

Background

The prevalence of patent foramen ovale (PFO) is reported to be 27.3% [1] in adults and may lead to paradoxical embolism, cryptogenic stroke, and migraine. We present a case of refractory acute hypoxic respiratory failure with biventricular thrombi and a PFO with worsening right-to-left shunt (RLS).

On Admission...

A 32-year-old female with stage IIIC squamous cell cervical carcinoma and history of intravenous drug use presented with atypical chest pain and dyspnea.

Past History: IV drug use, MRSA bacteremia 3 months prior, post IV antibiotics

Review of systems:

Cardiovascular: Atypical chest pain, orthopnea

Respiratory: Dyspnea on exertion

Gastrointestinal: Abdominal pain

Physical Examination:

Vital signs: HR 106 bpm, BP 97/44 mm Hg

RR 22/min, O₂ sat 92 % on 4 L nasal cannula

CV: Tachycardic, systolic murmur over pulmonic area

Laboratory studies, imaging and procedures

Labs on admission:

ABG paO₂ 71 mm Hg at FiO₂ 28 %, negative COVID-19 PCR

Troponin 0.23 ng/mL, upto 0.33 ng/mL over 10 hours

D-dimer level 4.54 ugFEU/mL

Blood cultures: No growth

Imaging on admission:

Serial EKGs: No ischemic changes over 10 hrs

CT pulmonary angiogram (CTPA): Diffuse ground glass opacities and consolidations, negative for pulmonary emboli (PE)

Echocardiogram: RV volume overload

Hospital Course

Her stay was complicated by increasing oxygen demands. A transesophageal echocardiogram (TEE) was done, which showed PFO with RLS only on abdominal compression and biventricular mobile masses. In the setting of elevated D-dimers without bacteremia, these masses were more consistent with thrombi. Despite diuresis and IV heparin, her respiratory status continued to worsen. Repeat CTPA and TEE confirmed worsening pulmonary hypertension and RLS on quiet respirations. A right heart catheterization showed high pulmonary filling pressures and normal wedge pressure. PFO closure was done in the same setting. However, her respiratory status continued to worsen and progressed to refractory right heart failure. Eventually she had a cardiac arrest and succumbed, after 35 minutes of CPR.

Right Heart Catheterization:

PA 68/40 mm Hg (mean 51 mm Hg)

PVR 1086.42 dynes*sec/cm⁵

PCWP 7 mm Hg

CO by Fick's method: 3.24 L/min

MAP: 95 mm Hg

SVR (estimated): 1877 dynes*sec/cm⁵



Discussion

Considering her worsening right-to-left-shunt as the culprit for her refractory hypoxic respiratory failure, it was thus decided to close the PFO. RV offloading is recommended prior to PFO closure with sildenafil, epoprostenol or nitric oxide when PVR/SVR > 0.66. In this scenario, it was 0.58, and hence with no foreseeable benefit had RV offloading been done.

Conclusions

This is a rare case of acute right heart failure unmasked by PFO closure. RV hemodynamics assessment prior to PFO closure can predict acute offloading, however, decompensation may still occur when it is least likely.

References

1. Hagen, P.T., Scholz, D.G. and Edwards, W.D., 1984, January. Incidence and size of patent foramen ovale during the first 10 decades of life: an autopsy study of 965 normal hearts. In Mayo Clinic Proceedings (Vol. 59, No. 1, pp. 17-20). Elsevier.
2. Hull, R.A., Hunninghake, J.C., Walter, R.J., Mason, P.E., Pickett, C.A. and Bush, K.N., 2020. Right Ventricular Failure Following Patent Foramen Ovale Closure on Venovenous-Extracorporeal Membrane Oxygenation. Case Reports, 2(15), pp.2387-2393.
3. Shakir, M. A., Walker, J., Cohen, E., Wang, D., Doroshov, J., & Kuntz, C. (2020). SHUNT THE FRONT DOOR: PFO CLOSURE IN A PATIENT WITH PULMONARY HYPERTENSION. Journal of the American College of Cardiology, 75(11_Supplement_1), 3166-3166.