

Enhanced exposure of subvalvular structures during mitral valve repair with a novel flexible and reusable leaflets retractor

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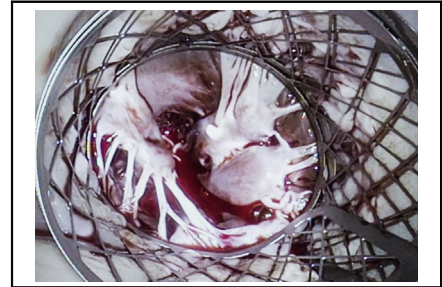
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Novel mitral valve leaflets retractor for minimally invasive valve reconstruction.

Central Message

During mitral valve repair, wide exposure of the left ventricle/papillary muscles for comfortable implantation of neochordae can be achieved using a novel, reusable leaflets retractor.

▶ Video clip is available online.

In degenerative mitral valve surgery, mitral valve repair can be performed with very low mortality (<1%) and offers a postoperative survival similar to the expected age- and sex-adjusted general population.¹ An important step of the valve reconstruction involves removal of the pathologic leaflet segment and/or resuspension of the loose leaflet segment on an adequate papillary muscle with the use of artificial chordae.² Exposure of the papillary muscles, particularly through a minimally invasive approach, can sometimes be challenging, especially in cases characterized by excess of leaflet tissue. Here we present a novel leaflets retractor manufactured from nickel–titanium alloy developed for easy introduction through the mini-thoracotomy and precise placement within the mitral valve annulus.

TECHNIQUE

In our clinic, the right mini-thoracotomy is the access of choice in all cases with isolated mitral or/and tricuspid valve pathology. Since August 2016, we have routinely used the retractor. After exposure of the mitral valve and inspection of the valve pathology, the leaflets retractor can be placed. For this, the flat retractor (0.12 × 25 × 200 mm) (Figure 1, A) can be easily rolled to a cylindrical form with a diameter of 15 mm and then grasped with a long needle holder (Figure 1, B). Like this, it may be introduced through the mini-thoracotomy and inserted into the mitral valve annulus. Initially, once released from the needle holder, the retractor opens spontaneously within the annulus and

if required, can be easily de-rolled/adjusted up to maximal diameter of the valve annulus by using additional long forceps (Video 1). Subsequently, both leaflets are pushed to the sides and exposure of entire subvalvular apparatus is achieved (Figure 2). Implantation of neo-chordae can be comfortably performed on one or several papillary muscles. Afterwards, the retractor can be removed by simple pulling on one retractor end (Video 1). Finally, artificial chordae are fixed to the free edge of the leaflet in any convenient manner.

COMMENT

Placement and release of new retractor, with normal minimally invasive instruments, is simple and convenient for the surgeon. It does not require additional devices or fixation tools and does not produce additional surgical trauma. Moreover, introduction and complete deployment requires only seconds and does not impact ischemia time.

The idea is not novel, and several facilitating tricks or special devices have been already proposed for this reason. Dr J. Lamelas developed a comparable commercial device (COLLAR Papillary Muscle Exposure Device; Miami Instruments, Miami, Fla). However, it is a disposable device that increases the costs of the procedure. Our retractor, in comparison, can be sterilized and was designed as a fine metal grate/mesh to allow it to remain easily fixed within the annulus. In addition, it allows the visualization of the

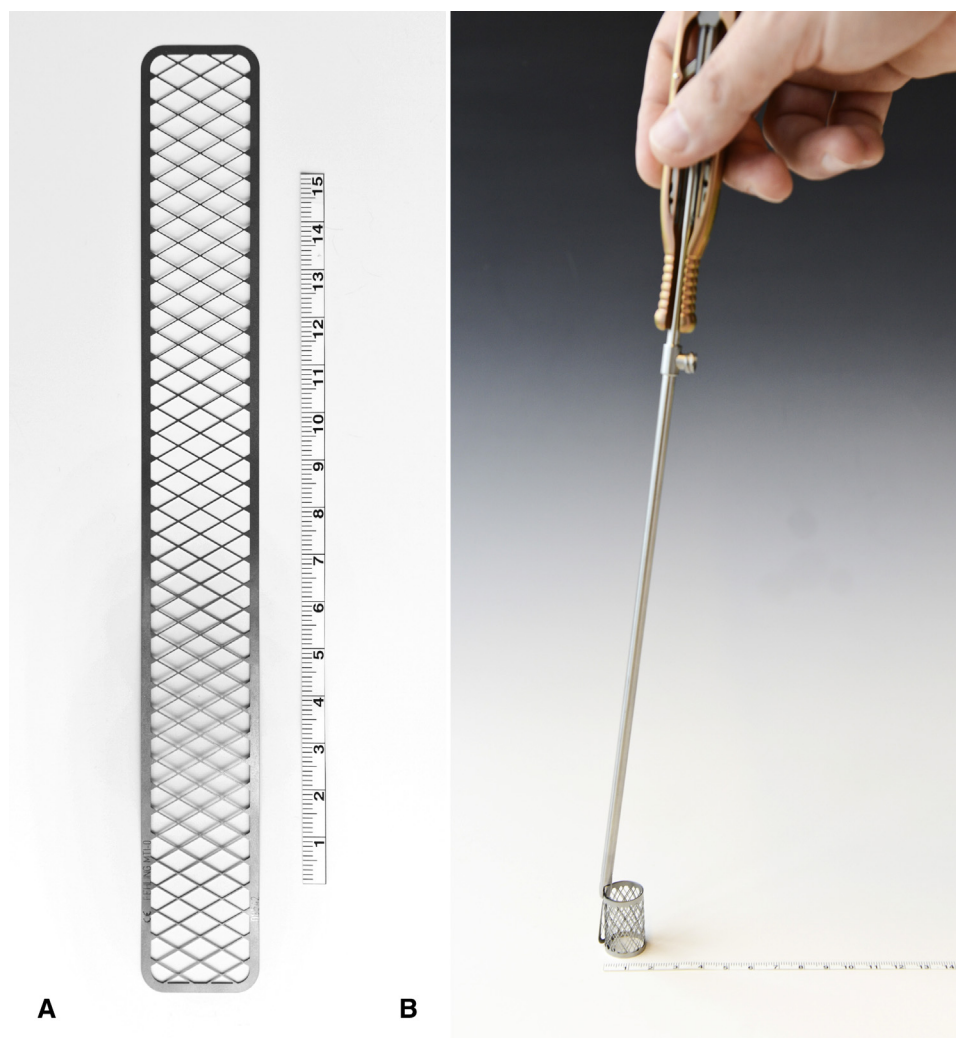
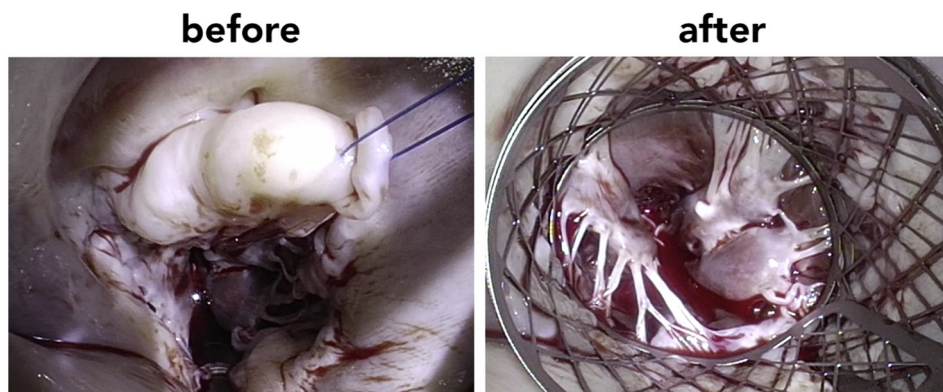


FIGURE 1. Mitral valve leaflets retractor for minimally invasive surgery, in the unmanipulated flat form (A) and in the cylindrical form held with a needle holder (B).

structures pushed under retractor. This allows visualization of native chordae during implantation of the neo-chordae and helps for their correct distribution on the appropriate

papillary muscle depending on insertion of the neighborhood native chordae. Furthermore, because of its flexibility, the retractor can even be placed within an already-



VIDEO 1. Minimally invasive mitral valve reconstruction with implantation of neo-chordae using the novel mitral valve leaflets retractor. Video available at: <http://www.jtcvsonline.org>.

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