> Several factors associated with a higher risk of complications include: male sex, age below forty, a diverticulum of more than 2 cm in length or with a narrow neck, the presence of heterotopic mucosa or the existence of a diverticular band.

Heterotopic tissue of gastric, duodenal, pancreatic or colonic morphology in MD has been reported to occur in 6% to 17%; gastric mucosa being the most common type.<sup>5,7</sup> This heterotopic mucosa is the main underlying pathological reason behind complications such as haemorrhage and perforation.<sup>5</sup>

Sometimes, MD may be accompanied by the ileal loop to which it is attached; rarely, it may undergo incarceration or strangulation, necrosis, and perforation.<sup>1</sup> Hernial strangulation of MD (Littre hernia) is a rare anatomoclinical form representing 10% of all complications of MD.<sup>7</sup> The most usual locations of LH are: inguinal (50%), umbilical (20%) and femoral (20%).<sup>1</sup> In the adult age, about half of LH occurs in the inguinal region.<sup>2</sup> In children, it is mostly found in umbilical hernias, and the diverticulum is more prone to adhere to the sac.<sup>1</sup> Due to the low incidence of LH, it is generally unsuspected. Clinically, a distinction

between the involvement of a small bowel loop versus a MD in an inguinal hernia cannot be made, hence the diagnosis of LH is often made in the perioperative period.<sup>8</sup> In addition, the signs and symptoms of an incarcerated MD on presentation are thought to progress slower than a hernia involving small bowel, hence making preoperative diagnosis of LH difficult.<sup>8,9</sup> Despite difficulty of making a preoperative diagnosis of LH, findings such as incomplete manual reduction of an incarcerated hernia, hernial faecal fistula and previous history of rectal bleeding should alert the clinician about LH.<sup>2</sup>

Surgery is the mainstay of treatment for LH. The techniques for surgical resection of MD include a simple diverticulectomy using a linear gastrointestinal (GI) stapler or segmental resection of the involved small bowel and primary anastomosis. In situations of perforation, bowel ischaemia or where presence of ectopic tissue is definitive, resection and small bowel anastomosis are recommended.<sup>8</sup> This is followed by closure of the hernial sac.

In our case of an infant presenting with acute painful right inguinoscrotal swelling, the likely differential diagnosis considering patient's age, clinical presentation and examination findings included that of testicular torsion, epididymo-orchitis or torsion of the testicular appendage, which commonly occurs in the paediatric age group.<sup>10</sup> However, given the normal appearances of the right testis and right epididymis on ultrasound, the above differential diagnoses were unlikely. Another possible differential diagnosis that was considered was an acute hydrocele, which demonstrates a similar appearance to an inguinoscrotal hernia on ultrasound. However, it is avascular on Doppler evaluation and is often painless. In view of the examination and ultrasound findings, an incarcerated inguinoscrotal hernia was considered the most likely primary preoperative diagnosis. Finally, the diagnosis of incarcerated inguinal LH was confirmed intraoperatively and on histology.

## Conclusion

The clinical presentation of LH is not significantly different from any hernia, whether complicated or not. However, while evaluating a child beyond the newborn period with an incarcerated hernia, an incomplete or failed manual reduction should raise the possibility of a LH, as in our patient's case. In addition, querying the history of rectal bleeding or repetitive abdominal pain in these cases should increase the suspicion of LH. Furthermore, LH, although rare, should be considered at the time of repair for any abdominal hernia involving small bowel as resection of the MD is critical in avoiding recurrent complications.<sup>2</sup>

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Shi Yuan Wang,<sup>1</sup>MBBS, FRCR,  
Ehab Shaban Mahmoud Hamouda,<sup>2</sup>MBBS, FRCR

<sup>1</sup>Department of Radiology, Changi General Hospital, Singapore

<sup>2</sup>Department of Radiology, KK Women's and Children's Hospital, Singapore

Address for Correspondence: Dr Wang Shi Yuan, Department of Radiology, Changi General Hospital, 2 Simei Street 3, Singapore 529889.  
Email: wshiyuan@yahoo.com.sg