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PERIOPERATIVE COMPLICATIONS OF ROBOTIC RADICAL PROSTATECTOMY AFTER THE LEARNING CURVE

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ABSTRACT

Purpose: We assessed the incidence of and analyzed factors that contributed to perioperative complications in patients undergoing robotic radical prostatectomy, that is Vattikuti Institute prostatectomy (VIP), at our institution.

Materials and Methods: We recorded operative and postoperative data on 300 consecutive patients who underwent VIP at our institution during a 1-year period. All operations were performed by 1 of 2 surgeons (MM or JOP). We reviewed the complications seen in these patients.

Results: There was no operative mortality and no case was converted to open surgery. A total of 269 (89.7%) patients were considered to have an ideal postoperative course, ie they were discharged home within 48 hours with no unscheduled office visits or complications. There were 14 unscheduled postoperative visits (4.7%) for transient urinary retention after early catheter removal (13) or hematuria (1). There were 17 complications, of which 16 (5.3%) were related to surgery and 1 was related to anesthesia. A total of 11 complications (3.7%) were minor (grade I) and 5 (1.7%) were major (grade II). Of them 3 (1%) patients required reoperation. There were no grade III or IV complications.

Conclusions: In our hands VIP is a safe operation with an overall complication rate of 5.3%, a major complication rate of less than 2% and a surgical re-intervention rate of 1%.

KEY WORDS: prostate, prostatic neoplasms, complications, prostatectomy, robotics

Surgical treatment for localized prostate cancer is effective with a reported cancer specific survival of as high as 98%.[1] The last few decades have seen the evolution of radical retropubic prostatectomy into a safe procedure with a low complication rate. However, radical retropubic prostatectomy is an invasive procedure with significant morbidity. In an era of laparoscopic surgery patients are now seeking minimally invasive alternatives to radical prostatectomy. In the late 1990s groups at a few European centers developed the technique of laparoscopic radical prostatectomy and established its feasibility.[2,3] The emergence of laparoscopic radical prostatectomy as an alternative to gold standard open retropubic radical prostatectomy is in many ways similar to the paradigm shift that was seen in surgical treatment for cholecystectomy.[4,5]

The introduction of robotics added a new dimension to minimally invasive surgery and provided the surgeon with certain advantages that compare directly to those of open surgery. In 2000 we started the first dedicated robotic prostatectomy program in the world. Recently we reported our technique for robotic assisted radical prostatectomy, called Vattikuti Institute prostatectomy (VIP), using the da Vinci® Surgical System.[6] We reported the outcomes and complications of the first 200 cases, encompassing our learning period.[7] In the current study we describe perioperative complications in cases performed by us during the second year of the existence of our program.

MATERIALS AND METHODS

The VIP program started in September 2001 and 245 patients underwent surgery in the first 12 months. Between September 4, 2002 and September 4, 2003 in program year 2, 300 patients with localized prostate cancer underwent robotic prostatectomy. There were no specific exclusion criteria. Any patient who was a candidate for open radical retropubic prostatectomy was considered a candidate for VIP.

Surgical technique. VIP was performed in all patients using the da Vinci® Surgical System with the 6 port technique described previously.[6] There were several changes in operative technique that characterize this series of patients. Of the patients 162 underwent bilateral pelvic lymphadenectomy, all vesicourethral anastomoses were performed with the running MVAC modification of the von Velthoven stitch[8] and 97 patients underwent extended nerve sparing using the veil of Aphrodite technique.[9] Thus, patients in this report underwent a technically more complex operation than previously reported patients. In addition, urological trainees became progressively more involved in the procedure. All operations were performed or supervised by 1 of 2 surgeons (202 by MM and 98 by JOP). At the initiation of this study the 2 surgeons had performed a total of 245 VIP (200 by MM and 45 by JOP).

Data collection and analysis. Demographic and operative data were collected prospectively and entered into an Excel (Microsoft, Redmond, Washington) data base. All entries were cross-referenced with the computerized medical record system maintained at Henry Ford Hospital and verified independently by 2 of us (LM and AB).

A patient was considered to have an ideal postoperative course if he was discharged home within 48 hours and had no complications. Patients were scheduled for followup at 4 to 7 days depending on surgeon preference and individual patient considerations. However, many patients were from distant geographic locations and were staying at local hotels in week 1, and the surgical team had a low threshold of seeing patients for unscheduled postoperative visits. In most instances these visits were to evaluate voiding difficulties after early de-catheterization. These patients were not considered to

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have complications, but rather a postoperative course that was not ideal.

Postoperative complications were defined according to the criteria of Clavien et al.[10] Grade I postoperative complications are those that are not life threatening and cause no lasting disability. Complications of this grade necessitate only bedside procedures and do not significantly extend hospital stay. Grade II complications are potentially life threatening but without residual disability. Grade III complications result in residual long-term disability or persistent life threatening conditions. Grade IV complications lead to patient death.

RESULTS

Mean patient age was 60.3 years (range 41 to 79) years, mean serum prostate specific antigen at diagnosis was 6.9 ng/ml (range 0.8 to 50.6), mean biopsy Gleason score was 6.4 (range 5 to 9), mean pathology Gleason score was 6.7 (range 5 to 10) and mean body mass index (BMI) was 27.3 kg/m^2 (table 1).

Intraoperative course. Mean operative time, defined as the start of insufflation to closure, was 177.5 minutes (range 81 to 365). Mean blood loss was 109 ml (range 50 to 750). None of the patients required any blood transfusions and there were no intraoperative complications or conversions to open surgery in either group.

Postoperative course. A total of 269 (89.7%) patients had an ideal postoperative course. Of the patients 15 (5%) were discharged home on the day of surgery on an outpatient basis and none of them had any rehospitalizations or complications. A total of 273 patients (91%) were discharged home in less than 24 hours and 98% were discharged home within 48 hours. Mean hospital stay was 1.2 days and the mean duration of catheterization was 6.9 days (table 2).

There were 14 unscheduled postoperative visits (4.7%) in as many patients. Of them 13 visits were for transient urinary retention after early catheter removal and 1 was for hematuria. All patients in urinary retention were treated with re-catheterization for 2 to 7 days. If patients were traveling home and postoperative care was provided by the local urologist, the catheter was left in for a longer period. The single patient who presented with hematuria was treated with light catheter irrigation.

Table 2 lists all complications and their severity scores. There were 11 grade I complications (3.7%). Five (1.7%) patients had ileus resulting in abdominal distention or nausea. Two cases were managed conservatively by intravenous fluids and 3 required decompression with a nasogastric tube. Four patients (1.3%) had postoperative anemia, defined as hemoglobin less than 10 gm/dl, from a port site or pelvic hematoma. They were treated with blood transfusion with packed red blood cells (2 and 4 U in 2 each). Two patients (0.7%) were diagnosed with a stitch abscess at the first followup visit and the wound was opened in the office to drain the abscess.

There were 6 grade II complications (2%), of which 1 was related to anesthesia. One patient who underwent difficult intubation had postoperative bronchial edema, which required continued intubation overnight. Two bowel injuries (0.7%) occurred during port placement in patients who required extensive lysis of adhesions because of peritonitis and multiple previous exploratory laparotomies. The 2 injuries were unrecognized at prostatectomy and the patients presented with delayed signs of peritoneal irritation. Each patient required reexploration and resection of part of the small bowel, followed by primary re-anastomosis. This resulted in extended hospital stays but no long-term disability. One patient (0.3%) had deep vein thrombosis (DVT) and pulmonary embolism 3 weeks after surgery. One wound dehiscence (0.3%) required exploration and closure. Thus, there were 16 complications related to surgery (5.3%), of which 5 (1.7%) were major and 3 (1%) required surgical re-intervention.

TABLE 1. *Demographic and operative characteristics in study population*

	Mean (range)
% Lymph node dissections	54.0
Mean age (yrs)	60.3 (41–79)
Preop prostate specific antigen (ng/ml)	6.9 (0.8–50.6)
Preop Gleason score	6.5 (5–9)
BMI (kg/m^2)	27.3 (20–38)
Blood loss (ml)	109.0 (50–750)
Operative time (mins)	177.5 (81–365)
Postop Gleason score	6.7 (5–10)

There were no blood transfusions or conversions.

TABLE 2. *Robotic prostatectomy outcomes and perioperative complications in 300 patients*

Mean days hospital stay (range)	1.2 (less than 1–21)	
No. pts discharged home in 23 hours (%)	273	(91.0)
No. ideal postop course (%)	269	(89.7)
No. unscheduled postop visits (%)	14	(4.7)
Mean days catheterization (range)	6.9	(2–21)
No. grade I complications (%):	11	(3.7)
Postop ileus	5	(1.7)
Postop anemia	4	(1.3)
Stitch abscess	2	(0.7)
No. grade II complications (%):	6	(2.0)
Clot retention—cystoscopy	1	(0.3)
Bronchial edema	1	(0.3)
Bowel injury during adhesion lysis	2	(0.7)
DVT	1	(0.3)
Wound dehiscence	1	(0.3)
Total No. complications (%)	17	(5.7)

There were no grade III or IV complications.

DISCUSSION

As of this writing, more than 1,200 VIPs have been performed at the our institution. From the onset of the program data have been collected in a prospective manner. We have previously reported results in the first 200 patients, encompassing our learning curve.[7] In this series we report our experience during program year 2 after learning.

The overall complication rate in our series was 5.3%, excluding the solitary anesthetic complication. The major complication rate was only 2.0%. These rates compare favorably to those reported in contemporary series of open or laparoscopic prostatectomy.[11–13] The low complication rate observed in this series supports our hypothesis that a structured approach is the key to safe learning.[14]

There is no standard criteria for reporting complications, thus, comparison with reported data are difficult. We report our complications based on the classification of Clavien et al[10] but we readily admit that these criteria are flexible and different surgeons may report complications differently. Thus, a comparison with other reported series is necessarily subjective. Therefore, we largely eschew this comparison and focus on a discussion of our own complications.

Access related complications. In patients without extensive abdominal surgery we use a Veress needle to insufflate the abdomen before port placement. The camera port is the only trocar that is placed blindly. The remaining ports are placed under direct vision with proper transillumination to avoid abdominal wall vessels. To date we have not experienced any access related injuries in this group of patients. In individuals with multiple abdominal operations we use the Hassan technique for obtaining access. Despite this, there were 2 bowel injuries, which occurred during lysis of adhesions by the surgeon at patient side. Each occurred in patients with multiple previous laparotomies and bowel resection, and