Catheter Directed Thrombolysis in the Setting of Pulmonary Embolism and Paradoxical Embolism

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Introduction

- **Paradoxical Embolism (PDE) is a serious form of thromboembolism often stemming from deep vein thrombosis**
  - Can introduce thromboemboli into the systemic circulation in combination with a patent foramen ovale (PFO)
- **Management of massive PDE**
  - Systemic or catheter-directed thrombolysis (CDT) using alteplase
  - Thrombectomy
- Here we present a **patient with bilateral PE and multiple arterial thromboembolisms** who was **successfully treated using CDT**

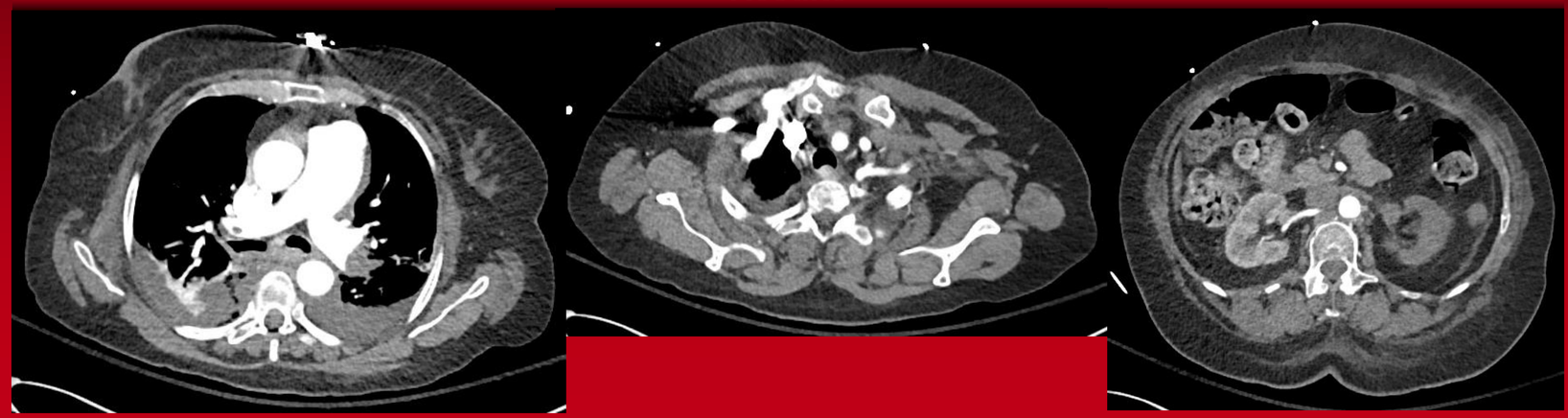
Learning Objectives

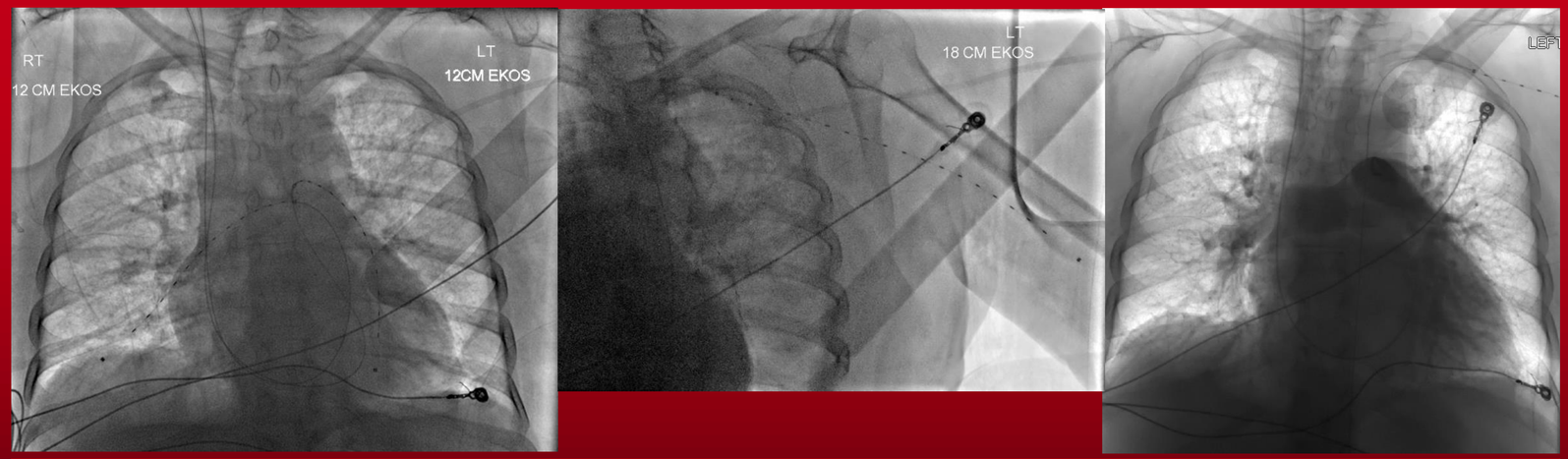
1. Review causes of paradoxical embolism
2. Methods of paradoxical embolism management
3. Describe catheter-directed thrombolysis' role in the management of paradoxical embolism

Methods

- This is a case study investigating the patient chart, imaging, and interventional radiology procedures performed in a single patient.

Results





- This patient was a 61-year-old female who presented to the emergency department with shortness of air, lethargy, hypoexemia to 30%, and left upper extremity (LUE) pain and pulselessness. She was started on 15 L of oxygen.
- Further workup revealed multiple l**arge pulmonary emboli and complete occlusion of the left axillary, renal, and subclavian arteries.**
- **Bilateral infusion catheters were placed in the subsegmental branches of the right and left pulmonary arteries.** A vertebral catheter and G**lidewire (Terumo, Somerset, NJ) were used to recanalize the subclavian artery and place an infusion cathete**r. **CDT** with an EKOS Endovascular System (Boston Scientific, Boston, MA) and alteplase was administered in **each pulmonary arter**y and the **left subclavian arter**y. Pharmacomechanical thrombolysis with alteplase was performed in the **left renal arter**y.
- Aft**er 12 hours CDT, the left subclavian, brachial, and radial arteriograms demonstrated improved flow** without evidence of residual thrombosis and markedly improved flow in the left renal artery after pharmacomechanical thrombolysis. A repeat pulmonary arteriogram demonstrated noticeably diminished clot burden with improved pulmonary arterial perfusion.
- Echocardiogram showed right ventricular enlargement and a PFO. The post-operative course was uncomplicated with discharge nine days later.

Conclusions

- Here we present a patient with a PFO, bilateral PEs, and paradoxical left subclavian artery and left renal artery occlusion
- Using CDT and alteplase, clots were lysed and flow was restored in all vessels
- This case demonstrates that CDT is a favorable option in patients with acute PE and multiple thromboembolisms that minimizes adverse effects associated with systemic thrombolytic administration.

Bibliography

1. Bagot CN, Arya R. Virchow and his triad: a question of attribution. Br J Haematol. 2008 Oct;143(2):180-90. doi: 10.1111/j.1365-2141.2008.07323.x. Epub 2008 Sep 6. PMID: 18783400.
2. Goldhaber SZ. Risk factors for venous thromboembolism. J Am Coll Cardiol. 2010 Jun 29;56(1):1-7. doi: 10.1016/j.jacc.2010.01.057. PMID: 20620709.
3. Wiener RS, Schwartz LM, Woloshin S. Time trends in pulmonary embolism in the United States: evidence of overdiagnosis. Arch Intern Med. 2011 May 9;171(9):831-7. doi: 10.1001/archinternmed.2011.178. PMID: 21555660; PMCID: PMC3140219.
4. Alotaibi GS, Wu C, Senthilselvan A, McMurtry MS. Secular Trends in Incidence and Mortality of Acute Venous Thromboembolism: The AB-VTE Population-Based Study. Am J Med. 2016 Aug;129(8):879.e19-25. doi: 10.1016/j.amjmed.2016.01.041. Epub 2016 Feb 27. PMID: 26925811.

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