

Original Article

Surgical Strategy for Synchronous Colorectal Neoplasia: Laparoscopic Resection is Feasible

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Key Words

Synchronous colorectal carcinoma;
Laparoscopic surgery

Background/Aims. New diagnostic technologies have led to a greater chance of preoperative detection of synchronous neoplasms in patients undergoing surgical resection of colorectal tumors. Although synchronous colorectal neoplasia (SCRN) has been known for years, clinical signs and symptoms, optimal diagnostic methods and treatment strategy, and prognosis remain unclear. The benefits of laparoscopic colon resection have been widely reported, and several reports of laparoscopic resection in cases of SCRN have also been published. However, larger series will be needed to verify the advantage of laparoscopic resection for patients with SCRN.

Methods. Among 1,023 retrospectively identified patients who underwent laparoscopic colon resection for colorectal cancer at our institution between 2004 and 2012, 32 (3.1%) had multiple primary colorectal neoplasms. There was at least one malignant tumor in all 32 cases, and 19 patients had two malignant tumors. In patients with synchronous adenomas who were not candidates for endoscopic mucosal resection or submucosal dissection of the benign lesions, benign and malignant lesions were resected simultaneously during laparoscopic colectomy.

Results. Twenty-one of the 32 patients had stage I or II tumors and 11 had stage III or IV tumors. The mean index tumor size was 4.4 cm, and the most frequent locations were the right colon and the rectum. Secondary tumors were evenly distributed in all locations. The mean operation time was 309 minutes, and blood loss was approximately 250 mL. Among surgical strategies, double anastomosis was performed in 12 patients, a permanent stoma was created in 3 patients, and 5 patients had a temporary stoma. In terms of immediate outcomes, time to flatus was 4 days and hospital stay was 14 days. Six patients had postoperative complications but there was no surgical mortality.

Conclusion. Laparoscopic surgery had acceptable short-term outcomes in patients with SCRN. The main advantages of laparoscopic surgery are smaller incisions and reduced postoperative pain. Despite longer operation times due to the extended dissection field, laparoscopic surgery was a feasible surgical strategy for patients with SCRN.

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Synchronous colorectal neoplasia (SCRN) is defined by the simultaneous occurrence of two or more colorectal neoplasms. The most advanced tumor is defined as the index tumor while the other neoplasm(s)

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are secondary tumor(s). Because the malignant potential of benign colorectal tumors strongly increases with time, if a synchronous adenoma is not resected at the time of initial diagnosis, the patient may be at significant risk of developing a metachronous carcinoma.¹⁻³

There are now many reports that highlight the advantages of laparoscopic colon resection, particularly in older patients, patients with early tumor stage, and those with functional bowel disease.^{1,5,11}

Recent studies have postulated that laparoscopic resection is associated with shorter time to flatus, faster recovery of colonic function, fewer short-term complications, and potential benefits related to the smaller incision, including better cosmetic outcomes and reduced postoperative pain.¹

To date, the evidence of comparable long-term prognoses for patients undergoing laparoscopic vs. open colon resection is strong, and initial laparoscopic surgery with removal of synchronous lesions has a much lower complication rate than second abdominal surgeries due to cancer recurrence.^{1,3,4}

A major drawback of laparoscopic colon resection is the prolonged operation time. This disadvantage becomes more notable in cases of SCRNs that require resection of additional colonic segments, which are sometimes supplied by different vessels, as well as creation of multiple anastomoses. Longer operation times may lead to increased intraoperative risk and complication rates. Moreover, the lack of tactile sensation remains a major drawback of laparoscopic surgery, and is associated with the potential failure of intraoperative identification of early tumors that may have been missed preoperatively, leading to increased rates of recurrence.^{1,2}

This retrospective study was performed to evaluate the short-term outcomes and complications of laparoscopic colon resection in patients with SCRNs in order to better define the utility and feasibility of this approach.

Methods

This was a single-center study, and all patients received a similar surgical treatment. We retrospectively identified 1,023 patients who underwent laparoscopic colon resection for primary colorectal adenocarcinoma

at the National Taiwan University Hospital Department of Colorectal Surgery between January 2004 and December 2012. Laparoscopic colectomy for synchronous colonic neoplasms was performed in 32 (3.1%) of these patients.

We collected patient data including age, body mass index, family history, and medical history including underlying cardiovascular disease or previous abdominal surgery. In the patients with SCRNs, we noted the location of the tumors, the surgical technique (colon resection, number of anastomoses, stoma creation), the duration of surgery, and the estimated blood loss. In order to determine surgical outcomes, we noted days to flatus, length of hospital stay, complications, histopathologic tumor stage, as well as long-term outcomes including recurrence and survival.

All SCRNs patients underwent preoperative abdominal and pelvic computed tomography and at least one endoscopic examination. Nineteen patients had two primary adenocarcinomas, while the other 13 had one primary adenocarcinoma and at least one adenoma that could not be resected endoscopically, as determined by a GI specialist who evaluated all patients with benign lesions for the possibility of endoscopic mucosal resection or endoscopic submucosal dissection. In 1 patient, a tumor that was diagnosed as benign on endoscopic biopsy was finally diagnosed as an adenocarcinoma upon histopathologic examination of the surgical specimen. Patients received postoperative adjuvant therapy with oral tegafur-uracil, 400 mg/day, for a period ranging from 6 months to 2 years, in accordance with established guidelines.

As the surgical technique, we adopted a medial-to-lateral approach for initial control of the pedicle vessels. We then used the no-touch isolation technique to mobilize the colon or rectum, allowing adequate margins of resection for oncological safety. Finally, we extended the surgical incision to extract the specimen and then performed the anastomosis. If we determined that a patient was at high risk for anastomotic leak, we created a protective stoma.

Results

During the study period, 32 patients were diag-

nosed with SCRN and all of them underwent laparoscopic colectomy. The mean age of the patients was 72 years, the male:female ratio was 3:1, and the mean body mass index was 23.3 kg/m². Five of the 32 patients (15%) had a positive family history for colorectal cancer. Twenty-five patients had two synchronous tumors, 4 had 3 synchronous tumors, and 3 had 4 synchronous tumors. The mean size of the index tumor was 44.6 ± 17.3 mm. The primary tumor was located in the right colon in 12 patients, in the rectum in 12 patients, in the transverse colon in 3 patients, and in the sigmoid colon in 5. According to the TNM system classification (American Joint Committee on Cancer, Sixth Edition), 7 patients had stage I disease, 14 had stage II disease, 10 had stage III disease, and 1 had stage IV disease (Table 1).

The mean operative time 309 minutes, and the mean estimated blood loss was 239 mL. Procedures with a single anastomosis included right colectomy (performed in 6 patients), left colectomy or sigmoidectomy (3 patients), low anterior resection for rectal cancer (2 patients), and subtotal colectomy (2 patients). Procedures with two anastomoses included subtotal right and left colectomy (7 patients) and right colon and rectum resection (5 patients). Stomas were created in 7 patients, including 3 end colostomies following abdominoperineal resection and 3 protective ileostomies (Table 2).

In terms of short-term outcomes, the time to flatus was 4 days and the postoperative hospital stay was 14 days. Six immediate complications were recorded, which included 1 catheter infection, 2 pneumonias, 1 bladder injury, 1 ileus, and 1 intra-abdominal hematoma.

Long-term follow-up records (> 1 year; median 31 months) were available for 25 patients. Among these, 1 patient died 25 months after surgery from chemotherapy complications, 3 patients developed distant metastases, and 1 presented with metachronous colon cancer at 46 months after surgery, with no recurrence after a second surgery.

Discussion

In this study, we found that patients with SCRN

tended to be older at the time of diagnosis.^{1,2} Considering the well-described stepwise progression of colorectal cancer, it is reasonable to expect older people to have a higher cumulative risk of colorectal adenoma and, consequently, to exhibit higher rates of SCRN.¹⁰

Table 1. Demographics characteristics

Varition	N = 32
Age (years), mean ± SD	72 ± 9.3 (51~87)
Gender	
Male	23 (71%)
Female	9 (29%)
Family history	
Colon cancer	5 (15%)
Non-colon cancer	3 (9%)
No family history	24 (75%)
Past abdomen surgery	
With past surgery	26
Without past surgery	6
Underline cardiovascular disease	
With cardiovascular disease	11
Without cardiovascular disease	21
BMI (weight/height ² , kg/m ²)	23.3 ± 3.8 (16.9~31.6)
Synchronorous tumor numbers	
2 tumors	25
3 tumors	4
4 tumors	3
Index Tumor location	
Ascending colon	12 (37.5%)
Transverse colon	3 (9.3%)
Descending colon	0 (0%)
Sigmoid colon	5 (15.6%)
Rectum	12 (37.5%)
Index tumor size (mm)	44.56 ± 17.3 (11~80)
Secondary tumor location	
Ascending colon	8 (23.5%)
Transverse colon	5 (14.7%)
Descending colon	7 (20.5%)
Sigmoid colon	11 (32.3%)
Rectum	3 (8.8%)
Index tumor stage	
Stage I	7 (21.8%)
Stage II	14 (43.7%)
Stage III	10 (31.2%)
Stage IV	1 (3.1%)
Secondary tumor stage	
Stage 0	15 (46.8%)
Stage I	11 (34.3%)
Stage II	5 (15.6%)
Stage III	0 (0%)
Stage IV	1 (3.1%)

Table 2. Operative characteristics

Operation time (min)	309 ± 84 (195~615)
Blood loss (ml)	239 ± 210 (50~1000)
Operation method	
Right hemicolectomy	4
Extended right hemicolectomy	2
Left hemicolectomy	3
Low anterior resection	1
Abdominoperineal resection	1
Subtotal colectomy	2
Right* + Left**	2
Right* + AR ⁺	5
Right* + LAR ⁺⁺	4
Right* + APR ⁺⁺⁺	2
Left** + LAR ⁺⁺	6
Anastomosis site	
One site	20
Two site	12
Stoma creation	8

* Right hemicolectomy; ** Left hemicolectomy; ⁺ Anterior resection; ⁺⁺ Low anterior resection; ⁺⁺⁺ Abdominoperineal resection.

We also found that family history seemed to be associated with a slight increase in the incidence of SCRN, which is consistent with previous genetic studies that have indicated a hereditary component of SCRN.^{3,4}

The index tumors were mostly located in the right colon and the rectum, while the secondary tumors were randomly distributed throughout the colon. Although the distribution of SCRNs is similar to that of single colorectal tumors, tumors associated with SCRN usually present at a lower stage at the time of initial diagnosis. However, the effect of SCRN on long-term survival of patients with colorectal cancer remains controversial.¹⁻⁴ In terms of surgical approaches to SCRN, multiple segmentectomy and anastomosis is not associated with increased complication rates, and it allows the potential for better preservation of function compared to total colectomy; this is particularly relevant in cases that involve the rectum.⁹

Because of the lack of tactile sensation, laparoscopic surgery does not allow accurate detection of SCRN by intraoperative palpation. In fact, early colonic neoplasms that might be undetectable by colonoscopy or preoperative imaging studies may be identifiable only during traditional open surgery. Therefore, when possible, it is important to diagnose SCRN

before laparoscopic colon resection in patients with colorectal cancer. When comprehensive preoperative colonoscopy is not available, we recommend extensive preoperative imaging studies and intraoperative colonoscopy, especially in high-risk patients.

The mean operative time for laparoscopic colon resection in patients with SCRN was 309.5 minutes, and it was 350.2 minutes in cases with 2 anastomoses. Thus, the creation of two anastomoses did not greatly affect the duration of the surgery considering the time spent for establishing the laparoscopic field and the overlapping dissection procedures. Nonetheless, short-term postoperative outcomes of laparoscopic colon resection in patients with SCRN remain a major concern. In our study, 6 patients (18%) required prolonged hospital stays due to complications, 3 of whom (9%) had procedure-related complications (1 bladder injury, 1 postoperative ileus, and 1 hematoma that required exploratory laparotomy for diagnosis). Overall, the postoperative morbidity associated with laparoscopic SCRN resection was acceptable in our study.

The most apparent advantage of laparoscopic surgery is better postoperative cosmesis and reduced incisional pain compared to traditional laparotomy.⁵⁻⁸ In our study, a metachronous colon cancer was found in only 1 patient during the long-term postoperative follow-up (46 months), which required a second laparoscopic colon surgery. On this occasion, we were able to observe that the intra-abdominal adhesions were far less severe than might have been expected if the patient had undergone a previous abdominal surgery with extended dissection. We believe that this highlights another potential advantage of laparoscopic surgery for SCRN and that it suggests that a lower complication rate might be expected after a second laparoscopic surgery. This would be especially relevant for patients with SCRN, who tend to have a higher incidence of metachronous colon cancer.

Conclusion

Laparoscopic colon resection for patients with SCRN had acceptable outcomes and complication rates. The advantages of laparoscopic surgery include

smaller incisions and reduced incisional pain postoperatively. Despite the longer operation times required by the extended dissection field, laparoscopic surgery was a feasible surgical strategy for patients with SCRN.

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原 著

以腹腔鏡手術來治療同時存在之多發性大腸直腸腫瘤

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背景與目的 隨著診斷技術的進步，臨床上有越來越多的同時存在之多發性大腸直腸腫瘤 (SCRN) 在手術前被診斷出來。雖然 SCRN 在臨床上被確認已有一段時間，但是其臨床特徵、診斷方式、治療策略、甚至預後如何都還未完全被瞭解。腹腔鏡手術應用在大腸直腸手術的優勢，無論是處理良性症狀或是惡性腫瘤都已經被廣泛的確定，但腹腔鏡手術使用在 SCRN 病患身上的經驗尚未被討論。本篇文章的目的，就是要收集並分析腹腔鏡對於 SCRN 治療效果以及其相關併發症，來總結腹腔鏡手術是否適用於治療 SCRN 病患。

方法 我們以回溯性統計從 2004 年到 2012 年，其中診斷為 SCRN 的病患並用腹腔鏡手術切除大腸直腸癌共 32 位，所收集的每個病患的多顆腫瘤中最少有一顆為惡性，其中同時診斷出有兩個惡性腫瘤的有 19 位。而病患併存的良性腫瘤皆經過評估不適合由內視鏡切除，所以與惡性腫瘤同時用腹腔鏡手術切除。

結果 在這 9 年期間有 32 名病患被診斷為 SCRN 並且接受腹腔鏡手術，其中平均年齡為 72 歲，男女比例為 3:1，BMI (weight/height², kg/m²) 為 23.3，家族病史中有大腸癌相關的只有 5 (15%)，大部分的病人腫瘤數目都是兩顆，有 4 位病患有三顆腫瘤，3 位病患有四顆腫瘤。手術部分平均手術時間為 309 分鐘，失血量為 239 ml，術式的種類依據切除的部位分為單一吻合的切除 13 例，而有兩處吻合的共有 12 例，全部術式裡有術後造口的共 8 例，包含了 3 例永久人工肛門，預防性人工肛門有 5 例。

手術 30 天內的短期追蹤裡顯示：排氣天數為 4 天，住院天數為 14 天，術後立即的併發症術目為 6 例 (18.7%)。長期追蹤超過一年的有 25 例，其中一例在術後 28 個月因為化療併發症死亡，3 例有遠處復發的病史，而有 1 位病人在術後 46 個月時發現有 metachronous colon cancer，經過在切除後目前追蹤 76 個月都沒有再復發或是轉移。

結論 用腹腔鏡手術來治療 SCRN 病患因為手術範圍擴大，手術時間明顯會比單一大腸腫瘤要長，但在術後併發症以及短期追蹤結果的比較下，並沒有比較差。而優勢的部分就是會比傳統剖腹的方式傷口小，疼痛少，因此，以腹腔鏡手術來治療 SCRN 的病患是一個適當的選擇。

關鍵詞 同步發生的大腸直腸癌、腹腔鏡手術。