COMMENTARY

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An argument for reviving the disappearing skill of cardiac auscultation

BEDSIDE CLINICAL DIAGNOSIS is an increasingly underappreciated art and skill. For example, contemporary medical students, residents, fellows, and cardiologists have been shown to lack competency in cardiac auscultation,[1,2] despite warnings from older physicians trained in an era when the physical examination was valued.[3,4]

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Well-honed auscultatory skills are an indispensable complement to echocardiography

However, echocardiography has given physicians the ability to visually evaluate cardiac function noninvasively and quickly. With advanced technology, does this modern decline in auscultatory skills matter? And specifically, can inexpert cardiac auscultation lead to the inadequate evaluation of valvular heart disease and subsequently to an incorrect recommendation for surgery?

Although the ill consequences for patient care would be difficult to prove, we strongly believe, on the basis of our experiences in a busy cardiovascular surgery clinic in a tertiary care center, that the answer to both questions is yes.

Here, we present three recent scenarios from the clinic of a senior cardiac surgeon who regards the skillful use of his stethoscope as being as important as the echocardiogram. These scenarios highlight how the clinical examination can complement echocardiography in the evaluation of valvular heart disease and how it can affect important management decisions.

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SCENARIO 1: SEVERE AORTIC INSUFFICIENCY?

A 53-year-old woman with Turner syndrome (gonadal dysgenesis) suffered an acute ascending aortic dissection requiring resuspension of the aortic valve and replacement of the ascending aorta. Her postoperative course was complicated by pneumonia, respiratory failure, and prolonged mechanical ventilation requiring tracheostomy.

Three months after she completed her convalescence at a skilled nursing facility, she presented to her cardiologist with progressive shortness of breath that severely limited her activity. Echocardiography showed moderately severe aortic insufficiency, and she was referred for aortic valve replacement.

At the cardiac surgery clinic, she reported a further decline in her functional status, with dyspnea during minimal exertion. On physical examination, however, there was no evidence of significant aortic incompetence, ie, no widened pulse pressure, left ventricular heave, or diastolic murmur. A cardiologist specializing in echocardiography reviewed the echocardiogram from the referring physician and found that the appearance was more consistent with mild to moderate aortic insufficiency.

Because her profound symptoms were out of proportion with the degree of aortic insufficiency that was observed, further workup including pulmonary function testing was pursued to find another cause; she was subsequently found to have significant tracheal ste-

nosis, likely related to her tracheostomy. Surgery to remove scar tissue resulted in marked improvement of her symptoms.

SCENARIO 2: SEVERE MITRAL REGURGITATION?

A 67-year-old man who had undergone homograft aortic valve replacement 13 years ago underwent routine echocardiography at another hospital. The test showed a large regurgitant jet and backward flow in the pulmonary veins, indicating moderate to severe mitral regurgitation. Also noted was a mildly decreased ejection fraction of 45%. Because of these findings, he was referred for consideration of mitral valve surgery.

At presentation, he had essentially no symptoms and had a very active lifestyle that included regular biking and running. A physical examination that included auscultation in the left lateral decubitus position noted only a soft systolic ejection murmur at the left upper sternal border.

In view of these findings, repeat echocardiography was ordered and revealed mild mitral regurgitation with normal left atrial and ventricular dimensions, as well as normal left ventricular systolic function. These findings were markedly different from those obtained at the other hospital. The murmur was thought to likely represent flow across the base of the homograft valve. These results confirmed our clinical suspicion that there was no indication for mitral valve surgery.

SCENARIO 3: NORMAL HEART VALVES?

A 62-year-old woman presented to her local cardiologist with a 3-month history of worsening shortness of breath and fatigue. She had an abnormal nuclear stress test that led to left heart catheterization, which revealed a 60% to 70% stenosis of the left main coronary artery. She was promptly referred for coronary artery bypass grafting.

The report from her referring cardiologist indicated normal findings on her cardiac physical examination. However, when we examined her, we noted an accentuation of the first heart sound, with an opening snap and a low-pitched mid-diastolic rumble heard best at the apex, in addition to a systolic ejection murmur, diminished second heart sound, and late-peaking carotid upstroke. Echocardiography revealed significant mitral stenosis, with a mitral valve area of 1.05 cm^2, as well as moderately severe aortic stenosis. These findings were consistent with rheumatic heart disease, and upon questioning, the patient reported that she had received that diagnosis in her 30s while teaching in China.

In light of the findings on physical examination and imaging, the patient underwent mitral and aortic valve replacement in addition to the coronary bypass procedure for which she had originally been referred.

A SELF-FULFILLING PROPHECY

These vignettes illustrate the importance of a detailed physical examination—particularly cardiac auscultation—in the clinical evaluation of structural heart disease.

In the first two, there were significant inconsistencies between the auscultatory and echocardiographic findings, and information obtained from careful cardiac auscultation ultimately directed further testing and led to the correct diagnosis. The third scenario is particularly worrisome in our opinion, as it not only represents a lack of auscultatory skills, but probably a failure to listen at all. Further, in this patient's case, failure to diagnose significant valvular disease would likely have meant a need for reoperation at a later date.

Training programs should encourage a renaissance in cardiac auscultation and in bedside clinical diagnosis

Although this is clearly unacceptable, in our experience it is not uncommon. As the skill of auscultation is lost, less and less information is obtained, and the abandonment of auscultation becomes a self-fulfilling prophecy.

AUSCULTATION SAVES MONEY

While these cases show the diagnostic capability of cardiac auscultation, they also show that auscultation has another virtue: it can save money. With skyrocketing health care costs, cost-effectiveness of care is increasingly important. In fact, the modern physician is called to the commitment of the just distribution of finite resources as a principle of

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medical professionalism.[5] Physicians skilled in cardiac auscultation will be better able to distinguish patients who do not have significant disease and, therefore, will provide more appropriate care by decreasing the mindless use of expensive imaging.

Physicians, especially cardiologists, who are not worried about the loss of auscultatory skills are likely those who do not know how to properly auscultate the heart and, therefore, do not appreciate the vital information it may provide. Dependent on echocardiography, they fail to recognize its numerous limitations, particularly in a real-world setting where core echocardiography laboratories are not commonplace. Furthermore, the use of sophisticated hand-held echocardiography machines, often by inexperienced and untrained operators, is on the rise.

Echocardiography: Still an imperfect science

Many variables contribute to the echocardiographic assessment of severity in valvular heart disease. These include jet size and character, which may be affected by inappropriate gain settings, Nyquist limits, wall filters, ultrasound beam angulations, and regurgitant orifice area calculations. Other factors potentially affecting echocardiographic reproducibility include variability between machines, sonographers, and interpreters, as well as differences in medications, loading conditions, and blood pressure.[6,7] This potential for variability in echocardiography underlines the importance of auscultation, particularly at tertiary referral centers, where many patients are evaluated and treated on the basis of testing at other facilities. Although echocardiography has rightfully become the cornerstone of diagnosing valvular heart disease, we may often forget that it is an imperfect science.

Well-honed cardiac auscultatory skills are still an essential part of medical practice and are an indispensable complement to echocardiography. For this reason, medical schools and training programs in cardiology should encourage a renaissance in the art of cardiac auscultation and bedside clinical diagnosis, which we believe will ultimately improve patient care. Excellent resources are available for teaching auscultation, including Web sites and audiovisual software. And there may even be a wise old doctor still around for advice.

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REFERENCES

1. **Mangione S**. Cardiac auscultatory skills of physicians-in-training: a comparison of three English-speaking countries. Am J Med 2001; 110:210–216.
2. **Vukanovic-Criley JM, Criley S, Warde CM, et al**. Competency in cardiac examination skills in medical students, trainees, physicians, and faculty: a multicenter study. Arch Intern Med 2006; 166:610–616.
3. **Fred HL**. Hyposkillia: deficiency of clinical skills. Tex Heart Inst J 2005; 32:255–257.
4. **Grais IM**. Bedside skills: a 50-year personal retrospective. Tex Heart Inst J 2010; 37:629–632.
5. **ABIM Foundation; American Board of Internal Medicine; ACP-ASIM Foundation; American College of Physicians-American Society of Internal Medicine; European Federation of Internal Medicine**. Medical professionalism in the new millennium: a physician charter. Ann Intern Med 2002; 136:243–246.
6. **Gottdiener JS, Panza JA, St John Sutton M, Bannon P, Kushner H, Weissman NJ**. Testing the test: the reliability of echocardiography in the sequential assessment of valvular regurgitation. Am Heart J 2002; 144:115–121.
7. **Fan PH, Anayiotos A, Nanda NC, Yoganathan AP, Cape EG**. Intramachine and intermachine variability in transesophageal color Doppler images of pulsatile jets. In vitro studies. Circulation 1994; 89:2141–2149.

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