Case Series

Combined laparoscopic and robotic surgery for synchronous colorectal and genitourinary cancer: A case series

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ABSTRACT

INTRODUCTION: Advances in diagnostic techniques and treatment have resulted in an increase in patients with synchronous cancer. Surgical reports of combined laparoscopic and robotic resection for synchronous colorectal and genitourinary cancer are rare.

MATERIALS AND METHODS: Between August 2015 and November 2017, three patients underwent combined laparoscopic and robotic surgery for synchronous colorectal and genitourinary cancer in our hospital.

RESULTS: Case 1 was a 59-year-old man with synchronous rectal and prostate cancer treated by combined laparoscopic anterior resection and robotic-assisted prostatectomy. Case 2 was a 77-year-old man with synchronous cancer of transverse colon and left kidney treated by combined laparoscopic transverse colectomy and robotic-assisted partial nephrectomy. Case 3 was a 74-year-old man with synchronous adenocarcinoma of descending colon and prostate treated by combined laparoscopic left hemicolectomy and robotic-assisted prostatectomy.

DISCUSSION: In simultaneous endoscopic surgery, it is necessary to consider sequence of resection, intraoperative position of patient and port arrangement. Simultaneous surgery allows promptly for postoperative adjuvant chemotherapy.

CONCLUSION: Combined laparoscopic and robotic surgery for synchronous colorectal and genitourinary cancer is suitable for advanced cancer cases requiring multidisciplinary treatment.

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1. Introduction

Recently, advances in diagnostic techniques have resulted in an increase in synchronous cancer patients. However, surgical reports of combined laparoscopic and robotic resection for synchronous colorectal and genitourinary cancer are rare [1,2]. We performed combined laparoscopic and robotic surgery in three such patients. The procedures and clinical experience are described below with review of selected literature.

2. Materials and methods

Between August 2015 and November 2017, three patients underwent combined laparoscopic and robotic surgery for synchronous colorectal and genitourinary cancer in our hospital. This report is retrospective case series. This work has been reported in line with the PROCESS criteria [3].

3. Results

3.1. Case 1

A 59-year-old man was referred for evaluation of positive fecal occult blood test and elevated prostate-specific antigen (PSA). His past medical history were hypertrophic cardiomyopathy and three surgeries for ascending colon diverticulitis. Colonoscopy found rectal adenocarcinoma (Fig. 2a), with evidence of lymph...
node metastasis on computed tomography (CT, Fig. 2b). Magnetic resonance imaging (MRI) and biopsy revealed prostatic adenocarcinoma (Fig. 2c). We decided to perform simultaneous endoscopic surgical resection. Under general anesthesia, the urologists performed robotic-assisted radical prostatectomy (RARP) with the patient in the lithotomy position (Fig. 1a). It took a long time to separate intra-abdominal adhesions resulting from previous surgery. After resection of the prostate and urethrovesical anastomosis, the surgeons performed a laparoscopic low anterior resection using the same port site. A diverting stoma of the ileum was constructed because the anastomosis was near the anal wedge. The procedure time was 676 min. The pathological diagnoses were rectal adenocarcinoma, stage T3N2M0 and prostate adenocarcinoma, stage T2cN0M0. The patient was diagnosed with recurrences in para-aortic and mediastinal lymph nodes 6 months after surgery. Chemotherapy is ongoing, with stable disease 32 months after surgery.

3.2. Case 2

A 77-year-old man was referred to the outpatient department because of diarrhea, nausea, and abdominal pain. Abdominal CT revealed obstruction of the left transverse colon (Fig. 3a), cancer of the left kidney (Fig. 3b), and a splenic aneurysm. Colonoscopy confirmed a constricting tumor of the transverse colon (Fig. 3c) pathologically diagnosed as adenocarcinoma. Endoscopic decompression was performed with a self-expanding metal stent, and transarterial embolization of the splenic aneurysm was done to prevent perioperative rupture. Combined laparoscopic transverse colectomy and robotic-assisted partial nephrectomy were performed. Under general anesthesia, the patient was placed in the right, lateral decubitus position with the port placement as shown in Fig. 1b. The surgeons mobilized the colon, the tail of the pancreas, and the spleen. After mobilization, the urologists performed robot-assisted partial nephrectomy. After rotating the table to bring the

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**Fig. 1.** Port arrangement in each operation (◎: 12mm trocar, ●: 8mm trocar, ○: 5mm trocar) (a) Case 1 (b) and case 3. (b) Case 2.

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**Fig. 2.** The examination of imaging before the operation in case 1.
(a) Colonoscopy showed rectal cancer. (b) CT suggested lymph node metastasis (yellow arrow).
(c) MRI showed prostate cancer on the left lobe (white arrow).
patient position to 45°, the surgeons performed a transverse colec-
tomy with lymph node dissection without inserting an additional
port. The operating time was 510 min, the blood loss was 50 mL, and
the pathological diagnoses were adenocarcinoma of the transverse
colon, stage T3N0M0 and renal cell carcinoma of the left kidney,
stage T3aN0M0. The patient remains cancer free with no evidence
of recurrence 12 months after surgery.

3.3. Case 3

A 74-year-old man was referred for evaluation of elevated PSA,
and a prostate biopsy revealed adenocarcinoma of the prostate.
Endocrine therapy was started, and surgery was scheduled, but a
preoperative abdominal CT was suspected tumor of the descend-
ing colon (Fig. 4a). A colonoscopy revealed cancer constricting
the descending colon, which was decompressed by endoscopic
placement of a self-expanding metal stent. The diagnosis was
synchronous adenocarcinoma of the descending colon and the
prostate, both of which were advanced (Fig. 4b, 4c). The patient
was treated by combined laparoscopic left hemicolectomy and
RARP. Under general anesthesia, the urologists started the RARP
with the patient in the lithotomy position and using six ports, the
same arrangement as shown in Fig. 1a. After resection of the prostate and
urethrovésical anastomosis, the surgeons performed laparoscopic
left hemicolectomy while maintaining the same port placement.
The operating time was 547 min with a blood loss of 50 mL. The
pathological diagnoses were adenocarcinoma of the descending
colon, stage T3N1M0 and adenocarcinoma of the prostate, stage
T4N1M0. The patient remains cancer free with no evidence of recur-
rence 6 months after surgery.

4. Discussion

Aydin et al. estimated that 1% of patients with carcinoma
had multiple primary malignancies, 4% of which were synchronous
colorectal and renal carcinomas and about 1% were synchronous
colorectal and prostate carcinomas [4,5]. Halak et al. recommended
routine use of preoperative imaging studies to exclude synchronous
asymptomatic renal lesions in patients with colorectal cancer [6–8].
Simultaneous laparoscopic resection of coexisting lesions has
been shown to be feasible [9,10], and the benefits of which have
been previously described [11–13]. There are few cases of simulta-
eneous endoscopic surgery for colorectal cancer and genitourinary
cancer, therefore surgical procedures have not been well described.
In simultaneous endoscopic surgery, it is necessary to consider
sequence of resection, intraoperative position of patient and port

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Fig. 3. Abdominal CT and endoscopic findings in case 2.
(a) Abdominal CT in outpatient show obstruction of left side transvers colon (yellow arrow).
(b) Left kidney mass was incidentally found, suggested renal cell carcinoma (white arrow).
(c) Colonoscopy showed tumor obstruction.

Fig. 4. Abdominal CT findings in case 4.
(a) Preoperative abdominal CT showed peripheral wall irregularities of the descending colon (yellow arrow).
(b) After colonic stent placement, enhanced CT showed metastatic lymph node (white arrow).
(c) Wall irregularities and rearward protrusion of prostate in enhanced CT (yellow circle).
arrangement [2,14]. In case 1, RARP was performed before rectal resection because the ureter was easily seen on the inner approach and dissection of the ventral aspect of the rectum was not necessary. In case 3, the ureter was dissected during the RARP, making it easier to see the ureter on the inner approach. In cases involving simultaneous prostatectomy and left hemicolectomy or rectal surgery, it may be better to perform the prostatectomy first. In case 2, mobilization of the left side of the colon and spleen were required for performing the left nephrectomy using an intraperitoneal approach. In our hospital, nephrectomy is often performed by the retroperitoneal approach. Therefore, the surgeons were more comfortable with mobilization of the left side of the colon and spleen than the urologists were. For that reason, the surgeons started the operation and the urologists performed the nephrectomy after mobilization. Lymph node dissection and colectomy were performed after nephrectomy. To maintain physical relationships and ensure good healing of the anastomotic site, reconstruction was performed as the last step. The position of case 2 during surgery was different from that of the other patients. In that patient, a lateral decubitus position was required for nephrectomy; therefore, the colectomy was performed with the patient in a semilateral position achieved by rotating the operation table. The difference in position had no influence on surgical procedure.

As the port arrangements used in separate procedures may differ, additional port insertion may be required for simultaneous surgery. However, in these patients, colorectal surgery was successfully performed with a port arrangement generally used in urogenital surgery, which resulted in use of the minimum number of ports. The port arrangement for urogenital rather than colorectal surgery was used because robotic surgery is more restricted in port arrangement than laparoscopic surgery. Previous studies stress the importance of planning port placement to share trocars and to avoid the use of unnecessary trocars [2,11]. Reducing the number of ports results in minimally invasive surgery, and previous reports of simultaneous surgery for colorectal and genitourinary surgery have noted the insertion of additional ports. However, our experience is that sharing ports in simultaneous endoscopic surgery for synchronous colorectal and urogenital cancer is possible.

Benefits of simultaneous surgery include decreased hospital stay, less postoperative pain and morbidity, early return to work [15]. Performing a second surgery for synchronous cancers prevents the initiation of adjuvant chemotherapy until both procedures are completed. In contrast, simultaneous surgery allows promptly for postoperative adjuvant chemotherapy. For this reason, synchronous advanced cancer cases that require multidisciplinary treatment may be indicated for simultaneous endoscopic surgery. This report is small case series, therefore further large research such as randomized control study should be required to evaluate the combined laparoscopic and robotic surgery for synchronous colorectal and genitourinary cancer.

5. Conclusion

Combined laparoscopic and robotic surgery for synchronous colorectal and genitourinary cancer allowed prompt initiation of adjuvant chemotherapy. Our experience supports simultaneous endoscopic surgery for advanced cancer cases requiring multidisciplinary treatment. Further research such as randomized control study should be required.

Conflict of interest

The authors have no conflict of interest to declare.

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Ethical approval

This report was approved by the ethics committee in Nagoya Tokushukai General Hospital (Institutional Review Board approval 2018-07-002).

Consent

Consent was obtained from patients for publication.

Author contribution

TI, ST and SK performed operation. TI drafted the manuscript. ST and SK participated in the correction of the manuscript. All authors read and approved the final manuscript.

Registration of research studies

This research registry U11 is 4269.

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References

[1] H. Kamiyama, K. Sakamoto, T. China, et al., Combined laparoscopic abdominoperineal resection and robotic-assisted prostatectomy for synchronous double cancer of the rectum and the prostate, Asian J. Endosc. Surg. 9 (2016) 142–145.
[2] H.J. Lavery, S.A. Patel, E. Chin, D.B. Samadi, Combined robotic-assisted laparoscopic prostatectomy and laparoscopic hemicolecction, JSLS 15 (2011) 550–554.
[3] R.A. Agha, A.J. Fowler, S. Rammohan, I. Barai, D.P. Orgill, the PROCESS Group, The PROCESS statement: preferred reporting of case series in surgery, Int. J. Surg. 36 (Pt A) (2016) 319–323.
[4] A. Aydiner, A. Karadeniz, Y. Uygun, et al., Multiple primary neoplasms at a single institution: differences between synchronous and metachronous neoplasms, Am. J. Clin. Oncol. 23 (2000) 364–370.
[5] N. Nisiyama, S. Yamamoto, N. Matsuoka, et al., Simultaneous laparoscopic descending colecctomy and nephroureterectomy for descending colon carcinoma and left urethral carcinoma: a report of case, Surg. Today 39 (2009) 728–732.
[6] M. Halak, D. Hazzan, Z. Kovacs, et al., Synchronous colorectal and renal carcinomas: a noteworthy clinical entity. Report of five cases, Dis. Colon Rectum. 43 (2000) 1314–1315.
[7] M. Takahashi, R. Ichikawa, K. Honjo, et al., Simultaneous laparoscopic colecctomy and nephrectomy for synchronous ascending colon cancer and right kidney cancer: report a case, Juntendo Med. J. 60 (2014) 345–348.
[8] S.H. Kim, J.Y. Park, Y.G. Joh, et al., Simultaneous laparoscopic radical nephrectomy and laparoscopic sigmoidectomy for synchronous renal cell carcinoma and colon carcinoma, J. Laparoendosc. Adv. Surg. Tech. A 14 (2004) 179–181.
[9] S.S. Ng, R.Y. Yiu, J.C. Li, et al., Endolaparoscopic left hemicolectomy and synchronous laparoscopic radical nephrectomy for obstructive carcinoma of the descending colon and renal cell carcinoma, J. Laparoendosc. Adv. Surg. Tech. A 16 (2006) 297–300.
[10] S.S. Ng, J.F. Lee, R.Y. Yiu, et al., Synchronous laparoscopic resection of colorectal and renal/adrenal neoplasms, Surg. Laparosc. Endosc. Percutan. Tech. 17 (2007) 283–286.
[11] H.J. Kim, G.S. Choi, J.S. Park, et al., Simultaneous laparoscopic multi-organ resection combined with colorectal cancer: comparison with non-combined surgery, World J. Gastroenterol. 18 (2012) 806–813.
[12] H. Matsui, Y. Okamoto, A. Ishii, et al., Laparoendoscopy-assisted combined resection for synchronous gastric and colorectal cancer: report of three cases, Surg. Today 39 (2009) 434–439.
[13] K. Ando, E. Oki, T. Ikeda, et al., Simultaneous resection of colorectal cancer and liver metastases in the right lobe using pure laparoscopic surgery, Surg. Today 44 (2014) 1588–1592.

[14] M. Shimomura, Y. Ogura, K. Taniguchi, et al., Simultaneous laparoscopic radical nephrectomy and laparoscope-assisted right colectomy for synchronous renal cell carcinoma and colonic adenocarcinoma. J. Jpn. Soc. Endosc. Surg. 15 (2010) 657–701.

[15] M. O’Sullivan, D.E. Kearney, S.K. Giri, et al., Combined laparoscopic-assisted nephrectomy and complete mesocolic excision for synchronous renal and colon cancers, BMJ Case Rep. 2015 (2015), bcr-2015211681.