Massive Pulmonary Embolism with Cardiac Arrest During Routine Tibial Bypass Surgery

Vascular Surgery
UNIVERSITY OF COLORADO **MEDICINE**

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Introduction

- Pulmonary embolism (PE) is the third most common cause of cardiovascular death, accounting for 5-10% of total in-hospital mortality.
- While massive PE accounts for less than 5% of cases, it carries a 90-day mortality of greater than 50%.
- Historically, massive PE was treated with systemic thrombolysis despite a significant risk of major bleeding, including intracranial hemorrhage.

Case Background

- A 48-year-old male was referred to vascular surgery following an unsuccessful free flap to cover a chronic non-healing ankle wound.
- A left lower extremity angiogram demonstrated a chronic occlusion of the distal superficial femoral artery (SFA) and popliteal arteries with collateralization to the peroneal artery (**Figure 1**).
- SFA to peroneal artery bypass was planned.

Figure 1: Initial angiography of left lower extremity
(A) Chronic occlusion of distal SFA and popliteal artery
(B) Collateralization to peroneal with further distal posterior tibial collateralization

Case Intervention

- Strong leg contraction upon exposure of the greater saphenous vein precipitated hypotension and cardiac arrest.
- During ongoing CPR, pulmonary angiography revealed significant bilateral filling defects with greater clot burden on the right (**Figure 2A**).
- Return of spontaneous circulation was achieved after 2 minutes of CPR and transesophageal echocardiogram revealed McConnell's sign **(Figure 2B).**
- An Indigo CAT8 catheter was then used to perform serial bilateral aspiration thrombectomies resulting in improved hemodynamic stability.

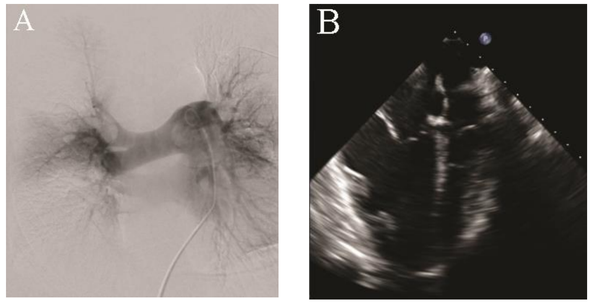


Figure 2: Cardiopulmonary imaging
(A) Pulmonary angiography following cardiac arrest
(B) Transesophageal echo demonstrating right heart dilation

Figure 3: Completion pulmonary angiography
Angiography of Right (A) and Left (B) lungs following aspiration thrombectomy

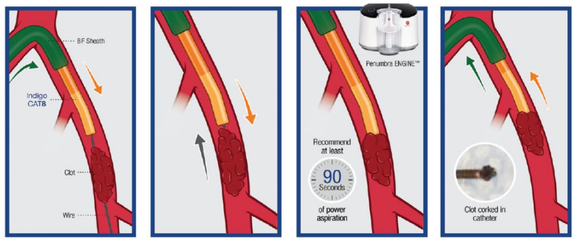
- Local thrombolysis was initiated with bilateral Cragg-McNamara catheters that infused tissue plasminogen activator (tPA) at a rate of 0.5mg/hr.
- Thrombolysis was continued for 48 hours with hemodynamic improvement.
- The patient was weaned from inotropic support by the fourth postoperative day with no further echocardiographic evidence of right heart strain on postoperative day five.

Discussion

- Current guidelines recommend systemic thrombolysis as initial therapy for massive PE, although new data shows less complications and lower mortality for catheter-directed thrombolysis (CDT) compared with systemic thrombolysis.
- The Indigo system works by continuous aspiration mechanical thrombectomy and has shown favorable results for treatment of sub-massive PE in patients with contraindications to thrombolytics.
- A retrospective analysis of suction thrombectomy, including Indigo, demonstrated similar outcomes compared to CDT in the setting of submassive and massive PE.
- EXTRACT PE is a single-arm prospective trial evaluating the efficacy and safety of the Indigo system in the setting of PE.

Discussion (cont.)

- The ability to perform pulmonary arterial interventions requires a unique set of skills not frequently included in the vascular surgery curriculum.
- The pulmonary embolism response team (PERT), a multidisciplinary rapid-response team for the management of severe PE, may present a great opportunity for vascular surgeons to gain experience in pulmonary endovascular interventions.



Conclusions

- The ability of vascular surgeons to rapidly intervene in the event of intraoperative massive PE may be limited.
- Need alternative therapies for individuals with contraindications to thrombolytics (such as in this case).
- The success of an expanding number of endovascular devices suggests that changes in PE therapy guidelines are likely to follow.
- Vascular surgeons use these devices in the periphery and expanding this skillset to PE management will increase their value as providers, position them to be leaders in the field, and improve patient care.

Disclosures

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