

migration, often resulting in oesophageal rupture [5]. Extrinsic airway compression of the main bronchi has once been reported [6].

The correct placement of the SBT is vital in reducing the risk of major complications, and the use of a chest radiograph to confirm the position of the SBT prior to maximal inflation of the gastric balloon has been suggested [5,7]. The gastric balloon should be positioned retracted against the cardia. Although not performed prior to maximal inflation in our case, an early chest radiograph confirmed the correct position of the gastric balloon. Once correct positioning has been confirmed, the SBT is commonly placed on traction with 500–1000 g weight (500 mL of crystalloid in our case). The use of traction does place the SBT at risk of migration. In our case, the gastric balloon migrated into the oesophagus, lodging behind the trachea, possibly being held in place by the complete cricoid ring. Life-threatening extrinsic tracheal compression thus ensued. This was evidenced by the rapid improvement in tidal volume and reduction in airway pressures on removal of the SBT. To avoid the use of traction, and its associated risks of migration, many clinicians now prefer to simply tape the SBT in place once the correct position of the gastric balloon has been confirmed by chest radiograph. Whether the SBT is held under traction or is taped in position, it is important that the correct position of the SBT at the lips or nose is clearly marked on the tube. This simple, but commonly overlooked, step allows any future dis-

placement to be easily recognized. In our case, displacement of the SBT was not immediately recognized but would have been greatly facilitated had the correct position of the SBT been clearly marked at the nose.

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## The use of esmolol to treat systolic anterior motion of the mitral valve after mitral valve repair

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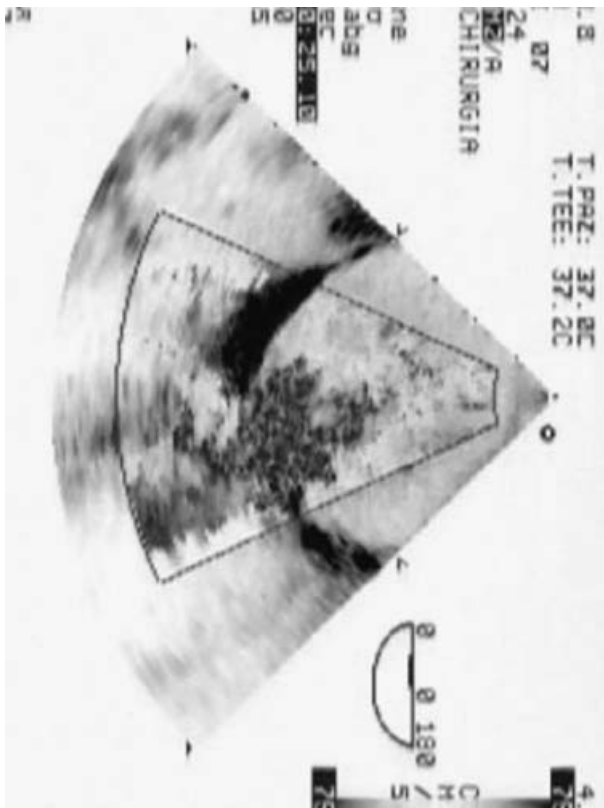
Systolic anterior motion of the mitral valve causing left ventricular outflow tract obstruction is common after mitral valve repair, but only rarely necessitates immediate additional surgical intervention. Although multiple surgical techniques have been proposed to prevent systolic anterior motion [1], it

remains a problem after mitral valve repair. The degree of systolic anterior motion extends along a continuous spectrum from minor chordal-only systolic anterior motion to its most severe form with permanent left ventricular outflow tract obstruction and moderate-to-severe mitral regurgitation.

The management of systolic anterior motion in the operative room remains controversial. Even if some authors advocate immediate surgical correction [2], most patients with systolic anterior motion can be successfully managed with medical treatment [3] (increasing systemic vascular resistance, augmenting intravascular volume and administering

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**Figure 1.**

Systolic anterior motion of the mitral valve causing left ventricular outflow tract obstruction after mitral valve repair. A mid-oesophageal four-chamber transoesophageal echocardiographic view at 0° rotation of a patient who has just been weaned from cardiopulmonary bypass.

$\beta$ -blockade), and rarely systolic anterior motion leads to early mitral valve repair failure necessitating revision or valve replacement.

A mid-oesophageal four-chamber transoesophageal echocardiographic view is shown of a patient who has just been weaned from cardiopulmonary bypass (CPB) after mitral repair (Fig. 1). The problem we faced was how to differentiate between transient (haemodynamic) and permanent (anatomic) systolic anterior motion. Being a referral centre for mitral surgery, with more than 400 mitral repairs per year [4], we have developed the 'esmolol test'. Here, 100 mg of esmolol is injected as a bolus through the central venous catheter. A rapid regression of systolic anterior motion is observed.

The potential for systolic anterior motion is provided by anatomic factors such as the presence of redundant anterior leaflet tissue, increased posterior leaflet height, prominent interventricular septum, narrow aortic-mitral angle and a too small annuloplasty ring [5]. Systolic anterior motion may be exaggerated by haemodynamic factors such as

hypovolaemia, vasodilation, increased inotropy and increased heart rate. The haemodynamic factors can be considered reversible, while the anatomic factors are relatively fixed and may not regress.

Decreased systemic vascular resistance, inotropic support, increased sympathetic tone and tachycardia with decreased diastolic left ventricular filling time are common haemodynamic conditions that present after separation from CPB. Conventional measures to resolve systolic anterior motion and left ventricular outflow tract obstruction such as intravascular volume expansion, termination of inotropic agents and increasing afterload could require time and may be unsuccessful.

Rapid injection of an esmolol bolus can quickly resolve the systolic anterior motion and left ventricular outflow tract obstruction if it is the result of haemodynamic factors, alleviating hyperdynamic left ventricular conditions and their contribution to dynamic left ventricular outflow tract obstruction and helping to identify the few patients who require immediate additional surgical intervention.

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