



## Intraoperative Cardiogenic Shock Caused by Intracardiac Tumor Thrombi Obstruction

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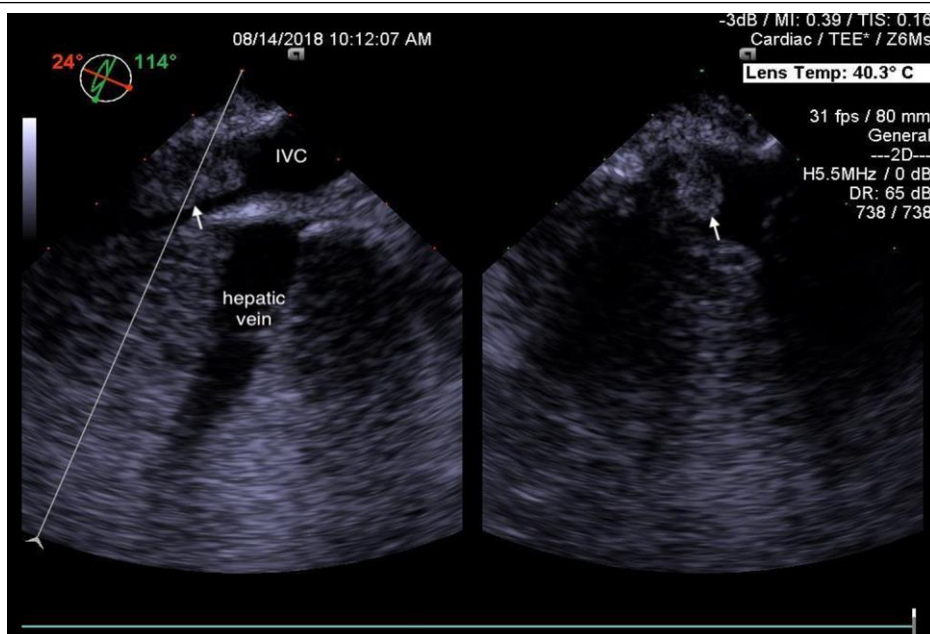
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### Keywords

Cardiogenic Shock; Tumor Thrombus; Inferior Vena Cava; Renal Cell Carcinoma

A 60-year-old man presented with left flank pain, a palpable abdominal mass, and hematuria for months. Computed tomography revealed a large

tumor in the left kidney (approximately 17.7 cm in diameter) with evidence of left adrenal, left renal vein, and inferior vena cava (IVC) invasion. He underwent



**Fig-1:**

Tumor (arrow) extends into inferior vena cava. IVC, inferior vena cava.

## Clinical Image

left nephrectomy with IVC thrombectomy. Transesophageal echocardiography (TEE) was used during the whole procedure and the tumor was found in the IVC (**Fig-1**) before resection.

After resection of the main tumor, pulseless electrical activity (PEA) following the sudden onset of hypotension was noticed during the snaring of the IVC. Cardiopulmonary resuscitation was performed and emergent cardiopulmonary bypass (CPB) was established. Newly discovered thrombi appeared in the right atrium (**Fig-2**), right ventricle, main pulmonary artery, and descending aorta; consequently, these were resected to remove the thrombi.

Weaning from CPB was difficult, with poor left ventricle wall motion noted on TEE. Since the left coronary artery was not seen, coronary obstruction by tumor thrombi was suspected. Therefore, coronary artery bypass graft operation was performed from the ascending aorta to the left anterior descending artery using a harvested autologous saphenous vein.

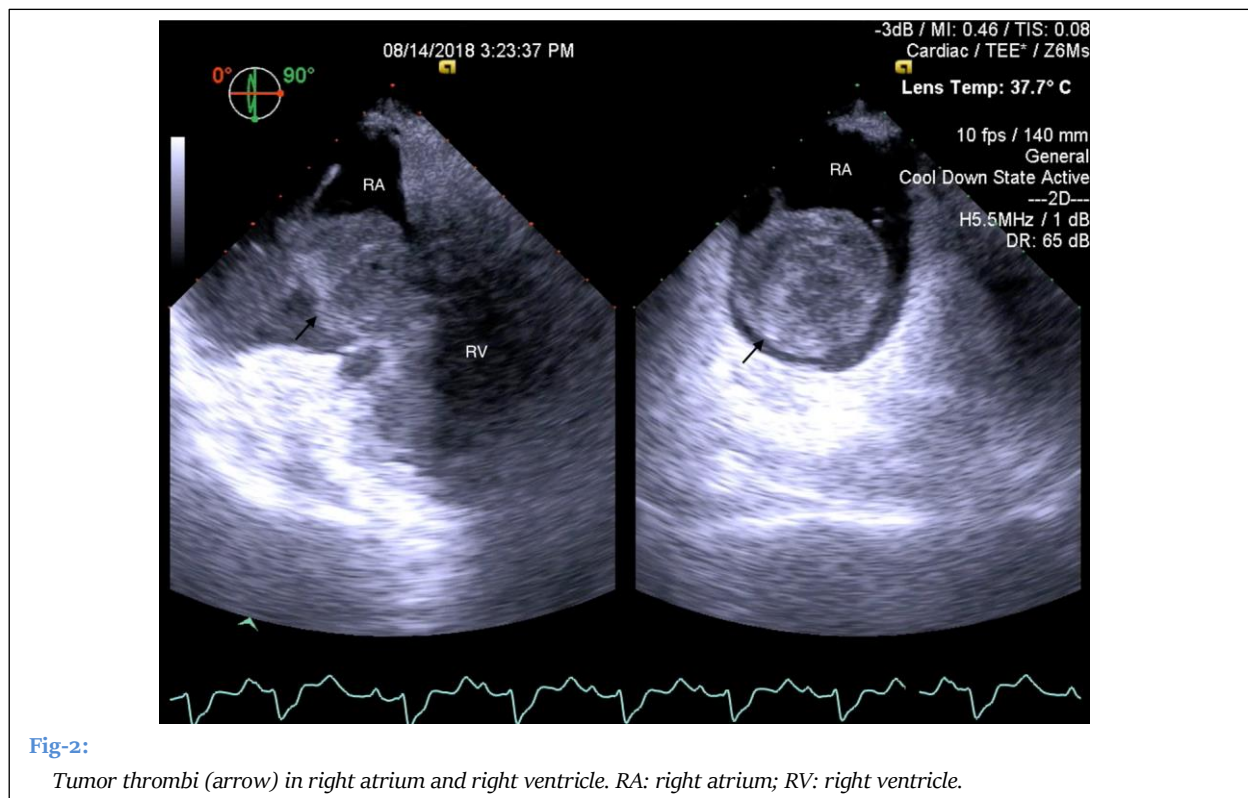
After the operation, the patient was transferred to the intensive care unit on extracorporeal membrane

oxygenation (ECMO) support. Unfortunately, he died six days later because of cardiac failure complicated by multiple organ failure. The final pathological examination revealed renal cell carcinoma with tumor thrombus formation and venous migration.

Renal cell carcinoma (RCC) is characterized by its association with hypercoagulability, venous migration, and tumor thrombus formation [1,2]. Intraoperative TEE allows for monitoring cardiac function, determining thrombus extension, and guiding the level for cross-clamping IVC [3]. For complete removal of advanced tumor thrombi, TEE guidance was indispensable in our patient. For RCC with advanced IVC invasion, a temporary IVC filter may be considered to prevent dangerous tumor thrombus migration [4].

## Declaration

This manuscript has not been published elsewhere and is not under consideration by another journal. There are neither conflicts of interest nor funding to declare. Since informed consent from the patient was not possible to get, an IRB approval (18MMHIS213e) for medical publication was received instead.



## Clinical Image

### Acknowledgment

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### References

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