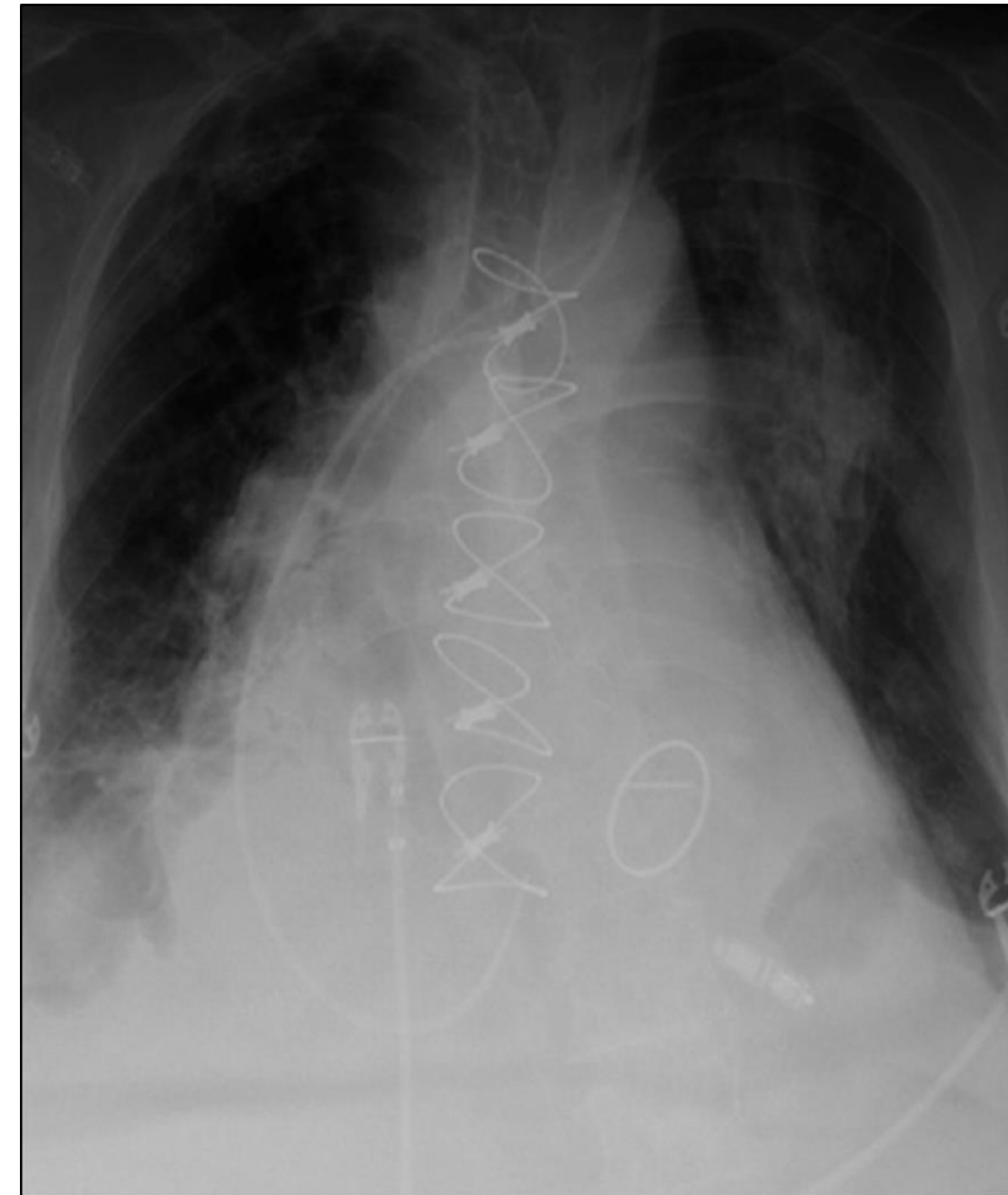


## INTRODUCTION

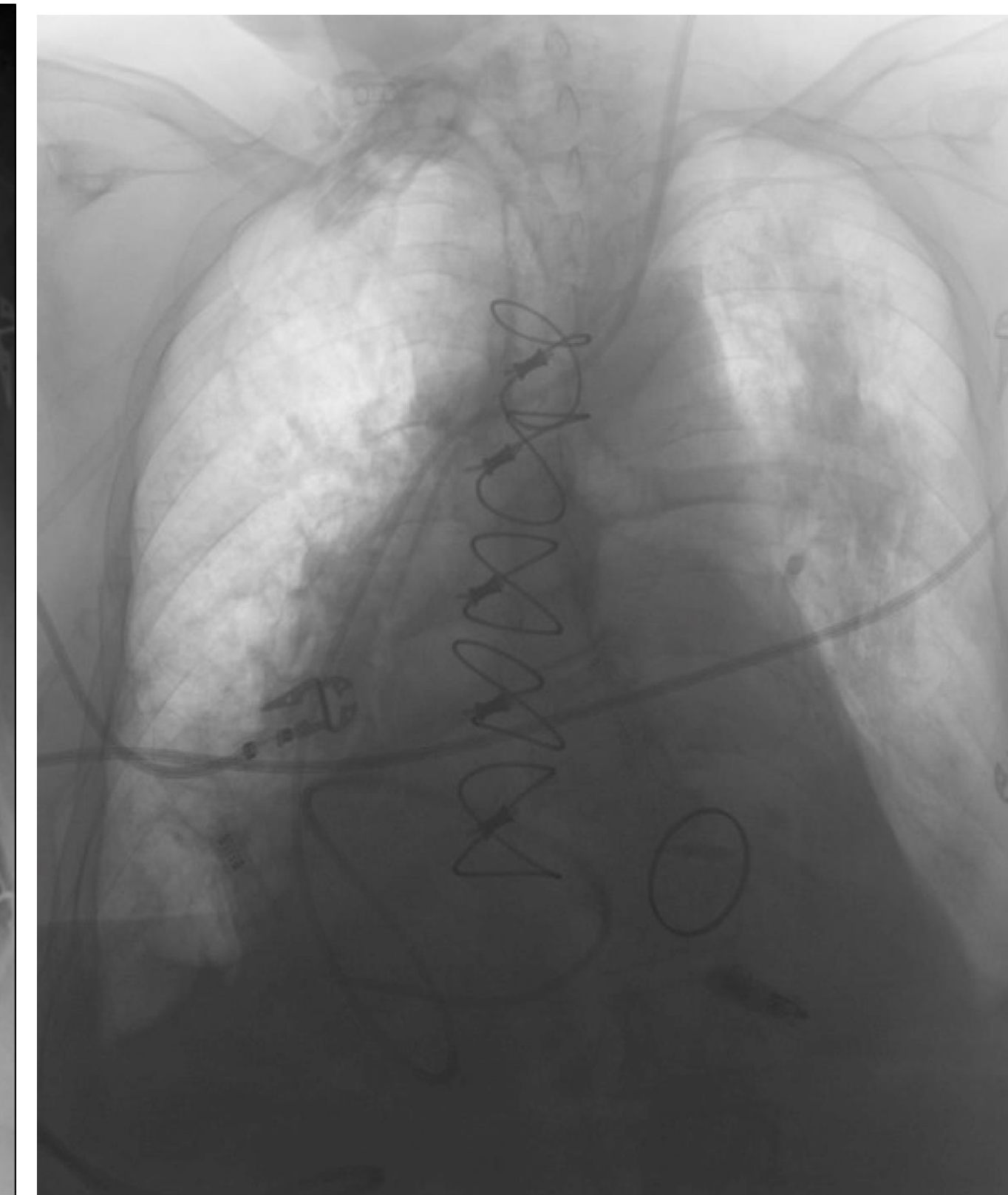
- Pulmonary artery catheter (PAC) is vital for hemodynamic monitoring of critically ill patients, providing measurements of cardiac output and cardiac filling pressures.
- PAC insertion can be challenging in the presence of severe tricuspid regurgitation (TR) and severely dilated RV.
- Insertion related complications can be further exacerbated by the presence of a leadless pacemaker in RV, increasing the risk of arrhythmias.
- This case report highlights the difficulties of PAC insertion in such scenarios and discusses strategies to improve catheter placement and outcomes.

## CASE REPORT

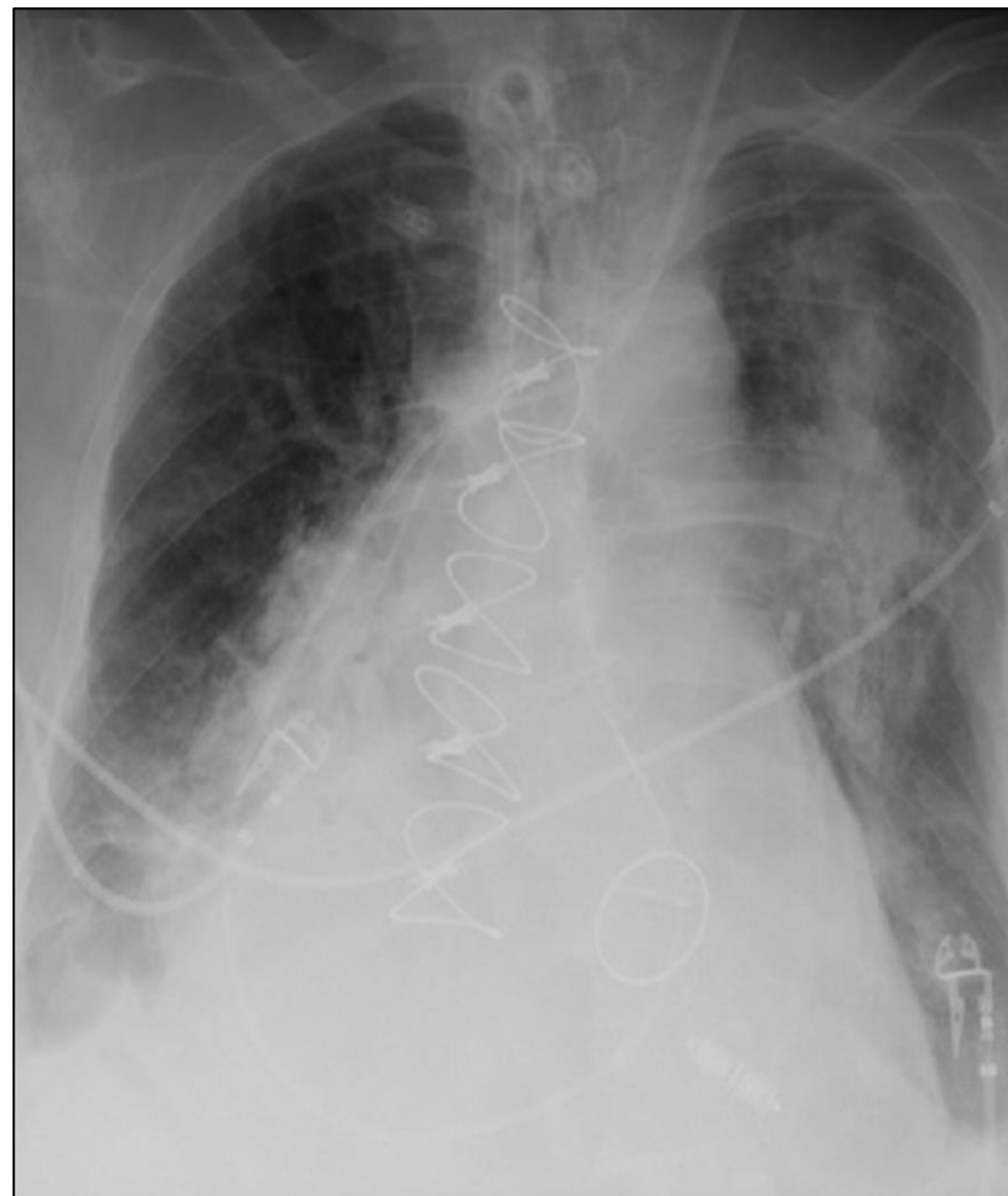
- 65-year-old female with reduced ejection fraction heart failure, mechanical MVR, atrial fibrillation, CKD, and OSA.
- Presented following a pre-syncopal episode with hemorrhagic shock and hemoperitoneum requiring vasopressors and blood transfusions.
- Underwent urgent splenectomy due to rupture spleen, worsening hypotension and anemia.
- ICU course complicated by altered mental status, metabolic acidosis, gastrointestinal bleeding, and respiratory failure, necessitating a tracheostomy.
- A subsequent CT abdomen/pelvis revealed ischemic perforated colitis, confirmed by exploratory laparotomy, which led to a hemicolectomy and colostomy.
- Later patient developed a vancomycin-resistant Enterococcus (VRE) sepsis.
- A transthoracic echocardiogram revealed severe MS, severe TR, and severely dilated RV with ongoing hypoxia and hypotension requiring three vasopressors.
- Swan-Ganz catheter placement required multiple attempts due to coiling in the RA, as well as VT in the presence of Medtronic Micra Leadless Pacemaker.



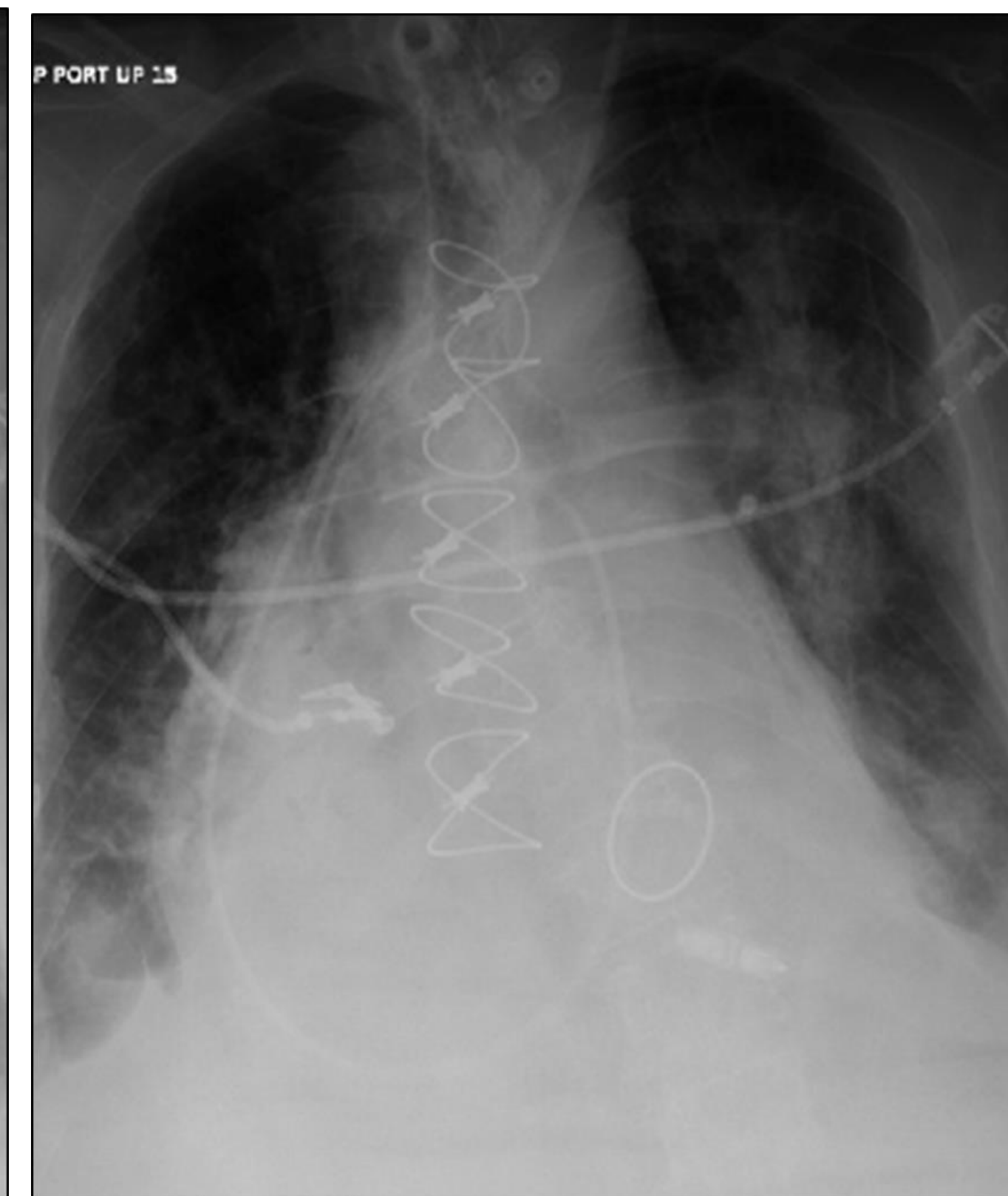
**Figure 1a:** X-ray image showing the PAC in the RA with the tip pointing back toward the RA



**Figure 1b:** showing the PAC coiled in RA, showing the difficulty with tricuspid regurgitation



**Figure 1c** showing the PAC passed the TV and in the RV



**Figure 1d** showing the final position of the PAC in the PA

## PULMONARY ARTERY CATHETER PLACEMENT

- Internal Jugular Vein & Cordis Insertion:** Ultrasound guided cannulation of the left internal jugular vein with successful placement of the Cordis, line was secured with sutures, and sterile dressing applied.
- Initial Swan-Ganz Catheter Placement:** Catheter floated with balloon inflated (1.5cc) advanced to 70 cm, balloon deflated. CXR revealed Swan-Ganz catheter coiled in the right atrium, requiring adjustment.
- Catheter Adjustment (2<sup>nd</sup> attempt):** Catheter retracted 30cm with balloon down, balloon re-inflated and advanced slowly into right ventricle. Patient developed significant ventricular tachycardia to 190 b/m.
- Management of Ventricular Tachycardia:** Balloon deflated and catheter retracted until arrhythmia resolved. Recheck with CXR showed the catheter terminating in right atrium and no longer coiled. Patient premedicated with Lidocaine 100mg IV push prior to third attempt
- Catheter Adjustment (3<sup>rd</sup> attempt):** Catheter retracted, balloon inflated and advanced to right ventricle with capture of the right ventricular waveform.
- Final Positioning:** Advanced catheter to 64 cm, visualized pulmonary artery waveform. Proper placement in proximal pulmonary artery via CXR.

Deflate the balloon

Withdraw the PAC by 10 cm

Re-inflate the balloon

Advance the PAC with continuous TEE guidance

Maneuver the catheter tip away from the right ventricle inflow sinus

Inflate the balloon with saline rather than air

## DISCUSSION

TR can make PAC insertion more difficult because the jet of blood from the right ventricle can push the catheter out of the right ventricle with each contraction. Here are some tips that may help:

## REFERENCES

- [Pulmonary artery catheters: Insertion technique in adults](https://www.uptodate.com/contents/pulmonary-artery-catheters-insertion-technique-in-adults) (https://www.uptodate.com/contents/pulmonary-artery-catheters-insertion-technique-in-adults)
- [Troubleshooting the insertion of the pulmonary artery catheter](https://derangedphysiology.com/main/cicm-primary-exam/required-reading/cardiovascular-system/Chapter%20803/troubleshooting-insertion-pulmonary-artery-catheter) (https://derangedphysiology.com/main/cicm-primary-exam/required-reading/cardiovascular-system/Chapter%20803/troubleshooting-insertion-pulmonary-artery-catheter)