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Outcomes, safety and staging of multivisceral resection for locally advanced primary colorectal cancer

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RESEARCH

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ABSTRACT

Background
Multivisceral resection is often required in the treatment of locally advanced colorectal cancer.

Aims
The present study provides an analysis of the perioperative and oncological outcomes of multivisceral resection for locally advanced primary colorectal cancer (clinically T4bNxM0).

Methods
Between January 2001 and December 2013, fifty-eight patients who underwent multivisceral resection for locally advanced colorectal cancers (clinically T4bNxM0) were retrieved from a retrospective database. Among these patients, we divided into two groups as follows: twenty-two patients met the criteria of presence of tumour cell in adhesion to a nearby organ or structures, as confirmed on microscopic examination after surgery (Group I) and thirty-six patients met the criteria of no tumour cell in adhesion to a nearby organ or structures after surgery (Group II).

Results
The actual distribution of stage after surgery was pathologically reported as follows: IIa (n=21, 58.3 per cent), IIb (n=2, 5.5 per cent), IIIb (n=9, 25.0 per cent), and IIIc (n=4, 11.2 per cent) in Group II (initial clinical T4bNxM0) and IVa (n=21, 95.5 per cent), (n=1, 4.5 per cent) in Group I. With a median follow-up of 47.7 months, the five-year overall survival rate for Group I and Group II was 38.0 per cent and 62.9 per cent, respectively (p=0.100). The five-year disease free survival rate was 36.8 per cent (Group I) versus 61.9 per cent (Group II) (p=0.200). The local recurrence rate was 4.5 per cent (Group I) versus 5.6 per cent (Group II) (p=0.278). The mean length of patients' hospital stay was 18.1 days and 15.9 days (p=0.049). The rate of morbidity was 10.3 per cent in Group I and 28.4 per cent in Group II (p=0.204).

Conclusion
Based on the present data, multivisceral resection for locally advanced colorectal cancer (clinically T4b) has acceptable perioperative and oncologic outcomes and may be a feasible procedure.

Key Words
Colorectal cancer, mutivisceral resection, T4b

What this study adds:

1. What is known about this subject?
This subject is about pathologic findings and analysis oncologic outcomes after multivisceral resection for colorectal cancer.

2. What new information is offered in this study?
The preoperative clinical T4b stage can change after surgery and can affect oncologic outcomes. And multivisceral resection is proper management for T4b colorectal cancer.

3. What are the implications for research, policy, or practice?

There is need for more study about stage of colorectal cancer through this subject of manuscript, and also need for development and update for guideline of treatment for colorectal cancer.

Background

The mainstay treatment of colorectal cancer is surgical resection. Surgeons sometimes encounter a situation where in the tumour directly invades or is adherent to the neighbouring organs or structures during locally advanced colorectal cancer surgery (Clinically T4b). As defined by the seventh American Joint Committee on Cancer (AJCC), in colorectal cancer T4b is a tumour that directly invades or is adherent to other organs or structures.[1] A tumour that is adherent to other organs or structures, grossly, is classified as clinically T4b. Direct invasion in T4 means that the tumour includes invasion of other organs as a result of its direct extension through the serosa, as confirmed upon microscopic examination.[1] However, if no tumour is present in the adhesion after surgery, microscopically speaking, the classification should be T1-4a, depending on the anatomical depth of the wall invasion. Multivisceral resection is often required in the treatment of locally advanced colorectal cancer (clinically, T4b patients).[2] The multivisceral resection is needed for clinically T4b of colorectal cancer, however, after multivisceral resection, among clinically T4b, there are existed true T4b or not true T4b on microscopic examination at pathological finding. Multivisceral resection often represents the unique possibility to achieve tumour-free margins (R0) and improve overall survival.[3–6] The aim of the present study is to provide an analysis of the perioperative and oncological outcomes of multivisceral resection for locally advanced primary colorectal cancer (clinically, T4b, per 7th AJCC) in a single institution.

Method

Between January 2001 and December 2013, 58 patients who underwent multivisceral resection for colorectal adenocarcinomas (clinically, T4b) were identified from a retrospective database. The present study is retrospective chart review study. The patients with clinical stage IV (including distant metastasis) in the present study were excluded. All data on clinical and pathological features were reviewed retrospectively. Patients were divided two groups: Group I, comprised of 22 patients with confirmed presence of tumour cell in adhesion to a nearby organ or structures, as confirmed on microscopic examination after surgery and Group II, comprised of 36 patients who no tumour cell in adhesion to a nearby organ or structures on microscopic examination after surgery. In group I, the definition of "invasion" is presence of tumour cell in adhesion organ or structure as a result of direct extension through the serosa on microscopic examination after surgery and the definition of "metastasis" is presence of tumour cell in adhesion organ or structure not as a result of direct extension through the serosa but as a result of haematogenous spread. The decision of invasion or metastasis was confirmed by a pathologist. All patients underwent colonoscopy and biopsy, staging scans (CT scan chest, abdomen and pelvis/MRI pelvis) and occasionally, PET scans. All patients underwent curative resection. Adjuvant chemotherapy was performed with 5-fluorouracil and a leucovorin-based regimen (six cycles of monthly bolus intravenous 5-fluorouracil (400–425mg/m2/day), days 1–5 and leucovorin (20mg/m2/day), days 1–5). The reasons for not performing postoperative adjuvant chemotherapy included advanced age, refusal of patient, and the side effects of the adjuvant chemotherapy. Patients received close follow-up and were included on a database until July 2016 or their death, if it occurred before July 2016. Disease-free survival was defined as extending from the date of surgery to the date of the detection of recurrence or the last follow-up or death. Patients in the two groups were compared with respect to patient`s demographics, peri- and postoperative morbidity, and pathologic and oncological outcomes.

Statistical Analysis

All statistical analyses were performed using SAS Version 9.1.3 (SAS Institute Inc., Cary, NC) and SPSS software, Version 24.0 (SPSS, Chicago, IL). Categorical variables were analysed using the $\chi 2$ or Fisher's exact test, and continuous variables were analysed using the Student t test/Mann-Whitney U rank tests. Cumulative-incidence methods were used to estimate the rate of cancer recurrence. Overall survival and disease-free survival were analysed using the Kaplan-Meier method, and a comparison was performed using the log-rank test. P values of less than 0.05 were considered statistically significant. The differences in overall and disease-free survival were assessed using the log-rank test (Figure 1).

Results

Patient characteristics

Patient characteristics were analysed through a comparison of Group I and Group II (Table 1). Twenty-two patients were included in Group I, while 36 patients were added to Group II. Mean age, sex ratio, height, weight, BMI, ASA scores, previous operation history, and initial CEA did not significantly differ between the groups. Adjuvant

chemotherapy was performed on 18 patients (81.8 per cent) in Group I and 24 patients (66.7 per cent) in Group II (p=0.210).

Resection of organs

The resection of organs included the bladder and/or ureter, the uterus, ovary, small bowel, omentum, stomach, spleen, and diaphragm. In Group I, the organ that was resected most common was the ovary (n=12, 54.5 per cent). Other organs that were resected in this group included the bladder and/or ureter (n=4, 18.2 per cent), the uterus (n=4, 18.2 per cent), the stomach (n=3, 13.6 per cent), the omentum (n=2, 9.1 per cent), and the small bowel (n=1. 4.5 per cent). In Group II, the organ that was resected most often was the uterus (n=13, 36.1 per cent). Other organs that were resected in this group included the ovary (n=10, 27.8 per cent), the bladder and/or ureter (n=8, 22.2 per cent), the small bowel (n=5, 13.9 per cent), the stomach (n=2, 5.6 per cent), the spleen (n=2, 5.6 per cent), and the omentum (n=1, 2.8 per cent), diaphragm (n=1, 2.8 per cent). One organ was resected in 18 (81.8 per cent) patients in Group I and 31 (86.1 per cent) patients in Group II. Two or more organs were resected in four (18.2 per cent) patients in Group I and five (13.9 per cent) patients in Group II (Table 2).

Pathologic results

The tumour-node-metastasis (TNM) stage, pT stage, pN stage and pM stage were classified according to AJCC (American Joint Committee Cancer, 7th edition). In Group I, “invasion” was reported in 10 patients (45.5 per cent); “metastasis” was reported in 12 patients (54.5 per cent). So, in Group I, distribution of stage reported that IVa was found in 11 (50.0 per cent) patients and IVb was found in one (4.5 per cent) patient. And also IIIc was in 5 (22.7 per cent) patients, IIIb was in 1 (4.5 per cent) patient and IIc was in 4 (18.2 per cent) patients. The distribution of stage in Group II was reported as follows: IIa (n=21, 58.3 per cent), IIb (n=2, 5.5 per cent), IIIb (n=9, 25.0 per cent), IIIc (n=4, 11.2 per cent). The initially clinically Tb4NxM0 was reported actually different distribution of stage at final pathologic finding after surgery. In Group I, T stage distribution was reported as follows: T3 (n=5, 22.7 per cent), 4a (n=3, 13.6 per cent), 4b (n=14, 63.6 per cent). In Group II, T stage distribution was reported as follows: T3 (n=33, 91.7 per cent), T4a (n=2, 5.6 per cent), T4b (n=1, 2.7 per cent) (p<0.05). In Group I, N stage distribution was reported as follows: N0 (n=9, 40.9 per cent), N1a (n=2, 9.1 per cent), N1b (n=6, 22.3 per cent), N2a (n=3, 13.6 per cent), N2b (n=2, 9.1 per cent). In Group II, N stage distribution was reported as follows: N0 (n=23, 63.9 per cent), N1a (n=3, 8.3 per cent), N1b (n=3, 8.3 per cent), N2a (n=2, 5.6 per cent), N2b (n=5, 13.9 per cent) (p=0.217). In Group II, M stage distribution was following as; M0 (n=10, 45.5 per cent), M1a (n=11, 50.0 per cent), M1b (n=2, 9.1 per cent). In Group I, M stage was all M0 (n=36, 100.0 per cent) (p<0.05). The histologic grades of differentiation did not significantly differ between the two groups (p=0.716). The mean number of harvested lymph nodes was 24.3±12.8 in Group I and 24.4±15.6 in Group II (p=0.698). The mean proximal resection margin in Group I and Group II was 16.2±11.9cm and 12.2±7.1cm, respectively, with (p=0.070). The mean distal resection margin was 7.9±7.9cm and 6.2±6.3cm, respectively, with (p=0.188). The mean specimen mass size was 6.2±2.1cm in Group I and 6.4±2.1 cm in Group II (p=0.945). The lymphovascular invasion rate was 68.2 per cent in Group I and 33.3 per cent in Group II (p<0.05) (Table 3).

Peri- and post-operative outcomes

The mean operation time was 261.8±95.2min (190–400) in Group I and 253.3±67.8min (235-450) in Group II (p=0.720). The mean blood loss was 631.8±367.9ml (100-1000) in Group I and 531.4±372.7ml (100-1500) in Group II (p=0.505). The mean length of patients’ hospital stay was 18.1±8.3 days (11–31) in Group I and 15.9±5.8 days (10–71) in Group II (p=0.049). The mean time to sips of water was 4.91±1.5 days in Group I and 4.97±1.5 days in Group II (p=0.653). The mean time to liquid diet was 6.41±1.6 days in Group I and 6.39±1.2 days in Group II (p=0.230). The mean time to soft diet was 7.41±1.6 days in Group I and 7.53±1.3 days in Group II (p=0.407). The total number of complications was nine (10.3 per cent) in Group I and nine (28.4 per cent) in Group II (p=0.204). Urinary dysfunction was found in three patients in Group II. Ileus was found in two patients in both Groups I and II. Wound dehiscence/infection was found in six patients in Group I and two patients in Group II. An intra-abdominal abscess was found in one patient in Group II. Anastomosis site leakage was in 1 patient in Group I and II, respectively. Pneumonia was found in one patient in Group II (Table 4).

Recurrence patterns and oncologic outcomes

The total number of recurrences was nine (40.9 per cent) in Group I and ten (27.7 per cent) in Group II (p=0.346). The rate of systemic recurrence was 36.4 per cent (n=8) in Group I and 22.2 per cent (n=8) in Group II (p=0.659). The organs of systemic recurrence included the lung (Group I: n=6, 27.3 per cent; Group II: n=6, 16.7 per cent), liver (Group I: n=2, 9.1 per cent; Group II: n=1, 2.8 per cent), and para aortic node (Group I: n=0; Group II: n=1, 2.8 per cent). The rate of local recurrence was 4.5 per cent in Group I and 5.6 per cent in Group II (p=0.278). The organs of local

recurrence included the anastomosis site (Group II: n=2, 5.6 per cent) and the ovary (Group I; n=1, 4.5 per cent). With a median follow-up of 47.7 months, the five-year disease-free survival rate was 36.8 per cent in Group I and 61.9 per cent in Group II (p=0.200). The five-year overall survival rate was 38.0 per cent in Group I and 62.9 per cent in Group II (p=0.100) (Table 5).

Discussion

Among patients with locally advanced colorectal cancer, cancer adherent to other organs or structures is sometimes discovered. These locally advanced adherent colorectal cancers should include multivisceral resection in which the cancer and adherent structures are removed en bloc. Some studies have demonstrated that 40-84 per cent of these adhesions between the cancers and the adjacent organs or structures include cancerous tissue and/or metastasis.[7–9] And so, it has been reported that in colorectal cancer patients, the rate of multivisceral resections performed accounts for 7–16 per cent of patients in which tumour invasion to adherent organs or structures is suspected.[10–12] Cancer staging is an important determinant of prognosis in colorectal cancer and provides treatment guidelines after surgery. In the seventh edition of the AJCC, in the TNM stage at the colon and rectum cancer staging, T4 is divided into T4a and T4b. The definition of T4b is a tumour that directly invades or is adherent to other organs or structures. This T4b is clinically, grossly classified and if a tumour is not present in the adhesion or structures after surgery, microscopically (pathologically) speaking, the classification of T4b should be changed T1-4a. In the present study, the initial clinical T4b was found in 58 patients. Among these patients, T4b was microscopically detected in 15 patients (25.9 per cent) after surgery and the rest of the patients were diagnosed mostly with T3, based on microscopic evaluation (39 patients, 67.2 per cent). The pathologic reports of microscopic T3 after surgery were comprised mostly of serosal fibrous adhesion and chronic inflammation. According to changed T stage after surgery, the final stage is different from the initial clinical stage. In the present study, the distribution of stage was IIa, IIb, IIIb, IIIc at no tumour invasion at adherent organs or structure group (Group I). Therefore, this group had better oncologic outcomes and a good prognosis compared to cases of tumour invasion or metastasis at adherent organs or the structure group (Group II). In addition, the total recurrence rate after surgery was lower (27.7 per cent vs. 40.9 per cent), although the local recurrence rate was similar between the two groups (5.6 per cent vs. 4.5 per cent) Some studies reported that malignant invasion was histologically confirmed in >60 per cent of patients presenting with adjacent organs adhering to the primary tumour.[13,14] In the present study, malignant invasion was histologically confirmed in 37.6 per cent. The reason for the low rate of invasion is maybe too small sized cases in the present study. The five-year survival rates for T2 and T3 patients were significantly better than those of patients with a T4 carcinoma and in addition, rectal cancer was associated with a significantly worse prognosis.[9,15] The five-year survival rates for T4 patients were 42~89.5 per cent.[15,16] The five-year overall survival rate of multivisceral resection at the colorectal cancer site ranged from 14.1 per centto 88.0 per cent. In the present study, stage IV patients (including most T4 patients) were microscopically confirmed to have tumour invasion or metastasis, and their five-year survival rate was 38.0 per cent, while their five-year disease-free survival rate was 36.8 per cent. In present study, clinically stage IV (included distant metastasis) was excluded. However, in final pathologic finding after surgery, M stage was in 12 (54.5 per cent) patients in invasion or metastasis group. The definition of M stage in AJCC 7th edition is M1a; Metastasis confined to one organ or site (for example, liver, lung, ovary, nonregional node), M1b; Metastases in more than one organ/site or the peritoneum. In present study, we classified 11 patients to M1a because of pathologic findings was reported “metastasis” not invasion. These organs were ovary (n=7), uterus (n=2), small bowel (n=1) and omentum (n=1). And also, stage IVa of the present study, even at pathological T3, included pathologic findings reported metastasis, not invasion in adherent organs or structure. The number of these cases was in five cases. Four cases were in ovary, one case was in omentum. We classified one patient to M1b. This case was ascending colon cancer with multi organs invasion (liver, pancreas, gallbladder, stomach, duodenal wall). In this case, microscopically confirmed tumour invasion was reported in liver, pancreas, gallbladder, duodenal wall. Indeed, it is unclear to determine the stage of multi-organs invasion.

In the present study, the total number of patients with postoperative morbidity was 18 (31.0 per cent) and there was no major complication or mortality. The incidence of complication after a multivisceral resection at a colorectal cancer site was reported to range from 11–44 per cent with an average of approximately 31 per cent.[4,6,8,16–19] The perioperative mortality of multivisceral resection patients ranged from 0~13 per cent.[8,16,20] The most common complications were wound infection (16.0 per cent), bowel obstruction or ileus (6.7 per cent), urinary complication (6.2 per cent), intra-abdominal abscess (5.4 per cent), anastomotic leak (3.7 per cent), and wound infection or dehiscence (2.1 per cent).[21] In the present study, the most

common complications were wound infection or dehiscence and the second-most common were ileus.

In present study, the rate of total recurrence was 33.9 per cent (Group I: 27.7 per cent, Group II: 40.9 per cent) after mutivisceral resection for colorectal cancer. However, the rate of total local recurrence was 5.4 per cent (Group I: 4.5 per cent, Group II: 5.6 per cent). One study was reported that rate of local recurrence was 8.2 per cent after mutivisceral resection for rectal cancer. The rate of total recurrence was 32.8 per cent in same study.[22] R0 resection (en bloc resection) is important for treatment of colorectal cancer. Multivisceral resection provides an opportunity to perform R0 resection for locally advanced colorectal cancer. One study reported that R0 resection was main prognostic factor in multivariate analysis for colorectal cancer and the proportion of R0 resections was much higher in multivisceral resection group compared to non-multivisceral resection group.[23] All cases included the performance open surgery in the present study. The benefit of laparoscopic surgery includes faster resolution of postoperative ileus, which can lead to shorter hospital stays, fewer occurrences of adhesive small bowel obstructions, and less morbidity related to the incision.[24–27] A study reported that laparoscopic multivisceral resection seems to be a feasible and effective treatment for carefully selected patients with colorectal cancer.[28]

The present study is limited by its retrospective, non-randomized, single-institution study format and significant selection biases. In addition, the cases offer a small number of sample size. Nevertheless, based on the present data, multivisceral resection for locally advanced colorectal cancer (clinically T4b) has acceptable peri- and post-operative and oncologic outcomes and may be a feasible procedure. Multivisceral resection provided a chance for curative resection with a clear resection margin (R0) for colorectal cancer surgery. This procedure can also change clinical stages and provide an opportunity to improve patients' prognoses.

Conclusion

Based on the present data, multivisceral resection for locally advanced colorectal cancer (clinically T4b) has acceptable perioperative and oncologic outcomes and may be a feasible procedure.

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PEER REVIEW

Not commissioned. Externally peer reviewed.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

FUNDING

No funding was obtained for this study.

ETHICS COMMITTEE APPROVAL

Ethical approval was not necessary as this analysis was based on retrospective review.

Figure 1: 5-year disease free survival rate and 5-year overall survival rate after multivisceral resection for locally advanced primary colorectal cancer

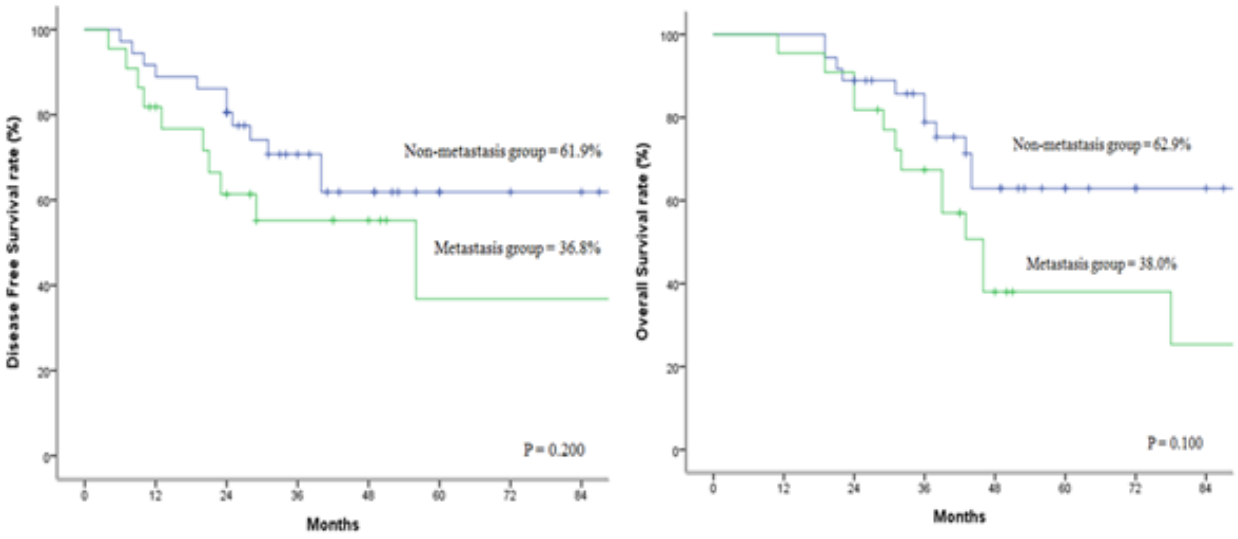

Table 1: Patient characteristics (n=58)

	Presence of tumor cell group (n=22) (%) (Group I)	**Non-tumor cell group (n=36) (%) (Group II)**	**p value**
Age(mean±SD, (range)) (year)	57.9±14.2 (44-83)	61.1±57.9(32-83)	0.758
Sex, n (%)			0.21
Male	4(18.2%)	12(33.3%)	
Female	18(81.8%)	24(66.7%)	
Weight(mean±SD, (range)) (kg)	57.9±14.5	59.5±15.4	0.533
	(39.6-73.2)	(43.3-94.3)	
Height(mean±SD, (range)) (cm)	156.8±11.3	158.7±9.2	0.886
	(141.1-179.0)	(139.6-185.5)	
BMI(mean±SD, (range)) (kg/m^2)	22.7±2.6(16.7-26.8)	23.3±3.2(17.9-31.8)	0.2
ASA score, n (%)			0.343
1	8(36.4%)	14(38.8%)	
2	14(63.6%)	19(52.8%)	
3	0(0.0%)	3(8.4%)	
Previous operation history	1(3.4%)	3(3.7%)	0.95
Initial CEA	15.7±31.4	17.5±62.7	0.953
	(0.0-138.1)	(0.5-68.1)	
Adjuvant chemotherapy	18(81.8%)	24(66.7%)	0.21

Table 2: Resection of organs at multivisceral resection for locally advanced primary colorectal cancer

	Presence of tumor cell group (n=22) (%) (Group I)	Non-tumor cell group (n=36) (%) (Group II)	P value
Bladder/Ureter	4(18.2%)	8(22.2%)	
Uterus	4(18.2%)	13(36.1%)	
Ovary	12(54.5%)	10(27.8%)	
Small bowel	1(4.5%)	5(13.9%)	
Omentum	2(9.1%)	1(2.8%)	
Stomach	3(13.6%)	2(5.6%)	
Spleen	0(0.0%)	2(5.6%)	
Diaphargm	0(0.0%)	1(2.8%)	
One organ	18(81.8%)	31(86.1%)	
More two organ	4(18.2%)	5(13.9%)	
Total number	22(100.0%)	36(100.0%)	0.489

Table 3: Postoperative pathologic outcomes

	Presence of tumor cell group (n=22) (%) (Group I)	Non-tumor cell group (n=36) (%) (Group II)	p value
pTNM stage, no. (%)			
IIa	0(0.0%)	21(58.3%)	<0.05
IIb	0(0.0%)	2(5.5%)	
IIc	4(18.2%)	0(0.0%)	
IIIb	1(4.5%)	9(25.0%)	
IIIc	5(22.7%)	4(11.2%)	
IVa	11(50.0%)	0(0.0%)	
IVb	1(4.5%)	0(0.0%)	
pT stage, no. (%)			
3	5(22.7%)	33(91.7%)	<0.05
4a	3(13.6%)	3(8.3%)	
4b	14(63.6%)	0(0.0%)	
pN stage, no. (%)			
0	9(40.9%)	23(63.9%)	0.217
1a	2(9.1%)	3(8.3%)	
1b	6(22.3%)	3(8.3%)	
2a	3(13.6%)	2(5.6%)	
2b	2(9.1%)	5(13.9%)	
pM stage, no. (%)			
0	10(45.5%)	36(100.0%)	<0.05
1a	11(50.0%)	0(0.0%)	
1b	1(4.5%)	0(0.0%)	
Grade of differentiation, no. (%)			
Well	0(0.0%)	0(0.0%)	0.716
Moderate	19(86.4%)	28(77.8%)	

Poor	2(9.1%)	5(13.9%)	
Mucinous	1(4.5%)	3(8.3%)	
Harvested no. of lymph nodes, (mean±SD, range), (No)	24.3±12.8 (3-52)	24.4±15.6 (3-72)	0.698
Lymphovascular invasion			< 0.05
- +	7(31.8%) 15(68.2%)	24(66.7%) 12(33.3%)	
PRM, (mean±SD, range), (cm)	16.2±11.9(7.0-30.3)	12.2±7.1(4.5-30.0)	0.07
DRM, (mean±SD, range), (cm)	7.9±7.9 (0.2-5.0)	6.2±6.3 (0.5-8.5)	0.188
Mass size	6.2±2.1 (0.7-9.8)	6.4±2.1 (1.5-8.5)	0.945

*PRM: Proximal resection margin; DRM: Distal resection margin

Table 4: Peri-postoperative outcomes at multivisceral resection for locally advanced primary colorectal cancer

	Presence of tumor cell group (n=22) (%) (Group I)	**Non-tumor cell group (n=36) (%) (Group II)**	**p value**
Operation time (min)	261.8±95.2 (190-400)	253.3±67.8 (235-450)	0.72
Blood loss (ml)	631.8±367.9 (100-1000)	531.4±372.7 (100-1500)	0.505
Length of hospital stay (day)	18.1±8.3(11-31)	15.9±5.8(10-71)	0.049
Time to sips of water (day)	4.91±1.5	4.97±1.5	0.653
Time to liquid diet (day)	6.41±1.6	6.39±1.2	0.23
Time to soft diet (day)	7.41±1.6	7.53±1.3	0.407
Total Morbidity (n; %)	9(10.3%)	9(28.4%)	0.204
Urinary dysfunction	0	3	
Ileus	2	2	
Wound discence/infection	6	2	
Intraabdominal abscess	0	1	
Anastomosis site leakage	1	1	
Pneumonia	0	1	

Table 5: Recurrence pattern of multivisceral resection for locally advanced primary colorectal cancer

	Presence of tumor cell group (n=22) (%) (Group I)	**Non-tumor cell group (n=36) (%) (Group II)**	**p value**
Systemic recurrence	8(36.4%)	8(22.2%)	0.659
Lung Liver Paraaotic node	6(27.3%) 2(9.1%) 0(0.0%)	6(16.7%) 1(2.8%) 1(2.8%)	
Local recurrence	1(4.5%)	2(5.6%)	0.278
Anastomosis site Ovary	0(0.0%) 1(4.5%)	2(5.6%) 0(0.0%)	
Total Number of Recurrence	9(40.9%)	10 (27.7%)	0.346