

## Additional applications of the Foley catheter in cardiac surgery

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**SUMMARY:** Additional applications of the Foley catheter in cardiac surgery.

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*We describe an additional use of the Foley catheter for preoperative and postoperative evaluation of the regurgitant mitral valve.*

**KEY WORDS:** Foley catheter - Cardiac surgery - Mitral valve repair - Minimally invasive surgery.

### Introduction

The use of Foley catheter has been frequently described in cardiac surgery due to its cheapness and versatility in many applications, such as for the cardioplegia administration or for the endovascular occlusion in addition to other devices. We describe an additional use of the Foley catheter for preoperative and postoperative evaluation of the regurgitant mitral valve.

### Patients and methods

At our Institution, from October 2008 to now, more than 100 patients underwent mitral valve repair for ischemic or degenerative regurgitation, both via right thoracotomy or full sternotomy.

After cardiopulmonary bypass institution and aortic cross clamp, the left atrium is opened and the mitral valve analyzed.

#### *Technique*

First of all, the mitral leaflets are carefully evaluated to identify undetected alterations of the cords, like elongation or rupture. However, the mechanisms of regurgitation could be unclear and the possibility to evaluate the mitral valve with the filled left ventricle offers additional information to understand the mechanisms of regurgitation.

Thus, we usually fill the left ventricle by the infusion of saline solution through a Foley catheter inserted via the mitral valve. The Foley catheter is usually connected to a 60 cc syringe (Fig. 1) with a cone-shaped output. At the proximal tip of the Foley catheter, the line for the urine output is connected to the cone-shaped output of the syringe and the saline solution is slowly administered. Usually, 120-150 ml are enough to fill the left ventricle (depending on the degree of ventricular enlargement), allowing a complete direct evaluation of the mechanisms of mitral regurgitation. When the preoperative evaluation is completed, the mitral valve is repaired according to the evidence of the direct inspection (in addition to the information obtained by preoperative trans-esophageal echocardiography). After the mitral valve is repaired, regardless of the surgical technique used, we carry out the postoperative control in the same way, by the infusion of saline solution through the Foley catheter inserted into the left ventricle via the repaired mitral valve. When the ventricle is completely filled (2-3 syringes), the mitral valve looks a D shaped conformation and the presence of regurgitation (when present) may be easily detected.

No complications have been reported, caused by the described technique.

### Discussion

The use of Foley catheter has been frequently described in cardiac surgery, such as for the cardioplegia administration or for the endovascular occlusion (1-2) in addition to other devices (3). However, no other papers dealing with the topic of mitral valve evaluation by means of a Foley catheter are available to us.

The practice of postoperative evaluation of the results of mitral valve repair by filling the left ventricle is widely accepted, with different and unpublished techniques, such

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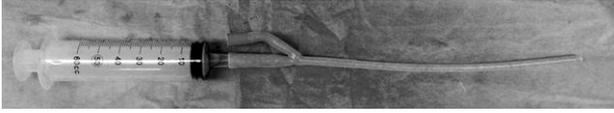


Figure 1 - The line for the urine output of the Foley catheter is inserted into the cone shaped output of a 60 cc syringe.

as the use of a segment of a chest tube or the use of a syringe alone. Unfortunately, the use of a stiff device as the chest tube may cause serious injuries to the repaired mitral valve. Moreover, the use of a short device such as the syringe is complicated in case of minimally invasive approach and interferes with the movement of the mitral leaflets, confusing the understand of the mechanisms of regurgitation.

In our opinion, the use of Foley for preoperative and postoperative evaluation of the mitral valve may be of interest, mainly in case of minimally invasive mitral surgery. It accounts several advantages:

- is a widely available device with a very limited costs;
- Foley catheter is smooth and this avoids any sudden

## References

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injury to the mitral valve, particularly after repair, when the presence of the prosthetic annulus or the suture into the mitral leaflet may be easily damaged by means of other devices;

- length of the Foley allows an easy filling of the left ventricle, without interferences with the function of the mitral valve;
- possibility to carry out a test for the mitral valve continence before and after repair is of great utility in those centers where the 3D echocardiography is not yet available, because the evaluation of the coaptation of the mitral leaflets by means of a direct inspection offers additional information for a more comprehensive understanding of the mechanism of regurgitation.

## Conclusion

The use of Foley catheter to fill the left ventricle in case of mitral valve repair is a simple trick to obtain a preoperative and postoperative evaluation of the function of the mitral valve.

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