A Massive Upper Abdominal Tumor

An Unusual Mechanism of Atelectasis and Cardiac Tamponade

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A 57-YR-OLD woman with a massive liver sarcoma presented with severe hypotension requiring high-dose vasopressor support (norepinephrine at 50 mcg/min), increased central venous pressure (more than 20 mmHg), and respiratory failure (requiring volume control ventilation with inspiratory oxygen fraction FIO2, 0.8 and positive end expiratory pressure, 12). Preoperative transthoracic echocardiography revealed compression of the right atrium, suggesting an extramural tumor; intramural infiltration could not be ruled out. Magnetic resonance imaging (coronal plane) of the chest showed a massive abdominal tumor compressing the right lower and middle lobes, leading to significant atelectasis (fig. A).

She was scheduled for tumor resection via laparotomy and sternotomy. Intraoperative transesophageal echocardiography (midesophageal four-chamber view) revealed significant obliteration of the right atrial cavity by an extracardiac mass (fig. B). Laparotomy and sternotomy resulted in immediate improvement of pulmonary mechanics and oxygenation, as well as decompression of the right atrium (fig. C). Consequently, arterial oxygen tension/FIO2 ratio increased (from 96 to 460), central venous pressure decreased (from 26 to 14 mmHg) and stroke volume (measured by thermodilution) increased (from 41 to 91 ml), such that the vasopressor requirement was markedly lower. The tumor was successfully resected.

An upper abdominal tumor may compress the lung as well as the right atrium, resulting in atelectasis and cardiac tamponade. Increasing pericardial pressure reduces and offsets filling pressure (intracardiac minus pericardial pressure), leading to initial impairment of right heart function, and ultimately of all four cardiac chambers. Decompression and removal of the mass can restore pulmonary function and normalize stroke volume, thereby improving arterial blood pressure.

References