

Anesthetic and Hemodynamic Management During Surgical Removal of Tumor Thrombus and Veno-Veno Bypass in a Patient with Complex Comorbidities

Flopateer Shenouda, Noa Rose MD, Stephanie Cardona MD, David Wlody MD • SUNY Downstate

Abstract & Introduction

Background

Renal cell carcinoma (RCC) accounts for **>90% of primary renal malignancies**

Clear cell RCC represents **~70% of cases**

Originates from **proximal convoluted tubule**

Venous invasion is a known complication:

Up to **10%** extend into the **inferior vena cava (IVC)** via the renal vein

Clinical Significance

IVC tumor thrombus causes:

Venous obstruction, Hemodynamic instability, High hemorrhage risk

Surgical resection is the primary treatment

Anesthetic complexity increases markedly with:

Large-vessel surgery, Need for **anticoagulation**, Potential for **massive blood loss**

Case Overview

71-year-old male w/ History of Right nephrectomy, ESRD, CAD

Underwent **IVC tumor thrombus resection** with **Veno-Veno bypass**

Managed with:

Invasive arterial and central venous monitoring

Careful anticoagulation to maintain graft patency

Aggressive blood loss management

Significant of This Case:

To illustrate the importance of:

Individualized anesthetic planning

Balancing hemorrhage vs. thrombosis

Real-time invasive hemodynamic monitoring

Highlights anesthetic strategies in **complex RCC with IVC involvement**

Case Presentation

Patient Profile

71 y/o male with **Left RCC** with **tumor thrombus** extending into the **IVC**

Prior **right nephrectomy** (>20 years prior) → **Solitary Kidney**

Presenting symptom: **Right foot edema** due to **IVC compression**

Major Comorbidities

End-stage renal disease (ESRD), Hypertension, Coronary artery disease (CAD) s/p **PCI to LAD, T2DM.**

Labs: Creatinine: **4.1 mg/dL**. BUN: **38 mg/dL**. Hgb **9.7 g/dL**.

Prior **ischemic stroke** with mild right-sided weakness

Suspected **platelet dysfunction** due to ESRD (normal platelet count)

ASA Physical Status IV

Pre-operative planning and Induction

General Anesthesia: Propofol, Fentanyl, Lidocaine

Airway: Direct laryngoscopy provided grade 1 view of glottis

Invasive lines: Right radial artery, left subclavian central venous line

Intraoperative Course

Venous bypass into the Right IJV to maintain venous return

IV **heparin** administered to prevent coagulation in the newly placed graft

Partial reversal with **Protamine** was done to balance thrombosis vs

Hemorrhage risk

Despite bypass, venous return and SVR were still reduced → Hypotension

Norepinephrine given to increase blood pressure and maintain perfusion

Titration guided by arterial line and CVP

Postoperative Course

Patient remained hypotensive, transported to surgical ICU on vasopressor

Urine production indicated residual renal function

Additional units of blood ordered

Discussion & Conclusion

Surgical Strategy & Prognostic Considerations

Standard RCC with IVC thrombus → **Radical nephrectomy + IVC thrombectomy**

Nephrectomy deferred in this case due to:

Prior **right nephrectomy** would render patient **anephric**

IVC tumor thrombus independently associated with **poorer prognosis**

Veno-venous bypass used to enable safe thrombus removal

Preserve **venous return and hemodynamic stability**

Goal: Remove IVC tumor thrombus while preserving solitary renal function

Impact of Comorbidities

ESRD: Platelet dysfunction

CAD: hypotension reduces coronary perfusion

Increased risk for intraoperative **hemorrhage** and **myocardial ischemia**

- Required careful planning and hemodynamic monitoring. Balancing of Thrombus vs Hemorrhage risk.

Role of invasive monitoring

Arterial Line: provides continuous, beat-by-beat blood pressure monitoring

- Essential during Heparinization, protamine reversal, and norepinephrine titration

Central Venous Access: administration of vasoactive medications, rapid transfusion of blood products and support decision making regarding hemodynamic management

Transfusion and Anticoagulation balance

Full systemic heparinization to prevent thrombus formation In graft, but this increases risk of hemorrhage, in a patient already at high risk. Protamine used for partial reversal to limit hemorrhage.

This case illustrates the delicate balance of managing the risks of **Thrombosis vs Hemorrhage** in surgeries requiring vascular reconstruction