Double inferior vena cava and associated venous anomalies: a case report

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Abstract

Introduction: Double inferior vena cava and associated venous anomalies are rare. Materials and Methods: In the present case study, during routine cadaveric dissection of the retroperitoneal region, an interesting venous anomaly was seen in the retroperitoneal region of a 70 years old embalmed male cadaver from the department of Anatomy, Khon Kaen University, Thailand. Results: I describe here a case of double inferior vena cava (IVC) associated with double left suprarenal veins (LSRV) and double right testicular veins (RTV). Double IVC were connected with the transverse interiliac vein. While the upper LSRV is a tributary of IVC, the lower LSRV is a tributary of the left renal vein. Right testicular vein bifurcate at about the height of iliac cristae to form medial and lateral RTVs, which drain into right IVC at different heights. All these duplication and associated anomalies are assumed to occur during embryological development. Conclusion: These anomalies are rare, but the knowledge about the possibilities of such anomalies is of great importance during retroperitoneal surgeries, and interventional radiology.

Keywords: double inferior vena cava, double suprarenal veins, double right testicular veins, venous anomalies.

1 Introduction

Double inferior vena cava (IVC) is a congenital venous anomaly caused by an unusual embryological development of the inferior vena cava (MOORE, PERSAUD and TORCHIA, 2013), estimated to occur in 0.2-3% of the population (NG and NG, 2009). Most of double IVC are incidentally found during diagnostic intervention with computed tomography (CT) or magnetic resonance imaging (MRI) (KAPETANAKIS, PAPADOPOULOS, GALANI et al., 2010). Since the renal segment of the IVC has the same origin as the gonadal veins in embryogenesis (ITOH, MORIYAMA, TOKUNAGA et al., 2001), variations of the IVC are often accompanied with anomalies of the gonadal vein (TAKAGI, NOZAKA and OHSAWA, 1982). Double IVC has significant clinical implications, especially during retroperitoneal surgeries or in the treatment of thrombotic diseases (RADERMECKER, VAN DAMME, KERZMANN et al., 2008). Also, understanding of the variation of the LSRV is clinically important for the renal transplantation, laparoscopic adrenalectomy, and adrenal venous sampling. Laparoscopic adrenalectomy has become the technique of choice in adrenal surgery, of which principal complication is intraoperative hemorrhage (BONJER, SORM, BERENDS et al., 2000; SUZUKI, USHIYAMA, IHARA et al., 1999). Adrenal venous sampling has been used as the golden standard test for the differentiation between unilateral adrenal adenoma and bilateral adrenal cortical hyperplasia, both of which are the most common causes of primary hyperaldosteronism (STACK, ROSCH, COOK et al., 2001). Likewise, prediction of the presence of duplicate testicular veins is important to avoid diagnostic and therapeutic errors during radiological and surgical procedures, especially ligation of varicocoele, because, if unnoticed, it may cause recurrence of varicocoele (TUBBS, SALTER and OAKES, 2005). Double IVC with coexistence of double right testicular veins (RTV) and double LSRV is extremely rare, and awareness of such venous anomaly is necessary to reduce severe hemorrhage in retroperitoneal surgeries, and in interventional radiology (CHEN, EMURA, NAGASAKI et al., 2012).

The objective of this study is to present a case of a double IVC accompanied by a double LSRV and double RTV.

2 Case Report

This rare venous anomaly was found in a 70-year-old male Thai cadaver during routine cadaver dissection in the Department of Anatomy, Faculty of Medicine, Khon Kaen University, Thailand. To investigate the retroperitoneal visceral organs, the anterior abdominal organs were removed. The kidneys and the adrenal glands were dissected according to the standard technique. Double IVC were found together with double left suprarenal veins (LSRV) and double right testicular veins. While the upper LSRV was a tributary of IVC, the lower LSRV was that of the left renal vein (Figure 1). In this case, the IVC present normally on the right side of abdominal aorta, but another similar vein, which was identified as left IVC on the left side of aorta, is parallel to normal IVC. After joining with the left renal vein, the left IVC across the aorta and joined the right IVC. Then, the common IVC traverse the normal retrohepatic route before passing through the diaphragm into the right atrium in normal anatomical position. The right renal vein drained into the right IVC. The interiliac vein was situated ventral to the body of the fifth lumbar vertebra anastomosing the right and left IVC. The right testicular vein (RTV) was bifurcated at the height of the iliac crest, and the medial branch drained to the right IVC below the height of right kidney. The lateral branch also drained to the right IVC, but just below the point of drainage of the right renal vein.

Figure 1
There are several case recipients in the laparoscopic nephrectomy (KENNEALEY, 1928). During normal development, IVC is converted to a unilateral, right-sided system, consisting of four components: (1) the infra-renal segment from the right supracardinal vein, (2) the suprarenal segment from the right subcardinal vein during its development (NAYAK, 2015). In that case, other vascular anomalies were not found and two left SRVs drain into the left renal vein. About the anomalies of testicular veins, bifurcation of the right testicular veins is very rare. The right testicular vein develops from the lower part of the right subcardinal vein. The terminal bifurcation of the right testicular vein might be due to the bifurcation of the right subcardinal vein during its development (NAYAK, RAO, SHETTY et al., 2013).

4 Conclusion
To our best knowledge, this is the first record of the coexistence of double IVC, double left SRV, and double right testicular veins. Those anomalies have particular importance for the various interventions that take place during retroperitoneal surgeries, and is essential for venous interventional radiologists.
orthopedists to reduce the risk of serious hemorrhage during surgical treatment and to avoid operative complication.

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References


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