

# Adult Intussusception

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## Objective

The objectives were to review adult intussusception, its diagnosis, and its treatment.

## Summary Background Data

Adult intussusception represents 1% of all bowel obstructions, 5% of all intussusceptions, and 0.003%–0.02% of all hospital admissions. Intussusception is a different entity in adults than it is in children.

## Methods

The records of all patients 18 years and older with the postoperative diagnosis of intussusception at the Massachusetts General Hospital during the years 1964 through 1993 were reviewed retrospectively. The 58 patients were divided into those with benign enteric, malignant enteric, benign colonic, and malignant colonic lesions associated with their intussusception. The diagnosis and treatment of each were reviewed.

## Results

In 30 years at the Massachusetts General Hospital, there are 58 cases of surgically proven adult intussusception. The patients' mean age was 54.4 years. Most patients presented with symptoms consistent with bowel obstruction. There were 44 enteric and 14 colonic intussusceptions. Ninety-three percent of the intussusceptions were associated with a pathologic lesion. Forty-eight percent of the enteric lesions were malignant and 52% were benign. Forty-three percent of the colonic lesions were malignant and 57% were benign.

## Conclusions

Intussusception occurs rarely in adults. It presents with a variety of acute, intermittent, and chronic symptoms, thus making its preoperative diagnosis difficult. Computed tomography scanning proved to be the most useful diagnostic radiologic method. The diagnosis and treatment of adult intussusception are surgical. Surgical resection of the intussusception without reduction is the preferred treatment in adults, as almost half of both colonic and enteric intussusceptions are associated with malignancy.

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A rare occurrence in adults, intussusception exists when a proximal segment of bowel (intussusceptum) telescopes into the lumen of the adjacent distal segment (in-

tussusciens). Adult intussusception represents 1% of patients with bowel obstructions<sup>1,2</sup> and 5% of all intussusceptions.<sup>3-5</sup> In contrast to intussusceptions in children, a demonstrable etiology is found in 70% to 90% of cases in the adult population.<sup>5-8</sup> Intraluminal lesions alter normal bowel peristalsis and form leading edges for the intussusceptum.<sup>9,10</sup> Although intussusceptions present acutely in

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**Table 1. PATIENT DEMOGRAPHICS**

Total patients	58
Mean age (yr)	54.4 (range 19–90)
Male:female	1.8:1
Enteric:colonic	44:14
Benign:malignant	31:27

children, adults may present with acute, intermittent, or chronic reported problems.<sup>11</sup> The predominant symptoms usually are those of bowel obstruction and, consequently, intussusception often is misdiagnosed initially in the adult population.

## METHODS

The records of all patients 18 years of age and older with the postoperative diagnosis of intussusception at the Massachusetts General Hospital during the years 1964 through 1993, inclusively, were reviewed retrospectively. Patients with rectal prolapse or stomal intussusception were excluded. Additionally, patients with intussusceptions occurring in conjunction with long enteric intubation also were excluded. Data on 58 patients were gathered from patients' charts, operative notes, and pathology reports.

Patients were divided into two groups: enteric intussusceptions and colonic intussusceptions. A lesion was considered to be enteric if the intussusception included solely jejunum or ileum. A lesion that involved the ileum and the cecum was designated as a colonic lesion. The patients were further divided into ones with benign enteric, malignant enteric, benign colonic, and malignant colonic lesions based on the final pathology reports. Persons who had intussusceptions after surgery were included in the group of patients with benign lesions.

## RESULTS

There were 58 patients with intussusception confirmed at operation (Table 1). There were no patients with radiographically documented intussusception who underwent nonoperative reduction. The patients ranged in age from 19 to 90 years old, with a mean age of 54.4 years. Males predominated in a ratio of 1.8:1. There were 44 patients with enteric intussusception and 14 patients with colonic intussusception. A pathologic lesion was identified in 93% of patients. There were four patients with idiopathic intussusception. The patients were subdivided based on pathologic reports into those with benign and malignant lesions. Fifty-two percent of enteric intussusceptions were

**Table 2. SYMPTOMS**

Symptom	%
Nausea/emesis	78
Abdominal pain	78
Melena/guaiac positive	29
Weight loss	10
Fever	10
Constipation	9
Diarrhea	7
Abdominal mass	7

benign and 48% were malignant, whereas 57% of colonic lesions were benign and 43% were malignant.

The predominant symptoms were those of bowel obstruction (Table 2). Seventy-eight percent of patients presented with nausea, vomiting, and abdominal pain. Melena or guaiac plus stool, frequently encountered in childhood intussusception, was present in only 29% of patients. Fever, weight loss, constipation, diarrhea, or a palpable abdominal mass was present in 10% or less patients.

Symptoms were further stratified according to etiology. Patients with benign enteric lesions reported nausea, emesis, and abdominal pain with the greatest frequency. Patients with malignant colonic lesions presented with melena or guaiac plus stool more often than with nausea, emesis, or abdominal pain. The mean duration of symptoms was 37.4 days and ranged from 1 to 365 days. The mean duration of symptoms was longer in benign as compared with that of malignant lesions and also was longer in enteric as compared with that of colonic lesions. However, there were acute presentations in each group.

The preoperative diagnosis of intussusception was made in only 32% of patients (Table 3). The most common diagnosis was bowel obstruction, which was documented in 50% of patients. A preoperative diagnosis of an abdominal mass was noted in 11% of patients, whereas gastrointestinal bleeding and acute cholecystitis represented 5% and 2%, respectively. Sixty-seven percent of the patients with malignant colonic lesions most frequently were diagnosed correctly as having intussusception. Only 22% of patients with benign enteric lesions

**Table 3. PREOPERATIVE DIAGNOSES**

Diagnosis	%
Bowel obstruction	50
Intussusception	32
Abdominal mass	11
GI bleed	5
Cholecystitis	2

**Table 4. PREOPERATIVE RADIOGRAPHIC STUDIES**

Examination	% of Patients	Accuracy (%)
KUB/upright	71	0
UGI	24	21
Abdominal CT	22	78
Barium enema	22	54
Abdominal ultrasound	5	0

KUB = kidney, ureter, and bladder; UGI = upper gastrointestinal; CT = computed tomography.

were thought to have intussusceptions before surgery. Gastrointestinal bleeding leading to operation was only seen in patients with malignant enteric lesions and was not seen in patients with colonic intussusceptions of either type.

Five different diagnostic radiologic methods were used in this series of patients (Table 4). Seventy-one percent had flat plate and upright x-rays of the abdomen and 5% had an abdominal ultrasound. Neither of these methods diagnosed intussusception. Twenty-four percent had an upper gastrointestinal barium study, which showed intussusception 21% of the time. Twenty-two percent of the patients had a barium enema, the results of which showed intussusception in 54% of the cases studied. Another 22% of the patients had an abdominal and pelvic computed tomography (CT) scan. The CT scan was the most accurate, showing intussusception in 78% of the cases.

**Table 5. ETIOLOGY OF INTUSSUSCEPTION**

Enteric (n = 44)	No.	Colonic (n = 14)	No.
Benign (n = 23)		Benign (n = 8)	
Postoperative	11	Lipoma	3
Meckel's diverticulum	3	Adenoma	2
Lipoma	3	Lymphoid hyperplasia	1
Peutz-Jeghers syndrome	2		
Neurofibroma	1		
Scleroderma	1		
Idiopathic	1		
Malignant (n = 21)		Malignant (n = 6)	
Metastatic melanoma	13	Adenocarcinoma	
Metastatic lymphoma	3	Stage B1	5
Metastatic sarcoma	2	Stage C1	1
Metastatic squamous cell CA	1		
Undifferentiated CA	1		
Jejunum adenocarcinoma	1		

CA = carcinoma.

**Table 6. MORTALITY**

	Number of Deaths	% of Deaths	Average Time Postoperatively
Benign enteric	2	8.7	17.5 days
Malignant enteric	11	52.4	9 mo
Benign colonic	2	12.5	1 yr
Malignant colonic	2	33.3	9 yr

In 93% of patients, an organic lesion was identified within the intussusception (Table 5). The most common cause of benign enteric intussusception was postoperative adhesions. A Meckel's diverticulum and a lipoma were responsible for three cases each, whereas polyps in patients with Peutz-Jegher Syndrome caused two cases. There was one person with a neurofibroma and one with scleroderma. Two patients had idiopathic enteric intussusceptions. Malignant enteric lesions consisted primarily of metastatic disease (96%). Thirteen patients had metastatic melanoma, the most common metastatic lesion of the small intestine. Three patients had metastatic lymphoma, two patients had metastatic sarcoma, one patient had squamous cell carcinoma, and one patient had undifferentiated carcinoma. Only one patient had a primary jejunal adenocarcinoma. Benign colonic lesions included three patients with lipomas, two patients with adenomas, and one patient with lymphoid hyperplasia. Six patients had malignant colonic disease, all of whom had primary adenocarcinoma of the colon. Five of these patients had modified Astler-Coller stage B1 disease, and one patient had C1 disease. Approximately 46% of all patients with intussusception had an underlying malignancy. Forty-eight percent of patients with enteric intussusceptions and 43% of patients with colonic intussusceptions harbored malignant lesions.

There were 16 deaths in this series occurring between 11 days and 15 years (average, 674 days after surgery) (Table 6). Thirteen of the 16 had malignancies. Seven of these 13 died of metastatic melanoma an average of 6 months after surgery. Only two of the deaths were perioperative: one patient died on postoperative day 11 of acute tubular necrosis and the other died on postoperative day 24 on an anastomotic leak.

## DISCUSSION

Intussusception remains a rare condition in adults, representing 1% of bowel obstructions and 0.003% to 0.02% of all hospital admissions.<sup>6</sup> In 30 years, there were only 58 adult patients with the diagnosis of enteric and colonic intussusception at the Massachusetts General Hospital.

Intussusception is a different entity in adults than in children. Adults present with a variety of symptoms that can be acute, intermittent, or chronic. Most often, these symptoms are consistent with bowel obstruction and are subacute or chronic.<sup>9</sup> The diagnosis of intussusception in adults is difficult secondary to the varying presentations. The preoperative diagnosis of intussusception is infrequent in the adult population. The majority of patients are brought to the operating room with the preoperative diagnosis of bowel obstruction (50% in this series), and the surgeon discovers an intussusception intraoperatively. In patients with a more indolent or confusing picture, the increasing use of ultrasound and abdominal CT may improve diagnostic ability.

A number of different radiologic methods have been described as useful in the diagnosis of intussusception: CT scan, barium studies, abdominal ultrasound, plain film, angiography, and radionuclide studies.<sup>12-16</sup> In this series, the abdominal CT scan proved to be the most useful with ultrasound being the second most accurate. Angiographic<sup>15</sup> and radionuclide<sup>16</sup> studies have shown diagnostic efficacy but were not used in this series. Although not pathognomonic, intussusception has been described as a "target mass" on both CT and ultrasound.<sup>12-14</sup> The intussusceptum is the center and the edematous intussusciens forms the external ring. Early intussusceptions are target masses associated with obstruction. As the bowel thickens, there is more bowel layering. Finally, the bowel necroses and appears as an amorphous mass associated with severe obstruction.<sup>13</sup> Barium studies, which are both the diagnostic and therapeutic choice in children with presumed intussusception, are the second most accurate radiologic method of diagnosis in this series. Upper gastrointestinal series test results showed an intussusception in 21% of patients studied, and barium enema test results showed intussusception in 54% of patients studied. Barium enemas are quite accurate in diagnosing colonic lesions. Other studies have shown the upper gastrointestinal and barium enema to show intussusception in 77% and 95% of the cases, respectively.<sup>8</sup>

Intussusceptions have been classified according to location. The most common classification system divides intussusception into four categories: enteric, ileocolic, ileocecal, and colonic.<sup>3,8,9</sup> Enteric and colonic intussusceptions are those that are confined to the small intestine and large intestine, respectively. Ileocolic intussusceptions are defined as those with prolapse of the ileum through the ileocecal valve into the colon. Ileocecal intussusceptions are defined as those with the ileocecal valve as the lead point for the intussusception.<sup>3,9</sup> It is difficult to distinguish between ileocecal and ileocolic intussusceptions. Patients in this series were classified by location (enteric and colonic) and by etiology (benign and malignant).

In distinction to intussusceptions in children, adults have an organic lesion within the intussusception in 70% to 90% of cases.<sup>3,5-7</sup> In 20% to 50% of cases of adult intussusception, the etiologic agent is a malignancy.<sup>3,17-19</sup> In this series, 46% of patients harbored a malignant lesion. When colonic intussusceptions are detected in adults, attempts at nonoperative reduction should not be performed. Surgical intervention is necessary in all cases of intussusception in adults.

The type of surgical intervention is predicated on the patients' medical history and intraoperative findings. Resection of all intussusceptions in adults without intraoperative reduction has been advocated; however, this is not always necessary. Of the 23 patients with benign enteric intussusceptions, 48% were caused by postoperative adhesions. The lead point in these intussusceptions is thought to be either the suture line of a previous enterotomy or an adhesion. In patients who present with a postoperative bowel obstruction and are found to have an associated enteric intussusception, intraoperative reduction without resection is reasonable provided the bowel appears viable. All patients with enteric lesions who have not had a previous laparotomy should undergo resection without reduction, because of the high incidence of associated malignancy.

Benign enteric lesions that are not associated with adhesions and benign colonic lesions require resection to prevent recurrent intussusception. Reductions of these intussusceptions with subsequent enterotomy, biopsy, and excision of the etiologic lesion necessitate an enterotomy in edematous and previously ischemic bowel. Resection without reduction avoids spillage of succus through inadvertent perforation during reduction and allows uninjured bowel to be used in the anastomosis.

Malignant lesions in the small intestine are most often metastatic, and resection of these lesions prevents recurrent intussusception and reduces symptoms originating from these metastatic lesions. Colonic lesions are malignant approximately 50% of the time,<sup>8,20</sup> as shown in this study. There is no way to distinguish between colonic intussusceptions, which harbor a benign or a malignant lesion.<sup>8,9</sup> A formal resection along lymphatic drainage should be performed for all colonic intussusceptions. Fortunately, most colonic lesions are on the right side, and resection with primary anastomosis can be achieved in unprepared bowels. Lesions in the left colon or the rectosigmoid should be resected with construction of a colostomy and a Hartmann pouch with reanastomosis at a later operation.

Of the six patients in this series with intussusception and colonic carcinoma, there were no lymph nodes positive that harbored adenocarcinoma, and the majority of lesions extended only through the muscularis propria without penetrating the serosa. Bulky lesions with serosal ex-

tension and intraperitoneal involvement prevent the bowel from intussuscepting. The prognosis for patients with colonic carcinoma and intussusception should be favorable.

Twenty-eight percent of the patients in this series died at an average of 674 days after surgery. Fifty-two percent of the patients who died had malignant enteric disease. They died an average of 9 months after surgery of metastatic disease. Only two patients died perioperatively.

In conclusion, intussusception is the invagination of a segment of the gastrointestinal tract into an adjacent segment. It can occur anywhere in the gastrointestinal tract. It occurs rarely in adults and has a variety of different presenting symptoms and varying duration of symptoms. Thus, the diagnosis of intussusception is difficult to make before surgery. The diagnostic radiologic method that is most useful in making the diagnosis of adult intussusception is the CT scan. The treatment in the adult population is always operative. In contrast to other studies, this series shows the proportion of benign-to-malignant lesions to be similar in both colonic and enteric locations. As almost 50% of intussusceptions harbor malignant lesions, resection without reduction is advocated as the best treatment of adult intussusception.

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