

## CASE REPORT

# Severe aortic stenosis associated with left diaphragmatic palsy

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Diaphragmatic palsy in cardiac surgery is mainly related to coronary artery bypass surgery and has sometimes been found as one of the main factors associated with cardioplegia. We present a patient who was diagnosed with aortic stenosis and had associated left diaphragmatic paralysis. Both etiologies were resolved in a single surgical time with adequate evolution.

**Key words:** Aortic valve stenosis; Bicuspid aorta valve. Diaphragmatic palsy.

La parálisis diafragmática en cirugía cardíaca se relaciona principalmente con las cirugías de revascularización coronaria y en ocasiones se ha encontrado como uno de los principales factores asociados a la cardioplejía. Presentamos un paciente que fue diagnosticado de estenosis aórtica y tenía asociado parálisis diafragmática izquierda. Se resolvió ambas etiologías en un solo tiempo quirúrgico con adecuada evolución.

**Palabras clave:** Estenosis aórtica; Válvula aórtica bicúspide; Parálisis diafragmática.

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Acquired diaphragmatic palsy in adults is very seldom associated to any primary heart disease. Most of cases are seen as a result of trauma or after using cardioplegia for open cardiac surgery [1,2]. We present herein one case of posttraumatic left diaphragmatic palsy in association with bicuspid aortic valve stenosis operated on successfully.

### CLINICAL CASE

A 69-year-old patient was referred at our institution with progressive dyspnea. Of note, a history of past left thoracic trauma 60 years ago was present. Echocardiography revealed a bicuspid aortic valve area of 0.65 cm<sup>2</sup>. Thoracic CT-scan demonstrated a cardiac shifting to the right. (Fig. 1A) (Fig. 1B).

Diaphragmatic plication and mechanical valve replacement were successfully performed (Fig. 2). Subsequent chest x-ray was carried out as a control (Fig. 1C) (Fig. 1D).

### COMMENT

Acquired diaphragmatic palsy in adults is multifactorial, infrequently associated with heart valve disease. Symptoms

will depend on the hemodynamic changes; whereas the respiratory symptoms depend on whether or not the paresis is unilateral or bilateral and, on the etiology, onset, progression, and presence of underlying pulmonary disease. Unilateral diaphragmatic palsy is commonly caused by ipsilateral phrenic nerve palsy. The most common cause is actually open-heart surgery, with an incidence between 2% and 20% [1,2]. The left phrenic nerve is more commonly affected than the right one, perhaps associated with the left internal mammary artery harvesting [2].

Another theory is that cold cardioplegia induces a direct thermal injury to the phrenic nerve during cardiac arrest [1,2]. Supporting this above, animal studies have demonstrated that local hypothermia induced by cardioplegia can lead to acute demyelination and axonal degeneration of the phrenic nerve [3]. In contrast, phrenic nerve injury is relatively uncommon in other non-cardiac thoracic surgery, such as lung resections for carcinoma [4]. Unilateral diaphragmatic palsy is a well-tolerated condition with a favorable prognosis. Diaphragmatic plication is indicated in carefully selected patients with unilateral diaphragmatic palsy.

Our patient presented some symptoms suggestive of heart valve disease and after the findings in the imaging studies we performed the surgical treatment of his heart disease and the diaphragmatic repair.

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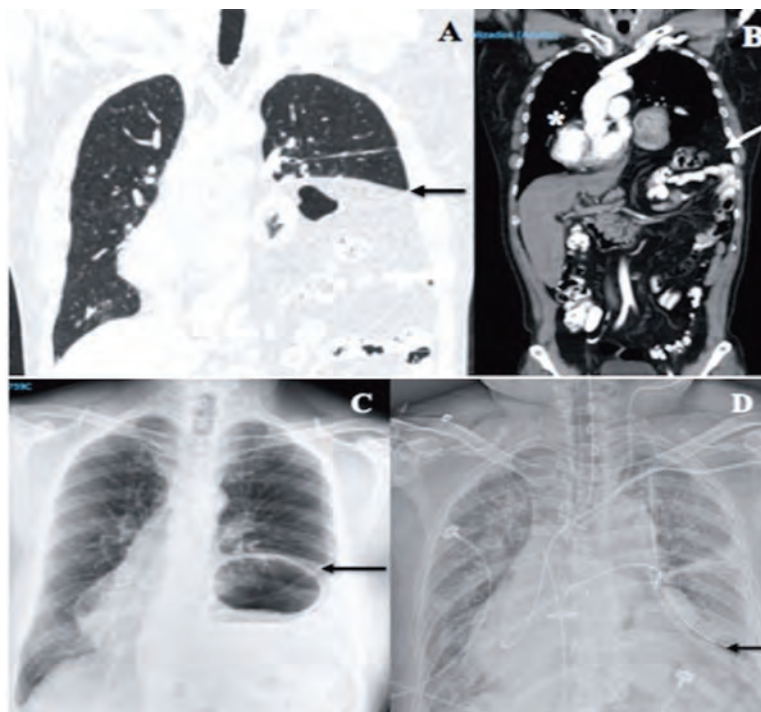


Figure 1. Coronal CT-scan reconstruction. A) pulmonary windows with coronal view. B) mediastinal windows with coronal view, shows abdominal structures into the left hemithorax (white and black arrows) and displacement of heart and aorta to the right (\*). C) preoperative chest X-ray with the left diaphragm raised up (arrow). D) postoperative chest X-ray with the left diaphragm in appropriate position (arrow).

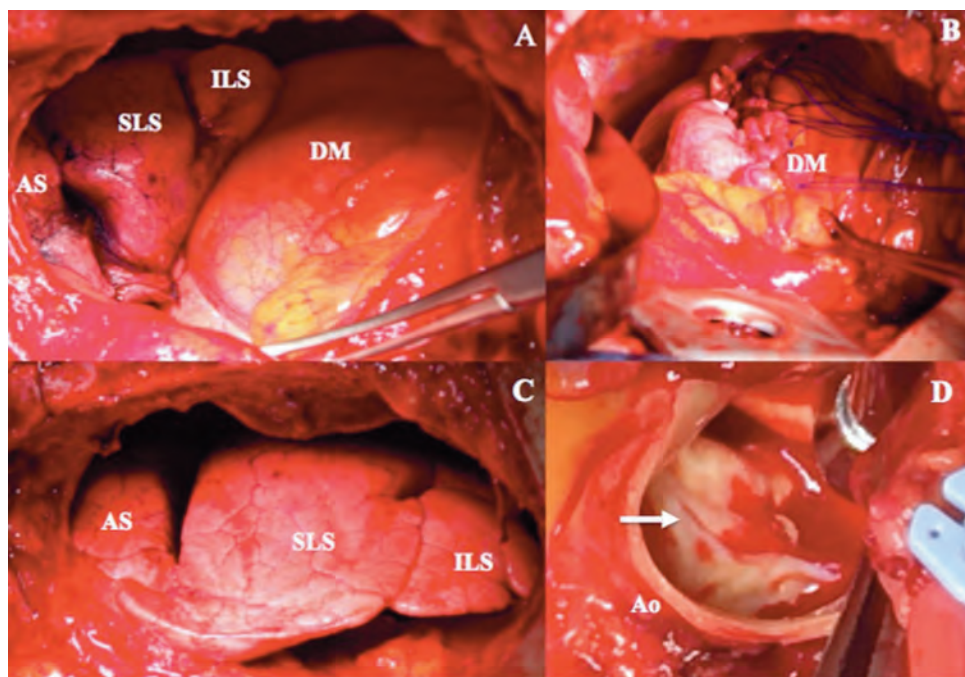


Figure 2. Intraoperative photograph shows A) elevated left diaphragm with pulmonary displacement, B) diaphragmatic plication, C) pulmonary expansion after correction, D) aortic valve calcified with stenosis (arrow).

AS: Anterior segment, SLS: Superior lingular segment, ILS: Lower lingular segment, DM: Diaphragm muscle, Ao: Aorta artery.

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