The Embryology Of Recurrent Discharge From The Umbilicus Of A 16-Year-Old Boy

D Raja, B Sultana

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Abstract

A 16-year-old, high-school boy's complaints of painless discharge from the umbilicus. The discharge stopped without medication but recurred a few months later. They sought advice from their family pediatrician who found a pea shaped swelling in the umbilicus and prescribed cephalexin and advised the patient to take the antibiotic for couple of weeks. The pediatrician could not explain the cause but assured the parents that the swelling in the umbilicus would disappear within a couple of weeks. The discharge continued despite five days of cephalexin therapy. The discharge appeared 'whitish' and mucus-like and had no urine or fecal odor. They eventually saw a plastic surgeon who excised the pea shaped granuloma under local anesthesia and cauterized it with silver nitrate. The plastic surgeon advised to contact a general surgeon if the discharge did not stop. The discharge stopped on the 5th day post-surgery but reappeared again after a few days. They sought the advice of a general surgeon who diagnosed it as a urachal cyst and advised it be removed. Immediately after the surgery the tissue was sent for histopathology for a confirmation of the diagnosis. The histopathological report showed a diagnosis of abscess.

INTRODUCTION

The umbilicus is the life-line in intra-uterine life. Multiple structures are connected to the umbilicus during intra-uterine life such as the left umbilical vein (obliterated after birth to become the ligamentum teres hepatis) connecting the liver, the median umbilical ligament connecting the apex of the bladder, the medial umbilical ligaments continuing proximally as superior vesical arteries, and the omphalomesenteric duct (vitelline duct) connecting the small intestine.[1]

There is a complete contrast in the physiological importance of the umbilicus during intra-uterine life and after birth. Preceding birth, the umbilicus functions as a channel allowing blood flow through the umbilical vessels between the placenta and the fetus. It also serves a vital role in the development of the intestinal and urinary systems. After birth, and once the umbilical cord falls off, no indication of these connections should be present. However, umbilical disorders may be seen in older children and can be life threatening. Most patients with umbilical problems present with a mass, or drainage from the umbilicus. Umbilical discharge and swelling, although rare in a 16 year-old boy, has a significant number of differential diagnoses, for example urachal cyst, Meckels diverticulum, umbilical hernia ulceration, abdominal abscess, urachal carcinoma, patent urachus, patent omphalomesenteric duct, umbilical granuloma, and omphalitis. An understanding of the anatomy and embryology of the abdominal wall and umbilicus is important to identify and properly treat these conditions.

CASE REPORT

A 16-year-old, high-school boy's complaints of painless discharge from the umbilicus was initially ignored by his parents who advised their son to have regular showers and allow for natural healing. The discharge stopped without medication but recurred a few months later. They sought advice from their family pediatrician who found a pea shaped swelling in the umbilicus and prescribed cephalexin and advised the patient to take the antibiotic for couple of weeks. The pediatrician could not explain the cause but assured the parents that the swelling in the umbilicus would disappear within a couple of weeks. The discharge continued despite five days of cephalexin therapy. The discharge appeared 'whitish' and mucus-like and had no urine or fecal odor. The parents were very anxious and, as it was Christmas, it was very difficult to get a surgical appointment. They eventually saw a plastic surgeon who excised the pea shaped granuloma under local anesthesia and cauterized it with silver nitrate. The plastic surgeon advised continuing with the cephalexin and to contact a general

surgeon if the discharge did not stop. The discharge stopped on the 5 th day post-surgery but reappeared again after a few days.

The physical examination revealed a well-developed and well-nourished 10th grade high school boy. He had no fever (oral temperature, 37.2° [98.9°F]), a heart rate of 88 beats per minute, and a blood pressure of 128/86 mm Hg. He weighed 134 lbs and was 5 feet 4 inches tall. The patient was anxious but neither toxic nor in acute distress. He had no pain around the umbilicus and was able to attend school regularly. A thin whitish discharge was observed pooling around the umbilicus. There was no sign of body piercing or tattooing. His bowel movement was good. He had no history of urethral stricture. He co-operated with the doctors during the physical examination. He had no rebound tenderness.

A urachal cyst was diagnosed and it was advised that it be removed. This was done two weeks later and immediately after the surgery the tissue was sent for histopathology for a confirmation of the diagnosis. Unfortunately, there was secondary infection in the operative stitches. The surgeon took out the stitches and prescribed septrin. The histopathological report showed a diagnosis of abscess. The surgical wound healed within seven days of septrin therapy and there has been no further discharge from the umbilicus.

Figure 1

Figure1: A discharging umbilical granuloma

Figure 2

Figure2: Umbilicus on 7th postoperative day

DIFFERENTIAL DIAGNOSIS

Discharge at the umbilicus generates a limited but important differential diagnosis. The discharge may include pus, blood, urine, or fecal matter.The type of discharge may or may not be infectious origin.

Omphalitis, the inflammation of the umbilicus, is seen in the newborn. The diagnostic clues are purulent discharge, periumbilical edema, and erythema.[7]

Umbilical granuloma is characterized by a homogenous gray mass and is resolved with topical silver nitrate.

Patent omphalomesenteric duct presents as a feculent or bilious discharge along with a lumen in the umbilical cord.

Patent urachus is characterized by discharge of urine through the umbilicus.[8]

Urachal carcinoma is seen in the in the elderly population with an insidious non-tender mass.

Umbilical hernia ulceration may be possible in any age group. The diagnostic clue is purulent discharge, with or without feculent material.[9] Abdominal abscess is often lateral to the umbilicus.[9]

PROGNOSIS

There is the possibility of recurrence of a urachal cyst in 10 to 30% of cases. The urachal cyst may not be removed completely. Reported complications include progressive enlargement of the cyst, hemorrhage, abscess, calculus formation, and fistula formation. Fortunately, these complications are uncommon. Remnants of the urachal cyst

have the potential to develop into adenocarcinma in 0.5% of cases.[10]

DISCUSSION

An urachal cyst is possible among older children or teenagers, as in this case. Uracus is the remnant of allantois. The allantois is the communicating duct between the upper part of the urogenital sinus and the umbilicus in intra-uterine life. Normally, the allantois and the superior end of the presumptive bladder undergo regression between the fourth and sixth weeks. The allantois and the constricted bladder apex are transformed into a ligamentous band, known as the urachus or median umbilical ligament.[2] The urachus, or median umbilical ligament, runs through the subperitoneal fat from the urinary bladder to the umbilicus along the posterior surface of the anterior abdominal wall. This band is about 5 cm long and 1 cm wide in the adult.[3] Very rarely, parts of the allantois may remain patent, producing a urachal fistula, urachal sinus, urachal diverticulum, or urachal cyst. A triad of lower midline mass, umbilical discharge and sepsis is suggestive of a urachal cyst. Symptoms include leakage of urine from the umbilicus in the urachal fistula, sterile or infected discharges from the urachal sinus, and a lump in the subumbilical region due to the urachal cyst. Urinary tract infection and peritonitis is also possible due to the infection or perforation of the urachus.[4] Urachal diverticulum is a site of urinary stasis and predisposes to infection and the formation of bladder stones. Rarely, cancer may arise from the urachal anomalies.[5]

Urachal anomalies are usually congenital problems in children. Urachal patency may be acquired from persistent urethral obstruction. Acquired urachal diverticula are most often seen with prostate enlargement (hyperplasia or neoplasia), producing obstruction to urine outflow and marked muscle thickening of the bladder wall.[6]

CONCLUSION

Umbilicus is an important junction of the body. During intra-uterine life, its value is immense. The urinary system, gastrointestinal system, and vascular system all pass through this small central gap of the abdominal wall. Although all of them are obliterated proximal to the inner aspect of the umbilicus after birth, there is still a possibility for patency later on. Umbilical discharge at any age should be promptly evaluated. Failure to diagnose and treat early may lead to septic shock or death.

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Author Information

Dewan S. Raja, M.B.B.S., M.Phil.
Professor of Anatomy and Toxicology, Palmer College of Chiropractic Florida

Bahar Sultana, M.B.B.S.
Assistant Professor of Microbiology and Pathology, Palmer College of Chiropractic Florida