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Case Report

A Case of Duplicated Vas Deferens Found Incidentally during Varicocelectomy

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Duplication of the vas deferens is a very rare congenital anomaly in which two vasa deferentia coexist within the spermatic cord. Duplication of the vas deferens can be found during herniorrhaphy, vasectomy, and varicocelectomy performed on the spermatic cord or around the spermatic cord. However, it is estimated that the incidence of duplication of the vas deferens is under-reported and under-recognized. Unless anomalies of the vas deferens such as duplication of the vas deferens are recognized by surgeons, it will be difficult to reduce vas deferens injuries and achieve a satisfactory surgical outcome. In addition, care should be taken in cases of duplication of the vas deferens because it can be complicated by non-testicular genitourinary anomalies. We report a case of duplication of the vas deferens discovered during routine varicocelectomy.

Key Words: Congenital abnormalities; Varicocele; Vas deferens

It is reported that vas deferens anomalies affect less than 0.05% of the general population [1]. Duplication of the vas deferens is a very rare congenital anomaly with only a few cases reported worldwide [1-5]. It is known that duplication of the vas deferens is associated with non-testicular genitourinary anomalies such as unilateral renal agenesis [1]. The term, duplication of the vas deferens, refers to the identification of two separate vasa deferentia within the spermatic cord [6]. The embryologic etiology of this congenital anomaly has not yet been clearly established, but it is assumed that duplication of the vas deferens is caused by the duplication of the fetal mesonephric system. Diagnosis of duplication of the vas deferens can be made by physical examination, but such a rare anomaly is not readily suspected or diagnosed during routine physical examination. As the number of operations on the spermatic cord or the surrounding areas increases, injury to vas deferens has come to be recognized as a complication of these surgeries. If duplicated vas deferens is not detected during surgery, iatrogenic injury to the vas deferens and other complications may develop [4]. The presence of such an anomaly can also lead to inadvertent failure of vasectomy. A lack of awareness of anatomical anomalies of the vas deferens may increase these problems. According to most case reports, duplication of the vas deferens is identified during orchiopexy, herniorrhaphy, vasectomy, or varicocelectomy. Therefore, surgeons performing inguinal procedures should be well aware of the con-

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dition to reduce vas deferens injury and vasectomy failure. We report a case of duplication of the vas deferens discovered during varicocelectomy, which was being performed to treat varicocele.

CASE REPORT

A 22-year-old male patient presented with a worm bag-like scrotal mass accompanied by scrotal pain. His past medical history and family history was insignificant. On physical examination, he was diagnosed with left varicocele (grade 3), and there were no other abnormal findings in the external genitalia. A semen analysis revealed asthenospermia and it was decided to perform varicocelectomy. Using an inguinal approach, varicocelectomy was performed through a small skin incision over the inguinal canal under spinal anesthesia. Upon isolating the left spermatic cord, two vasa deferentia were identified in the spermatic cord (Fig. 1A). On Doppler, both structures showed no signal, whereas an arterial signal was noted in the vascular structure lateral to the duplicated vas deferens. They were separated from the level of the internal inguinal ring to the level of the epididymal tail (Fig. 1B). After duplication of the vas deferens was confirmed, the enlarged veins were ligated and varicocelectomy was performed. The other side of the scrotum was also carefully examined, but it was confirmed that only one vas deferens was present on that side. The patient's postoperative course was uneventful. The postoperative abdominal-pelvic computed tomography (CT) scan did not identify any genitourinary malformations such as ipsilateral renal agenesis. At the 6-month follow-up, there were no signs of varicocele and the external genitalia were found to be otherwise normal.

DISCUSSION

A vas deferens anomaly is a very rare congenital malformation, with the prevalence being less than 0.05% [1]. Anomalies of the vas deferens can be classified into absence, duplication, ectopia, hypoplasia, and diverticulum [3,6]. Anomalies of the vas deferens are highly under-reported and under-recognized. Among the anomalies of the vas deferens, duplication of the vas deferens is a rare congenital malformation with only a few cases reported in the world literature. Since Coetzee [7] first reported a double vas deferens in 1959, there have been 20 reports describing a total of 23 cases of duplicated vasa deferentia. Identification of the vas deferens is necessary during operations such as orchiopexy, herniorrhaphy, vasectomy, and varicocelectomy because injury to the vas deferens is a recognized surgical complication of these operations. Injury to the vas deferens during surgery may cause infertility, chronic pain, and spermatic granulomas [5]. In patients with a unilateral duplicated vas deferens, the anatomic variant may not be recognized, resulting in in-

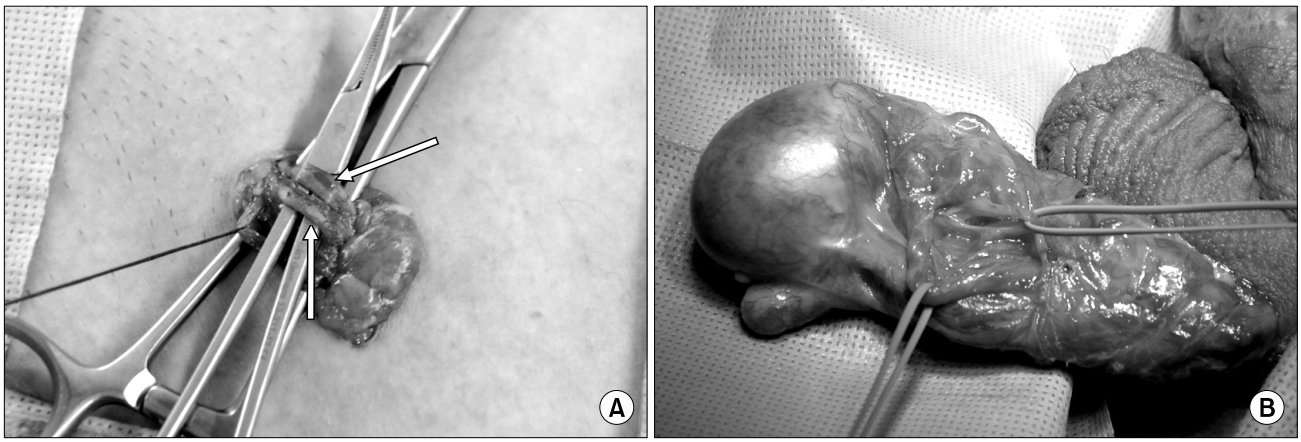

Fig. 1. (A) Duplication of the vas deferens identified during left sided varicocelectomy. The arrows mark two parallel vasa deferentia at the level of the inguinal canal. A spermatic artery hung with silk sutures. (B) Two vasa deferentia enter into the epididymal tail (held by vessel loops).

creased chances of intra-operative injury and subsequent complications.

While the terms 'duplicate' and 'double' vas deferens have been used interchangeably, duplication of the vas deferens refers to the identification of two separated vas deferens within the spermatic cord, and it should be distinguished from the term 'double vas', which describes an ectopic ureter draining into the ejaculatory system and is often associated with ipsilateral renal dysgenesis [3,6]. Liang et al [2] has suggested 3 types of classification systems for poly-vasa deferentia: type I is the classical duplicated vas deferens (partial or complete) where a second vas deferens is identified in the spermatic cord with no polyorchidism. Type II is multiple vas deferens associated with polyorchidism. Type III is false poly-vasa deferentia and represents the double vas deferens, where an ectopic ureter drains into the ejaculatory system. Intraoperative exploration and post-operative CT confirmed that there was no extra-testis and abnormal ureter draining system in our case. According to this classification, our case can be considered a type I duplicated vas deferens.

The embryologic etiology of duplication of the vas deferens has not yet been clearly established. However, the following two theories are the most supported: The first theory suggests that the duplication of the vas deferens may be due to duplication of the fetal mesonephric system [3,6]. According to this theory, the vas deferens develops from the central portion of the mesonephric (Wolffian) duct, which is termed the 'proximal vas precursor'. Duplication of the proximal vas precursor presumably gives rise to the duplication of the vas deferens. Another potential theory suggests that transverse division of the mesonephric duct during organogenesis causes the duplication of the vas deferens [8].

Duplication of the vas deferens has been identified within a wide range of ages from 7 months to 75 years [7,9]. Most of the cases have been incidentally found during orchiopexy, herniorrhaphy, vasectomy, varicocelectomy, and radical prostatectomy. It is unclear whether patient fertility is affected by duplication of the vas deferens. However, considering the wide age range, it is assumed that the condition does not affect the fertility of patients. It is known that duplicated vas deferens is associated with other congenital abnormalities such as ipsilateral renal agenesis and cystic fibrosis, but it is difficult to find reported cases complicated with other genitourinary malformations. Further discussion on possible genitourinary abnormalities that may accompany duplicated vas deferens is required, and consensus on intraoperative exploration and post-operative imaging should be established. Our case was also found incidentally during varicocelectomy, and the patient's preoperative semen analysis did not show severe abnormalities.

Diagnosis of duplication of the vas deferens is the identification of a second vas deferens. Unidentified duplication of the vas deferens during inguinal surgery can lead to a failure of procedures such as vasectomy or an injury to the vas deferens including scarring, obstruction, spermatic granulomas, or chronic pain. Because most duplicated vasa deferentia are found incidentally, especially during inguinal operations, intra-operative Doppler can be helpful in the differentiation of the vas deferens from other structures such as the spermatic arteries and veins [2]. Clinically, the possibility of a duplicated vas deferens at the level of the inguinal canal should be kept in mind in inguinal operations. Although there have been no reported cases of non-testicular genitourinary anomalies associated with duplicated vas deferens, postoperative renal and bladder imaging such as a CT scan can be considered to confirm other abnormalities in the genitourinary tract if a duplicated vas deferens is found during surgery.

In conclusion, duplication of the vas deferens is a rare finding, and it is likely under-reported and under-recognized. Failure to recognize this variation can lead to injury of the vas deferens during inguinal surgery and can also result in unexpected outcomes after vasectomy. Doppler sonography can be an important and useful tool to differentiate duplicated vasa deferentia from spermatic vessels. Postoperative imaging such as abdominal CT scans should be performed to determine the presence of any other genitourinary anomalies.

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