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IMAGING FEATURES IN A CASE OF PARTIAL DUPLICATION OF RT SIDED IVC WITH URETER COURSING THROUGH ITS SPLIT

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ABSTRACT Development of Inferior Vena Cava is a fairly complex process involving appearance and subsequent disappearance of many embryonic veins. The IVC develops mainly from posterior cardinal vein, supracardinal vein, subcardinal vein and hepatocardiac channel. Various types of anomalous IVC have been described in literature the more common entities being a left IVC, duplicated IVC, preureteric IVC and absent IVC. A right sided double IVC (RDIVC) is an anomaly rarely described in literature. Furthermore many variants of a RDIVC have been described in literature. Our case of partial duplication with ureter crossing through its spilt has been only reported twice in literature. The importance of the entity lies in identifying it, to offer surgery in case it's causing obstruction as was seen in our case or to be aware of it before any abdominal operations or procedures like IVC filter placement.

KEYWORDS : Inferior Vena Cava, Right Double IVC, Partial duplication, Retrocaval ureter

INTRODUCTION

The embryological development of Inferior vena cava (IVC) is a fairly complex process. Although finer differences are seen in the literature, more or less it is known to develop from various longitudinal venous channels namely the posterior subcardinal veins, subcardinal veins and supracardinal veins [1,2]. The hepatocardiac channel also contributes in the formation of the hepatic segment of the IVC. The IVC has four segments the rest three of it being the infra-renal, the renal and the supra-renal segments. The common defects which have been described are namely a left IVC, double IVC, absent IVC, azygous continuation of IVC and pre-ureteric IVC (more commonly known as retrocaval ureter) [2]. Our case wherein the ureter was seen to cross through a partial spilt of IVC has only been described twice in literature as per our knowledge.

CASE REPORT

A 25 year old male presented to the Radiology Department with complains of low backache for Ultrasound of Abdomen. He was found to have hydronephrosis with proximal hydro ureter however no calculi were identified. The patient was then taken up for IVU which confirmed the findings of proximal hydroureteronephrosis with medial deviation of ureter giving a likely diagnosis of retrocaval ureter. The patient was subsequently taken up for a CT Urography which was performed on a 16 slice MDCT scanner. The CT images confirmed the findings of hydronephrosis and hydroureter, however instead of a retrocaval ureter, the ureter was seen to course through a partial split of IVC in its infra-renal portion. The ureter proximal to this course was dilated and the part distal followed a medial course then usual with a normal caliber. The IVC distal and proximal to split and bilateral iliac veins were normal. In the region of split the IVC was divided into a larger ventrolateral vessel and a smaller dorsomedial vessel. The findings were confirmed on MRI. The patient was offered surgery to release the compression, however he refused the same.

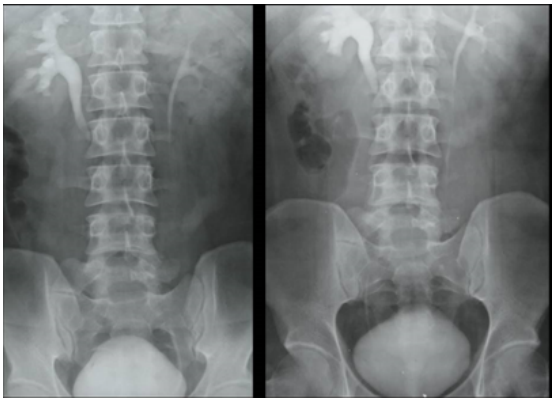

Fig 1: IVU showing Right hydroureteronephrosis

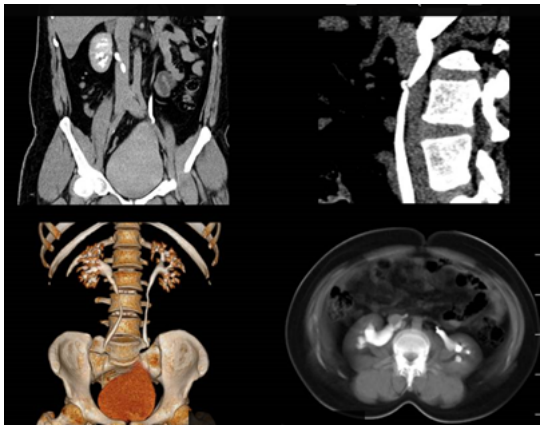

Fig 2:CT showing course of Right Ureter through a split in the IVC

DISCUSSION

IVC is known to develop in a very complex manner with the process involving appearance and subsequent disappearance of various embryological venous channels. This probably explains the fact that deviations from a normal pattern are not that uncommonly seen. The IVC is derived from part of right posterior cardinal vein, the right supracardinal vein, the right subcardinal vein and the anastomosis between supracardinal-subcardinal vessels and the subcardinal-hepatocardiac channels. The literature commonly describes the anomalous IVC in the form of a double IVC, left IVC and pre-ureteric IVC [2]. A double IVC has been described in two forms, one with a vessel on each side and the other with two vessels on right side. Our case falls into the later variety [2]. The one with two vessels on right side has also been called as Right Double IVC (RDIVC). Literature has described very few cases of RDIVC.

A total of seven cases of RDIVC were described in a review article by Nagashima et al [3]. They had described few characteristic observations in these cases namely the ventral –dorsal relationship of two vessels and unusual course of left common iliac vein.

Based on these observations, they came up with the theory that the ventral right IVC was derived from the subcardinal vein and the dorsal IVC from the supracardinal vein. Their observation and theory was also based on the fact that retrocaval ureter was not observed in any of the seven cases they reviewed or reported [3].

However, cases similar to our patient has been described previously by Shin et al and Gong et al [4,5]. Shing described two cases of RDIVC with second case similar to ours. They also observed that two vessels were having lateral-medial relationship rather than ventral-dorsal as described by Nagasaki. They came up with an alternate theory of

possible embryological deviation wherein they speculated the lateral vessel originating from posterior cardinal vein and the medial vessel originating from the supracardinal vein. They also reported association of retrocaval ureter in their first case. Gong et al described almost a similar case of partial split too with an associated retrocaval ureter with proximal hydroureteronephrosis.

Our case offered some unique characteristics with the relationship of two vessels more of ventral and dorsal in cranial cuts and becoming medial-lateral caudally. Also the ureter coursed posterior to the ventrolateral vessel with a characteristic appearance of retrocaval ureter on IVU. There was hydrouretronephrosis as described by Gong et al. In contrast to other cases described in literature, our case did not have any other anomalous findings in form of abnormal communication between iliac veins or anomalous course of these veins.

The complex developmental process probably accounts for varied presentation of a similar appearing anomaly with a likely possibility of multiple embryological explanations.

The clinical importance of identifying the anomaly lies in the fact that it may cause obstruction as was seen in our case. Also, in a likelihood of placement of IVC filter such anomalies may preclude desirable results. Being aware of the aberration before a major abdominal surgery is also warranted for better planning and execution.

CONCLUSION

Partial duplication of IVC with ureter coursing through a split causing obstruction is an extremely rare entity, resulting due to complex embryological aberrations. However identification of the same is essential for avoiding misinterpretation and avoiding complication during abdominal operations. Effective clinical management in the form of surgery can be provided if associated with obstruction.

REFERENCES

1. Thomas W Sadler. Langman's Medical Embryology. 13th edition. Lippincott Williams and Wilkins, 2014.
2. Inderbir Singh. Human Embryology. 10th edition. Jaypee. 2017.
3. Nagashima T, Lee J, Andoh K, et al. Right double inferior vena cava: report of 5 cases and literature review. J Comput Assist Tomogr 2006;30-642-5.
4. Mack Shin, Jong Lee, Sung Bin Park, et al. Right double inferior vena cava associated with retrocaval ureter; computed tomography in two cases. Clinical Imaging 2014;38-353-356.
5. Jingshan Gong, Hongtao Jiang, Te Liu, et al. Imaging of partial double vena cava with ureter passing through its split, confirmed at surgery. Clinical Imaging 2011;35- 148-150.