

# Our Clinical Experience in Intestinal Intussusception Surgery in Adults

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### SUMMARY

**Introduction:** Intussusception is the invagination of a proximal segment of the intestine into the lumen of an adjacent distal segment. Although it is rarely seen in adults, it is a common condition in childhood.

**Materials and Method:** Patients aged 18-80 years who underwent surgery for intestinal intussusception between 2017 and 2022 at HSUT Balıkesir Atatürk City Hospital were retrospectively evaluated. Patients under 18 and over 80 years of age and patients who did not undergo any surgical procedure were excluded from the study. In this context, 17 patients were included in our study.

**Findings:** Seventeen patients who met the criteria were included in our study. Six of the patients were female and 11 were male with a mean age of 43.4 years (19-78). Abdominal tomography was performed in all seventeen patients and intussusception was diagnosed in sixteen patients (94,1%). Four patients underwent preoperative colonoscopy and mass and intussusception were identified in three of these patients. The types of operations performed were segmentary resection + anastomosis in nine patients, ileocecal resection + anastomosis in two patients, right hemicolectomy + anastomosis in four patients, right hemicolectomy + end ileostomy in one patient and subtotal colectomy in one patient. Two patients developed wound site skin infection postoperatively and one of these patients developed eventration at the same time. Postoperative pathological examination revealed malignancy in five patients; adenocarcinoma in three patients, gastrointestinal stromal tumor (GIST) in one patient and lymphoma in one patient. Polyps were seen in five patients and lipomas were detected in two patients. In four patients, the primary cause of intussusception could not be identified and was reported as idiopathic. In only one patient, intussusception due to postoperative (after appendectomy) adhesions was detected intraoperatively.

**Discussion:** Intussusception in adults is an acute onset disease. Preoperative diagnosis is difficult in these patients due to the lack of specific findings. Delayed diagnosis may lead to high mortality. As previously mentioned, intussusception is 20 times more common in pediatric age group than in adults. Intussusceptions in the adult age group account for less than 5% of all cases of intussusception, but only 1% of patients with signs of ileus. In a large-scale study, the rates of enteric, ileocolic and colonic types were found to be 49.5%, 29.1% and 19.9%, respectively. In our study, these rates were 52.9%, 41.1% and 5.8%, respectively. Although our rates are compatible with the literature, geographical differences and dietary habits affect these rates. Intussusception is a difficult disease to diagnose. In one study, the preoperative diagnosis rate was below 50%. In our study, this rate was 88.2%. Physical examination findings of the patients vary.

**Conclusion:** Intussusception in adults is a rare disease with acute onset that is difficult to diagnose. The diagnosis and treatment of these patients may be delayed. Cross-sectional imaging methods should be used in cases of suspicion. Delayed diagnosis may be associated with high morbidity and mortality rates. Treatment is mainly surgical.

**Key Words:** Intussusception, Emergency surgery, Acute abdomen, Adult

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## Erişkinlerde İntestinal İntusepsiyon Cerrahisinde Klinik Deneyimimiz

### ÖZET

**Giriş:** İntusepsiyon, bağırsağın proksimal bir segmentinin komşu distal segmentin lümenine invajinasyonudur. Yetişkinlerde nadiren görülmesine rağmen çocukluk yaş grubunda yaygın bir durumdur.

**Gereç ve Yöntem:** SBÜ Balıkesir Atatürk Şehir Hastanesi SUAM de 2017-2022 yılları arasında intestinal intusepsiyon tanısı ile cerrahi uygulanan 18-80 yaş arası hastalar retrospektif olarak değerlendirilmiştir. 18 yaş altı ve 80 yaş üstü hastalar ile herhangi bir cerrahi prosedür uygulanmayan hastalar çalışma dışı bırakılmıştır. Bu kapsamda çalışmamıza 17 hasta dahil edilmiştir.

**Bulgular:** Çalışmamıza kriterleri karşılayan 17 hasta dahil edilmiştir. Hastaların 6'sı kadın ve 11'i erkekti ve yaş ortalaması 43,4 (19-78) idi. On yedi hastanın tümüne abdominal tomografi çekilmiş ve hastaların on beşinde (%88,2) intusepsiyon tanısı konulmuş. Dört hastaya ameliyat öncesi kolonoskopi uygulanmış ve bu hastaların üçünde kitle ve invajinasyon tanımlanmış. Yapılan operasyon tiplerine bakıldığında; dokuz hastaya segmenter rezeksiyon + anastomoz, iki hastaya ileoçekal rezeksiyon + anastomoz, dört hastaya sağ hemikolektomi + anastomoz, bir hastaya sağ hemikolektomi + uç ileostomi ve bir hastaya subtotal kolektomi uygulanmış. Postoperatif iki hastada yara yeri cilt enfeksiyonu gelişirken bu hastalardan birinde aynı zamanda evantrasyon geliştiği görülmüştür. Ameliyat sonrası patolojik incelemede; beş hastada malignite saptandı, üç hastada adenokarsinom, bir hastada Gastrointestinal stromal tümör (GIST) ve bir hastada lenfoma raporlanmıştır. Beş hastada polip görülürken iki hastada lipom tespit edilmiştir. Dört hastada intusepsiyonun primer nedeni tespit edilememiş ve idiyopatik olarak raporlanmıştır. Sadece bir hastada postoperatif (apendektomi sonrası) adezyonlara bağlı invajinasyon operasyon sırasında tespit edildi.

**Tartışma:** Erişkinlerde intusepsiyon akut başlangıçlı bir hastalıktır. Bu hastalarda spesifik bulguların olmamasından dolayı ameliyat öncesi tanı konulması zordur. Gecikmiş tanı yüksek mortaliteye neden olabilir. Daba öncede belirtildiği gibi intusepsiyon çocukluk yaş grubunda erişkinlere göre 20 kat daha fazla görülür. Erişkin yaş grubu intusepsiyonları tüm intusepsiyon vakaları göz önüne alındığında, hastaların %5'inden azını oluşturan ileus bulguları olan hasta grubunun ancak %1'inde bulunur. Yapılan geniş çaplı bir araştırmada; enterik, ileokolik ve kolo-kolonik tiplerin görülme oranları sırası ile %49,5, %29,1 ve %19,9 olarak bulunmuştur. Bizim çalışmamızda ise bu oranlar sırası ile %52,9, %41,1 ve %5,8 şeklinde gözlenmiştir. Oranlarımız literatür ile uyumlu olsa da coğrafi farklılıklar ve beslenme alışkanlıkları bu oranları etkilemektedir. İntusepsiyon, tanısının konulması zor bir hastalıktır. Yapılan bir çalışmada operasyon öncesi tanı konulma oranı %50'nin altındadır. Bizim çalışmamızda bu oran ise %88,2'dir. Hastaların fizik muayene bulguları değişkenlik göstermektedir.

**Sonuç:** Erişkinlerde intusepsiyon tanı konulması zor, akut başlangıçlı nadir bir hastalıktır. Bu hastaların tanısı ve tedavisi gecikebilir. Şüpheli olduğu durumlarda mutlaka kesitsel görüntüleme yöntemleri kullanılmalıdır. Gecikmiş tanı yüksek morbidite ve mortalite oranları ile ilişkili olabilir. Tedavisi esas olarak cerrahidir.

**Anahtar Kelimeler:** intusepsiyon, acil cerrahi, akut batın, erişkin

## 1. INTRODUCTION

Intussusception is the invagination of a proximal segment of the intestine into the lumen of an adjacent distal segment. Although it is rarely seen in adults, it is a common condition in childhood. The most common cause of adult intussusceptions is malignant neoplasms. Intussusception accounts for only 1-3% of patients operated for ileus and its causes are quite different from those in the pediatric age group. In children, it develops due to benign causes and treatment is generally medical. In adults, it usually develops secondary to an underlying benign or malignant cause. The diagnosis is made on preoperative radiologic imaging or intraoperatively. In our study, we retrospectively evaluated the cases of intestinal intussusception in the adult age group and tried to obtain information about the diagnosis and treatment modalities.

## 2. MATERIALS AND METHOD

Patients aged 18-80 years who underwent surgery for intestinal intussusception between 2017 and 2022 at HSUT Balıkesir Atatürk City Hospital were retrospectively evaluated. Patients under 18 and over 80 years of age and patients who did not undergo any surgical procedure were excluded from the study. In this context, 17 patients were included in our study. The time from symptom onset to the time of diagnosis, duration of hospitalization, diagnostic method, type of intestinal intussusception, postoperative pathologic diagnosis, development of postoperative complications and type of operation performed were evaluated.

## 3. FINDINGS

Seventeen patients who met the criteria were included in our study. Six of the patients were female and 11 were male with a mean age of 43.4 years (19-78). When the anamnesis of the patients was

analyzed, it was found that all patients presented with abdominal pain. Three patients reported diarrhea at the same time. Eight patients (47.05%) complained of nausea and vomiting. In 41.1% (7 patients), inability to pass stool and 29.4% (5 patients) had signs of ileus such as distension. When the physical examination findings of the patients were analyzed, it was observed that all patients except three patients had tenderness and six patients (35.2%) had defense-rebound. Hematochezia was detected in the rectal examination of three patients. Laboratory findings revealed low hemoglobin levels (below 10 mg/dl) in three patients (17.6%) and leukocytosis in nine patients (52.9%). Preoperative ultrasonography was performed in nine patients; four patients had findings in favor of intussusception and two patients had findings in favor of acute appendicitis. Minimal fluid was seen in the abdomen in one patient, while in two patients no clear evaluation could be made due to dense gas. Abdominal tomography was performed in all seventeen patients and intussusception was diagnosed in sixteen patients (94,1%). Four patients underwent preoperative colonoscopy and mass and intussusception were identified in three of these patients.

The types of operations performed were segmentary resection + anastomosis in nine patients, ileocecal resection + anastomosis in two patients, right hemicolectomy + anastomosis in four patients,

right hemicolectomy + end ileostomy in one patient and subtotal colectomy in one patient. Two patients developed wound site skin infection postoperatively and one of these patients developed eventration at the same time. The patient who developed eventration was operated under emergency conditions due to ileus while receiving chemotherapy for multiple liver metastases and peritonitis carcinomatosa. The patient died due to liver failure in the long term postoperative follow-up. Ten (58,8%) of the cases included in the study were small bowel intussusception, while seven (41,1%) were ileo-cecal. Only one case was colonic (5.8%) intussusception.

Postoperative pathological examination revealed malignancy in five patients; adenocarcinoma in three patients, gastrointestinal stromal tumor (GIST) in one patient and lymphoma in one patient. Polyps were seen in five patients and lipomas were detected in two patients. In four patients, the primary cause of intussusception could not be identified and was reported as idiopathic. In only one patient, intussusception due to postoperative (after appendectomy) adhesions was detected intraoperatively. GIST and lymphoma were seen to be of jejuno-jejunal origin. Two of the three patients reported as adenocarcinoma had ileo-cecal intussusception, while the other patient had colonic intussusception. In addition, this patient underwent subtotal colectomy due to multiple polyps in the colon.

**Table 1.** Intussusception site and patient distribution.

Place of Settlement	Number of Patients
Jejuno - jejunal	3
Ileo - ileal	6
Ileo - çekal	7
Colo - colonic	1

**Table 2.** Distribution of patients according to pathology results.

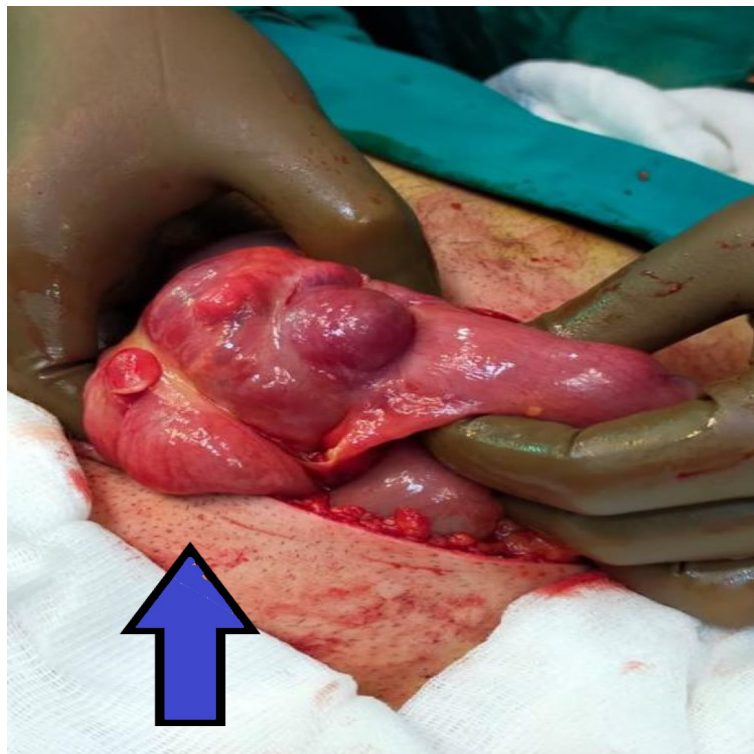
Pathology Result	Number of Patients
Adenocarcinoma	3
GIST	1
Lymphoma	1
Idiopathic	4
Adhesion	1
Lipoma	2
Polyp	5

#### 4. DISCUSSION

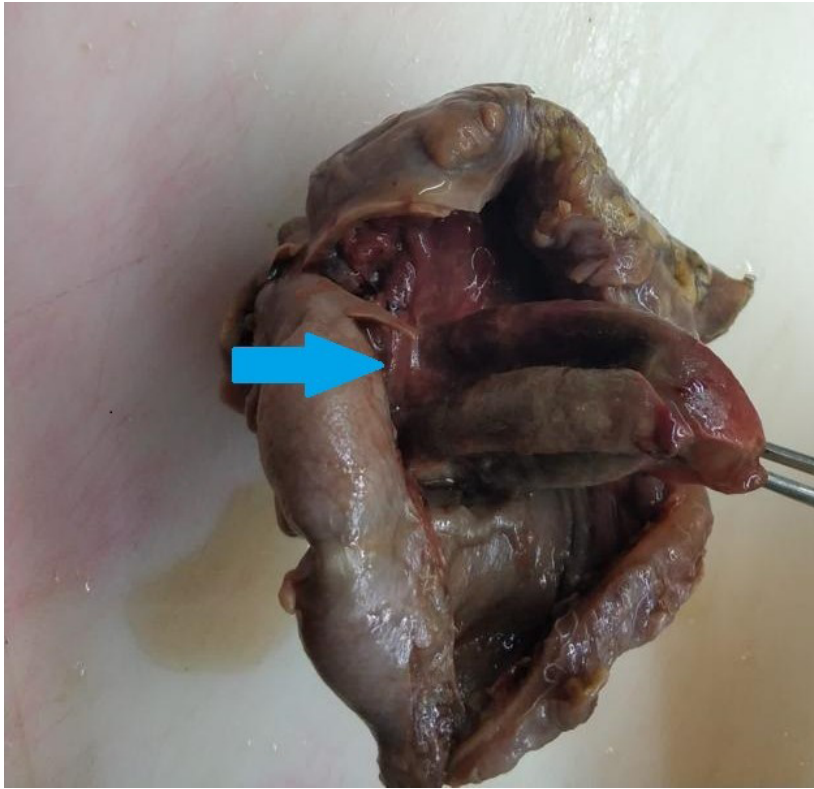
Intussusception in adults is an acute onset disease. Preoperative diagnosis is difficult in these patients due to the lack of specific findings. Delayed diagnosis may lead to high mortality. As previously mentioned, intussusception is 20 times more common in pediatric age group than in adults. Intussusceptions in the adult age group account for less than 5% of all cases of intussusception, but only 1% of patients with signs of ileus [3]. After the fifth decade, the incidence is gender-neutral [4].

Intestinal intussusceptions are classified into four groups according to their location and cause of occurrence.

- 1) Enteric type: limited to the small intestine.
- 2) Ileocolic type: The ileum invades into the cecum but not the appendix [Figure 1,2].
- 3) Ileocecal type: The ileocecal segment invades the colon.
- 4) Colocolonic type: invaginated segments are limited to the colon and rectum.



**Figure 1.** Intraoperative view of ileocolic intussusception.

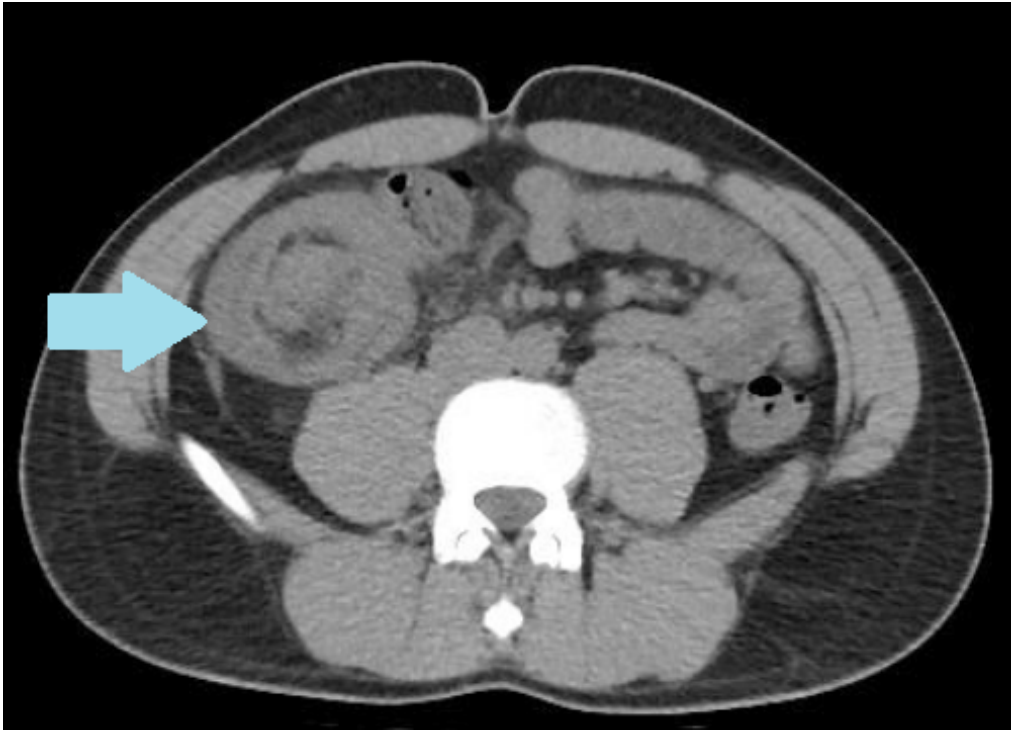


**Figure 2.** Macroscopic image of ileocolic invagination.

Enteric type intussusceptions are more common. In a large-scale study, the rates of enteric, ileocolic and colonic types were found to be 49.5%, 29.1% and 19.9%, respectively [5]. In our study, these rates were 52.9%, 41.1% and 5.8%, respectively. Although our rates are compatible with the literature, geographical differences and dietary habits affect these rates. Especially high fiber diet and genetic reasons affect both the type of intussusception seen and the rates between countries. The intestinal segments where intussusception is most commonly seen are the junction areas of mobile and fixed areas such as ileum and cecum [4]. The mobile proximal segment of the intestine slides into the relatively more fixed distal segment. This may result in edema, obstruction and ultimately ischemia of the intestinal segment. Decreased blood flow in the affected segment leads to increased bacterial translocation. If perforation develops as a result of necrosis in the affected segment, the patient may develop peritonitis and sepsis [6,7].

Although symptoms vary in patients, acute onset of colic or persistent abdominal pain, nausea, vomiting and bloating are present in most patients. Pain is observed in over 80% in all studies [5,8,9,10]. In our study, all patients presented to the hospital with abdominal pain. In addition, 47.05% of the patients had nausea and vomiting, 41.17% had inability to pass gas and stool, and 29.4% had ileus symptoms such as distension.

Intussusception is a difficult disease to diagnose. In one study, the preoperative diagnosis rate was below 50% [11]. In our study, this rate was 88.2%. Physical examination findings of the patients vary. Radiologic imaging modalities must be used to differentiate from other causes of acute abdomen. Standing direct abdominal radiography, abdominal ultrasonography and/or abdominal computed tomography should be used. Especially computed tomography is the gold standard in the diagnosis of intussusception (Figure 3).



**Figure 3.** CT image of a patient with ileocolic intussusception.

It is considered to be the method that best shows the localization of intussusception, its cause and its relationship with the surrounding tissue. In our study, abdominal CT was performed in all patients and the term intussusception was used in radiology reports in 88.2% of the patients (15 patients). Abdominal ultrasonography was performed in 9 patients in our study and the diagnosis of intussusception was made in only 4 patients (44.4%). Although abdominal ultrasonography has a high diagnostic value in the pediatric age group, its specificity is low in the adult age group.

Unlike in the pediatric age group, intussusception in the adult age group is usually due to a cause. Therefore, its treatment is surgical resection. In some studies, it has been argued that non-operative follow-up of patients can be performed due to high diagnostic rates as a result of the increased use of cross-sectional imaging methods [12-15]. Some studies have reported that a wait-and-see strategy can be used if the cause of intussusception cannot

be demonstrated and the affected segment is smaller than 3.5 cm. If the patients have acute abdominal symptoms, radiologic signs of ileus and elevated acute phase reactants such as leukocytosis and CRP, surgical procedure should be performed. In addition, if a mass causing intussusception is seen on computed tomography, surgery should be performed. Surgery should be considered as the first treatment option in ileocolic and colocolonic intussusceptions with high malignancy rate.

In surgical treatment, various types of operations ranging from segmental resection to hemicolectomy are recommended according to the location of the intussusception. In addition, some studies have reported that intraoperative reduction can be used instead of resection. However, it should be kept in mind that perforation may develop in this region with the reduction method, malignant cell dissemination may increase in the presence of malignancy, and the risk of leakage may increase in anastomoses to be performed after perforation due to edema [7,16]. It

should also be kept in mind that reduction can only be attempted in post-operative or idiopathic enteric intussusceptions. Close postoperative follow-up of these patients is very important.

Whether the surgical procedure is performed open or laparoscopically depends on the experience of the surgeon [4,17,18]. All cases in our study were operated with open surgery. Only two patients developed surgical wound infection and one of these two patients was evacuated. The complication rate in open surgery is not very high (11.7%).

## 5. CONCLUSION

Intussusception in adults is a rare disease with acute onset that is difficult to diagnose. The diagnosis and treatment of these patients may be delayed. Cross-sectional imaging methods should be used in cases of suspicion. Delayed diagnosis may be associated with high morbidity and mortality rates. Treatment is mainly surgical. The type of surgery may vary according to the experience of the surgeon. A wait-and-see strategy can be tried only in enteric-type intussusceptions and in high-volume centers with good follow-up facilities.

## 6. CONFLICT OF INTEREST

The authors wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

## 7. AUTHOR CONTRIBUTIONS

Conceptualization, C.İ.B.; methodology, C.İ.B.; software, A.İ.K., O.S.; investigation, C.İ.B., A.İ.K.; resources, C.İ.B., A.İ.K., O.S.; data curation, A.İ.K., O.S.; writing—original draft preparation, C.İ.B., A.İ.K., O.S.; writing—review and editing, C.İ.B., A.İ.K., O.S.; visualization, A.İ.K., O.S.; supervision, C.İ.B.; project administration, C.İ.B. All authors have read and agreed to the published version of the manuscript.

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