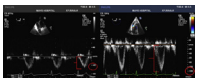
Author has nothing to disclose with regard to commercial support.



PHYSIOLOGIC IMPLICATIONS OF PECTUS EXCAVATUM

Reply to the Editor:

The physiologic implications of pectus excavatum (PE) have for years been debated by physicians. Most patients with PE evaluated for surgery have had symptoms, including exertional dyspnea, chest discomfort, palpitations, and exercise limitations.[1,2] Other less common symptoms have included gastric fullness, dysphagia, reflux, and anxiety.[1,2] In our series of more than 300 adults undergoing surgical repair, nearly 80% had documented cardiac compression associated with their symptoms.[1] More publications continue to support the evidence for significant cardiopulmonary implications that surgical repair can improve.[1,3-7]

One clear mechanism of impairment is the mechanical compression of the right heart chambers, with ensuing limitation of diastolic filling and stroke volume. We previously demonstrated that PE surgery causes a significant increase in right ventricular chamber size, with corresponding increases in right ventricular stroke volume and cardiac output (Figure 1).[3] This change resulted in an increase in right ventricular cardiac output of 38% in all adult patients with PE studied before and after surgical repair and a 65% increase in the older patient cohort (≥30 years).[1,3] Others have reported significantly improved maximal anaerobic oxygen uptake, maximum aerobic capacity, and oxygen uptake per heartbeat after surgical repair.[5-7] With most patients having no ventilator limitations, improvements in aerobic capacity are suggested to be the result of improved cardiovascular adaptation at maximal workload.[4-7] This improved adaptation may be due entirely to relief of cardiac compression and improved cardiac output or may additionally be contributed to by improving respiratory mechanics. Patients with PE demonstrated significantly decreased chest wall motion and increased abdominal contribution to respiration in one study.[8] Impaired inspiratory muscle generation of negative pulmonary pressure may also contribute to the limitations of venous return and cardiac output. With exercise, these changes might impede further the heart's ability to increase the stroke volume and meet increased metabolic demands.[5] Surgical repair of PE has been documented to carry a sustained improvement of these abnormally low maximum cardiac indices and pulmonary function variables.[4,5,7] There are, however, no long-term (>5 years) studies or follow-up of patients with either repaired or unrepaired PE to document the course of PE over patient lifetimes. Further prospective studies and registries are thus indicated ultimately to answer the question, "What are the physiologic implications of PE and the benefits of surgical repair?"

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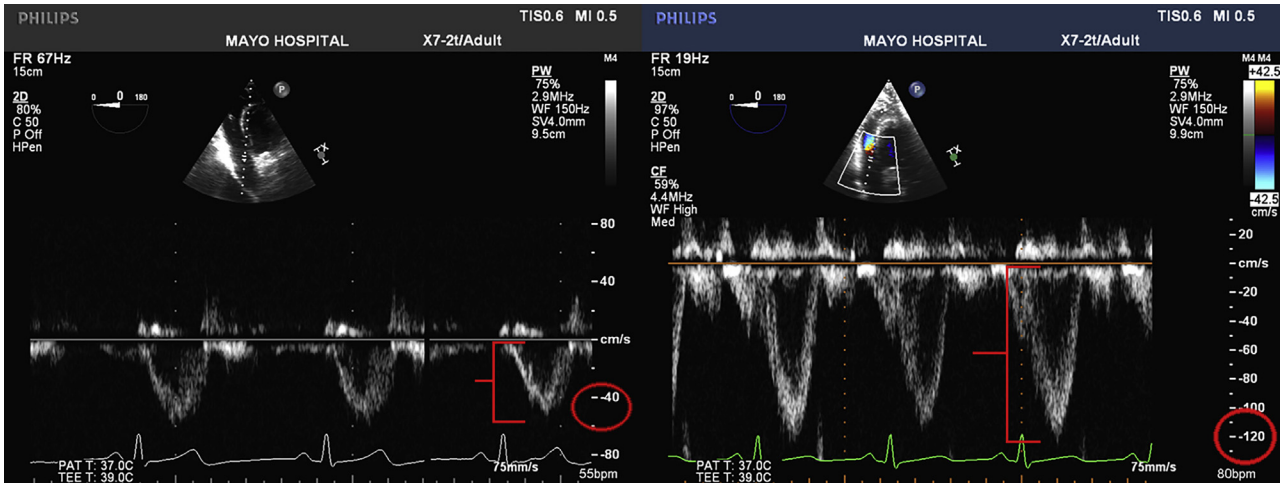

FIGURE 1. Transesophageal echocardiograms taken before (*left*) and after (*right*) Nuss pectus repair in a patient with severe pectus excavatum. The relative right ventricular outflow track velocities are also shown. A significant increase in right ventricular flow is seen increasing with velocity time interval with increase from 40 to 120 cm/s after relief of cardiac compression.

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