Does the Use of a Barbed Polyglyconate Absorbable Suture Have an Impact on Urethral Anastomosis Time, Urethral Stenosis Rates, and Cost Effectiveness During Robot-assisted Radical Prostatectomy?

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OBJECTIVE To evaluate the use of a single needle driver with the V-Loc (Covidien, Dublin, Ireland) running suture and compare this with the use of 2 needle drivers with polyglactin interrupted sutures (IS) in dividing the dorsal venous complex (DVC) and forming the urethrovesical anastomosis (UVA) during robot-assisted radical prostatectomy (RARP).

MATERIALS AND METHODS A prospective cohort study was performed to compare V-Loc (n = 40) with polyglactin (n = 40) sutures. Division of the dorsal venous complex and formation of the UVA during robot-assisted radical prostatectomy using V-Loc or polyglactin sutures were studied. Preoperative, intraoperative, and postoperative parameters were measured.

RESULTS V-Loc sutures were associated with a statistically significant reduction in mean dorsal vein suture time (3.15 minutes V-Loc vs 3.75 minutes IS, $P = .02$) and UVA anastomosis time (8.5 minutes V-Loc vs 11.5 minutes IS, $P = .001$). No significant difference was noted between operative time (121 minutes V-Loc vs 130 minutes IS, $P = .199$), delayed healing rates (5% V-Loc vs 7.5% IS, $P = .238$), continence rate at 12 months (97.5% V-Loc vs 95% IS, $P = .368$), and urethral stenosis rates (2.5% V-Loc vs 2.5% IS, $P = .347$) in both groups.

CONCLUSION The use of a V-Loc running suture with a single needle driver is a feasible, reproducible, and economic technique with no significant difference in continence rates and urethral stenosis rates, compared with the use of a traditional interrupted suture. UROLOGY 82: 90–94, 2013. © 2013 Elsevier Inc.

The introduction of robotics into urology has allowed more surgeons to perform minimally invasive prostatectomy. This procedure has significant cost implications, and although the operative equipment costs and procedure times have decreased with the increasing experience of using the robot, there is no overcoming the initial capital expense or the cost of expensive disposable instruments and maintenance contracts.

There are undoubtedly growing financial pressures that are being felt by the medical community in Europe and North America. The high additional costs of robot-assisted radical prostatectomy (RARP) are a problem of consideration. At present, the use of the robot adds €1500 (US $1948.50) to the costs compared with the standard open procedure.[1]

The use of 2 needle drivers during RARP, when performing the dorsal vein complex (DVC) ligation and formation of the urethrovesical anastomosis (UVA) is a well-described technique.[2]

We evaluated the use of a single needle driver with the barbed polyglyconate (V-Loc, Covidien, Dublin, Ireland) running suture and compared this with the use of 2 needle drivers with polyglactin interrupted sutures (IS) in dividing the DVC and forming the UVA.

The use of a single needle driver and a barbed V-Loc suture may provide clinical and financial advantages to the robotic setting. We describe a novel technical modification during robot-assisted radical prostatectomy and evaluate its outcome clinically and economically.

MATERIALS AND METHODS

We performed a prospective cohort study with 2 groups of patients (n = 40 in each group), with similar preoperative

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characteristics, who underwent RARP between March 2010 and March 2011 by a single experienced surgeon (H.B.).

We performed the division of the DVC and formation of the UVA with either an IS or V-Loc running suture. The patients in the IS group underwent an interrupted suture with polyglactin using 2 needle drivers according to the Montsouris technique,[3] which was our reference. The patients in the V-Loc group underwent a single-knot running suture technique with barbed polyglyconate (V-Loc) suture using a single needle driver. All patients assigned to either group were provided with informed consent.

We describe 2 different ways of dividing the DVC and performing the UVA according to the particular group the patient was assigned to.

IS Group

1. Dividing of the DVC

By the use of a double needle driver, 1 or 2 periurethral retropubic stitches (2-0 braided coated polyglactin, needle length 26 mm, suture needle half circle) were passed from right to left between the urethra and the DVC, were then tied into a knot. Another stitch was passed again through the DVC, then through the pubic bone into a figure of 8, then tied with a mild amount of tension according to Patel's technique[4] (Fig. 1A).

2. Fashioning of the UVA

By the use of a double needle driver, an interrupted 3-0 polyglactin suture (needle length 17 mm, suture needle half circle) was used, according to the Montsouris technique.[3]

V-Loc Group

1. Dividing of the DVC

A single needle driver was used to perform a similar running suture as in the IS group, though in a knotless fashion. A running suture (2-0 barbed polyglyconate) was passed three times from right to left between the urethra and the DVC, then twice through the pubic bone (Fig. 1B).

2. Fashioning of the UVA

The sequential steps used a running 3-0 barbed polyglyconate (V-Loc) with a single needle driver. The stitch was placed at the 4-o'clock position. To promote efficiency of the running sutures, the needles are passed from outside into the bladder and then inside out of the urethra in one throw. Care is taken to pull the suture perpendicular to the urethral stump, rather than pulling it back towards the camera (as this can cause the suture to take a U-turn through the urethral wall and increase the risk of a urethral tear).

Data were collected on preoperative and postoperative maximum urinary flow (Qmax) (at 12 months), preoperative and postoperative International Prostate Symptom Score (IPSS) (at 12 months), prostate volume, DVC suture time, UVA time, operative time, bladder neck conservation, delayed healing rate, length of hospital stay, continence evaluation, and cost difference between both techniques.

Delayed healing was defined as the persistence of a high level of creatinine in the drain beyond postoperative day 7.

Global cost was defined as the combined total cost of the robot and disposal instruments, including sutures (excluding value added tax).

Statistical Methods

We performed a prospective cohort study. Qualitative data were reported as frequencies and percentages and as an odds ratio along with their 95% confidence intervals (95% CI). Shapiro-Wilk and Kolmogorov-Smirnov tests were used to assess the normality of quantitative data. Quantitative data were reported as mean ± standard deviation if normal, or as a median with its interquartile range (median [first quartile-third quartile]). The univariate analysis included the χ^2 test corrected by the Fischer exact test when needed, the Mann-Whitney U test and the t test as appropriate. All the reported P values were 2-sided and P values less than .05 were considered significant. All computations were done using SPSS v13 statistical software (Chicago, IL).

RESULTS

All patients in the V-Loc group underwent a successful procedure using one needle driver. There was no significant difference in many baseline characteristics between the 2 groups (Age, preoperative and postoperative Qmax at 12 months, preoperative and postoperative IPSS at 12 months, prostate volume, bladder neck conservation and continence rate at 12 months, operative time, transfusion rate, delayed healing rate, length of hospital stay, and urethral stenosis rate requiring a urethrotomy). There was a difference in DVC suture time and anastomotic suture time; however, there was no significant difference in the overall operative time between the 2 techniques (Table 1). The cost ratio was calculated as 1.2. The retail price of barbed polyglyconate per suture is €17 (US $22), whereas polyglactin 3-0 retail for €3.2 (US $4.2) (Table 2).

In the V-Loc group, the mean time required in the operating room for each procedure was measured at 121 minutes compared with 130 minutes in the IS group. In the IS group, we used 4 polyglactin 3-0 sutures, compared with the V-Loc group that used 2 barbed polyglyconate sutures per procedure. The retail cost was €12.8 (US $16.6) in the IS group and €34 (US $44) in the V-Loc group.

In the V-Loc group, 97.5% of patients were fully continent (no pads) at 12 months compared with 95% in the IS group ($P = .351$). At 12 months, 2.5% of patients in the V-Loc group used 1 pad compared with 5% in the IS group. In both groups, there was no need for a blood transfusion. Minor bleeding was managed conservatively.

Perioperative complications were classified by using the modified Clavien system, which was stratified into 5 grades (Table 3).

DISCUSSION

Financial resources in national health care systems are restricted with high pressure constantly being applied to make procedures cost effective; hence, economic considerations are particularly important when new technologies are introduced. One of the main factors leading to the higher cost of RARP was the high surgical supply costs, which were not overcome by reduced room and board costs.[5,6]