

# 'Cupid and Psyche': a novel technique for robotic hysterোসacropexy in the treatment of pelvic organ prolapse

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## ABSTRACT

**Purpose:** The purpose of any surgical repair of pelvic organ prolapse (POP) is to restore pelvic anatomy, preserving urinary, intestinal and sexual functions while avoiding complications. We present a novel robotic approach to hysterোসacropexy (HSP) in the treatment of POP.

**Methods:** In our technique (named 'Cupid and Psyche', recalling as it does the famous sculpture by Canova), the two branches of the MESH encircle the uterus from behind, lifting and supporting it.

The aim of this technique is to resolve POP, minimizing the risk of vaginal erosion: the posterior 'embrace' of the uterus limits the direct contact of the mesh with the vagina, thus reducing any risk of erosion/extrusion at this level. We performed 10 cases of robotic HSP.

**Results:** All procedures are completed robotically. Median operative time (skin-to-skin) is 125 min [interquartile range (IQR) 85-145], including port placement, robot docking and console time. We have never had any cases of intraoperative or postoperative complications.

With regard to short-term follow-up, analysis of outcomes is limited; in any case, we have never had any cases of MESH erosion or other complications, and no sexually active woman complained of dyspareunia.

**Conclusions:** Maintaining sufficient motility of the vagina is another advantage of 'Cupid and Psyche', avoiding as it does any negative effects on patients' later sexual activity, granting more natural motility of both uterus and vagina but resolving the prolapse.

Further prospective studies comparing the long-term functional outcomes of the various HSP techniques are needed to confirm these findings.

**Keywords:** MESH, Pelvic organ prolapse, Robotic surgery, Sexuality

## Introduction

Pelvic organ prolapse (POP) has widespread prevalence, affecting nearly 50% of parous women. The number of patients presenting with POP will probably increase as the population ages (1, 2). Because of its high prevalence, deleterious effects on the quality of life and impact on the healthcare system, female pelvic floor dysfunction is an important public health issue (3).

The purpose of any surgical repair of POP is to restore pelvic anatomy, preserving urinary, intestinal and sexual functions while avoiding complications. The incidence of surgery for prolapse is between 1.5 and 4.9 cases per 1000 women-years (4-7). Although the peak incidence of such surgery is for women aged 60-69 years (42.1 per 10,000 women), almost 58% of procedures are undertaken in women under 60 (4).

For apical prolapse, repair by abdominal sacrocolpopexy is recommended for its excellent anatomical and functional outcomes (8). Surgery usually involves the use of native tissues for site-specific repair of fascial defects.

Diez-Itza et al (9) observed that 29% of operated women would probably require re-intervention within 12.5 years, due to recurrence. The reason for this high recurrence risk is typically attributed to the autologous tissues used during POP repair. As native tissues, by definition, are of inherently insufficient quality (10), surgical repairs with implant materials are recommended for reinforcement.

The most common graft-related complications (GRCs) include reherniation, contraction (or shrinkage), chronic pain,

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seroma, infection, formation of adhesions and extrusion (also called erosion).

Exposure and extrusion are conditions in which epithelial integrity is lost (11). They may be due to primary incomplete or failed closure of the vagina, inappropriate insertion with passage through the vagina and other still undetermined secondary mechanisms, for example, infection and folding. In the case of exposure, the implant is displayed and the mesh becomes visible through the separated vaginal epithelium. Extrusion is the gradual passage out of a body structure or tissue (e.g. a loop of tape protruding into the vaginal cavity) (11).

Although evidence of the safety and efficacy of uterine preservation for surgical management of uterine prolapse is currently lacking (12), most surgeons decide to spare the uterus when hysterectomy was not indicated, as in for young or sexually active menopausal patients.

The aim of this paper is to describe a novel robotic approach to hysteropexy (HSP) in the treatment of POP, presenting our early experience.

We performed 10 cases of robotic HSP.

## Methods (surgical technique)

The patient is placed in a dorsal lithotomy position [see Video]. The da Vinci Surgical System (Intuitive Surgical, Sunnyvale, California, USA) is used in a four-arm configuration, with a zero-degree scope.

A 12 mm supra-umbilical camera port is placed, and pneumoperitoneum is established. Under direct vision, two robotic ports are placed 8 cm on either side of the camera port in a wide configuration. The fourth robotic port is placed 3 cm above the left anterior superior iliac spine, and an additional 12 mm laparoscopic port for the assistant is placed between the right robotic port and the right anterior superior iliac spine (Fig. 1). The patient is placed in a 15% Trendelenburg position. The robot is placed between the patient's legs and docked.

To retract the uterus upwards, a stitch is passed through the fundus uteri. Instead of using a static suture passing through the skin, we prefer to use this stitch, as it allows dynamic lateral traction during the various steps of the operation.

The bladder is filled with 200 ml of saline, to better define the bladder. The peritoneum is slightly incised just over its reflection from the bladder on the anterior vaginal wall. Extensive isolation of the anterior vaginal wall is unnecessary with this technique, and the risks of both bleeding and devascularisation of the wall are thus reduced: we believe that extensive cautery at this level and consequent partial devascularisation of the vaginal wall, above all in menopausal patients, may favour adverse events such as erosion/extrusion of the mesh.

We then perform an incision of the posterior peritoneal reflection overlying the uterine cervix, creating a posterior plane on which to place the posterior branch of the mesh; this is followed by incision of the right and left broad ligaments of the uterus.

Lateral retraction of the sigmoid colon is achieved with the help of the fourth robotic arm, in order to expose the sacral promontory. The overlying tissue of the sacral periosteum is cut, exposing the bone. The superficial incision of the parietal peritoneum is extended from the promontory to the posterior reflection.

## Trocars Position Scheme (for da Vinci™ 4-arm)

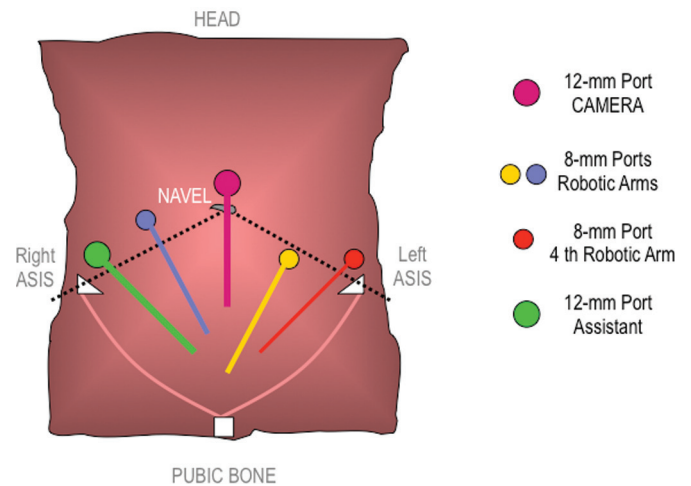


Fig. 1 - Scheme of trocars' positioning.

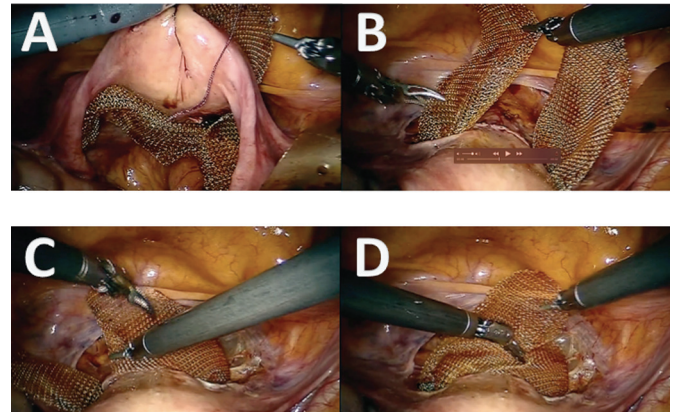


Fig. 2 - Each distal part of the mesh is passed through the broad ligament through the previously created hole (A), and crossed on the anterior surface of the uterus (B-D).

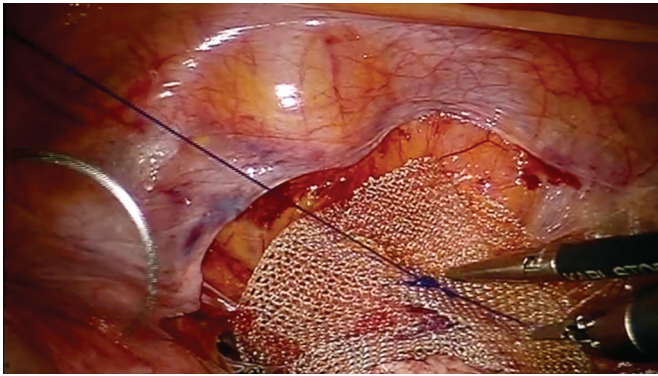
The mesh is a two-branched rectangular polypropylene strip: both branches are sutured together on the proximal side.

Each distal part of the mesh is passed through the broad ligament through the previously created hole, and crossed on the anterior surface of the uterus (Fig. 2A-D). The two crossed branches are sutured on the anterior surface of the uterus and on a small portion of the anterior vaginal wall with non-absorbable 2-0 monofilaments or Ticron® stitches (Fig. 3).

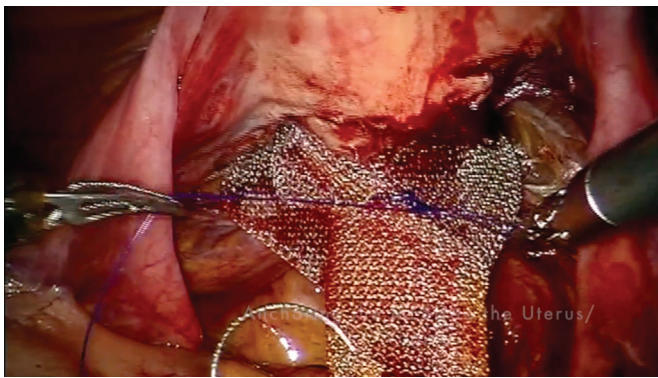
The two branches of the mesh are then fixed on the posterior uterine surface and together with the same kind of stitches as above (Fig. 4).

The proximal parts of both branches, previously sutured together, are sutured to the sacral promontory with three single, non-absorbable 2-0 monofilaments or Ticron® stitches (Fig. 5).

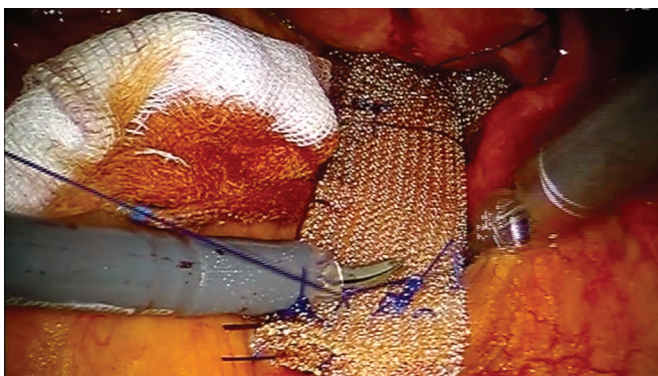
To cover the mesh and avoid contact with the bowel, the parietal peritoneum near the anterior and posterior surfaces



**Fig. 3** - The two crossed branches are sutured on the anterior surface of the uterus.



**Fig. 4** - The two branches of the mesh are then fixed on the posterior uterine surface and together.



**Fig. 5** - The proximal parts of both branches are sutured to the sacral promontory.

of the vaginal vault and the sacral promontory is sutured with absorbable stitches.

## Results

All procedures are completed robotically. Median operative time (skin-to-skin) is 125 min [interquartile range (IQR) 85-145], including port placement, robot docking and console

time. Median estimated blood loss is insignificant, and no intraoperative transfusions are required. We have never had any cases of intraoperative or postoperative complications.

With regard to short-term follow-up, analysis of outcomes is limited; in any case, we have never had any cases of mesh erosion or other complications, and no sexually active woman complained of dyspareunia.

## Discussion

We named the above technique 'Cupid and Psyche', recalling as it does the famous sculpture by Canova, in which Cupid embraces Psyche from above and behind, while her arms encircle his head and shoulders. In the same way, with our technique, the two branches of the mesh encircle the uterus from behind, lifting and supporting it.

The aim of this technique is to resolve POP, minimizing the risk of vaginal erosion: the posterior 'embrace' of the uterus limits the direct contact of the mesh with the vagina, thus reducing any risk of erosion/extrusion at this level.

Maintaining sufficient motility of the vagina is another advantage of 'Cupid and Psyche', avoiding as it does any negative effects on patients' later sexual activity. In comparison with other proposed techniques, the placement of the mesh around the uterus avoids distal fixation on either side of the levator muscle and the posterior wall of the vagina, granting more natural motility of both uterus and vagina but resolving the prolapse.

In addition, minimizing dissection of the peritoneal area between bladder and vagina, this technique can reduce the risk of some intraoperative and postoperative complications, such as vaginal or bladder injuries, or erosion/extrusion of mesh.

Robotic HSP was developed to reduce surgical invasiveness and has been shown to achieve similar results with respect to the open approach. The proposal of novel robotic approaches for POP is justified by the need to further improve functional outcomes, such as sexual function.

It was in this spirit that we developed and propose here the 'Cupid and Psyche' technique. However, because our study group is small, these results are preliminary and further prospective studies comparing the long-term functional outcomes of the various HSP techniques are needed to confirm the above findings.

## Disclosures

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