Umbilical Hernia and Other Disorders of the Umbilicus

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Key Points

1. Umbilical hernias in children often spontaneously close with time.
2. Indications for surgery include failure to close by age 3–5 years, incarceration, strangulation, perforation, or evisceration.
3. Other disorders of the umbilicus can occur including umbilical granulomas, fistulas, sinuses, infections, cysts, and more.

I. Diagnosis and Treatment:

Umbilical hernia is a common abdominal abnormality identified in infancy and is usually self-limiting. Umbilical hernias occur as a result of failure of the umbilical ring to close completely after birth. Only hernias that are very large, symptomatic, or persist past age 3–5 years (surgeon specific) will require operative repair.

Physical examination is sufficient to establish the diagnosis of an umbilical hernia. Most are asymptomatic and are only identified by visualizing a bulge at the umbilicus. The bulge may enlarge with straining and crying. Often, small bowel and/or omentum typically fill the hernia sac. Most are easily reducible. The defects are often small (<1.5 cm) and there may be redundant skin overlying the umbilicus.

Umbilical defects can be identified at birth and about 80% will spontaneously close. If the hernia has not spontaneously resolved, many consider hernia

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repair at age 3–5 years. Hernias with incarceration, strangulation, perforation, or evisceration should receive prompt operative intervention. Incarceration is less common with umbilical hernias as compared to groin hernias.

II. Pathophysiology:

The umbilicus is an essential structure of fetal development. Five structures course the umbilicus during gestation: 3 vessels (2 arteries and 1 vein); the urachus which communicates to the bladder and the omphalomesenteric duct which communicates with the terminal ileum.

Umbilical hernias result from failure of closure of the fascial ring through which the umbilical cord passes. This opening typically closes within a few weeks after the umbilical cord separates.

III. Epidemiology:

Umbilical hernias are more common in African-American, premature, low birth weight, and male children. Also associated with trisomy 21, congenital hypothyroidism, mucopolysaccharidosis, Beckwith-Wiedemann syndrome, and patients requiring peritoneal dialysis.

IV. Surgical Repair:

Repair is done with general anesthesia. The cosmetic result of repair is an important aspect of the surgical procedure. A curvilinear incision is made below the umbilicus, and the hernia sac is dissected away from the fascia. The fascia is closed using either absorbable or nonabsorbable interrupted sutures. The skin is closed with absorbable suture. Large proboscis-type hernias may benefit from flap skin closures such as the 3-flap umbilicoplasty.

V. Complications:

Postoperative complications include bleeding, infection, and recurrence.

VI. Other Umbilical Abnormalities:

a. Delayed separation of the cord

- Normally separates within 1–2 weeks.
- A delay in its drop may be associated with a leukocyte adhesion deficiency, a rare immunologic disorder.

b. Umbilical granuloma

- After cord separation, a small area of granulation tissue may develop.
- Treated with silver nitrate until the area epithelializes.

c. Umbilical Infections

- Higher incidence in undeveloped countries.
- Hand washing and cord care reduce the incidence.
- Omphalitis is a rare yet aggressive bacterial infection of the newborn that may spread to surrounding tissues. This is a true surgical emergency that may require repeated debridements along with broad-spectrum intrave-

nous antibiotics. The condition may progress to sepsis and death if not recognized early.

d. Omphalomesenteric Remnants

- Remnants of the vitelline or omphalomesenteric duct—include fistulas, sinus tracts, cysts, mucosal remnants, and congenital bands.
- Vitelline fistula—fistula communicates with the ileum manifested clinically by discharge of fecal contents at the umbilicus.
- Vitelline sinus—blind sinus opening at the umbilicus caused by failure of the obliteration of the distal portion of the vitelline duct. Clinically manifests as discharge of mucous at the umbilicus.
- Vitelline cyst—failure of the obliteration of the middle portion of the vitelline duct. The cyst can get infected and/or rupture at the umbilicus, with the discharge of purulent effluent.
- Vitelline band—failure of the obliteration of the vitelline duct leading to a fibrous band that may lead to intestinal volvulus, obstruction, and/or strangulation.

e. Urachal Remnants

- Urachal fistula—clear drainage from the umbilicus due to a fistula connecting the umbilicus with the apex of the urinary bladder. The etiology is related to incomplete urachal obliteration. Diagnosis is usually made with ultrasonography with subsequent surgical excision to prevent complications including infection and metachronous malignancy.
- Urachal cysts—often cause infection and present as a painful mass between the umbilicus and suprapubic region also related to failure of obliteration of the middle portion of the urachus. Treatment is similar to the fistula.

Umbilical anomalies are a common problem seen by every pediatric surgeon. They have been described in surgical textbooks dating back to the early twentieth century. The appearance of the umbilicus was recognized in early works which recommended observation and compression. Most umbilical hernias resolve without intervention. Those that persist beyond the third birthday are likely to require operative closure. Large umbilical defects (greater than 1.5 cm) are unlikely to resolve and earlier intervention may be indicated. Little has changed in the surgical management of umbilical hernias over the past 100 plus years. An understanding of the anatomic structures which course the umbilicus in fetal life helps determine other considerations such as associated anomalies including urachal and omphalomesenteric remnants. Urachal and vitelline remnants often present with infection and thus require surgical excision (Fig. 1).

Fig. 1 Umbilical granuloma. Source: Alfred P. Kennedy, Jr., MD

Study Questions

1. A 14-month-old female presents with a 1.5-cm reducible umbilical hernia. The parents describe that the hernia increases in size with crying. What is the treatment?

   a) Elective repair
   b) Abdominal binder
   c) Reassurance to parents
   d) Emergent repair

   Answer: c) Reassurance to parents. The patient is below 3 years of age, the hernia is asymptomatic and there is no indication for surgical intervention at this time.

2. A 9-month-old male presents with clear umbilical drainage. What is the most likely diagnosis?

   a) Umbilical hernia
   b) Omphalitis

c) Umbilical granuloma
d) Urachal remnant

Answer: d) Urachal remnant. Clear drainage is typically associated with a urachal remnant.

Further Reading

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