Conquering a Clot: A Journey in Managing a Clot-in-Transit

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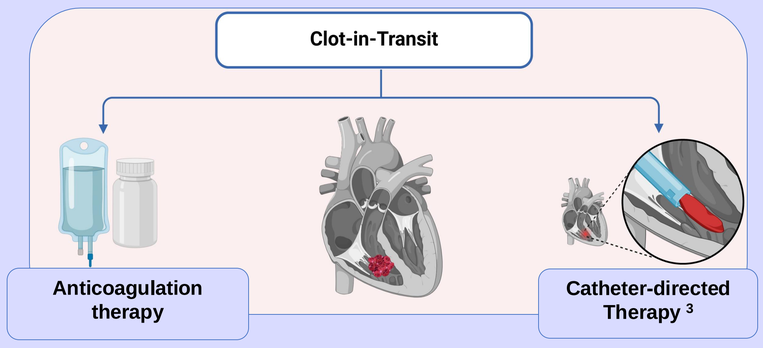
Introduction

- A clot-in-transit (CIT) is a motile, floating thrombus in the right heart that is not attached to any intracardiac structure.
- It is a rare occurrence in patients with pulmonary embolism and is usually diagnosed with a transthoracic echocardiogram (TTE).
- There is limited data and no clinical trials to help guide which treatment options provide optimal outcomes for patients with a CIT.[1]



Case Summary

Patient Presentation:

- 67-year-old male with no prior medical history initially presented with a stroke.
- **A transthoracic echocardiogram** revealed a mass in the left atrium.
- He was discharged with prescription for 20 mg of rivaroxaban per night before the removal of the mass.
- Subsequently, **he underwent surgery to remove the left atrial tumor** with repair of the atrial septum using a pericardial patch.
- The mass was confirmed to be a **cardiac myxoma.**
- After discharge, the plan was for the patient to continue taking aspirin for one year following the pericardial patch closer of the atrial septum.
- Two weeks after discharge, the patient called emergency medical services (EMS) for back pain, and **he was found in cardiac arrest.**
- The patient was in asystole and eventually achieved a return of spontaneous circulation (ROSC).
- **Labs:** showed Troponin-I elevation from 0.115 > 0.356 > 0.710 > 2.041 > 1.658
- A **CT pulmonary angiogram (CTPA)** performed in the post-arrest period revealed extensive acute bilateral pulmonary emboli along with a right ventricle to left ventricle (RV LV) ratio of 2.0.

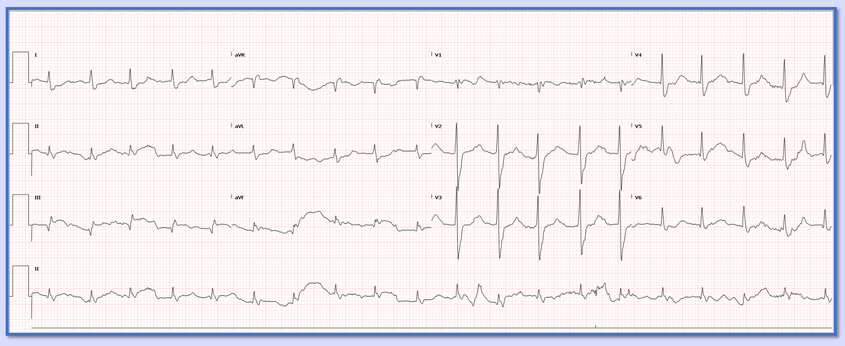
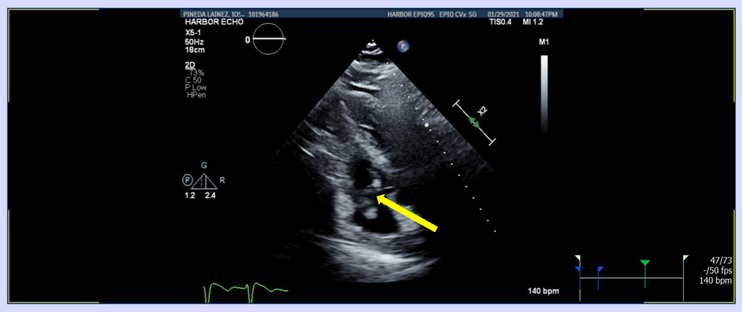
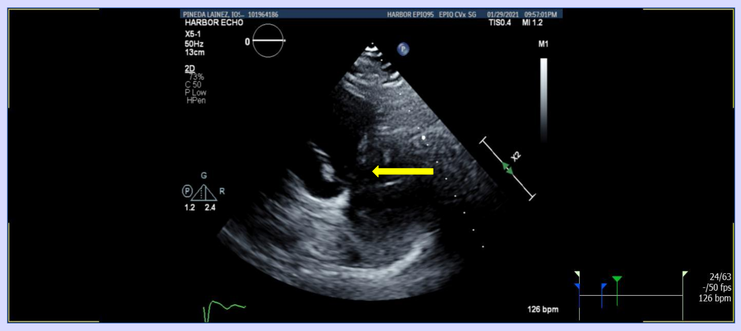


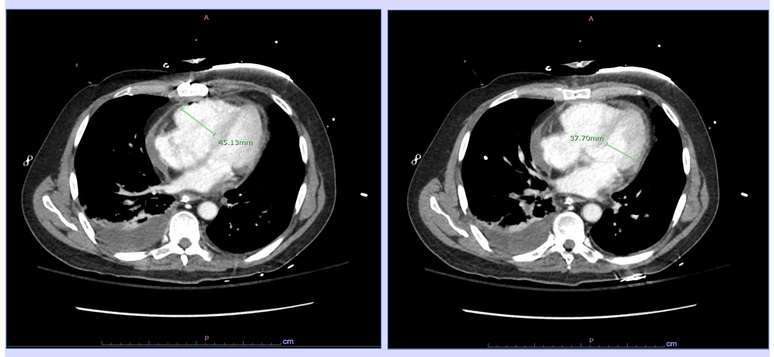
Figure 1: EKG showing sinus tachycardia, non-specific intraventricular conduction delay, and ST elevation, probable inferior injury

Imaging





Figures 2 and 3: Transthoracic echocardiogram showing a large, up to 3.5 cm, irregular, and mobile echo density rising from the right atrium and extending across the tricuspid valve to the right ventricle.

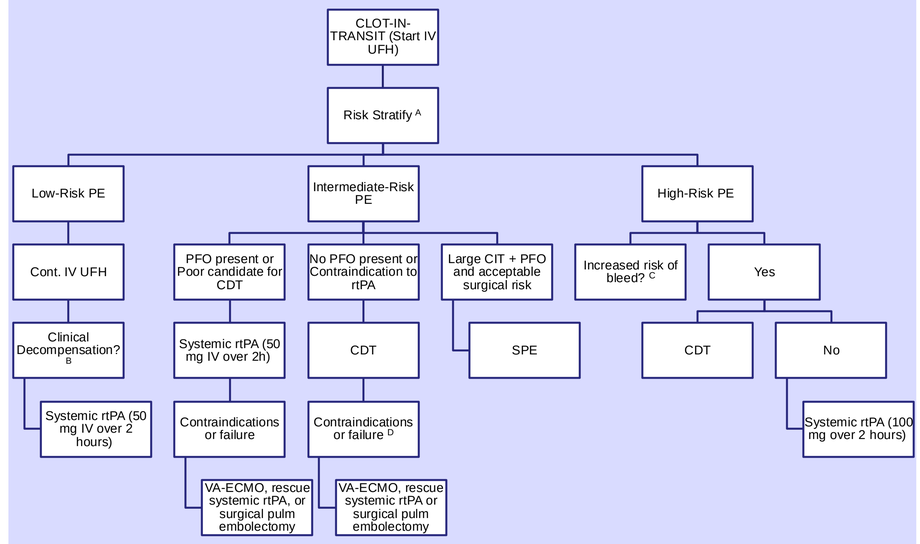


Figures 4 and 5: CTPA demonstrating extensive, acute bilateral pulmonary emboli. Right ventricular strain. RV LV ratio 2.0. Small right and trace left pleural effusions.

Management and Resolution

- The **Pulmonary Embolism Response Team (PERT)** was activated, and he was started on **a heparin drip**.
- **An echocardiogram** revealed a 3.5 cm irregular, mobile density originating from the right atrium, extending across the tricuspid valve into the right ventricle.
- Due to his recent thoracotomy and atrial septum repair, along with significant RV strain, a multidisciplinary decision was made to administer **50 mg of alteplase over 2 hours with close monitoring**.
- During the first dose of alteplase, his vasopressor requirements decreased, and his mental status remained stable.
- **He required a second 50 mg dose**, after which his hemoglobin dropped acutely from 10 to 6.
- With resuscitation and vasopressors, his condition eventually stabilized, and he was extubated with intact mental status and a stable neurologic exam.

CIT Algorithm



A: Risk stratification according to 2019 ESC PE Guidelines
B: SaO2 < 90%, paO2 < 65 mmHg, SBP < 90 mmHg, HR > 110, persistent RV strain on repeat TTE, increasing troponin in absence of other cause.
C: High bleed risk: elderly (>75 yo), frail, weight < 65 kg, recent major surgery, post-CPR.
D: Failure: Recurrent hemodynamic instability, obstructive or cardiogenic shock, or cardiac arrest. Rescue dose identical to first dose.

Absolute Contraindications to thrombolysis:

- Prior ICH
- Cerebral vascular lesion
- Intracranial neoplasm
- Ischemic stroke within three months
- Aortic dissection
- Active bleeding or bleeding diathesis
- Closed-head or facial trauma within three months

Abbreviations: CDT, catheter-directed thrombectomy; PFO, patent foramen ovale; rtPA, recombinant tissue plasminogen activator, SPE, surgical pulmonary embolectomy; UFH, unfractionated heparin; VA-ECMO, veno-arterial extracorporeal membrane oxygenation

Discussion

- The optimal management of a CIT has not been definitively established.
- Different treatment approaches include anticoagulation alone, systemic thrombolysis, surgical embolectomy, and endovascular catheter-based therapies.[2]
- It is important to stratify patients based on their risk profile to ensure that the benefits of the chosen treatment outweigh the risk of bleeding.
- Additional research is required to guide healthcare providers in delivering the most appropriate care.

References

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2. Patel AN, Amrutiya RJ, Manvar BN. A Proposed Approach for the Management of Clot-in-Transit. Cureus. 2022 Aug 27;14(8): e28481. doi: 10.7759/cureus.28481. PMID: 36176887; PMCID: PMC9512516.
3. Zhang, RS, Yuriditsky, E, Zhang, P. Comparing Management Stategies in Patients With Clot-in-Transit. Circulation: Cardiovascular Interventions. 2024 Jun 6; 17(8). Https//doi.org/10.1161/CIRCINTERVENTIONS.124.014109