

The vital step in successful laparoscopic adrenalectomy: Identifying the adrenal vein

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Introduction

Laparoscopic adrenalectomy (LA) is the procedure of choice for most of the small and medium-sized adrenal tumours [1]. During this procedure paying attention to the haemostasis is of paramount importance for technical success, as the adrenal gland is a highly vascular endocrine organ. To achieve this, the most important initial step is to have a good understanding of the anatomy especially the blood supply of the gland. Usually, each adrenal gland is drained via a single central vein and, the right vein drains into the inferior vena cava (IVC) and the left vein, after joining the inferior phrenic vein drains into the left renal vein. But there are anatomical variants which are very significant in technical point of view for the surgeon.

Case presentation

A 37-year-old male who presented with left loin discomfort found to have left-sided non-secreting 73mm x 63mm adrenal mass with atypical phenotype in the contrast-enhanced CT scan. It showed a density of 24H. During LA, we encountered a renal vein abutting the adrenal mass and with lateral displacement of the adrenal vein. The patient underwent the procedure with less than 100 ml of blood loss. He was discharged on the 2nd postoperative day without any complications. The histology revealed a Schwannoma which is confirmed by immunohistochemistry.

Surgical Technique

The surgery was performed under general anaesthesia with the right semi-decubitus position with 4 port entry (Figure 1). The proximal left colon and the splenic flexure were mobilized downwards and medially. Then, the splenorenal ligament was divided and the spleen and the pancreas were mobilized medially to expose the left adrenal area. Identification of the pancreas and the splenic vein lying on the posterior wall of the pancreas is the first step in a medial mobilization of the spleen and the pancreas. During inferior

mobilization of the mass, it was noted that the left renal vein abutted the mass and the left adrenal vein was joining the left renal vein laterally, more towards the renal hilum (Figure 2). The main clue to suspect the renal vein at the lower border of the mass was the slight oscillations of the renal vein. The left adrenal vein was clipped with Haemolock clip and the renal vein was carefully separated from the mass with mono-polar diathermy hook.



Figure 1. Right semi-decubitus position with 4 port entry

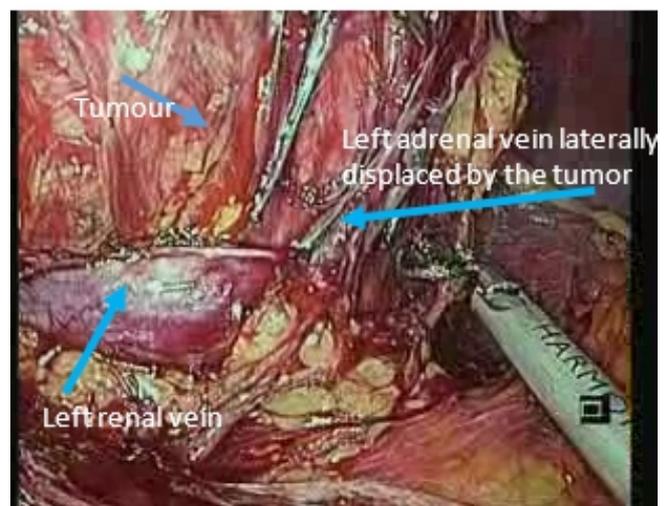


Figure 2. Identification of adrenal vein

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Discussion

Maintenance of haemostasis during laparoscopic adrenalectomy is important. To achieve this the bottom-line is the identification of adrenal veins which may show various anatomical variations. Failing to identify the vein increases the risk of bleeding leading to conversion to open surgery.

During embryogenesis, adrenal veins form during the development of the prerenal inferior vena cava (IVC). They are the remnants of the lower portion of the subcardinal veins, superior to the subcardinal sinus. There are many communications between the posterior cardinal, supra-cardinal, and subcardinal veins of the primitive venous system. Understanding these multiple communications helps to explain the most likely cause for the anatomical variants identified during later in the life.

Variability of adrenal vein anatomy has been described as 13% during laparoscopic adrenalectomies [4]. Anomalies of left adrenal vein comprises of draining directly to the renal vein without receiving the inferior phrenic vein; bifid adrenal vein; formation of two left adrenal veins; connecting to one of the duplicated gonadal veins; and direct drainage to the IVC [2]. Drainage of the left adrenal vein in to the left renal vein lateral to the adrenal gland has not been described. Knowledge regards to these variants are vital for surgeons who perform adrenalectomies as well as interventional radiologists doing adrenal vein sampling for diagnosis of primary hyperaldosteronism.

Firstly, if we had not identified the left renal vein it would have caused a torrential bleed resulting in conversion to open procedure, which is not the gold standard for tumors less than 12 cm in size [5]. Inferior mobilization of the left adrenal gland is advised in operative anatomy literature for early clipping of the left adrenal vein [5]. On the other hand, it would be a catastrophe to have a hole in the left renal vein because it warrants the control from either side of the bleed as there are no valves in renal veins. In our patient, the adrenal vein was medial and inferior to the left adrenal gland. Therefore, this might not be a true anomaly but rather displacement of the vein by the large tumor.

Various drainage patterns of adrenal–renal vein complex has been described in cadaveric studies and during adrenalectomies [2]. The commonest anatomical variant detected has been two adrenal veins draining from each gland when compared to a one central vein [4]. Other variants described were right adrenal vein draining into the hepatic vein or to the right inferior phrenic vein and the variants of the left adrenal vein were it drains in to the left renal vein without connecting to the left inferior phrenic vein, bifid adrenal vein and adrenal vein directly draining to the IVC [2,4]. It was noted that these anatomical variants were more commonly detected on the right side (4). Surgeons must be aware of the anomalies and displacements to achieve an optimal surgical outcome with minimal complications.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

References

1. Gagner M, Lacroix A, Bolte E. Laparoscopic adrenalectomy in cushing's syndrome and pheochromocytoma. *N Engl J Med.*1992;327 (14):1033. [pubmed:1387700]
2. Kaitlin M. F, Sara S. Juan CPL. Anomalous adrenal vein anatomy complicating the evaluation of primary hyperaldosteronism. *Radiol Case Rep.*2018 Feb;13(1):139-141. doi.org/10.1016/j.radcr.2017.09.010
3. Cesmebasi A, Du PlessisM, Lannatuono M, Shah S, Tubbs RS, Loukas M.A review of the anatomy and clinical significance of adrenal veins. *Clin Anat.*2014 Nov;27 (8):1253- 63. doi.org/10.1002/ca.22374.Epub 2014 Apr 15.
4. Scholten A,Cisco RM, Vriens MR, Shen WT, Duh QY.Variant adrenal venous anatomy in 546 laparoscopic adrenalectomies. *JAMA Surg.* 2013 Apr;148 (4):378-83. doi.org/10.1001/jamasurg.2013.610.
5. Matthew J Mellon, Amanjot Sethi, Chandru P Sundaram . Laparoscopic adrenalectomy: Surgical techniques. *Indian J Urol.* 2008Oct-Dec;24(4):583-589. doi.org/10.4103/0970-1591.44277.

Learning Points:

- Meticulous attention to positioning the patient and placement of the ports will assist in better delineation of the surgical anatomy during adrenalectomy.
- Initial identification of the adrenal vein with its anatomical variations is crucial for performing a safe laparoscopic adrenalectomy.