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DOUBLE INFERIOR VENA CAVA ACCOMPANIED BY OTHER VASCULAR ANOMALIES A CASE REPORT

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During anatomical dissection of a 70-year old male cadaver a double inferior vena cava (further DIVC) with other vascular anomalies was found. The aim of this study was to elucidate the anatomical nature of this congenital malformation, describe its development, correlate it with the preexisting studies of other authors and analyze its clinical significance.

METHODS

During routine topographic dissection course of an adult, 70-year old male cadaver in the Department of Anatomy in Pilsen, the right IVC was found to be standard; whereas the left sided IVC was double probably due to persistent infrarenal segment of supracardinal vein. Anomalous renal vessels and lumbar arteries were also found. Detailed dissection of the abdominal and pelvic areas was performed and photographically documented.

RESULTS

In the abdomen DIVC was found. Superior vena cava was standard, actual variability appeared below the level of renal hilum. There was a standard right sided inferior vena cava, whereas on the left side an anomalous larger vein was found, probably left sided inferior vena cava. From this level in range of L1–L5 a left IVC run parallel with the right IVC without any crossing (Fig. 1). Comparing both IVCs it appeared that the left one was larger, indicating that it was the dominant vein draining the lower part of body. The left renal vein was connecting both the veins together. A second, larger connection was found at the level of promontory behind the aortic bifurcation (Fig. 2). Below this level both IVCs continued into common iliac veins without any abnormality. Median sacral vein drained into the right sided inferior vena cava. Apart from this, in the right renal hilum, there were just two arteries, veins were standard. In the left renal hilum there were five arteries with four veins having abnormal position. More interesting was reduction and relocation of lumbar veins: instead of four pairs, there were four unpaired

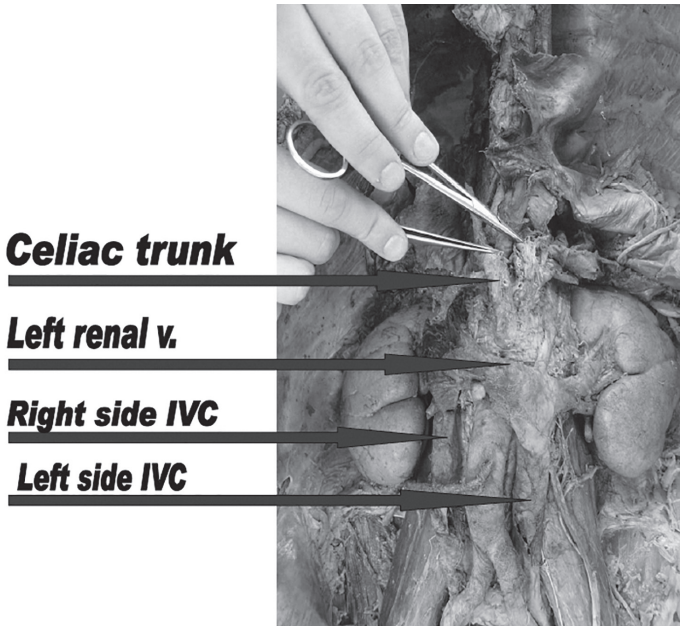

Fig. 1 Anomalous left side IVC connected by left renal vein into standard right side IVC

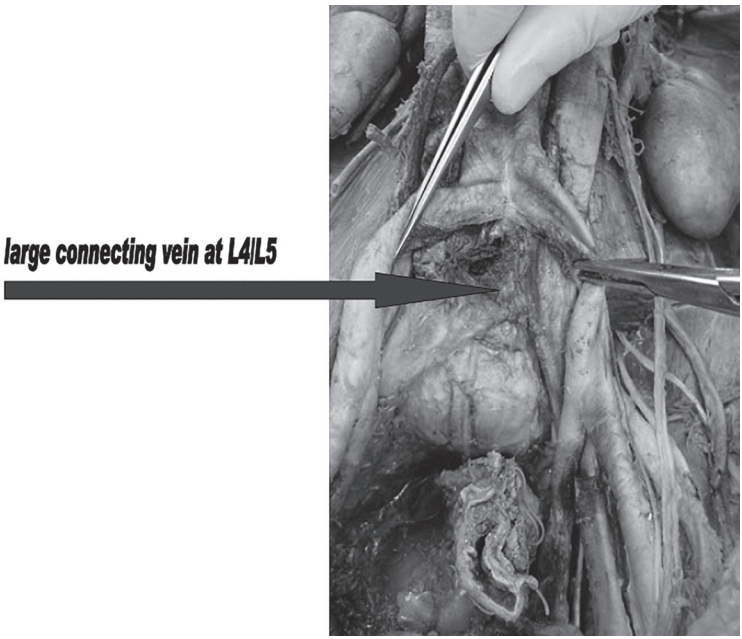

Fig. 2 Second site of connection of both sides IVC

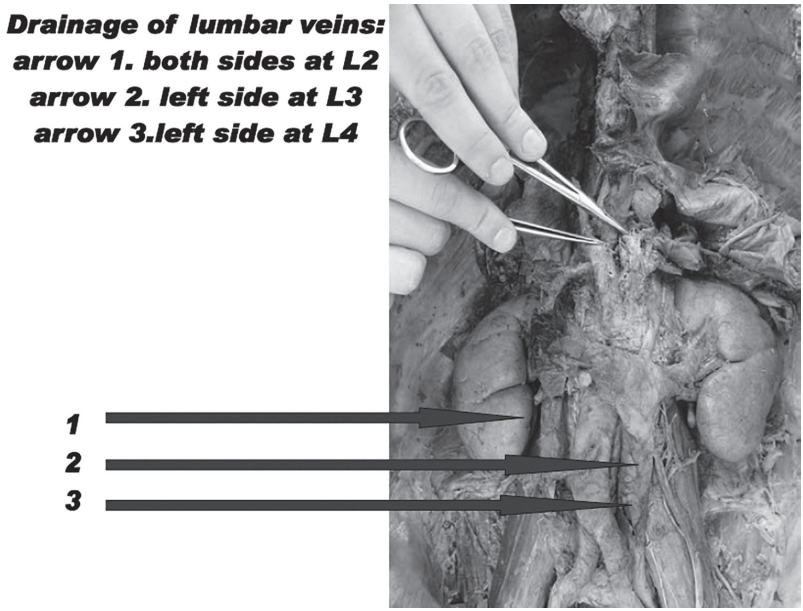

Fig. 3 Levels of drainage of lumbar veins

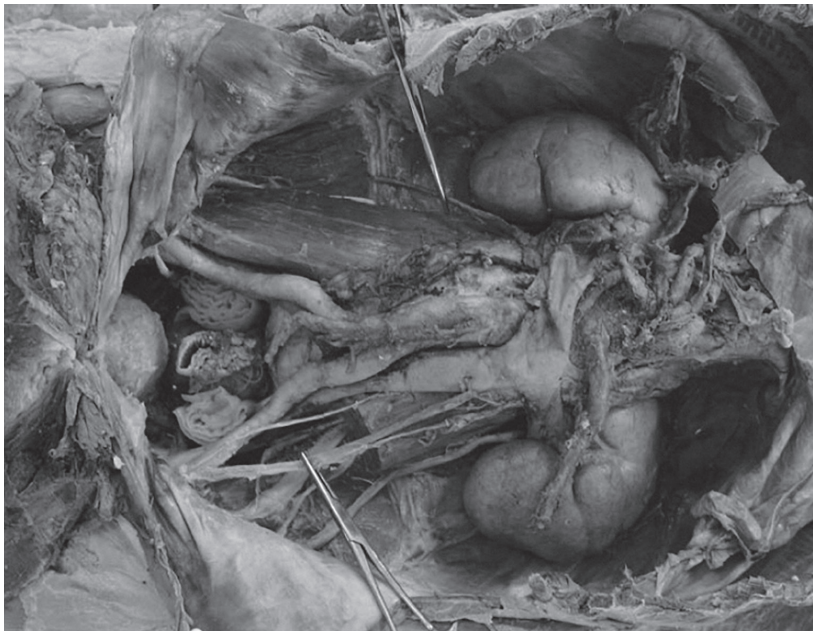

Fig. 4 Abdominal view showing the course of the testicular veins

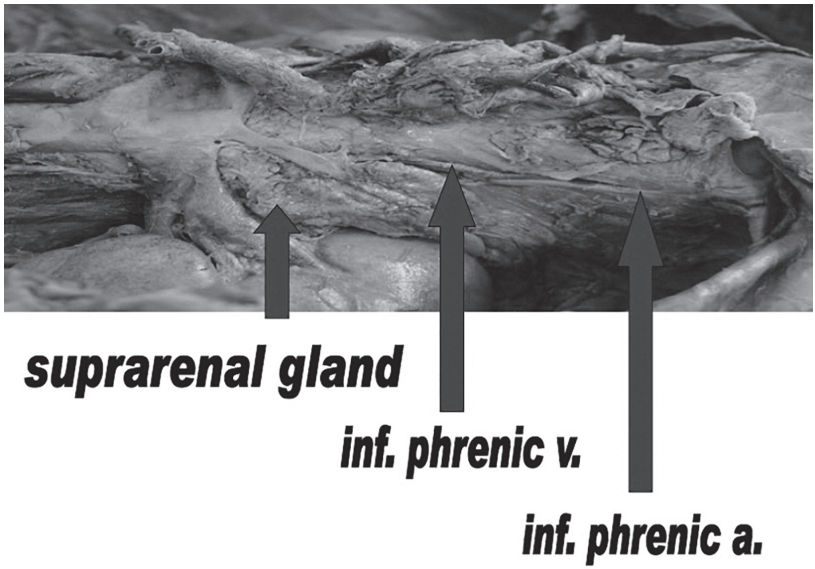

Fig. 5 Course of inferior phrenic artery and vein

veins out of which only one drained into the right IVC, confirming the dominant role of the left sided IVC (Fig. 3). Furthermore, we observed that both testicular veins drained on both sides into the IVCs (Fig. 4).The last anomaly was of arterial origin – the left inferior phrenic artery was joining the inferior phrenic vein at the level of celiac trunk, which is much lower than normal (Fig. 5).

DISCUSSION

Congenital anomalies of the IVC are quite a rare pathology, most of the cases being asymptomatic and diagnosed accidentally by CT of abdomen or preoperative angiography. (6) (Fig. 6, author: MUDr. K. Ohlídalová, Ph.D., Department of Radiology, University Hospital in Pilsen). Incidence of DIVC in population is about 0.2–3%, thus it belongs to the more common large venous anomalies. The basic reason for this malformation is a complex process of embryogenesis during the 6th–10th week of gestation. (1, 2) The IVC develops from persistent caudal part of posterior cardinal vein, supracardinal vein and subcardinal vein. The persistent left supracardinal vein, which normally disappears, forms the left sided IVC in this case. According to former researchers supernumerary renal veins, if present, are more common on the right side. (3, 4) Ready access to IVC has a high diagnostic and therapeutic value. (5, 7) Correct placement of a Greenfield filter in the left IVC requires recognition of this anomaly. (8) The works of previous authors have high-

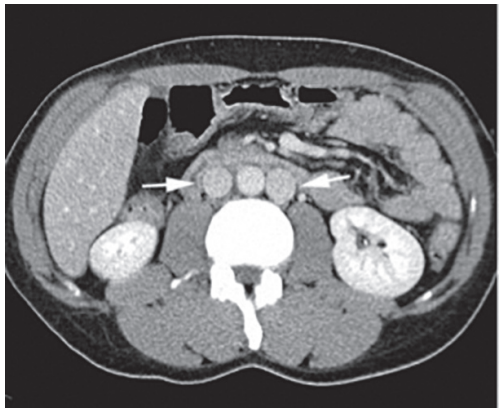

Fig. 6 Course of inferior phrenic artery and vein

lighted the incidence of duplication of IVC and their surgical implications. Here we present a unique case of double IVC with rare pelvic connection and anomalous pattern of renal vessels. Combination of such vascular malformations is of extreme surgical importance, especially in surgery of abdominal aortic aneurysm or graft harvesting for renal transplantation. Other described combinations with DIVC are associated anomalies of renal vessels, azygos and hemiazygos veins and horseshoe kidney.

CONCLUSSIONS

Most cases of double IVC are diagnosed accidentally by imaging methods for other medical reasons or at autopsy, however these variations can be of important clinical significance. Radiologically they can be mistaken for a pathological finding; they can complicate retroperitoneal surgery such as renal surgery of both resectional or transplant type, can be injured or ligated during surgery.

Therefore it is of high importance to have a complete and comprehensive knowledge of variations in the anatomy of the IVC so that they can be diagnosed pre-operatively to assist safe retroperitoneal surgical interventions.

SUMMARY

A case of a double inferior vena cava found at autopsy of a 70-year old male is described. The IVC anomaly was combined with further anomalies of the renal, lumbar and testicular vessels. The ontogenetic basis of these anomalies is discussed and the possible clinical implications are stressed.

SOUHRN

Vena cava inferior duplex – kazuistika

Při topografické pitvě těla 70letého muže byla nalezena zdvojená dolní dutá žíla doprovázená některými dalšími abnormalitami cévního systému. Bylo zjištěno, že obě duté žíly probíhají vpravo i vlevo podél páteře v rozsahu obratlů L1 až L5. Levá v. renalis sloužila jako spojka obou dutých žil. Další mohutnější spojka byla nalezena pod bifurkací aorty ve výši L5 a byl tak vytvořen venózní okruh. Vznik pelvické žilní spojky, která nebyla dosud v literatuře popsána, lze vysvětlit anomálií v prenatálním vývoji. Jde o neobvyklý nález, který je z hlediska lokalizace významný pro chirurgické výkony v této oblasti.

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