A 37-year-old woman was referred to our institution for minimally invasive surgical repair of a partial anomalous pulmonary venous connection of the right upper pulmonary vein into the superior vena cava and a sinus venosus atrial septal defect. Diagnosis was refined on admission. The patient received routine preparation in the operating room by oral intubation, right radial arterial line, and a left jugular central venous pressure catheter. Peripheral superior vena cava cannulation (Medtronic Inc., Minneapolis, Minn) was used to reduce the length of the thoracotomy. Through a right posterolateral thoracotomy, cardiopulmonary bypass was performed, and the aorta was cross-clamped. On cardiopulmonary bypass, during surgical repair of the anomalous pulmonary venous drainage by baffling it into the left atrium with an autologous pericardial patch, hemodynamic instability and hypovolemia occurred, requiring plasma expanders and packed red blood cell transfusion. At discontinuation of the cardiopulmonary bypass, at routine transesophageal echocardiography examination, a massive left pleural effusion compressing the left lung was noted. Immediately, the thoracotomy was closed and the left side of the chest was drained. Inasmuch as the hemorrhage from the left chest tube was not diminishing and a left carotid artery puncture during left jugular vein cannulation was suspected, an immediate left lateral thoracotomy in the second intercostal space was performed to repair a tear at the origin of the left carotid artery.

The patient was then transferred to the intensive care unit in stable hemodynamic condition and receiving moderate inotropic drug support. Postoperative chest radiograph in the intensive care unit showed a right-sided cardiac mass (Figure 1). This unusual finding was further investigated with thoracic computed tomography, which confirmed a cardiac herniation.

Figure 1. A, Plain chest radiograph performed in intensive care unit shows a right-sided cardiac mass. The central venous catheter has an anomalous path from the superior vena cava into the right atrium. B, Plain chest radiograph at discharge. The cardiac mass is in its normal position.

Figure 2. Thoracic computed tomography of the herniated heart. The left atrium (LA) is connected to an anterior and right-sided left ventricle (LV).
herniation through the pericardium to the right side of the chest (Figure 2). The patient was urgently taken back to the operating room, still in stable hemodynamic condition, and a right re-thoracotomy was performed. The dislocated heart was manually placed back into the pericardial cavity, with no complications. To prevent any further cardiac herniation, the pericardium was closed with a polytetrafluoroethylene membrane. The patient’s hemodynamic condition improved, and inotropic drug support was discontinued. The postoperative chest radiograph confirmed the normal levocardia (Figure 1B).

Cardiac herniation is a rare event, which is usually described after blunt trauma to the chest or a pneumectomy, but it can occur as a complication of correction of simple congenital heart malformations through minimally invasive approaches. Caution must be observed when the pericardial sac is incised on the right side, allowing the heart to be freely shifted into the chest cavity.

Disclosures
None.

References
Cardiac Herniation After Minimally Invasive Cardiac Surgery: An Unusual Potentially Lethal Complication
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