

Case Report

Preoperative Contrast Ultrasonographic Diagnosis of Patent Urachal Sinus

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Abstract: A patent urachal sinus, as well as other congenital urachal anomalies, may be at risk of injury during laparoscopy. Leakage of fluid at the midline site of trocar entry is the usual postoperative sign of injury to a patent urachal sinus. Pre-operative diagnosis of this anomaly can prevent injury during laparoscopy. We describe a contrast ultrasound technique for diagnosis of patent urachal sinus.

Keywords: Congenital anomalies; Urachal injury; Urachal sinus

Introduction

A urachal remnant is a rare anomaly [1–7] where the allantois extrudes into the umbilical cord during early fetal development and remains either partially or totally open after birth [5–7]. Urachal sinus anomalies are most commonly found during infancy, childhood, or in the teenage years [2,7–10]. However, cases have been described in adults [6–10].

Four types of patent urachal anomaly have been described [1,6,7–9]:

1. A patent urachus in communication with the bladder and the umbilicus;
2. A urachal sinus with communication only to the umbilicus;
3. A urachal cyst obliterated proximally and distally;

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4. A vesicourethral diverticulum between the bladder and the urachus.

The incidence of urachal anomalies is unknown. Urachal cysts are the most common anomalies in adults. However, reports about complications that arise from injury to a patent urachal sinus are very scarce: a search of the literature yielded one case of injury to a patent urachal sinus during laparoscopy [10].

The management of urachal anomalies involves complete excision of the umbilicovesical tract if there is a symptomatic patent tract [9]. In cases where there is injury to an asymptomatic patent urachus that is closed at the umbilicus, a repeat laparoscopy or laparotomy may be necessary to excise the urachal anomaly.

Case Report

A 48-year-old G5, P7007 woman with genital prolapse and genuine stress urinary incontinence underwent pre-operative ultrasound scanning for evaluation of the paravaginal spaces and the urethra by a technique developed and tested by the authors [11]. Because the patient also complained of abdominopelvic pain, the abdomen and pelvis were also scanned. Diagnosis of a patent urachal sinus was made during full-bladder midline transabdominal ultrasound scanning in the subumbilical region with a 3.5 MHz convex transducer placed in a longitudinal orientation (ACUSON 128 XP Computed Sonography System, ACUSON Corporation, Mountain View, CA, USA). The patent urachal sinus was seen as a narrow echolucent duct that extended from the dome of the bladder to a region just below the umbilicus (Fig. 1).

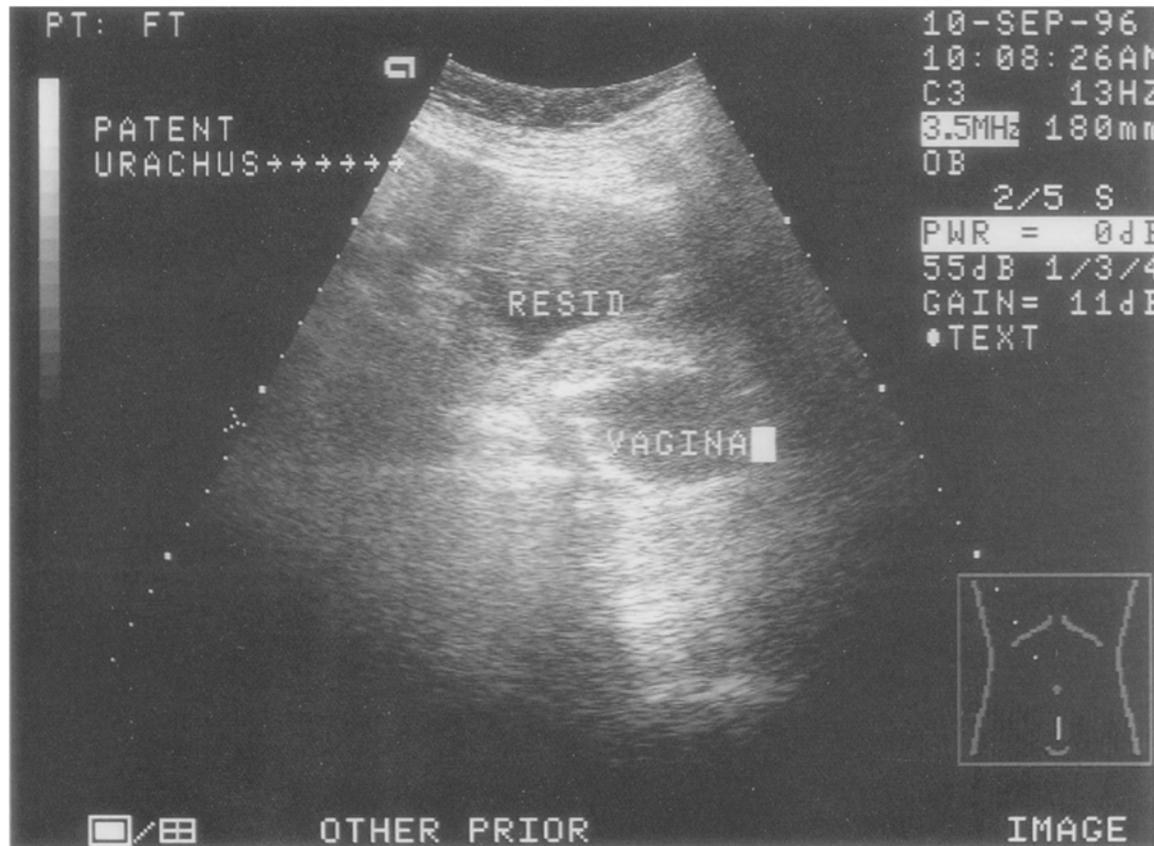


Fig. 1. Transabdominal ultrasound picture of bladder with postvoid residual. A patent urachus is visible in the upper left-hand corner of the ultrasound image. A water-filled condom is in the vagina.

The patient had undergone standard physical, neurological, and urodynamic evaluation along with residual check prior to ultrasound imaging. Pre-operative evaluation demonstrated a 450 ml bladder capacity with a 250 ml residual after postvoid catheterization. Care was taken to avoid the patient's urachus during laparoscopic repair of the paravaginal defects.

Discussion

The urachus is a vestige of the allantois, which normally obliterates and atrophies during fetal development. Under normal conditions the urachus is merely a fibrous structure extending from the bladder to the umbilicus. It is attached to the transversalis fascia anteriorly and to the parietal peritoneum posteriorly. If there is a patent urachal sinus, especially one with communication to the bladder, there is risk of perforation during laparoscopic surgery, which may result in post-operative leakage of urine at the site of injury [10]. This can be prevented by preoperative diagnosis.

Unlike the present case of an intact asymptomatic patent urachus, all other cases described in adults were reported following injury or medical complications [2-7,10]. The complications reported include inadvertent

perforation during laparoscopy with post-operative leakage of urine at the trocar entry site [10], complications of Meckel's diverticulum [4], malignant degeneration [12], and infection with abscess formation [3,7,13,14].

We are not suggesting that preoperative ultrasound is indicated solely to prevent injury to urachal anomalies during laparoscopy, as our literature search indicates that injury to urachal remnants is extremely rare. Ordering a preoperative ultrasound to prevent injury will not be cost-effective, nor will it be an efficient way to prevent injury to urachal anomalies. However, we are suggesting that when a transabdominal ultrasound is performed with a full bladder for any other reason, the sonographer can look for and rule in or out a patent urachus by a longitudinal midline scan, with no additional discomfort or cost to the patient.

The patient described in our case report participated in a study of contrast ultrasound for evaluation of paravaginal defects in patients with stress urinary incontinence [11]. The protocol required transabdominal ultrasound examination of all study patients. We did not use sonography in place of clinical evaluation for the study of patients with paravaginal defects, but to determine whether the paravaginal defects were unilateral or bilateral, and to compare post-operative reconstructive outcome with pre-operative paravaginal anatomy.

In clinical practice we consider ultrasound to be indicated when a history of pelvic pain or the findings on pelvic examination suggest pelvic pathology. Ours is the first case in the literature where contrast ultrasonography was used to make a precise pre-operative diagnosis of a patent urachus, and allowed us to prevent what would otherwise have been an inadvertent and unavoidable urachal injury. However, we are not suggesting that contrast ultrasound be used as a screening tool for all cases of laparoscopy. What we are recommending is that additional attention be focused on the urachus when ultrasonography is indicated to rule out pelvic pathology. We agree that the rarity of urachal anomalies renders inappropriate the performance of an ultrasound examination solely to screen for this condition.

Urachal sinus anomalies have been diagnosed traditionally by radiography [15]. A patent urachus can be injected at the umbilical opening with a radio-opaque material, or a cystogram can be done to demonstrate the patency at the umbilicus. Fistulography, however, is only useful if there is an open end, with leakage or abscess formation.

There is one case report where an operative urachal sinus complication was managed conservatively [1]. Theoretically, the urachus can be ligated laparoscopically or, if necessary, excised from the bladder and repaired by a technique previously described [16].

Considering the scarcity of reports about urachal sinus injuries and the large number of abdominal laparoscopic procedures performed yearly, we believe that patent urachal ducts that communicate with the bladder are extremely rare in adults. It is possible that the urachal canal can reopen in patients with bladder overdistension problems or with long-standing prolapse associated with large residual volumes. This would explain an asymptomatic patent urachus that remains closed at the umbilical end in an adult patient. However, we found no reports on a Medline search of the literature that addressed intravesical pressure as a cause of reopening of a previously closed urachus. We also found nothing in the literature that suggested that this could not happen. Therefore, the idea of spontaneous opening of a previously closed urachus is simply a speculative possibility. We agree with authors who suggest that urachal anomalies are most likely congenital. We believe that, at least in the vast majority of cases, persistent urachal patency is a congenital rather than an acquired condition that results from constant intravesical pressure.

Our case indicates that transabdominal sonography seems to be a relatively simple technique to detect a patent urachus when ultrasound studies are performed for other indications. Pre-operative identification of a narrow echolucent duct that extends from the dome of the bladder to the subumbilical region may alert surgeons to the presence of a patent urachal sinus. Avoidance of midline subumbilical trocar entry in affected patients will prevent inadvertent perforation during laparoscopy that could result in post-operative urine leakage at the site.

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