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CASE REPORT

Fusion of the seminal vesicles discovered at the time of robot-assisted laparoscopic radical prostatectomy

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Abstract The reported incidence of seminal vesicle anomalies is low, and it usually occurs in association with other genitourinary anomalies, thus frequently diagnosed by a cluster of fertility, pain or obstructive symptoms. We present a case of a clinically silent seminal vesicle fusion encountered during a robotic assisted radical prostatectomy. Awareness of potential congenital anomalies is crucial for surgeons, to prevent surgical complications or adverse outcomes as a result of the altered anatomy.

Keywords Seminal vesicle anatomy · Congenital anomalies · Robot assisted laparoscopic radical prostatectomy

Introduction

The seminal vesicles (SV) were first described, by Fallopius in 1561, as paired hollow genital organs [1] located posterior to the prostate. The SV are an exclusively male organ as no analog has been described in the female. Their development begins with the virilization of the genital organs, approximately at the 7th week of gestation [2] via an androgen-dependent [3] mechanism. Many variants of congenital abnormalities of the SV have been described, the most common being agenesis. SV malformations are most often associated with other mesonephric duct abnormalities, for example congenital defects of the vas deferens, ureter, and kidney. However, very little has been published about the prevalence and clinical significance of isolated malformations. Herein, we present a case report of SV fusion incidentally encountered during a robot-assisted laparoscopic radical prostatectomy (RARP) that led to modification of the surgical technique.

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Case report

A 61 year old male with a previous history of bilateral vasectomy was diagnosed with organ-confined adenocarcinoma of the prostate (T1c, Gleason 3 + 3, PSA 4 ng/ml). No abnormalities of the seminal vesicles were noted during digital rectal exam, or on trans rectal or pelvic ultrasound. The patient underwent RARP at our centre using an antegrade transperitoneal approach with early division of the bladder neck. During the SV dissection, two vasa were identified and ligated using clips, then divided. The medial border of the seminal vesicles was noted to approach the midline and fuse at the distal third of the organ (Fig. 1). This fusion did not allow separation of the SV, thus they were resected en bloc. Typically, upward medial traction is placed on the seminal vesicles to facilitate lateral release of the neurovascular bundles (NVB) but this was difficult because of the fusion. Bilateral interfascial nerve sparing was performed by rotating the fused vesicles and developing the plane in between the NVB.

Final pathology was a Gleason 6 (3 + 3) pT2c adenocarcinoma of the prostate with negative surgical margins and fused seminal vesicles (Fig. 2). A renal ultrasound was performed and demonstrated normal upper tracts. At three months follow-up the patient is disease free (PSA undetectable).

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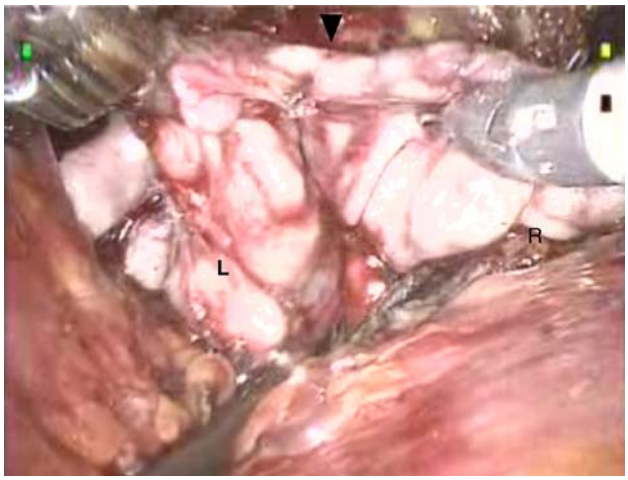

Fig. 1 Intraoperative picture showing the left (*L*) and right (*R*) seminal vesicles fused by an isthmus in the midline (*arrow head*)

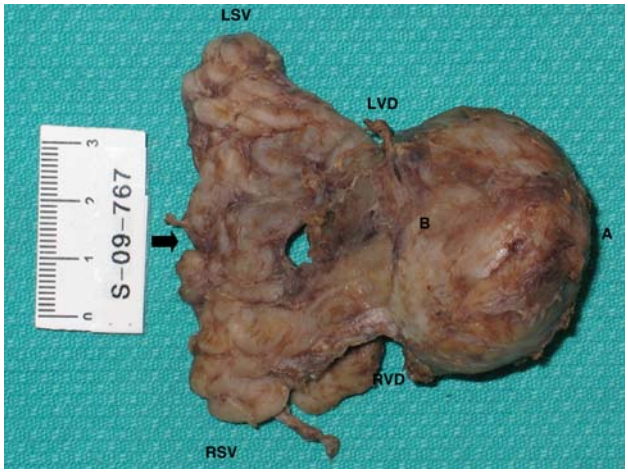

Fig. 2 Fixed specimen, showing the left (*LSV*) and right (*RSV*) seminal vesicles, fused in a midline isthmus (*arrow*), right (*RVD*) and left (*LVD*) vas deferens, and prostate base (*B*) and apex (*A*)

Discussion

Congenital urogenital abnormalities are common in humans, occurring in about 10–14% of the general population. The incidence of SV anomalies in pediatric post mortem studies is around 0.05% [4]. Congenital malformations of the seminal vesicles can be classified in three broad categories: number (agenesis, fusion, duplication), canalization (cysts), and maturation malformations (hypoplasia). These abnormalities are frequently associated with other more important abnormalities, for example renal agenesis or vas deferens anomalies leading to infertility [2]. Symptoms related to obstruction and secondary seminal vesicle dilation such as pain or discomfort can make them clinically apparent.

In this context, Malatinsky et al. [4] studied a cohort of 149 infertile patients with vesiculographies. They found that eight patients had solitary seminal vesicle anomalies, including one with SV fusion (0.6% incidence in their study). So, because of the rarity, most of the studies to date consist of sporadic case series and case reports in infertile patients.

Embryologically, the SV arises from the proximal vas precursor located in the central portion of the mesonephric duct. It is important to remember that the ureteral bud originates from the caudal common mesonephic duct and separates at the 7th week of gestation, so nearly all patients with defects occurring after this time only present with solitary reproductive duct anomalies. This rule is not universal, however, and non-invasive screening for upper urinary tract imaging in the form of renal ultrasound might be warranted. The physical, imaging, and operative findings in our case strongly suggest that the abnormality probably occurred at a later gestational age.

The increasing use of imaging is likely to increase diagnosis of SV anomalies in symptomatic and asymptomatic patients. Magnetic resonance, computed axial tomography, and ultrasound (pelvic or trans rectal) have the ability to detect SV defects and may serve as screening tools of at-risk populations, as demonstrated by Sheih et al. [5–7]. On retrospective review of our case imaging, we were able to identify the SV fusion on trans rectal ultrasound (Fig. 3).

To our knowledge there are few reported cases of an SV anomaly diagnosed during radical prostate surgery and this is the first SV fusion reported. Christiano et al. described a case of a unilateral SV duplication encountered during radical open prostatectomy [8], and Acharya et al. [9] have reported on one case of left SV and vas deferens agenesis encountered during RARP (an incidence of 0.08%). Our patient cohort, consists of 255 procedures. In our series one

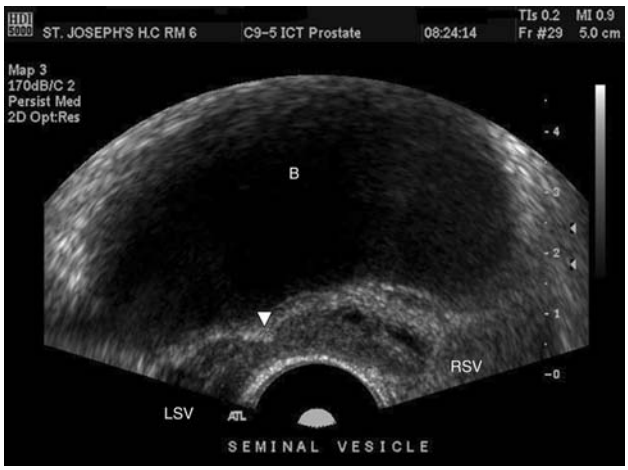

Fig. 3 Trans rectal ultrasound image, showing the bladder (*B*), and the right (*RSV*) and left (*LSV*) seminal vesicles joined in the midline by an isthmus (*arrow head*)

other Wolffian anomaly was encountered preoperatively, identified as renal agenesis and ipsilateral SV absence (making our SV anomaly incidence 0.78%). In our case the surgical technique had to modified slightly to complete the NVB release and complete the nerve sparing.

Although the frequency of SV involvement by prostate cancer at the time of surgery has diminished in the PSA era to less than 10%, we believe it is paramount to completely remove them during radical prostatectomy, because the available evidence shows that patients with positive SV have a higher rate of biochemical recurrence [10] and that up to 22% of the local recurrences occur in the remnants of the spared or partially resected SV [11].

Conclusion

Solitary SV anomalies are an extremely rare forms of congenital defect, and fusion has only been sporadically reported previously. The surgeon must be aware of this anatomic variant during surgical procedures involving the vicinity and/or resection of the seminal vesicles in order to avoid complications or incomplete resection.

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