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CASE REPORT

A Rare Cause of Intestinal Obstruction: Mesodiverticular Band

İntestinal Obstrüksiyonun Nadir Bir Nedeni: Mezodivertiküler Band

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ABSTRACT

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract. Some of the major complications of MD are bleeding, intestinal obstruction and diverticulitis. So, we aim to indicate in this case report that intestinal obstruction can occur secondarily to the MD and mesodiverticular band.

A 63-year-old male patient with no known previous history of medical problem or abdominal surgery came to the emergency department with a severe abdominal pain, nausea and vomiting that had started the previous day. Physical exam showed an increase in bowel sounds, distention and generalised sensitivity largely on the epigastric region. An Erect abdominal plain radiograph revealed a few distended small bowel loops and multiple air-fluid levels. Even though the patient was initially thought to suffer from a mechanical intestinal obstruction, the subsequent abdomen CT of the patient, which was taken urgently, showed fluid accumulation in the intestinal loops and local dilatation, favouring an obstruction. The patient who developed acute abdomen in the follow-up was taken to the surgery immediately. It was observed that small intestine was strangled 60 cm proximity to the ileocecal valve. This strangulation was observed to be resulted from the mesodiverticular band of the inflamed MD. The mesodiverticular band extended from the vertex of the MD to the mesentery and significantly compressed the distal ileum. Once the mesodiverticular band was detached from the mesentery by electrocautery, the ileal loop became free. Since the free ileal bowel loop was observed to be ischemic, 15 cm segmental small intestine was resected including the MD and the inflamed, fragile mesentery of the intestinal loop. Histologic analyses confirmed that the diverticulum was MD.

As the preoperative diagnosis of intestinal obstruction which is caused by mesodiverticular band is difficult, it is associated with high mortality and morbidity. Early diagnosis and immediate surgery will prevent the strangulation and bowel gangrene therefore, mesodiverticular band which is one of the complications of MD should be kept in mind in the differential diagnosis of the patients referring with the symptoms of an intestinal obstruction.

Keywords: Intestinal obstruction, meckel's diverticulum, mesodiverticular band

ÖZ

Meckel divertikülü (MD) gerçek bir divertiküldür ve intestinal duvarın tüm katlarını içerir. MD gastrointestinal sistemin en sık görülen konjenital anomalisidir. Popülasyonun %1 ile 4'ü arasında görülür. MD'nin sık görülen komplikasyonlarının başlıcaları kanama, intestinal obstrüksiyon ve divertikülittir. Biz de bu olgu sunumunda; intestinal obstrüksiyonun MD'ye ve mezodivertiküler banda sekonder oluşabileceğini sunmayı amaçladık. Daha önceden bilinen bir hastalığı ve abdominal cerrahi öyküsü olmayan 63 yaşında erkek hasta acil servise bir gün önce başlayan şiddetli karın ağrısı, bulantı, kusma şikayetiyle başvurdu. Fiziksel muayenede barsak seslerinde artış, distansiyon ve epigastrik bölgede daha fazla olmak üzere yaygın hassasiyet vardı. Ayakta düz batın grafisinde birkaç adet distandü ince barsak ansı ve multiple hava sıvı seviyeleri izlenmişti. Mekanik intestinal obstrüksiyon düşünülen hastanın çekilen acil bilgisayarlı tomografisinde obstrüksiyonu işaret eden intestinal anslarda sıvı akümülasyonu ve yer yer dilatasyon saptandı. Takiplerinde akut batın gelişen hasta acil operasyona alındı. Genel anestezi altında göbek üstü median ve göbek altı median insizyonla eksploratif laparotomi gerçekleştirildi. Eksplorasyonda ileoçekal valfin 60 cm proksimalinde ince barsağın strangüle olduğu görüldü. Mekanik obstrüksiyonun süperiorunda dilate anslar izlendi. Bu strangülasyonun inflame MD'nin mezodivertiküler bandı nedeniyle oluştuğu görüldü. Mezodivertiküler band MD'nin tepe noktasından mezentere doğru uzanıyordu ve distal ileumu belirgin derecede komprese ediyordu. Mezodivertiküler band mezenterden elektrokoter yardımıyla ayrıldıktan sonra ileal ans serbestleştirildi. Serbestleştirilen ileal barsak ansının iskemik olarak izlenmesi üzerine MD ve barsak ansına ait inflame, frajil mezenteri de içerecek şekilde 15 cm segmental ince barsak rezeke edildi. Sonrasında

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elle çift kat uç uca anastomoz yapıldı. Histolojik çalışmalar ile divertikülün inflame MD olduğu doğrulandı. Komplike MD'nin tanısını cerrahiden önce koymak çoğunlukla zordur çünkü akut apandisit, enflamatuvar barsak hastalığı ve intestinal obstrüksiyonunun diğer nedenleriyle klinik olarak karışabilmektedir. Mezodivertiküler bandın neden olduğu intestinal obstrüksiyon preoperatif tanısının zorluğu nedeniyle yüksek mortalite ve morbidite ile ilişkilidir. Erken tanı ve acil cerrahi, strangülasyonu ve barsağın gangrene olmasını engellediği için MD komplikasyonlarından mezodivertiküler band,intestinal obstrüksiyon tablosuyla başvuran hastaların ayırıcı tanısında akılda tutulmalıdır.
Anahtar Kelimeler: İntestinal obstrüksiyon, meckel divertikülü, mezodivertiküler band

Introduction

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract. It develops due to the incomplete closure of the vitelline or omphalomesenteric duct in 5th-7th weeks of fetal development and usually settles on the antimesenteric edge of the ileum. MD is a true diverticulum and includes all layers of the intestinal wall. Meckel diverticulum develops in 1-4% of the population and equally in both sexes. It is generally clinically silent. It is most often detected incidentally during autopsy or surgery. Complications are more common in men. The main complications of MD are bleeding, intestinal obstruction and diverticulitis.[1,2,3,4,5] In this case report, we aimed to present that small bowel obstruction might develop secondary to the MD and mesodiverticular band.

Case Report

A 63-year-old male patient, who did not have a previously known disease and a history of abdominal surgery, was admitted to the emergency department with the complaint of severe abdominal pain, nausea and vomiting. On physical examination, fever was 36.8 °C, arterial blood pressure was 110/70 mm Hg and pulse was 94/min. In the abdominal examination, there was increase in the bowel sounds, distension and widespread tenderness which was more in the epigastric region. Rectal examination was natural. Leukocyte count was 12.090/mm^3, hemoglobin level was 15.4 g/dL and platelet count was 301.000/mm^3 in the complete blood count. Renal and liver function tests were normal. On erect abdominal plain film, several distended small bowel loops and multiple air-fluid levels were observed. Abdominal USG revealed intra-abdominal free fluid and hyperperistaltic dilated small bowel loops. In the emergency computed tomography (CT) of the patient who was considered to have mechanical intestinal obstruction, fluid accumulation and local dilatation were detected in intestinal loops indicating obstruction (Figure 1, 2). In the follow-up, the patient developed acute abdomen and underwent emergency surgery. Under general anesthesia, exploratory laparotomy was performed with incisions below and above the belly button. In exploration, the small intestine was strangulated at 60 cm proximal to the ileocecal valve. Dilated loops were observed superior to mechanical obstruction. It was seen that this strangulation developed due to the mesodiverticular band of the inflamed MD. The mesodiverticular band extended from the vertex of the MD to the mesentery and significantly compressed the distal ileum (Figure 3, 4). After the mesodiverticular band was separated from the mesentery with the help of an electrocautery, the ileal lobe was released. Upon ischemic monitoring of the released ileal bowel loops, a 15 cm segmental small intestine was resected, including the MD and the inflammatory and fragile mesentery of the bowel loops. Then, double end-to-end anastomosis was performed manually. Following the bleeding control, a drainage catheter was placed in the pelvis.

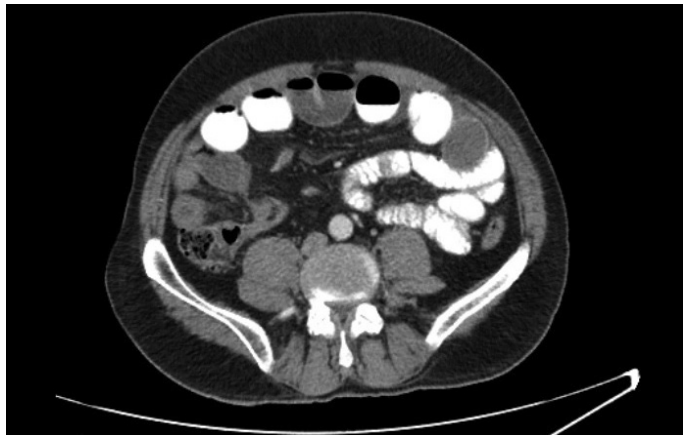

Figure 1. Air fluid levels in small intestine

Figure 2. Dilated small bowel loops

Histological studies confirmed that the diverticulum was an inflamed MD. The patient with a normal postoperative course was discharged 7 days later and no complication was observed during the 3-month follow-up period.

Figure 3. View during operation

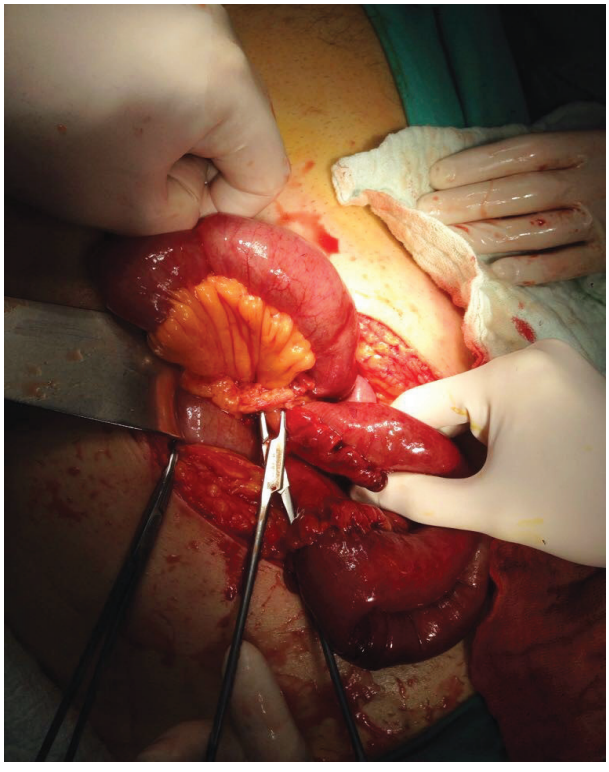

Figure 4. Mesodiverticular band view during operation

Discussion

MD develops due to the incomplete closure of the vitelline or omphalomesenteric duct in 5th-7th weeks of fetal development. It is a true diverticulum that contains all the layers of the intestinal wall and is usually located at the antimesenteric edge of the terminal ileum at a distance of 60-100 cm from the ileocecal valve.[1,2,5,7] The distance to ileocecal valve varies depending on age. In children under 2 years of age, the distance is known as an average of 34 cm, and in adults, an average of 67 cm. Although its size is variable, it is mostly short and it has wide rim. It is approximately 2.9 cm long and 1.9 cm wide. These features cause it to be called ileal appendix.[1,2]

MD rarely causes symptoms, but is usually detected incidentally. The risk of lifelong complications of MD is between 4-6%.[1,2,3,6] Symptomatic MD is more common in men (2: 1 in men, 5: 1 in women). In symptomatic patients, the diverticulum may include heterotopic gastric mucosa (50%) pancreatic mucosa (5%) and to a lesser extent colonic, endometrial and hepatobiliary tissues. These tissues are responsible for complications such as gastrointestinal bleeding, inflammation, intestinal obstruction, intussusception, hernial involvement, umbilical sinus, fistula or tumor.[4,6] The most common complications are bleeding, intestinal obstruction and diverticulitis. While bleeding and intussusception are more common under 2 years of age, obstruction and diverticulitis are more common in adults.[2,4] Elsayes et al.[8] detected intestinal obstruction in 40% of symptomatic MDs. In our patient, ileus was observed clinically.

The most common mechanisms causing intestinal obstruction are as follows: Volvulus of the small intestine around the fibrous band extending from the meckel diverticulum to the umbilical lumen; sagging of MD into the small intestine lumen and intertwining of the small intestine segment with the distal ileum and then with the large intestine resulting in ileoileal and ileocolic intussusception; the formation of intestinal obstruction with Littre hernia as a result of the incarceration of the diverticulum into the hernia; the formation of obstruction as a result of trapping of the small bowel loops between the veins of the diverticulum and the mesodiverticular band; the band that extends between the diverticulum and the base of the mesentery forms a loop, strangling part of the ileum and causing obstruction; and MD stone.[1,2,3,4,5,6] The ileus was secondary to the mesodiverticular band in our patient.

Other rare mechanisms include tumors (lipomas, carcinoid tumors and others), volvulus due to inflammatory adhesions caused by the meconium impaction in the MD in neonatals, cecal volvulus which develops around a band extending from

the MD to the umbilicus, gallstone ileus, and obstruction in the MD due to phytobezoar formation.[9,10]

Yolk sac is fed from two different vitelline arteries. One of them undergoes degeneration while the other forms the superior mesenteric artery. The degenerated vitelline artery turns into a fibrous band surrounded by a peritoneum or mesodiverticular band. This band usually extends from the vertex of the MD to the ileal mesentery and sometimes causes ileal obstruction by trapping the bowel loops.[7,11] Intestinal obstruction caused by mesodiverticular band is associated with high mortality due to the difficulty of preoperative diagnosis.[1,2,3]

It is often difficult to diagnose complicated meckel's diverticulum before surgery because it can be clinically confused by acute appendicitis, inflammatory bowel disease, and other causes of small bowel obstruction.[12]

Various imaging tests are used in the diagnosis of MD. Conventional radiological examinations have limited value in diagnosis. In general, findings of complication can be radiologically viewed. Small bowel obstruction can often be detected on plain abdominal x-ray. Nonspecific findings such as enlarged bowel loops and multiple air-fluid levels are usually seen. Despite its limited utility, ultrasonography (USG) is used in the diagnosis of MD. In the USG, a blind-ended fluid-filled structure and a thin-walled intestine segment can be seen in the lower right quadrant.[13] In our patient, free fluid inside the abdomen and hyperperistaltic dilated small bowel loops were observed in USG. It is difficult to distinguish MD from normal small intestine in patients that are not complicated by tomography. Abdominal CT helps diagnosis in complicated patients such as intussusception. Nevertheless, seeing structures filled with fluid or air that are associated with the small intestine that ends up blind can help in diagnosis.[2,4,6,7] In our patient, fluid accumulation and local dilatation were detected in intestinal loops indicating obstruction in CT. Arteriography and technetium pertechnetate are useful methods when there is massive bleeding or ectopic gastric mucosa.[4,14]

Treatment of symptomatic MD is surgical resection.[2,4,7] Generally, wedge resection of the MD is sufficient, but in some patients, segmental ileal resection and end-to-end anastomosis may be required, as in our patient. The results of surgical resection are generally good. The frequency of early postoperative complications in patients operated on due to complications of MD is 12%. These early complications are wound infection (3%), prolonged ileus (3%) and anastomosis leak (2%).[12]

When asymptomatic MD is detected incidentally, resection is controversial.[2] Resection of MD detected incidentally is safer with 2% morbidity and 1% mortality rates.[12] Due to the difficult preoperative diagnosis of complicated MD, most surgeons recommend prophylactic diverticulectomy in MD detected by chance. This recommendation stands out due to lower morbidity rates compared to complicated MD resection.[15]

Today, laparoscopy is accepted as the diagnosis and treatment method in small bowel obstruction with unknown etiology. Intestinal obstruction caused by the mesodiverticular band can also be treated with a laparoscopic approach.[4,5,7] In our patient, we could have preferred a laparoscopic approach instead of emergency exploratory laparotomy, so that the patient's hospitalization period could be shortened. However, we could not perform laparoscopy because the operation was planned under emergency conditions and the necessary equipment could not be provided.

Conclusion

As a result, delays due to the difficulty in preoperative diagnosis of intestinal obstruction caused by mesodiverticular band may cause an increase in morbidity and mortality rates. Since early diagnosis and emergency surgery prevent strangulation and intestinal gangrene, mesodiverticular band, which is one of the complications of MD, should be kept in mind in the differential diagnosis of patients presenting with small bowel obstruction.

Ethics

Informed Consent: Written informed consent was obtained from the patient for publication and any accompanying images.

Peer-review: Internally and externally peer reviwed.

Authorship Contributions

Surgical and Medical Practices: H.E.A., S.Z., Concept: H.E.A., M.C.A., Design: S.Z., M.C.A., Data Collection or Processing: M.F.E., Analysis or Interpretation: M.C.A., Literature Search: S.Z., M.F.E., Writing: H.E.A., M.F.E.

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