Study Of Anomalies Of Inferior Vena Cava In Human Cadavers During Routine Dissection.

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Abstracts: **Introduction:** Inferior vena cava also known as posterior vena cava is the large vein that carries de-oxygenated blood from the part of the body below the diaphragm into right atrium of the heart. Formation of the Inferior vena cava is a complex process resulting in numerous but rare anomalies. Knowledge of caval anomalies is very important to radiologists, surgeons and urologists who are dealing with abdominal cavity. During retroperitoneal surgery any inadvertent injury to these anomalous veins leads to significant haemorrhage. **Material and method:** In present study, 20 human cadavers were dissected during routine dissection during the year of 2011- 2012 in anatomy department at AMC MET Medical College, Ahmedabad. **Observation and discussion:** Anomalies of inferior vena cava were found in 2 male cadavers with ages range from 40-60 years. In both cadavers double inferior vena cava was present. **Conclusion**: The occurrence of this variation of inferior vena cava is about 0.2-3% in the population .Anomalies of IVC are rare and are consequences of its complex mode of development. The knowledge of anomalies of inferior vena cava is important in diagnostic and surgical approaches. In our study, in two cadavers out of 20, we found double inferior vena cava during routine dissection.[Shah M et al NJIRM 2014; 5(1) : 54-56]

Key Words: inferior vena cava, double, anomalies

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Introduction: The Inferior vena cava is formed by the union of right and left common iliac veins on right anterior surface of fifth lumbar vertebra and conveys venous blood to right atrium from all parts of the body below the diaphragm. [1]In the foetal life it conveys mixed blood; oxygenated blood being derived from the left umbilical vein via ductus venosus. After birth it carries deoxygenated blood only. After its formation, inferior vena cava ascends upwards on right side of bodies of lumbar vertebrae and on right Psoas major muscle to right of aorta. It enters the thorax through caval opening in central tendon of diaphragm. According to its course, inferior vena cava has hepatic, pre-renal, renal and post-renal segments. The abdominal part of inferior vena cava is 20cm in length. [2] The embryogenesis of inferior vena cava is a complicated process involving development, regression, anastomoses and replacement of three pairs of venous channels posterior cardinal, sub cardinal and supracardinal.[3] This complexity of development of inferior vena cava accounts for a number of diversity in its anomalies.[4] Among most common anomalies, incidence are: Double inferior vena cava in 1.03%, left sided inferior vena cava in 0.69% and azygos continuation in 0.08%. Knowledge of these anomalies is important in both diagnostic and operative purposes.[5]

The knowledge of anomalies of inferior vena cava is important in diagnostic and surgical approaches. During retroperitoneal surgery any inadvertent injury to these anomalous veins leads to significant haemorrhage. The surgeons, oncologists, radiologists, and urologists who have to perform retroperitoneal surgeries, should be aware of normal patterns as well as rare anomalies of vessels of this region. Preoperative identification of a congenital anomaly of IVC is critical for uneventful retroperitoneal surgery[6] Evaluation of malformation of inferior vena cava is essential in order to avoid major surgical complications during laparoscopic donor nephrectomy, ureteral obstruction and deep vein thrombosis. Malformations of inferior vena cava have been described as a possible risk factor for deep vein thrombosis in young adults[7]. The modern techniques like CT scan and MRI has helped the doctors to diagnose its variations.

Material and method: During routine dissection schedule, abdomen region of 20 cadavers were dissected in Anatomy department at AMC MET Medical College during the year 2011-12. As inferior vena cava is a retroperitoneal structure peritoneum is removed. Large intestine and loop of small intestine was also removed from the cavity. Retroperitoneal organs like kidneys, suprarenal

glands with associated vessels were kept in situ. Length and diameter of right and left vena cava were measured with cotton thread. Formation of inferior vena cava, course, its tributaries and presence of associated anomalies were examined.

Observation and discussion: In present study, 20 cadavers were dissected during routine dissection classes. In 18 cadavers, inferior vena cava was found on right side, formed by union of right and left common iliac veins on right anterior surface of fifth lumbar vertebra, 2.5 cm to the right of median plan with normal course. Its major tributaries like right gonadal vein, right and left renal veins and right suprarenal vein were opened into it directly. Abdominal part of inferior vena cava was 20 cm in length and 1.5 cm in diameter.

Anomalies of inferior vena cava were found in 2 male cadavers with ages range from 40-60 years. In both cadavers double inferior vena cava was present. (Figure -1 &2). Right sided inferior vena cava was normal in position with its normal course and tributaries. It was 20 cm in length and 0.8 cm in diameter. The left inferior vena cava began at site of origin of left common iliac vein .It was shorter in length- 10 cm and its diameter was 0.55 cm .It ascended upwards medial to Psoas major and opened into left renal vein. Before its opening into left renal vein it receives left testicular vein. Left renal vein crossed body of second lumbar vertebra and opened into right inferior vena cava (fig-1).

Fig-1 Right Inferior vena cava shown by white and left sided Inferior vena cava is shown by red arrow. (Double inferior vena cava)

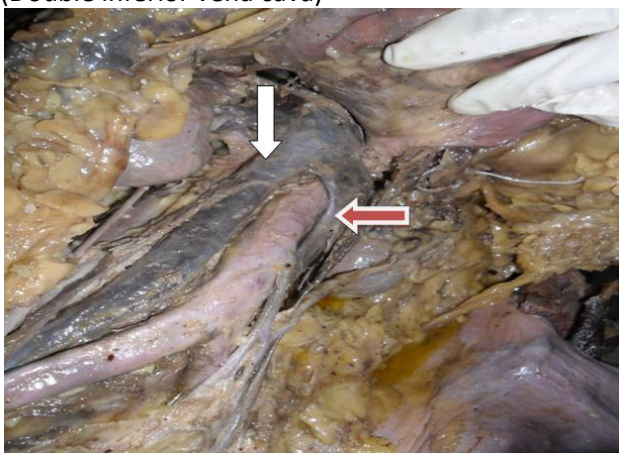
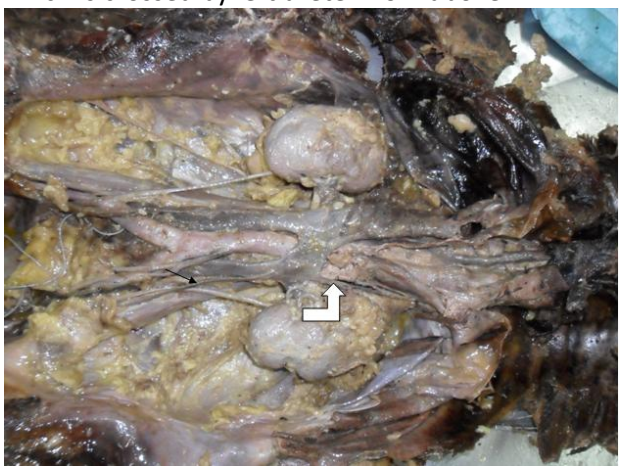


Fig-2 Black arrow shows left testicular vein and white arrow shows left supra- renal vein which opened into left renal vein. Red arrow shows left renal vein and Blue shows Psoas major muscle which is crossed by left ureter from above.



In other cadaver with double inferior vena cava , we found both vena cava were of equal length - 12cm and of equal diameter – 0.6 cm with widest left renal vein and left suprarenal vein was opened into left renal vein..This bilateral presence of inferior vena cava resulted from failure of regression of the left supracardinal vein. The occurrence of this variation of inferior vena cava is about 0.2-3% in the population [8].Such anomalies of inferior vena cava has been described by Rosse and Gaodum Rosse [9] Moore and persaud and Wang et al.[10] Wang, L.T. et al identified duplication of inferior vena cava causing ureteral obstruction. Simforoosh N. Et al [11] reported three cases of left inferior vena cava during laparoscopic donor nephrectomy.

Conclusion: Anomalies of IVC are rare and are consequences of its complex mode of development. Left and double IVC are among the most frequent anomalies. The occurrence of this variation of inferior vena cava is about 0.2-3% in the population.[12] In our study, we found that in one cadaveric dissection, there was double inferior vena cava as shown in Fig-1.In that case, we found that The left inferior vena cava was shorter in length- 10 cm and its diameter was 0.55 cm .It ascended upwards medial to Psoas major and opened into left renal vein. Before its opening into left renal vein it receives left testicular vein. Left renal vein crossed body of second lumbar

vertebra and opened into right inferior vena cava (fig-1). In other cadaver with double inferior vena cava , we found both vena cava were of equal length -12cm and of equal diameter – 0.6 cm with widest left renal vein. Left testicular vein was drained into the left inferior vena cava and left suprarenal vein was opened into left renal vein. Evaluation of malformation of inferior vena cava is essential in order to avoid major surgical complications during laparoscopic donor nephrectomy, ureteral obstruction and deep vein thrombosis.

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