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Case report

Rare case of left adrenal cortical carcinoma with level 3 inferior vena cava thrombus via adrenal vein



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KEYWORDS

Left adrenocortical carcinoma;
Supra diaphragmatic IVC thrombus

Abstract

Introduction: Adrenocortical carcinoma (ACC) is a rare malignancy with an incidence of 0.7–2.0 cases/million inhabitants/year. It shows a bimodal pattern of age distribution with a higher incidence in the first decade and then between 40 and 50 years. Women are most frequently affected (55–60%).

Observation: A 21-year-old male, incidentally detected with left supra renal tumor invading the left renal vein and the thrombus extending into the supra diaphragmatic IVC, underwent laparotomy with simultaneous median sternotomy on total cardiac bypass for removal of IVC tumor thrombus and radical excision of the tumour with left nephrectomy and splenectomy. The histopathology report came to be adrenal cortical carcinoma with no renal parenchymal invasion and the immuno-histochemistry showing it to be positive for synaptophysin, inhibin and KI-67 (15%) while negative for chromogranin, pan cytokeratin and CD-10 receptors. Patient then received 3 weekly 6 cycles of adriamycin and cisplatin chemotherapy. Bone scan and CECT abdomen and thorax done in the follow up after two years were normal. There are not many cases of adrenal carcinoma reported in the literature, but it has been seen that it rarely shows venous thrombosis in the IVC. In all the reported cases radical surgery is the preferred treatment option, even in the tumors extending to the right atrium. The unique feature in our case is that the tumor has extended to the supra diaphragmatic IVC via the left adrenal vein, without the renal parenchyma involvement.

Conclusion: The intravascular extension of the adrenal carcinoma is rare but its presence alone is not a contraindication to radical surgery, as it is the best hope for prolonged survival.

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Introduction

Adrenal cortical carcinoma is a rare disease with an annual incidence of 0.7–2.0 cases/million. It shows bimodal pattern of age distribution

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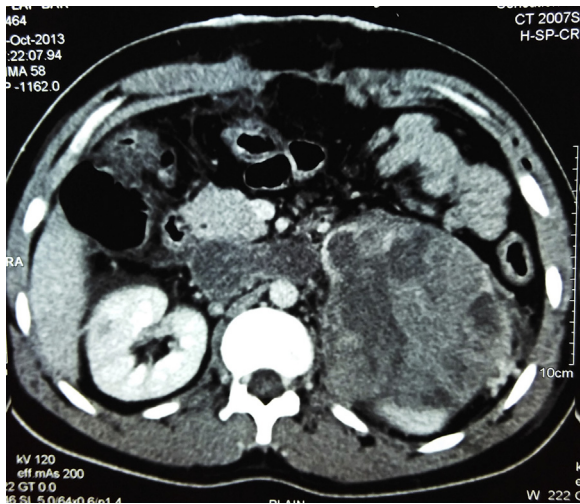


Figure 1 CECT image axial view of left adrenal tumor with renal vein and IVC thrombus.

with peak incidence in first and the fifth decade of life and is more common in females (55–60%) [1]. Approximately 40–60% cases presents with symptoms of steroid hormone excess, most commonly being cortisol, 30% cases presents with symptoms related to abdominal mass effects and 15–20% cases are incidentally diagnosed [2]. It is an aggressive tumor with early metastasis and approximately 80% cases present with disseminated disease and metastasis in: lung (71%), lymph nodes (68%), liver (42%) and bone (26%) [3]. Venous tumor thrombosis to IVC or atrium is rare and is considered as a tumor extension instead of metastatic disease, but with a poor prognostic outcome. Involvement of vena cava can occur through direct extension or more often by intraluminal extension from renal or adrenal vein. In such cases, radical surgery with removal of the tumor and the thrombus may give better treatment outcome [4].

Case report

A 21 year old male presented with right flank pain and low grade fever was incidentally detected with left supra renal tumor with gall stones on ultrasonogram. There was no history of any urinary complaints and no significant family history. On examination, the patient was stable with no palpable abdominal lump. On further evaluation by contrast enhanced CT, 11.3 × 11.0 cm heterogeneously enhancing mass lesion, with necrotic component within it, in relation to the upper pole of left kidney was detected with level 3 tumor thrombus invading into the left renal vein and extending into the IVC excluding just 2.5 cm of the extra cardiac IVC (Figs. 1 and 2). No bony lesions were seen. Two small lung nodules suspicious of metastasis were also seen but confirmation by either biopsy or PET scan was not possible due to the small size. Urinary metanephrines, vanillyl-mandelic acid and other serum adrenal hormone profile levels were within normal limits. The routine blood investigations were within normal limits. The patient was then taken up for laparotomy with simultaneous median sternotomy in collaboration with cardio thoracic surgeon. Trans esophageal echocardiography showed tumor extension into the supradiaphragmatic IVC just peeping into the right atrium. With total circulatory arrest, IVC was snugged at its junction with right atrium and then opened longitudinally in the abdomen for tumor thrombectomy. The total hypothermia time (20°C) was 44 min. The left nephrectomy with en bloc splenectomy,

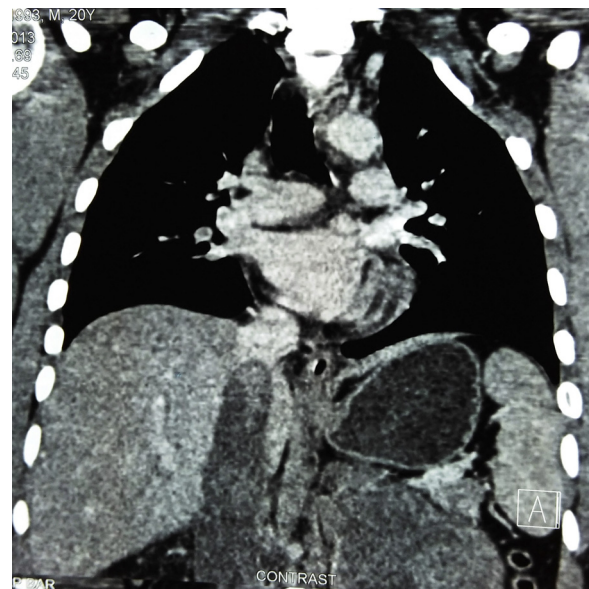


Figure 2 CECT image coronal view of level 3 IVC thrombus.



Figure 3 Gross cut section of specimen showing un-involved renal parenchyma and the tumor thrombus extending from adrenal vein to the renal vein.

due to adhesions and infiltration, was done. The total operative time was about 8 h and the estimated blood loss was one litre. Patient was managed in the ICU for two days. He received two units of blood transfusion for the blood loss. He developed minimal surgical site infection and chest infection which was managed by antibiotics; otherwise he recovered well and was discharged on the post operative day seven. The histopathology report came to be adrenal cortical carcinoma with no renal parenchymal or surrounding tissue invasion and identical tumor tissue in the renal vein and IVC thrombus (Fig. 3). Single hilar lymph node isolated was free of tumor. Immuno-histochemistry showed it to be positive for synaptophysin, inhibin and Ki-67 (15%) while negative for chromogranin,

pan cytokeratin and CD-10 receptors. The tumor was classified as European Network for the Study of Adrenal Tumours (ENSAT) stage III due to the presence of venous tumor thrombus with poor prognosis due to Ki-67 being >10%. Patient then received 3 weekly 6 cycles of adriamycin and cisplatin chemotherapy. CECT abdomen and thorax was done in the follow up period of two years and was found to be normal with the resolution of the lung nodules as well. We followed the follow up protocol of CECT abdomen and chest every 3 months for 2 years and thereafter 6 monthly for 5 years.

Discussion

Adrenal cortical carcinoma is a rare disease and the venous tumor thrombus to IVC or atrium is even rarer. Nakanoma et al. reported a similar case of left adrenal tumor with intracaval extension managed by radical surgery involving resection of tumor, left kidney, spleen and IVC tumor thrombus. They reported it as being the 8th case report in the literature [5]. Osman et al. in their study of 206 patients, who underwent adrenal surgery, concluded that venous thrombosis with adrenal tumors is a rare pathological condition in which open surgery is the standard of care. Also they reported that these patients of primary adrenal malignancy with venous thrombosis have a poor prognostic outcome [6].

In the literature, it is suggested that complete tumor resection is the only curative approach to adrenal cortical carcinoma with adjuvant therapies aiming to decrease the risk of recurrence only. Thus, an aggressive surgical approach is the treatment of choice even in cases with tumor thrombus reaching the right atrium. For patients who are unfit for surgery or who refuse radical surgery, chemotherapy can be tried. Mitotane is the most effective and frequently used chemotherapeutic agent in metastatic adrenal carcinoma and in combination with cisplatin, doxorubicin and etoposide, it has produced a clinical response rate of about 50% even in advanced cases. But it is also known for its toxicity involving the nervous system (ataxia, amnesia, confusion) and gastro-intestinal system (nausea, diarrhea, vomiting). Hence, in patients who do not tolerate or afford mitotane, other chemotherapeutic agents such as cyclophosphamide, doxorubicin and cisplatin can be tried. The role of radiotherapy is not well defined and is limited to bone metastases only in which it is the treatment of choice.

Due to the aggressive nature of the tumor and quick development of metastasis, early diagnosis gives the best chance of resection and hence the greatest chances of survival. There are many newer investigations to provide an early diagnosis. Urinary steroid profiling (USP), which uses gas chromatography/mass spectrometry to detect small amount of steroid precursors in apparently non functional tumors, is under review in the SERENDIPITY-trial for its cost effectiveness in the work-up of adrenal tumors. Measurement of circulating tumor cells in the blood stream may be a valuable early marker for detection of malignancy and for disease progression or treatment monitoring. The *11C*-metomidate (*MTO*) “*11C* MTO-PET” scan using tracer ‘mitomidate’ that specifically bind to adrenocortical CYP11B enzymes can be useful to prove adrenocortical origin.

Prognosis of adrenal carcinoma is poor and the five years survival rate decreases further with higher ENSAT (European Network for

the Study of Adrenal Tumors) stage (Stage 1: 66–82%, Stage 2: 58–64%, Stage 3: 24–50%, Stage 4: 0–17%), incomplete microscopic resection (R1: 20% overall survival) or macroscopic resection (R2: 15% overall survival) of the tumor and the proliferation index (Ki67 >10% and mitotic count >20 mitosis/50 HPF) [7].

Conclusion

ACC is a rare and malignant tumor with unclear pathogenesis and a poor prognosis. Vascular tumor thrombus to IVC and atrium is further rare and more common on the right side due to proximity to the vessel. Surgery is the treatment of choice even in the presence of extensive tumor thrombus—thus early diagnosis gives the best chance of resection, and the greatest chances of survival. Mitotane has been the backbone of medical therapy but newer targeted therapy has to be developed to decrease reliance on this old and toxic drug.

Consent

Written consent was taken from the patient to undergo surgical procedure and oral consent was given by the patient for this case report.

Author's contribution

Dr. R.K. Gopala Krishna and Dr. S. Basu managed the case including carrying out the surgery. Dr. K. Jain did the typesetting for the work.

Conflict of interest

On behalf of all the authors the corresponding author states that there is no conflict of interests.

Source of funding

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