



Original Article

EARLY OUTCOME OF LAPAROSCOPIC ABDOMINO-PERINEAL RESECTION (APR) IN LOW RECTAL AND ANAL CANCER - OUR INITIAL EXPERIENCE IN BANGABANDHU SHEIKH MUJIB MEDICAL UNIVERSITY

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Abstract

Background: Colorectal cancer is the second most common malignancy in the western countries and the rectum is the most frequent site involved. Carcinoma of the lower part of the rectum involving the anal canal and carcinoma of the anal canal are now successfully managed by laparoscopic abdomino-perineal resection (APR) and postoperative morbidities are less and recovery is uneventful. In the current age of minimally invasive surgery, laparoscopic surgery for colon cancer has been established as equivalent to conventional open surgery in terms of oncological clearance. The purpose of the study is to compare the early outcomes of laparoscopic abdomino-perineal resection (LAPR) surgery in low rectal and anal cancer patients in terms of surgical site infections, postoperative pain, recovery, hospital stay and margin clearance of tumor with that of open abdomino-perineal resection (OAPR) surgery.

Methods: This randomized controlled trial was carried out in the Colorectal Surgery Unit of Bangabandhu Sheikh Mujib Medical University, Dhaka from May, 2012 to April, 2013. 50 patients in low rectal and anal canal cancers were randomized into two groups with 25 patients in conventional open abdomino-perineal resection (OAPR) and rest 25 patients in laparoscopic abdomino-perineal resection (LAPR). Early outcome variables after surgery were evaluated.

Results: Demographic data and baseline characteristics are equivalent in both groups of population. Tumors were more common in rectum (80% and 76%), most of the tumors were adenocarcinomas (80% and 72%) and most of the tumors were present in stage-II (40% and 48%) with grade-2 (64% and 52%) in LAPR and OAPR groups respectively. During early post-operative follow up, abdominal surgical site infection was found more in conventional open abdomino-perineal resection (OAPR) patients than that of laparoscopic abdomino-perineal resection (LAPR) patients ($p=0.001$). Other morbidity and colostomy related complications were not significant in early post-operative period in both groups of population. Degree of pain was also less after laparoscopic abdomino-perineal resection ($p=0.001$). Stoma function occurred earlier after Laparoscopic abdomino-perineal resection ($p=0.017$) and ambulation, feeding liquid and feeding solid all had no difference for both groups. Shorter mean length of postoperative hospital stay and early hospital discharge was possible after Laparoscopic abdomino-perineal resection ($p=0.001$). Oncologic parameters were equivalent to those with open procedures.

Conclusion: The patients undergoing laparoscopic APR for low rectal and anal canal carcinoma have overall superior outcomes in terms of surgical site infection, postoperative pain, postoperative hospital stay and has equivalent oncological clearance as with those with open procedures.

Key words: Low rectal and anal canal cancer, Laparoscopic abdomino-perineal resection, Open abdomino-perineal resection.

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Introduction

Colorectal cancer is the second most common malignancy in the western countries and the rectum is the most frequent site involved¹. Carcinoma in the lower part of the rectum involving anal canal especially sphincters or purely in the anal canal is now successfully managed by laparoscopic APR and postoperative morbidities are less and recovery is uneventful². In the current age of minimally invasive surgery, laparoscopic surgery for colon cancer has been established as equivalent to conventional open surgery in terms of oncological clearance. The advantages of laparoscopic surgery are smaller incisions, shorter recovery time and less wound related complications. However the narrow confines and angulations of the bony pelvis and the standard practice of autonomic nerve sparing total mesorectum excision has made laparoscopic surgery in the setting of rectal cancer more challenging³.

This study was done to compare the early outcomes of laparoscopic APR with that of open APR in low rectal and anal cancer patients in terms of surgical site infections, postoperative pain, recovery, postoperative hospital stay and margin clearance of tumor.

Materials and Methods

50 patients of low rectal and anal canal cancers with similar demographic and baseline characteristics were randomized by lottery methods into two groups- laparoscopic abdomino-perineal resection (LAPR) and open abdomino-perineal resection (OAPR) with 25 patients in each group.

Surgical techniques:

- Laparoscopic abdomino-perineal resection (LAPR):
Under General anaesthesia, 5 ports were made on anterior abdominal wall. One 10mm in umbilical region, one 10mm in right iliac fossa, one 5mm in left iliac fossa and two 5mm ports in between umbilicus and iliac fossa of both sides. Diathermy was used in all patients. Specimen was removed through perineum. End colostomy was done in

left iliac fossa. A drain was placed in the pelvis through the perineal wound.

- Open abdomino-perineal resection (OAPR)
Under General anaesthesia, abdomen was opened by extended lower midline incision. Diathermy was used in all patients. Specimen was removed through perineum. End colostomy was done in left iliac fossa and a drain was given through perineum in pelvis.
- Postoperative measures
Combination of ceftriaxone and metronidazole were given at the time of induction of anesthesia in both groups and two more doses were given after 8 hours and 16 hours following the operation. None of the patients got prophylaxis against thromboembolism. Oral feeding was started when stoma started functioning and drain was removed when collection became less than 25 ml/day.

Demographic variables

- Age, gender, location of tumor, tumor type, stage of the tumor and tumor grade were considered in demographic variables.

Postoperative outcome measures:

- Surgical site infections (abdominal and perineal), Colostomy related complications (prolapse, retraction and necrosis), Pain score by Visual Analogue Pain Scale (no pain, mild, moderate-1, moderate-2, severe and worst pain)⁴, Recovery (days), Postoperative hospital stay (days) and tumor free margin clearance (radial and proximal) were taken as postoperative outcome measures.

Statistical analysis:

All results were analyzed by using the SPSS version 11.5. The qualitative data were analyzed by chi square (χ^2) test or fisher exact test. Normally distributed continuous data were considered by t-test (parametric) and asymmetrical distribution continuous data were considered by Mann Whitney u-test (non parametric). P-value < 0.05 was considered significant. Data and results were presented in the form of mean \pm (s.d.), range and percentage.

Table I
Patients demographic and Baseline data (n=50)

| | Group | | p value |
|---|--------------------|---------------|----------------|
| | Laparoscopic(n=25) | Open(n=25) | |
| Age in years | | | 0.397** |
| Mean (s.d.) | 38.72 (0.89) | 42.60(15.70)# | |
| Median (Range) | 36 (19-65) | 40 (11-75) | |
| Gender | | | 0.258* |
| Male | 15 (60.0) | 11 (44.0) ## | |
| Female | 10 (40.0) | 14 (56.0) | |
| Location of tumor | | | 0.733 |
| Rectum | 20 (80.0) | 19 (76.0)# | |
| Anal canal | 5 (30.0) | 6 (24.0) | |
| Tumor type | | | 0.776* |
| Adenocarcinoma | 20 (80.0) | 18 (72.0)# | |
| Squamous cell carcinoma | 3 (12.0) | 3 (12.0) | |
| Malignant Melanoma | 1 (4.0) | 3 (12.0) | |
| Gastrointestinal stromal tumor | 1 (4.0) | 1 (4.0) | |
| Staging of tumor | | | 0.841* |
| Stage-I | 5 (20.0) | 4 (16.0)# | |
| Stage-II | 10 (40.0) | 12 (48.0) | |
| Stage-III | 10 (40.0) | 9 (36.0) | |
| Grade of tumor | | | 0.691* |
| Grade-1 | 3 (12.0) | 4 (16.0)# | |
| Grade-2 | 16 (64.0) | 13 (52.0) | |
| Grade-3 | 6 (24.0) | 8 (32.0) | |
| Complications | | | |
| Abdominal surgical site infection | 0(0.0) | 13(52.0) | 0.001 |
| Perineal surgical site infection | 5 (20.0) | 6 (24.0) | 0.733* |
| Colostomy prolapse | 2 (8.0) | 1 (4.0)## | 1.000* |
| Colostomy retraction | 1 (4.0) | 1 (4.0) | 1.000* |
| Colostomy necrosis | 0 (0.0) | 1 (4.0) | 1.000* |
| Pathological evaluation | | | |
| Tumor free radial margin | 2 (8.0) | 0 (0.0)## | 0.490* |
| Tumor free proximal margin | 1 (4.0) | 0 (0.0) | 1.000* |
| Recovery [mean(range) in days] | | | |
| Ambulation | 2 (1 – 5) | 2 (1 – 10) # | 0.375** |
| Stoma function | 2 (2 – 5) | 2 (2 – 10) | 0.017** |
| Feeding liquid | 2 (2 – 5) | 2 (2 – 11) | 0.070** |
| Feeding solid | 2 (3 – 6) | 2 (3 – 12) | 0.070** |
| Degree of postoperative pain | | | 0.001* |
| Moderate pain-2 (interferes with concentration) | 22 (88.0) | 1 (4.0) | |
| ## Severe pain (Interferes with basic needs) | 3 (12.0) | 9 (36.0) | |
| Worst pain (Bed rest required) | 0 (0.0) | 15 (60.0) | |
| Postoperative hospital stay (days) | | | 0.001** |
| Mean (s.d.) | 10.96 (3.45) | 16.28 (5.08) | |
| Median (range) | 10 (7 - 19) | 15 (9 - 27) | |

*X² test was done to measure the level of significance

** Mann-Whitney U test was done to measure the level of significance

Figures within parentheses indicates range in column

Figures within parentheses indicates percentage in column.

Results

Demographic data and baseline characteristics are similar in both groups of population. Tumors were more common in rectum (80% and 76%), most of the tumors were adenocarcinomas (80% and 72%) and most of the tumors were present in stage-II (40% and 48%) with grade-2 (64% and 52%) in LAPR and OAPR groups respectively.

During early post-operative follow up, abdominal surgical site infection was found more in conventional open APR patients than that of laparoscopic APR patients ($p=0.001$). Other morbidity and colostomy related complications were not significant in early post-operative period in both groups of population. Degree of pain was also less after laparoscopic APR ($p=0.001$). Stoma function occurred earlier after Laparoscopic APR ($p=0.017$) and ambulation, feeding liquid and feeding solid all had no difference for both group. Shorter length of postoperative hospital stay and early hospital discharge was possible after Laparoscopic APR ($p=0.001$). Oncological parameters were equivalent to those with open procedures.

Discussion

In this study, there was no statistically significant difference in gender between the two groups ($p>0.05$). This was closely similar to previous studies done by Simorov et al⁵.

Tumors were more common in rectum (80% and 76%) and most of the tumors were adenocarcinomas (80% and 72%) in stage-II (40% and 48%) with grade-2 (64% and 52%) in LAPR and OAPR groups respectively. Ages of both experimental and control groups are similar ($p>0.05$). The mean (s.d.) of age of experimental and control groups were 38.72 (10.89) and 42.60 (15.70) respectively. Moreover median (range) age of LAPR and OAPR groups were 36 (19-65) and 40 (11-75) respectively. There was no statistically significant difference in age between the groups ($p>0.05$). The mean age was closely similar to previous studies done by Simorov et al, but differ from other studies performed by Kockerling et al, Fleshman et al who reported that the mean age was 65 and 67 respectively^{5,6,7}.

Abdominal surgical site infection was absent in LAPR group whereas it was present in 52% cases in OAPR group in present study ($p<0.05$). Considering the perineal surgical site infection, there was no difference in the two groups ($p>0.05$). But a study by Fleshman et al. showed that perineal infections occurred more

often in the laparoscopic abdominoperineal resection group (24 vs. 8 percent; $P=0.02$)⁷. Only stoma function occurred earlier for LAPR group ($p<0.05$) and ambulation, feeding liquid and feeding solid all had no difference for both group ($p>0.05$). Fleshman et al had also observed dissimilar recovery of bowel function among their study population.

Comparison of colostomy related complications in both groups of patients were done. No patient developed early postoperative complications like hemorrhage and infection. Again no significant early colostomy related complications like prolapse, retraction and necrosis were observed in both groups of population.

Length of postoperative hospital stay for LAPR group was found shorter than that of OAPR group. Early discharge was possible after laparoscopic APR. In a study by Iroatulama et al in 1998 it was reported that laparoscopic APR was associated with a 50 per cent reduction in the length of hospitalization without any compromise to lateral or distal resection margins, number of lymph nodes harvested, or morbidity⁸. Again, a study by Leung et al in 2000 reported that hospital stay was significantly less in the LAPR group than in the OAPR group⁸. Kockerling et al had similar results in their study in 2000⁶.

Comparison of degree of postoperative pain between laparoscopic and open APR by visual analogue scale was done and analyzed. 88% of the patients had moderate pain in LAPR group whereas 60% of the patients had worst pain in OAPR group. Postoperative pain in LAPR group was found to be less than that of OAPR group ($p<0.05$). Several studies showed that postoperative analgesic requirements were significantly less in the LAPR group^{9,10}. Finally pathological evaluation in both groups of patients after histopathology following surgery was compared. Oncologic parameters were equivalent to those of open procedures in radial margin clearance ($p>0.05$) and in proximal margin clearance ($p>0.05$). This study was similar to the study conducted by Fleshman et al⁷.

Conclusion

The patients undergoing laparoscopic APR for low rectal and anal canal carcinoma has overall superior outcomes in terms of surgical site infection, postoperative pain, postoperative hospital stay and has equivalent oncological clearance as with those with open procedures.

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