Ultrasound for Critical Care Physicians: Really, At Her Age?

A 71 year old woman presented with dyspnea since late 2013 and denies a prior history of dyspnea. She had a cardiac pacemaker placed in 2008 for sick sinus syndrome. Her physical exam was unremarkable and her SpO₂ was 96% on room air. However, it decreased to 84% with exercise. Chest x-ray and pulmonary function testing were unremarkable (a DLco was unable to be performed). A transthoracic echocardiogram was performed (Figure 1).

Figure 1. Static image with Doppler flow of transthoracic echocardiogram.

Which of the following **best explains** the patient's dyspnea and hypoxia?

1. Cardiac tamponade
2. Decreased cardiac contractility
3. Intracardiac shunt
4. Mitral insufficiency
5. Ventilation perfusion mismatch from COPD

Correct!

3. Intracardiac shunt

The transthoracic echocardiogram shows flow between the right and left heart, in this case at the atrial level. Cardiac contractility appears normal and there is no evidence of cardiac tamponade or mitral insufficiency. Ventilation perfusion mismatch is the most common cause of hypoxia but cannot be assessed on an echocardiogram and the patient has normal pulmonary function testing.

The patient had a large patent foramen ovale (PFO) confirmed by transesophageal echocardiography and cardiac catheterization. PFO is a normal fetal communication between the right and left atria which remains open in 20-34% of the population but is usually small. In most cases, a PFO poses no threat to health (1). However, large PFOs can enable bloodborne material, such as thrombi, air, or vasoactive substances, to pass from the venous to the arterial circulation or in very rare instances cause a right to left shunt (2). Adults may present with dyspnea from a PFO and can present with platypnea and orthodeoxia which are defined as dyspnea and oxygen desaturation induced by upright posture and relieved by the recumbent position respectively (2). This patient had neither and it was surprising that there were no complaints of dyspnea until she was in her 70's. Closure of the PFO resulted in marked improvement in her symptoms.

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References

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