



MEDICAL EDUCATION: PART I

CLINICAL REASONING THROUGH
PRE-OPERATIVE DYSPNEA: LISTENING
TO THE PATIENT'S CLUES

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A 55-year-old gentleman was referred to our hospitalist-led, pre-operative medicine clinic before paraesophageal hernia (PEH) repair. He had dysphagia, chronic reflux, and chronic progressive dyspnea with mild-moderate restriction on PFTs, attributed in part to his paraesophageal hernia.

The aim of pre-operative assessment is to determine a patient's peri-operative risk, employ strategies to mitigate these risks, and thereby reduce peri-operative morbidity and mortality. While referring physicians often view a pre-operative evaluation as synonymous with "cardiac clearance," the aim is to understand all co-existing medical conditions, as each may confer increased peri-operative risk. While his dyspnea may in part be attributed to the PEH, it is also prudent to complete a thorough history and physical examination to exclude cardiopulmonary causes of dyspnea. The 2014 ACA/AHA guidelines for pre-operative cardiac evaluation recommend transthoracic echocardiogram (ECHO) to assess LV function in patients with dyspnea of unclear etiology or with known heart failure and a change in symptoms or functional status.¹ In addition to left ventricular systolic failure, the differential for dyspnea should include other cardiac etiologies, such as symptomatic arrhythmia, valvular or ischemic disease, or pulmonary hypertension and/or associated right heart failure.

Our patient has known non-ischemic cardiomyopathy, with LVEF 30% five years prior, deemed tachycardia-mediated, given persistent atrial fibrillation. He then underwent AV node ablation and pacemaker placement. Given his dyspnea, his cardiologist had recently updated an ECHO, which showed LVEF 60%. Diastolic dysfunction was considered, recognizing this is also associated with worse post-operative outcomes,² but he did not appear volume overloaded. There was also concern that his

dyspnea could represent an anginal equivalent. Nuclear perfusion stress showed a fixed defect, and coronary catheterization revealed only diffuse RCA irregularities. He had normal pacemaker function.

A comprehensive cardiac evaluation has essentially excluded symptomatic heart disease. Limiting pre-operative evaluation to cardiac etiologies, however, fails to account for other co-morbidities. Pulmonary peri-operative complications are as common as those related to cardiac disease and may even be more costly.³ Among non-cardiothoracic surgical candidates, routine pre-operative spirometry and chest X-rays are not recommended unless indicated by symptoms concerning for undiagnosed pulmonary disease. Obstructive Sleep Apnea (OSA), obesity hypoventilation syndrome, and pulmonary hypertension should be considered, as they are prevalent and likewise associated with increased perioperative complications.⁴

Dedicated pulmonary evaluation confirmed CPAP adherence for known OSA. His recent ECHO had also shown normal RV function and RVSP 29mmHg. Though he remained anticoagulated for his atrial fibrillation, given a remote history of a DVT, Chest CT was obtained and negative for chronic thromboembolic disease. The CT also showed no parenchymal disease. The remaining component of his dyspnea was attributed to restrictive lung disease (FVC 79% predicted, FEV1 89% predicted, ratio 0.89) due to obesity (BMI 42kg/m²), his PEH, and deconditioning.

In addition to the very thorough cardiac evaluation, he has had an extensive pulmonary evaluation. Still, we have lingering concerns that his dyspnea remains significantly out of proportion to his mild-to-moderate restrictive defect.

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At the time of his pre-op clinic visit, he endorses ongoing exertional dyspnea, then goes on to describe this more as extreme fatigue than overt dyspnea. It has slowly progressed over the past year, then accelerated over the last six months. Now, he can barely walk across a room. Medications included pantoprazole, hydrochlorothiazide, and warfarin. He apologizes that he cannot recall the name of a new medication for his restless leg syndrome (RLS), then mused that perhaps he was so fatigued because his severe RLS was costing him sleep.

The patient's distinguishing between overt exertional dyspnea and extreme fatigue helps redirect our diagnostic focus. We start by wondering whether his self-reported severe RLS is a directing "red flag" for underlying pathology or a misdirecting "red herring". Is he tired because of poor sleep quality or is he fatigued due to underlying pathology such as iron deficiency, which itself is leading to severe RLS?

Exam revealed a fatigued appearing gentleman. Cardiopulmonary exam was normal, including HR 74 bpm, BP 113/72 mmHg, and O₂ saturation 100% with normal respiratory rate. Labs revealed HCT 32% and MCV 68.4fL, down from HCT 39% with MCV 85.3fL six months prior. Iron studies demonstrated transferrin saturation 3% and ferritin 4 ng/mL (27% and 98.4 ng/mL, respectively, one year prior). INR was therapeutic at 2.35. He denied melena or hematochezia. His upper endoscopy with PEH evaluation had revealed mild gastritis with several small gastric fundus ulcerations.

Iron deficiency anemia (IDA) to this degree is likely contributing to our patient's severe fatigue. In addition to its role in erythropoiesis, iron is involved in cellular oxygen transport, the electron transport

chain of mitochondrial respiration. Even when hemoglobin/hematocrit normalize with therapy, iron deficiency itself, marked by low ferritin, has been linked with symptomatic fatigue and dyspnea on exertion, along with increased morbidity and mortality in patients with heart failure. In the pre-operative setting, current guidelines recommend intravenous iron supplementation to correct IDA prior to elective surgery.⁵ Numerous studies support positive effect of intravenous iron on secondary post-operative endpoints, including transfusion requirements, acquired infections, acute kidney injury, and hospital length of stay.

His PEH repair was cancelled to facilitate management of his symptomatic IDA and minimize his perioperative risk. Additionally, if his dyspnea/fatigue resolved, he would no longer meet surgical indications for PEH repair based on symptomatic pulmonary compromise.

Summary Points:

- **Broad categories for dyspnea include cardiac, pulmonary, and hematologic etiologies. In the pre-operative setting, emphasis is often placed on investigating potential cardiopulmonary disease.**
- **While we had immediate access to a thorough past cardiopulmonary testing and prompt laboratory results, such a case highlights the importance of avoiding premature closure of the differential for dyspnea to just cardiac or pulmonary causes.**
- **Clarifying questions that delve into common symptoms, such as dyspnea, can help direct further work up. Ultimately, it was the patient's own sleep deprived musings plus laboratory trends that cemented the concern for iron deficiency.**

References

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