

Incidental finding of unusually located urachal remnant and its implications for prostatectomy – case report

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ABSTRACT

Urachal anomalies are rare congenital malformations resulting from the failure of the caudal portion of the allantois to obliterate, which, by stretching and narrowing, forms the urachus. Such pathologies may be both symptomatic and asymptomatic if they become infected or undergo malignant transformation. In this paper, we report an unusual form of a urachal remnant in a 68-year-old Caucasian male, detected incidentally during open, radical, non-nerve-sparing,

retropubic prostatectomy, performed from the suprapubic access point. The structure attached to the anterior wall of the urinary bladder appeared to connect to a cutaneous sinus at the dorsum of the penis and posed a challenge for dissection of the retropubic space of Retzius. We discuss how surgeons could benefit from the knowledge that such structures are able to appear.

Keywords: andrology; urachal remnant; urology; prostatectomy; retropubic space.

INTRODUCTION

The urachus is a tubular, 3-layered structure derived from the cloaca, a part of the urogenital sinus, functioning as a precursor to the urinary bladder, and the allantois. It usually runs vertically in the preperitoneal space and connects the dome of the urinary bladder with the umbilical region [1]. After birth, it usually undergoes an obliteration, sometimes only partially, and becomes a cord of fibrous tissue named the median umbilical ligament [2]. In this article, we wish to present case of rare location of a urachal remnant, discovered incidentally during radical retropubic prostatectomy, attached to the anterior wall of the urinary bladder and running under the pubic symphysis.

Various forms of urachal anomalies can persist as initially latent remnants, but can become infected or undergo malignant transformation, and develop symptoms at later stages of life [3]. This is clinically particularly important, given that the risk of urachal cancer development increases with age, and the time the remnant remains *in situ* [4, 5]. Epidemiological data regarding urachal anomalies is scarce, as the occurrences of such malformation are relatively rare. According to a review article by Wilson et al., they are twice as common in men as in women; however, data varies between multiple reviewed studies [3]. We did not come across any conclusive evidence on how urachal anomalies form in humans and what causes them. To the best of our knowledge, this is the first case of a urachal remnant located in this particular anatomical region.

CASE REPORT

A 68-year-old male patient was admitted to the hospital for scheduled treatment due to previously diagnosed prostate cancer. The patient presented with no coexisting illnesses.

During the physical examination, a crescent-shaped fold of skin, reminiscent of an ectopic external urethral orifice or a fistula, was detected on the proximal region of the dorsal side of the penis (Fig. 1A). It was determined that the structure was present at birth. The patient stated that it did not impact on his day-to-day functioning, and did not report any drainage from the structure.

The prostatectomy was performed from the suprapubic access point, using the classic retropubic technique. During dissection of tissue in the retropubic space, an abnormal cord-like structure was detected between the puboprostatic ligaments, above the dorsal venous complex (DVC, plexus of Santorini), running sagittally in the median plane above the prostatic gland, emerging from the anterior surface of the anterior wall of the urinary bladder in the direction of the pubic symphysis (Fig. 1C). The structure was removed, based on the assumption, that it might be a urachal remnant. A probe was inserted into the mentioned orifice on the dorsum of the penis (Fig. 1B), but it was not possible to establish whether the channel on the penis communicated with the urachal remnant.

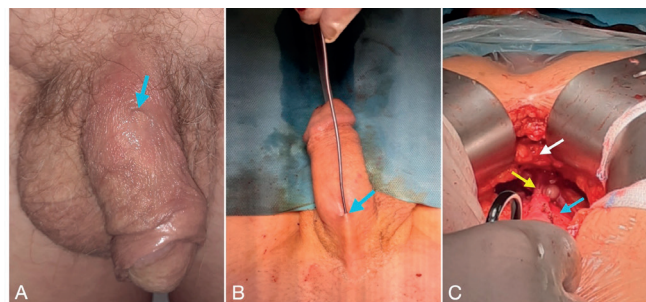


FIGURE 1. A. Crescent-shaped fold of skin on the dorsal side of the penis in the proximal region (arrow). B. Probe inserted to the cutaneous sinus (arrow). C. Intraoperative image of the remnant (yellow arrow), pubic symphysis (white arrow), urinary bladder (blue arrow)

After a post-operative re-evaluation of the patient's tomogram, a faintly defined structure with a location and course corresponding to that of the excised urachal remnant was detected (Fig. 2A). The structure run underneath the pubic symphysis and corresponded with the course of the noticed channel at the dorsal side of the penis (Fig. 2B). Histopathological examination confirmed the initial supposition the nature of the structure, being a urachal remnant and was determined to be free of cancerous malformations (Fig. 3). The patient was scheduled, for a follow-up appointment 3 months after the procedure. The patient currently does not present any urinary incontinence. The performed procedure was not nerve-sparing and erectile dysfunction was diagnosed prior to the prostatectomy.

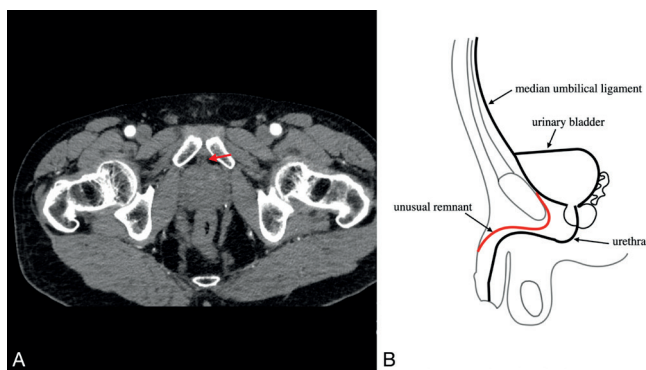


FIGURE 2. A. Computed tomography scan of the pelvis, arrow showing the remnant. B. The red line marks the course of the discovered remnant. When the bladder was retracted, the structure tensed over the dorsal venous complex (not shown) and the prostate

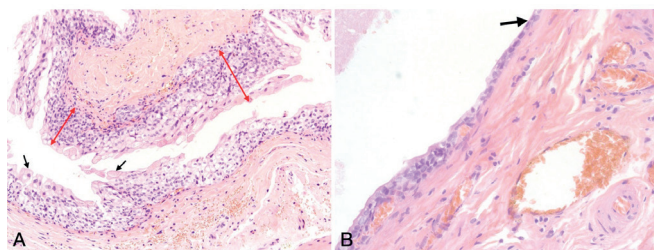


FIGURE 3. Histological image of cross-section of the excised remnant. The mucosal lining was characterized by relatively high morphological heterogeneity, with regions of highly stratified cuboidal (transitional) epithelia (A – red arrows), containing mucous-filled cells (A – black arrows) and regions showing very low stratification (B – black arrow), not typically seen in this type of epithelium. A. H&E staining, objective mag. x20 (Leica Microscope DM5000B with Leica Microsystems Camera – DFC450 C). B. H&E staining, objective mag. x40 (Leica Microscope DM5000B with Leica Microsystems Camera – DFC450 C)

DISCUSSION

At the beginning of the third week of gestation, the allantois begins to appear as a small structure dilating from the caudal wall of the yolk sack. The cloaca, which is communicating with the allantois ventrally, gives rise to the urinary bladder, which opens into the allantois at the level of the umbilicus where it is initially located. The descent of the urinary bladder into the pelvis starts around the fourth and fifth month of gestation, which causes its upper pyramidal part to form a narrow structure retaining connection to the umbilical region – the

urachus. Over the course of gestation and postnatal development, the urachus becomes a fibrous cord, mostly with no lumen present, known as the median umbilical ligament [1]. It lies between the peritoneum and the transversalis fascia in the preperitoneal space and forms the median umbilical fold by raising the parietal peritoneum, covering the posterior surface of the anterior abdominal wall.

Urachal pathologies are a rare disorder commonly diagnosed in childhood by some forms of drainage from the umbilical region noted during a physical examination, for example. Often, if the urachus becomes infected, a palpable painful mass above the pubic symphysis or below the umbilicus can be detected. In adults, the diagnosis of a urachal remnant was shown to often be connected with hematuria and pain. The most common urachal lesion diagnosed in adults is urachal cancer (51%) [3, 5]. Diagnosing or identifying urachal remnants can be difficult as their symptomatic appearance varies between individual patients and groups of patients.

In the presented case, the urachal remnant terminated in a region at a relatively great distance from the usual site of attachment and posed a certain level of difficulty for the dissection of adjacent tissue. The radical prostatectomy procedure requires scrupulous tissue dissection, and the identification of important anatomical structures such as the neurovascular bundles containing e.g. cavernous nerves, which play a vital role in achieving and maintaining a penile erection. Another challenge is to maintain hemostasis to prevent possibly life-threatening bleeding from the DVC, with which the remnant was closely bordering.

The caudal portion of the urachus and the adventitia of the umbilical arteries contribute to the abundant fibrous tissue, marking the termination of the umbilical fascial tunnel and the formation of the umbilical scar [6]. The urachus can deviate from its course in the median plane by attaching to the umbilical arteries, but this did not seem to be the case in this patient [1]. A comparable case was reported by Sun et al. where a cystic dilation of urachal origin communicated with a heterotopic sinus on the glans penis, dorsally to the usual external urethral orifice, with noticed drainage [7].

Performing the prostatectomy by suprapubic access provided the surgeon with a wide operating field, making the excision and dissection less challenging. Given the fact that laparoscopic or robot-assisted approaches are increasingly becoming the techniques of choice for prostatectomies, the knowledge of such urachal variations can help the surgeon prepare for such an eventuality, as a significant portion of urachal anomalies present without symptoms or with non-specific symptoms, and as in this case might not always be detected with gold standard imaging techniques such as computer tomography (CT) [8]. Re-evaluation of the CT scan helped determine that the median umbilical ligament was also present and its course did not present abnormally, which makes the case even more interesting, from not only the clinical point of view but also anatomically. In accordance with existing research, making a prediction regarding possible malignant development in tissues of urachal remnants in adults is difficult. Parameters such as the symptoms

or their epithelial lining did not allow the determination of the likelihood of future development of urachal cancer, which has been shown to have a cancer-specific survival rate of 49% [4, 5, 9].

Based on the reviewed research, we believe that completely excising an encountered urachal remnant during the prostatectomy procedure should be performed, as it not only allows freedom to continue the procedure but also might prevent future cancerous malformations associated with urachal tissue, albeit this issue is debated among specialists and needs further clinical examination [5, 10]. In future research, one should also consider investigating the possible anatomical courses of urachal remnants.

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