Acute Peritonitis Caused by Intraperitoneal Rupture of an Infected Urachal Cyst: Report of a Case

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Abstract
Embryologically, the urachus is the tubular structure that connects the dome of the bladder to the umbilicus. Incomplete obliteration of the urachal lumen results in several anomalies. The most common urachal abnormality is the urachal cyst and, while intraperitoneal rupture of an infected urachal cyst is very rare, acute peritonitis resulting from intraperitoneal rupture is the most dangerous of all complications associated with urachal anomalies. We report herein a case of acute peritonitis caused by intraperitoneal rupture of an infected urachal cyst.

Case Report
An 80-year-old woman was admitted to our hospital with a 24-h history of severe lower abdominal pain. Her temperature was 36.9°C and her blood pressure 136/90 mmHg. Abdominal examination revealed distension of the lower abdomen with tenderness, muscular guarding and rebound tenderness, and diminished bowel sounds. There was no erythema or purulent discharge around the umbilicus. A complete blood cell count showed a red cell count of 247,000/mm³, hemoglobin of 8.1 g/dl, hematocrit of 24.2%, a leukocyte count of 22,400/mm³, and a platelet count of 36,700,000/mm³. C-reactive protein was elevated at 19.1 mg/dl. The remaining laboratory findings and tumor markers were within normal limits. An abdominal X-ray showed no intra-abdominal free air, but ultrasonography revealed turbid ascites in the abdominal cavity. Computed tomographic scan revealed a thick-walled cystic mass superior to the dome of the bladder diffusely contiguous with the anterior abdominal wall (Fig. 1). There was free peritoneal fluid in the abdomen. Urinary catheterization yielded turbid urine, but bacterial culture of the urine was not done. An exploratory laparotomy was performed immediately under a preoperative diagnosis of perforated colon. Abdominal exploration revealed free intraperitoneal pus, and a fibrous mass extending from the dome of the bladder adhered to the ileum. This mass was identified as an urachal cyst abscess with intraperitoneal perforation. As much of the remnant urachal cyst as possible was excised, followed by irrigation of the peritoneal cavity with saline and the insertion of a
silicone drain. The postoperative hospital course was uneventful.

Pathologic examination of the excised specimen revealed acute and chronic inflammation of the urachal cyst with ulcer formation, hemorrhage, abscess formation, granulation tissue, edema, lymphoid follicle formation, fibrosis, and severe inflammatory cell infiltration. Few transitional cells such as urachal epithelial cells were seen in the resected specimen. No tumor tissue was found in the specimen submitted (Fig. 2). Bacterial culture of the pus grew \textit{Staphylococcus warneri}.

A postoperative voiding cystourethrogram suggested extrinsic compression of the bladder dome (Fig. 3). A postoperative cystoscopy showed normal bladder urothelium and an extrinsic mass impinging on the posterior aspect of the bladder dome. An infected urachal cyst was found adhered to the dome of the bladder, causing the wall of the bladder to be thickened and deformed.

**Discussion**

Embryologically, the urachus is the tubular structure that connects the dome of the developing bladder to the allantois at the level of the umbilicus. The lumen of the urachus usually obliterates and eventually becomes a fibrous cord. The urachus is situated in the loose connective tissue in the space of Retzius between the transversalis fascia and the peritoneum. The normal adult urachus ranges from 3–10 cm in length, with a base diameter of 8–10 mm and an apex diameter of 2 mm. The urachus consists of a three-layered structure of transitional cell epithelium, connective tissue, and an outer smooth muscle layer.

Incomplete obliteration of the urachal lumen results in the following five anomalies: congenital patent urachus; umbilical urachal sinus; vesicourachal diverticulum; urachal cyst; and alternating sinus. Urachal cysts are the most common type of urachal abnormality in adults. Most urachal cysts develop in the lower third of the urachus due to epithelial desquamation and degeneration, and generally remain silent and small. Small urachal cysts are not uncommon and are often undetected or found incidentally, unless infection or malignant change occurs. Symptomatic cysts of clinical significance are less common and occur predominantly in the lower third of the urachus adjacent to the bladder. They often present as acute abdominal or pelvic disease.

Infection in the urachal cyst may originate from a hematogenous, lymphatic route or by direct spread from the bladder or umbilicus. If an infected urachal