ORIGINAL ARTICLE

LAPAROSCOPIC ASSISTED ABDOMINOPERINEAL RESECTION OF LOW SEATED RECTAL CANCER: EVALUATION OF THE TECHNIQUE AND FUNCTIONAL OUTCOME

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Abstract

Aim: To assess feasibility, advantages and short term outcome of laparoscopic abdominoperineal resection (LAPR) for low seated rectal cancer.

Methods: From June 2008 to December 2011, 20 patients with operable low seated adenocarcinoma of the rectum were subjected to LAPR. Surgical technique, postoperative morbidity, clinical results and urogenital functions were reviewed in close follow-up for a period of 12 months.

Results: Sixty percent were males and 40 % females with mean age 52.5 years. Mean tumor size was 5.2 cm and the most common presentation was bleeding per rectum (80%). Mean operative time was 184.5 min, 55% were stage III and 45% moderately differentiated adenocarcinoma. There was 20% incidence of complications with perineal wound infection the commonest (15%). Both male and female patients' sexual functions get markedly deteriorated postoperative and to a lesser extend urologic function. Recurrence rate (5%), port site and distant metastasis (0%) were recorded.

Conclusions: LAPR is safe, feasible, meets oncologic requirements of radicality with accepted survival and recurrence patterns compared to open APR but at the expense of longer operative time. Also, LAPR is associated with worse sexual function affection in both males and females and lesser urinary function affection.

Keywords: Rectal cancer, Laparoscopic resection, Abdominoperineal resection.

INTRODUCTION

The Abdominoperineal resection (APR) was the first radical resection for low rectal cancer described by Ernest Miles in 1908. APR is the surgical treatment in patients with distal rectal cancer in whom an anterior resection cannot be performed.[1] Recently, APR was performed in no more than 14% of rectal cancers.[2]

The laparoscopic assisted Miles operation represents a truly laparoscopic operation. The full benefit of the laparoscopic approach can theoretically be realized in APR surgery. APR does not require division of the distal rectum or mesorectum, nor requires an abdominal extraction or anastomosis.[3]

Fears of tumor dissemination related to pneumoperitoneum were minimized because of the position of the tumor. If retraction is difficult in the deep pelvis and visualization is limited, the surgeon may have a natural tendency to perform more of the dissection from the perineal approach.[4] The magnified

view of the pelvis facilitates identification of surgical planes, nerves, and the pelvic floor, particularly in a narrow pelvis.[5]

Two major draw backs with APR are: APR patients experienced more sexual dysfunction specially with use of laparoscopy in both male and females and to lesser extent on urinary function.[6] Another potential drawback of the APR is the tendency for delayed perineal wound healing, particularly when preceded by the use of neoadjuvant radiation therapy.[7]

PATIENTS AND METHODS

From June 2008 to December 2011, 20 patients diagnosed to have adenocarcinoma of the lower rectum (up to 6 cm from anal verge) were admitted to colorectal surgery unit in Mansoura University Hospital, general surgery department and colorectal surgery unit, where LAPR was done.

The decision for operation was based on preoperative evaluation of the tumor (MRI); all tumors were not suitable for sphincter saving, with postoperative follow up for one year.

Preoperative work-up included: Colonoscopy, Barium enema, abdominal ultrasound, chest X-ray, pelvic MRI, preoperative examination under anaesthesia and tissue biopsy for all cases.

Preoperative down staging was offered by neoadjuvant radiation for some patients, individually planned according to Multidisciplinary team decision. All patients underwent LAPR following the principles of TME (in the abdominal phase).

All patients included in the study were personally interviewed and asked to apply for 2 questionnaires after giving an informed consent; International Prostate Symptom Score (IPSS) for all patients[8] , International Index of Erectile Function (IIEF) questionnaire for 12 males[9] and Female Sexual Function Index (FSFI) for 8 females.[10]

Exclusion criteria: (1) Tumors higher up than 6 cm from anal verge, (2) Those with locally advanced tumor (3) Patient with distant metastasis (M1), (4) Significant Cardiovascular Comorbidities; (5) Mortality and Conversion to open procedure, (6) Patient older than 70 years and sexually inactive, (7) Patients refused to complete the questionnaires or non-compliant patients.

Study outcome measures included: Operation time, blood loss and transfusion, ICU admission, time of colostomy functioning, time until resumption of full oral intake, length of hospital stay and morbidity. Detailed pathological data including histopathology, grade of differentiation, tumor size, distance of tumor from anal verge, length of resected specimen, TNM stage, circumferential resection margins and the number of lymph nodes harvested. Also, 1 year follow up for recurrence, port site and distant metastasis were documented. Urogenital function was assessed by three well-recognized specific scores. These questionnaires were applied preoperatively and one year postoperatively.

Statistical analyses: Data were analyzed with SPSS Software, version 16 (SPSS, Inc., Chicago, IL) for windows. The variables were compared with Student t test for continuous parametric data and Man Whitney test (z) for continuous non parametric data. Chi square ($\chi 2$) test was used for categorical variables. Fisher exact test was used when 50% of cells or more were less than 5. P value <0.05 was considered as statistically significant.

RESULTS

From June 2008 to December 2011, 20 Patients diagnosed to have adenocarcinoma of the lower rectum were treated by LAPR. Sixty percent were males and 40% were females with mean age of 52.5 years and mean BMI 23.5. Most of our patients suffered from mixed symptoms with bleeding per rectum as the commonest presentation (80%) as shown in Table 1.

We found that 55% of our patients were stage III and mean distance from the anal verge was 3.35 cm. Fifty five percent of the collected lymph nodes (LN) were infiltrated by malignant cells. Circumferential Resection margin (CRM) was infiltrated in 20% of our patients as shown in Table 2.

Mean operative time was 184.5 minute and mean length of hospital stay was 9.2 days. There were no port site metastasis and only 1 case showed local recurrence. The commonest postoperative complication was perineal wound infection (20%) as shown in Table 3.

Regarding male sexual function, there were 11 patients with good sexual score and can get potent erection sufficient for penetration and able to ejaculate and reach orgasm and one patient with poor sexual function (8%) preoperatively. One year after LAPR, only 4 (36%) still have good sexual functions while 7 (64%) suffered from impotence and ejaculatory problems as shown in Table 4.

On the other hand, 75% of females showed poor sexual function preoperatively, while at the end of one year 87.5% showed poor sexual function as shown in Table 5.

Regarding urinary function, 75% of our patients had normal International prostatic symptom score (IPSS) preoperatively, while 25% were suffering from mild urinary symptoms. One year after LAPR, 60% were completely unaffected by surgery, while 20% had marked affection and 20% had mild deterioration. Deterioration was markedly observed in incomplete emptying, frequency and intermittent emptying as shown in Table 6.

Table 1. General characteristics of all patients.

Male	12 (60%)
Age (years)*	52.5 ± 12.47 (25-69)
BMI (kg/m2):	
Underweight (Less than 18.5)	3 (15%)
Normal (18.5-24.9)	7 (35%)
Overweight (25-29.9)	4 (20%)
Obese (more than 30)	6 (30%)
Clinical presentation:	
Bleeding per rectum	16 (80%)
Constipation (altered bowel habits)	10 (50%)
Anal pain	6 (30%)
Anal discomfort	7 (35%)

*Values are mean ± SD (range).

Table 2. Pathological findings.

Stage	
I	5 (25%)
II	4 (20%)
III	11(55%)
Grade of differentiation and M/E	
Well differentiated adenocarcinoma	5 (25%)
Moderately differentiated adenocarcinoma	9 (45%)
Poorly differentiated adenocarcinoma	1 (5%)
Mucinous adenocarcinoma	4 (20%)
Signet ring carcinoma	1 (5%)
Gross picture	
Annular stenosing	8 (40%)
Ulcer	8 (40%)
Mass	4 (20%)
Distance of tumor from anal verge*	3.35 ± 0.098 (2-6 cm)
Tumor size*	5.2 ± 1.74 (3-7 cm)
positive circumferential resection margin (▪ 2 mm)	4 (20%)
Total Number of LN collected per specimen*	8.35 ± 4.14 (0-14)
Patients with malignant LN infiltration	11 (55%)
Length of resected specimen*	27.15 ± 2.94 (23-35)

*Values are mean ± SD (range).

Table 3. Operative and postoperative outcomes.

Operative time (min)*	184.50 ± 29.24 (120 - 240)
Blood loss (cc)*	505 ± 619.18 (100 - 3000)
Blood transfusion	4 (20%)
ICU admission	2 (10%)
Colostomy function (day)*	3.8 ± 1.6 (2 - 8)
Start full oral (day)*	4.7 ± 1.72 (3 - 9)
Hospital stay (day)*	9.15 ± 4.27 (5 - 24)
Complications	
Wound infection	3 (15%)
Intraoperative bleeding	1 (5%)
Colostomy related morbidity	1 (5%)
Cardio respiratory	1 (5%)
Total number of patient with complications	4 (20%)
1 year local Recurrence	1 (5%)
Port site & distant metastasis	0 (0%)

*Values are mean ± SD (range).

Table 4. Male sexual function affection.

Males sexual function	Pre-operative	One year postoperative	P value
Erectile*	25.2 ± 5.08	15.5 ± 9.6	P = 0.002
Orgasm*	8.2 ± 1.8	4.7 ± 3.2	P < 0.001
Total IIEF score* ††	63.3 ± 10.89	38.6 ± 22.5	P = 0.001

*Values are mean ± SD.
†† Internation index erectile function (IIEF Score): Good (60:75), Fair (44:59), Poor (5:43).

Table 5. Female sexual function affection.

Females sexual function	Pre-operative	One year postoperative	P value
Lubrication*	11.5 ± 5.4	5.1 ± 4.4	P = 0.001
Pain*	9.3 ± 3.3	6 ± 3.5	P = 0.01
Orgasm*	9.5 ± 3.3	4.6 ± 3.1	P < 0.001
Total FSFI score* ††	56.5 ± 22.4	31.7 ± 17	P = 0.001

* Values are mean ± SD.
†† Female sexual function index (FSFI Score): Good (76:95), Fair (58:75), Poor (4:57).

Table 6. Urinary function affection.

Urinary function affection	Pre-operative	One year postoperative	P value
Incomplete emptying*	0.8 ± 1.2	1.8 ± 1.6	P = 0.003
Frequency*	1 ± 1.2	1.9 ±1.4	P = 0.005
Intermittent emptying*	0.35 ± 0.7	1.6 ±1.4	P < 0.001
Total IPSS score *††	4.5 ± 5.3	9.9 ± 7.9	P = 0.002

* Values are mean ± SD.
†† International prostatic symptom score (IPSS Score): Normal (0:7), moderately symptomatic (8:19), severely symptomatic (20:35).

DISCUSSION

LAPR was described by Sackier in 1992.[11] Then, Decanini et al., 1994 have documented the feasibility of an oncologic LAPR.[12]

A great deal of controversy has surrounded its use. Several important studies have demonstrated the benefits and safety of laparoscopic rectal cancer surgery.[13]

Pioneers have shown the feasibility and promising short-term benefits of laparoscopic resection of rectal cancer. End points such as sexual and urinary dysfunction have been the subject of research in several trials. These frequently reported morbidities after APR are caused mainly by unintentional injury to the autonomic plexus.[14]

The majority of trials reported a median of 12 lymph nodes harvested per specimen; this was true for both laparoscopic and open resections and complying with the requirements of UICC.[15] After neoadjuvant therapy few or no nodes may be found.[16] Because high ratio of our patients (65%) were exposed to preoperative radiation, this may explain reduced number of LN collected in our study.

Positive CRM (less than 2 mm) are significant predictors of local recurrence. Most studies and also ours confirm the oncologic safety associated with LAPR as regard CRM.[17] The safety of CRM improved with use of extralevator APR technique in the perineal phase of dissection, but on the expense of operative time and wound morbidity.[18]

Open surgery still has shorter operative time than laparoscopy nearly in all studies, LAPR has a steep and long learning curve. However, it is strongly believed that operative time will decrease with continuous practice.[19]

NG et al., 2008[3] demonstrated that laparoscopic assisted APR offers better immediate outcomes in terms of faster return of bowel function, earlier mobilization, and less analgesic requirement when compared with open surgery for low rectal cancer, but at the expense of longer operative time and higher direct cost. Oncological clearance and long-term survival are seemingly not jeopardized by the laparoscopy but usually associated with poorer sexual outcome when compared to open APR.[20] All this was confirmed by our results when compared to the outcomes of open APR in these trials.

Besides the reduced abdominal wall trauma in LAPR, less manipulation of abdominal contents may diminish postoperative adhesions and reduce rate of incisional hernia.[21]

Regarding sexual and bladder dysfunction in rectal cancer patients, APR is associated with a higher risk of postoperative sexual dysfunction compared to sphincter preservation surgeries.[22]

Paraskevas et al., 2009 demonstrated that sexual functioning was significantly worse 1 year after laparoscopic surgery.[23] Erectile dysfunction and ejaculatory problems were the commonest in males while difficulty with lubrication and dyspareunia were predominant in females.[20] Similarly, the principal finding of our study is the dramatic decrease in IIEF & FSFI scores postoperatively and the high rates of sexual

dysfunction at 1year postoperatively in both male and females.

Whether this is from APR surgery itself or laparoscopy, stoma, preoperative radiotherapy, many anatomic, psychological or pathologic factors influence this issue.[24] Other significant adverse risk factors (tumor stage, age, multimodal therapy, pelvic inflammation, BMI, diabetes, and medication) have possible influence on the postoperative incidence of sexual dysfunction.[25]

Urinary score was less markedly affected by laparoscopic surgery. The incidence of bladder dysfunction after laparoscopic rectal surgery is low and equal to open surgery.[26] In our study incomplete emptying, frequency and intermittent emptying were the most affected parameters.

Few studies found Laparoscopy significantly preserve urogenital function. From their point of view, the 30° optics can be considered as a "third eye" of the surgeon, allowing to reach the narrow lower portion of the pelvis and to perform under direct vision some maneuvers that in open surgery are under the exclusive control of touch.[27]

In conclusion: LAPR for low rectal cancer has an accepted oncologic radicality, reduced rate of local recurrence compared to open APR but at the expense of longer operative time. Urinary function is less affected but sexual function in both males and females is deteriorated.

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