International Journal of Gynecology and Obstetrics xxx (2014) xxx–xxx

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

www.figo.org

CLINICAL ARTICLE

Initial experience of robotic anterior pelvic exenteration at a single institute

Shailesh Puntambekar *, Akhil Lawande, Riddhi Desai, Seema Puntambekar, Geetanjali A. Joshi, Saurabh N. Joshi

Department of Surgical Oncology and Minimal Access Surgery, Galaxy Care Laparoscopy Institute, Pune, India

ARTICLE INFO

Article history:
Received 23 July 2013
Received in revised form 13 December 2013
Accepted 26 March 2014

Keywords:
Minimally invasive exenterative surgery
Pelvic cancer
Pelvic exenteration
Robotics

ABSTRACT

Objective: To present the initial experience with robotic anterior pelvic exenteration in patients with advanced pelvic cancer at Galaxy Care Laparoscopy Institute, Pune, India. *Methods:* A retrospective chart review of data from 10 patients with advanced cervical carcinoma and bladder involvement or with vault recurrence following hysterectomy who were treated at the study hospital between November 2009 and May 2011. Clinicopathologic data and postoperative data including operative time, blood loss, blood transfusions, hospital stay, lymph node yield, and complications were recorded. *Results:* The mean operative time was 180 minutes, the mean blood loss was 110 mL, and the mean duration of hospital stay was 5 days. There were no treatment-related morbidities or mortalities. A mean parametrial clearance of 3 cm with a distal vaginal margin of 3.5 cm was achieved. All patients had tumor-free margins. The mean number of harvested lymph nodes was 24. Six patients had positive lymph nodes on pathologic examination and were treated with chemoradiotherapy. At a median follow-up of 11 months, 8 patients were disease-free. *Conclusion:* Robot-assisted anterior pelvic exenteration had favorable operative, pathologic, and short-term clinical outcomes. A large multicenter study is required to confirm the results.

1. Introduction

Advanced pelvic malignancies are often associated with involvement of adjacent organ compartments within the pelvis and occurrence of regional or distant metastases. Patients with pelvic malignancies can experience severe debilitating complications such as recurrent bleeding, urinary or bowel fistulas, lower extremity swelling, and refractory pain, mainly because of local invasion [1,2]. The resulting reduction in life expectancy justifies the use of aggressive surgery in affected women.

Pelvic exenteration (PE) is the radical en-bloc resection of multiple pelvic and extrapelvic organs followed by surgical reconstruction to reestablish visceral and parietal functions [3]. During anterior PE (APE), the reproductive tract and the bladder together with the pelvic ureters and the urethra are removed. The main indication for PE is a persistent or recurrent cervical malignancy after primary or adjuvant radiation/chemoradiation treatment [4,5]. Since the introduction of PE in 1948 [6], the continuous evaluation of surgical and reconstructive techniques, the use of stringent patient selection criteria, and improvements in peri- and postoperative care, antibiotic use, and medical management have resulted in decreased morbidity and mortality rates [5,7,8].

Minimal invasive approaches have many operative and postoperative advantages [9,10]. The laparoscopic approach can also be applied to exenteration, with comparable surgical and oncologic outcomes [11–13]. The procedure is complex and requires advanced laparoscopic skills. However, the introduction of robot-assisted laparoscopic pelvic surgery has opened new doors for PE. The robotic approach provides technical advantages resulting in minimal fatigue of the operating surgeon, a magnified 3-dimensional view of the surgical field, precise dissection in the paravesical and pararectal spaces, and facilitation of complex procedures such as intracorporeal suturing [2,14]. We present our initial experience with robotic APE in patients with advanced pelvic cancer.

2. Materials and methods

After obtaining approval from the ethics committee at the study institute, a retrospective chart review was performed of all patients who underwent robotic APE at the Galaxy Care Laparoscopy Institute, Pune, India, between November 1, 2009, and May 31, 2011. Patients with advanced carcinoma of the cervix with bladder involvement or with vault recurrence following radical or plain hysterectomy (after radiation and chemotherapy) were eligible for inclusion. Per institutional policy, informed consent was obtained from all patients prior to the procedure.

The inclusion criteria for robotic APE were: biopsy-proven advanced cervical carcinoma with bladder involvement or vault recurrence after

* Corresponding author at: Department of Surgical Oncology and Minimal Access Surgery, Galaxy Care Laparoscopy Institute, 25-A, Karve Road, Erandwane, Pune, Maharashtra, 411004 India. Tel.: +91 9822023706; fax: +91 2025466122.
E-mail address: shase63@gmail.com (S. Puntambekar).

http://dx.doi.org/10.1016/j.ijgo.2013.12.015
0020-7292/

prior treatment, absence of tumor extension up to the lateral pelvic wall, no extrapelvic spread as demonstrated by a negative computer tomography scan, negative para-aortic lymph nodes on preoperative laparoscopic inspection, no involvement of the rectum, absence of peritoneal deposits or distant metastases, and good performance status. Patients with a central pelvic tumor of less than 5 cm without pelvic side-wall involvement, no requirement for pelvic reconstruction, and a body mass index within the normal range were considered to be ideal candidates for robotic APE.

All cancers were confirmed by biopsy. Preoperative imaging included a computer tomography scan of the abdomen and pelvis to assess tumor size, tumor location, and presence of distant metastatic disease. Moreover, each examination included a cystoscopy and a proctoscopy. The preoperative anesthetic evaluation included a thorough clinical examination, routine blood and urine chemistry, chest radiography, and electrocardiography and echocardiography as required. A diagnostic laparoscopy was performed in all patients prior to docking of the robot, to rule out peritoneal disease, para-aortic lymph node involvement, and extrapelvic metastases.

For each patient, the following data were collected from the medical records: age at the time of surgery, stage and histology of the primary tumor, size and site of the tumor, treatment history, type of surgical procedure, reconstructive technique, and further adjuvant treatments. Operative records were reviewed for operative time, blood loss, number of blood transfusions, duration of hospital stay, and lymph node yield. The operative time was calculated as the time from insertion of the first port to undocking of the robot; the time taken for urinary diversion was not included. Blood loss was estimated based on measurement of the amount of blood lost through the suction drain system. The criterion for a blood transfusion was blood loss of more than 400 mL or a fall in hemoglobin levels by 1.5 g/dL. Postoperative early complications (within 30 days of the procedure), late complications (30 days to 1 year after the procedure), and postoperative mortality were also recorded.

Mechanical bowel preparation was achieved using a polyethylene glycol solution. Combined regional and general anesthesia was administered. The patient was placed in a modified Lloyd-Davies position. A bolster was placed beneath the patient at the level of the anterior superior iliac spine. The positioning of the patient helped to achieve a clear operative field. The vagina was packed with gauze. The procedure was performed with a 3-arm da Vinci robotic system (Intuitive Surgical, Sunnyvale, CA, USA) using a 0-degree telescope. The da Vinci patient unit was positioned between the legs. A total of 5 ports were placed as follows: a 12-mm camera port was placed just above the umbilicus; an 8-mm robotic port was placed on the left side such that it was 10 cm lateral and 5 cm caudal to the camera port; a mirror image configuration was used for the right-sided robotic port; finally, 2 assistant 10-mm ports were placed pararectally at the level of the camera port for uterine manipulation, insertion of clips, and energy delivery.

A myoma screw was inserted through the left upper pararectal assistant port for uterine manipulation. The dissection was started by taking a peritoneal cut medial to the right ureter at the level of the sacral promontory. The ureter was then pushed medially and the pararectal space lateral to the ureter was opened. The internal iliac artery was seen as the lateral limit of the pararectal space. The anterior division was clipped or ligated and then cut. The uterine artery and the superior vesical artery and vein were identified, clipped, and cut. The dissection was carried on anteriorly to the paravesical space and caudally to the levator ani. Similar steps were repeated on the left side.

A posterior "U" cut was made, as in radical hysterectomy. Dissection in the pouch of Douglas was carried out in between the 2 layers of the Denonvilliers fascia and thus the rectum was separated from the posterior vaginal wall. The ureter was pushed medially to expose the cardinal ligaments and the uterosacral ligaments, which were then cut on both sides. The limit of the dissection was the levator ani.

The anterior dissection was performed by cutting the anterior leaf of the broad ligament, and the peritoneal cut was extended to separate the bladder from the anterior abdominal wall. Similar steps were repeated on the left side.

The bladder was then brought down from the anterior abdominal wall to enter the retropubic space (cave of Retzius). The tissue anterior and lateral to the urethra and vagina was cut. The urethra was accessed anteriorly. The posterior urethral wall and the anterior vaginal wall were cut. A good length of the vagina below the growth was exposed. Generally, a vaginal cuff of 2.5–3.0 cm is achieved at the study institute.

A colpotomy was then performed. An ilio-obturator nodal dissection was done on both sides. The entire specimen along with the nodes was placed in an endobag and removed vaginally. The vagina was repacked to prevent air leakage.

All patients had an ileal conduit for urinary diversion. This was performed extracorporeally by making a 5-cm transverse incision in the right iliac fossa. The vagina was then sutured with a 2-0 Vicryl (Ethicon, Somerville, NJ, USA) continuous intracorporeal suture. Hemostasis was achieved. An abdominal drain was placed through the right lower port. The ports were then removed under vision and closed. The patients were admitted to the intensive care unit for at least 24 hours postoperatively and then transferred to the regular ward.

The data are presented using descriptive statistics (mean and range) as applicable.

3. Results

In total, 10 patients underwent robot-assisted APE during the study period. The mean age was 54.2 years (range 45–60 years) and the mean body mass index (calculated as weight in kilograms divided by the square of height in meters) was 23.8 (range 18–28) (Table 1). Five (50.0%) patients had previously received chemoradiotherapy. The remaining 5 (50.0%) patients had undergone primary surgery, including 2 (20.0%) women with a vesicovaginal fistula, 2 (20.0%) women with a vault recurrence following radical hysterectomy, and 1 (10.0%) woman with a central lesion with bladder involvement. All patients had a squamous carcinoma with bladder involvement on histopathology.

The mean operative time was 180 minutes (range 150–240 minutes) (Table 2). The mean blood loss was 110 mL (90–150 mL). No patient needed a blood transfusion. There were no intraoperative complications, and no conversion to laparoscopic or open surgery was required during the procedure. The mean duration of hospital stay was 5.0 days (range 3.5–8.0 days). No major early or late morbidities were reported during the postoperative period, and there was no surgery-related mortality.

We achieved a parametrial clearance of 3.0 cm (range 2.5–3.5 cm) with a distal vaginal margin of 3.5 cm (range 3–3.8 cm) (Table 2). All patients had tumor-free margins. The mean number of harvested lymph nodes was 24 (range 20–28). Six (60.0%) patients had positive lymph nodes on pathologic examination. Of these, 3 (50.0%) had already received chemoradiotherapy and were therefore treated with radiotherapy to the para-aortic region. The other 3 (50.0%) patients received adjuvant concurrent chemoradiation. The median duration of follow-up was 11 months. One (16.7%) patient died after 7 months because of

Table 1
Clinicopathologic data (n = 10).

Parameter	Value[a]
Age, y	54.2 ± 4.94 (45–60)
Body mass index[b]	23.8 ± 3.41 (18–28)
Histology	
Squamous cell carcinoma	10 (100.0)
Site of the lesion	
Primary cancer of the cervix	5 (50.0)
Vault recurrence	2 (20.0)
Vesicovaginal fistula	2 (20.0)
Central tumor with bladder involvement	1 (10.0)

[a] Values are given as mean ± SD (range) or number (percentage).
[b] Calculated as weight in kilograms divided by the square of height in meters.

Please cite this article as: Puntambekar S, et al, Initial experience of robotic anterior pelvic exenteration at a single institute, Int J Gynecol Obstet (2014), http://dx.doi.org/10.1016/j.ijgo.2013.12.015