Case Analysis

Clinico-pathological Features of Colonic Intussusception in Adults

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Key Words
Adult;
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Purpose. Adult intussusception is a uncommon disease, and the colonic inrussusception is less than enteric intussusception. Because of the limited experience with such clinical entities, we report a series of adult colonic intussusception to discuss diagnosis and treatment.
Methods. From January 1997 to December 2008, a total of 18 patients with adult colonic intussusceptions were reviewed. We divided the patients into colocolic group and ileocolic group and analyzed the data of these 18 patients.
Results. There were 11 ileocolic intussusception and 7 colocolic intussusception. The mean duration of symptoms was 22.2 days (range 1 to 105 days), and abdominal pain was represented in all patients. Only one patient underwent hydrostatic reduction without operation and others underwent bowel resection with organic lesion. One hundred percent of colocolic intussusception cases were malignant lesions and this was more than ileocolic intussusceptions (27% and $p < 0.001$). All patients with colon cancer had a favorable outcome and are still alive.
Conclusion. Colonic intussusception in adults is a rare disease. Abdominal pain is complained of by all *patients* but the symptoms have various duration. Abdominal ultrasonography and computed tomography are useful tools for colonic intussusception diagnosis. In our study, colocolic intussusception had more malignant probability than ileocolic intussusception. Primary resection with associated lymph node dissection without reduction is the principle method of treatment.
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Ileocolic intussusception is a common disease in children that are half a year to 2 years old, but intestinal or colonic invagination is a rare disease in adults. Intussusception in adult patients represents 1% of patients with bowel obstruction and 5% of all intussusception.[1-5] It is usually primary and benign in children intussusception and pneumatic or hydrostatic reduction of the intussusception is enough to treat the condition in 80% of the patients. In contrast, 70% to 90% cases of intussusception in adults are secondary to a pathologic leading point that can be only identified intraoperatively, and surgery is necessary in most cases.[6,7]

Lesions that result in enteric intussusceptions are much different from colonic intussusceptions, and most colonic intussusceptions are caused by tumors, especially colon adenocarcinoma.[8] The incidence of colonic intussusceptions is more rare than intestinal intussusception and is about one-third of intestine intussusception cases. Because of limited experience with such clinical entities and the various considerations involved in diagnosis and treatment, we report

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our experience with regards to adult colonic intussusception.

Materials and Methods

The medical records of all patients 18 years or older with a diagnosis of colonic or ileocolic intussusception at our institute from January 1997 to December 2008 were included. Patients with rectal prolapse and plolapse around the ostomy were excluded. We reviewed and evaluated the clinical features of patients, diagnosis of methods, time of surgery, surgical method, surgical finding, the pathology of lesions and the outcomes of these patients.

Patients were divided into two groups: ileocolic intussusceptions and colocolic intussusceptions. Lesions that involved the ileum and the cecum were defined as ileocolic intussusception. Lesions that involved only the colon were defined as colocolic intussusception. Comparisons were tested using the Student *t* test and chi-square test. A *P* value of less than 0.05 was considered to be significant.

Results

A total of 18 patients had a diagnosis of ileocolic or colocolic intussusception. The presenting clinical picture of these patients is shown in Table 1. The mean age of these patients was 48.6 with a range of 20 to 78 years. Twelve patients were male and six were female. There were 11 patients with ileocolic intussusception and 7 patients with colocolic intussusception. Eight patients had benign lesions and 10 patients had malignant lesions. Only one patient underwent hydrostatic reduction and had no pathological lesion identified.

The most common presenting complaint was abdominal pain and it was seen in all patients. Vomiting, tenesmus and bloody stool were also the symptoms and signs noted in some of these patients. Ten patients had acute symptoms ranging from 1 day to 1 week and 7 of these patients had symptoms such as vomiting which is a sign of bowel obstruction.

In Table 2, plain abdomen was performed for all of these patients and no pictures showed a specific diagnosis of intussusception. Computed tomography (CT) was performed in 14 patients, and the diagnosis rate for CT was 71%. Abdominal ultrasonography was performed in 8 patients and the diagnosis rate was 63%. One patient underwent lower GI series and 3 patients had colonoscopy, which showed the intussusception during the examinations. Four patients had no definite preoperative diagnosis of intussusception and we made the diagnosis of intussusception intraoperatively.

In the ileocolic group, eight patients had benign lesions and 3 patients had malignant lesions. Of the benign lesions, two patients had idiopathic intussusceptions without organic lesion, three patients had intestinal polyp or colonic polyp, one patient had colonic lipoma and two patients lymph node hyperplasia. In malignant lesions, one patient had colon cancer and two had intestinal or colonic lymphoma. Total 9 patients underwent right hemicolectomy in ileocolic group, one had wedge resection of intestine for polyp and one had hydrostatic reduction without operation.

In the colocolic group, all 7 patients had malignant lesions. Four patients had colon adenocarcinoma, the other three were lymphoma, metastatic adenocarcinoma and muscinous cystadecacinoma. Two patients underwent left hemicolectomy, two patients were transverse colon segmental resection, and the other three were right hemicolectomy, anterior resection and Hartmann's operation. There was no difference in age, duration of symptoms and gender between the two groups, but there was a significant difference in the ratio of benign and malignant lesions ($P < 0.001$) as shown in Table 3.

There were 5 patients with colon adenocarcinoma in our series, 3 patients with stage II colon cancer and 2 patients with stage III colon cancers. All of the 5 patients were still alive until the last follow up. The average survival time of these 5 patients was 58.2 months with a range of 21 to 123 months. Other patients with malignant lesions had a worse prognosis, two patients with lymphoma in ileocolic group and one patient with metastatic adenocarcinoma in colocolic group expired due to disease progression, and the other patients are still alive. There were no major complications for all patients who received op-

Table 1. Clinical pictures and operative strategy of 18 patients

Patient number	Age	Gender	Symptoms	Symptoms duration	Diagnosis method	Preoperative Diagnosis	Type of intussusception	Operation method	Pathology	Complication
1	74	Male	Abdominal Pain, Vomiting	1	X-ray, CT	+	Ileocolic	No operation	Idiopathic	-
2	43	Male	Abdominal Pain, Vomiting	1	X-ray, LGI series	+	Ileocolic	Right hemicolectomy	Idiopathic	-
3	78	Female	Abdominal Pain, Vomiting	3	X-ray, CT	+	Ileocolic	Right hemicolectomy	Intestine polyp	-
4	23	Male	Abdominal Pain	30	X-ray, Colonoscopy	+	Ileocolic	Wedge resection	Intestine polyp	-
5	69	Male	Abdominal Pain, vomiting	3	X-ray, CT	+	Ileocolic	Right hemicolectomy	Colon polyp	-
6	71	Male	Abdominal Pain	45	X-ray, Sonography, CT	+	Ileocolic	Right hemicolectomy	Colon lipoma	-
7	60	Female	Abdominal Pain	6	X-ray, Colonoscopy	+	Ileocolic	Right hemicolectomy	Lymph node hyperplasia	-
8	26	Male	Abdominal Pain, Vomiting	1	X-ray, Sonography CT	-	Ileocolic	Right hemicolectomy	Lymph node hyperplasia	-
9	61	Male	Abdominal Pain, Tenesmus	90	X-ray, CT	-	Colocolic	Anterior resection	Colon adenocarcinoma	-
10	47	Female	Abdominal Pain	7	X-ray, Sonography, CT	+	Colocolic	Hartmann's operation	Colon adenocarcinoma	-
11	44	Female	Abdominal Pain, Bloody stool	5	X-ray, Sonography, CT	+	Colocolic	Left hemicolectomy	Colon adenocarcinoma	-
12	63	Male	Abdominal Pain	21	X-ray, CT	-	Colocolic	Left hemicolectomy	Colon adenocarcinoma	-
13	33	Female	Abdominal Pain	10	X-ray, Sonography, CT	-	Colocolic	Transverse colon segmental resection	Metastatic Adenocarcinomca	-
14	51	Female	Abdominal Pain	60	X-ray, Colonoscopy, CT	+	Colocolic	Transverse colon segmental resection	Mucinous cystadecarcinoma	-
15	20	Male	Abdominal Pain, Vomiting	2	X-ray, Sonography, CT	+	Colocolic	Right hemicolectomy	Colon Lymphoma	-
16	33	Male	Abdominal Pain	10	X-ray, Sonography, CT	+	Ileocolic	Right hemicolectomy	Intestine and colon lymphoma	-
17	56	Male	Abdominal Pain, Vomiting	1	X-Ray, Sonography	+	Ileocolic	Right hemicolectomy	Colon adenocarcinoma	-
18	23	Male	Abdominal Pain	105	X-Ray, CT	+	Ileocolic	Right hemicolectomy	Intestine and colon lymphoma	-

erative treatment.

Discussion

Ileocolic and colocolic intussusception in adults remains a rare disease, representing less than 1% of bowel obstructions.[9] The symptoms of adult intussusception varies from patient to patient. Abdominal pain, palpable mass and hemepositive stool are the clinical triad of children's ileocolic intussusception.[8] However, these triad symptoms are not common in adults and no one had this triad in our series. In adults, abdominal pain is the most common of symptoms, all

Table 2. Preoperative diagnostic methods

Examination	Number of patients	Suspect intussusception	
		n	Percentage
X-ray of abdomen	18	0	0
CT	14	10	71
Colonoscope	3	3	100
Lower GI series	1	1	100
Ultrasound	8	5	62

Table 3. The difference between ileocolic group and colocolic group

	Ileocolic	Colocolic	*P* value
Number of patients	11	7	
Gender (Male/female)	9/2	3/4	0.08
Mean age	50.5	45.6	0.08
Mean duration of symptoms (Days)	18.7	27.9	0.66
Benign/Malignant	8/3	0/7	**< 0.001**

patients in our study presented with abdominal pain with subacute, chronic or intermittent symptoms. Other symptoms and signs such as bowel obstruction, tenesmus or lower gastrointestinal bleeding were also noted in our patients. Because of the various and obscure symptoms, many cases were diagnosed during laparotomy without preoperative diagnosis. For this reason, it is important for surgeons to be aware of various diagnosis and treatment principles for this entity.

Approximately 70% to 90% of cases of intussusception in children are ileocolic type without leading point.[3,4] In contrast, about 90% of adult patients have a leading point with a well-identified organic lesion, and the same result was also seen in our study with only two cases (11%) of idiopathic lesion. In adult intussusception, about 23% to 50% of patients are colonic type, and the etiology is quite different between the colonic and enteric type.[8,10,11] In enteric intussusception, benign lesion such as tumor, diverticulum, Meckel's diverticulum, or adhesion all can lead to small bowel invagination, and benign lesions account for about 70% of cases of intussusception in the small intestine.[8] In contrast, intussusception involved in the colon had more malignant lesions than the enteric type of intussusception. About 55% of malignant tumors, either primary or metastatic tumors, were noted in our patients and this is compatible with other reports.[8,12,13] Interestingly, all the patients with colocolic intussusception in our series had malignant tumors and this was not reported in other series. The most common malignant lesion was colon adenocarcinoma in colocolic intussusception, but various malignant tumors were noted in ileocolic intussusception such as lymphoma, metastatic tumor or colon adenocarcinoma.

Abdominal ultrasonography (US) and computed tomography (CT) are very useful tools for diagnosis of intussusception. The typical picture of intussusception in US is target sign in transverse view and pseudokidney sign in longitudinal view. Ultrasonography assist with making a quick diagnosis but it depends on the operator's technique and it is also not suitable for obese patients. CT was considered as the most sensitive and accurate method for diagnosis because it can show all the structures of intussusception and the surrounding tissue but CT still has limitations with regards to identify tumor or thickness of the bowel wall caused by intussusception.[14,15] Colofibroscope and lower gastrointestinal series (LGI series) were also a useful tool for diagnosis, and they have a 100% diagnosis rate before operation in our series. However colofibroscope and LGI series have the risky to make bowel perforation when the patient has bowel obstruction sign. We suggest that colonoscope and LGI series may be performed in selected patients.

When intussusception is diagnosed in adult patient, laparotomy is considered the recommended treatment. Surgical resection for involved small bowel or large bowel without reduction is the principle of treatment.[16] According to Eisen, most of the colonic lesions are colon adenocarcinoma, and primary reduction has the risk of perforation and the seeding of malignant cells in peritoneum cavity.[13] For this reason, reduction should be avoided before bowel resection. Because the most common malignant lesion in colonic intussusception is colon adenocarcinoma in our study and other reports, we suggest that colonic lesion resection with associated lymph node dissection should be performed in all patients. It seems that colon adenocarcinoma with intussusception does not influence survival. Azar et al. reported 6 cases intussusception with colon caner, and they had favorable outcomes.[8] Of the 5 patients in this study with intus-

susception and colon cancer, two patients were lymph node positive and all patients are still alive until the last follow up.

In conclusion, colonic intussusception in adults is an uncommon disease, it presents different symptoms and the symptoms have various duration. Abdominal US and CT are very useful for diagnosis of colonic intussusception. In our study, colocolic intussusception had a greater malignant probability than ileocolic intussusception. Primary resection with associated lymph node dissection without reduction is the principal treatment modality in adult colonic intussusception.

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病例分析

成人大腸腸套疊之臨床病理表徵

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目的 成人腸套疊是一種很罕見的疾病，而大腸的腸套疊又比小腸的腸套疊少許多，因爲此種疾病並不多見，大家的經驗也不多，所以我們整理了小腸腸套疊的病人，並將這一類的病人做一分析。

方法 從西元 1997 年至 2008 年總共有 18 個大腸腸套疊的病人在本院接受治療，我們將這 18 個病人分爲大腸大腸套疊和小腸大腸套疊兩組，然後進行分析比較。

結果 共有 11 個小腸大腸套疊和 7 個大腸大腸套疊的病人。平均的症狀是 22.2 天 (1 至 105 天)，其中腹痛表現於所有的病人。只有一個人沒有接受外科手術，而是用灌腸的方式解套。所有大腸大腸套疊的病人都是惡性的病灶，而小腸大腸套疊的只有 27% ($p < 0.001$)。這裡面是大腸癌的病人目前都還存活，預後沒有比較差。

結論 成人大腸腸套疊是一種很罕見的疾病，腹痛是最主要的症狀表現。腹部超音波以及電腦斷層對於診斷此疾病有最高的正確率。在我們的研究中大腸大腸套疊的病比小腸大腸套疊有較高的惡性比率，直接將病灶切除不在術中解套並將其周圍的淋巴腺進行擴清爲現在認爲最適當的治療方式。

關鍵詞 成人、大腸、腸套疊。