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# Comprehensive Retrospective Analysis of Inguinal Hernias and Our Experiences with Special Hernias

# Kasık Fıtıklarının Kapsamlı Retrospektif Analizi ve Özel Fıtıklardaki Deneyimlerimiz

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### ABSTRACT

**Aim:** This study aims to review specific types of inguinal hernias over the past three years and analyze the surgical decision-making processes based on recent literature. **Materials and Methods:** A retrospective review was conducted of 1,159 patients who underwent inguinal hernia surgery at Servergazi State Hospital between January 1, 2021, and December 31, 2023. Data analyzed included patient demographics, hernia types, locations, surgical methods, and complications. Special hernias, including Amyand's, Littre's, and Richter's hernias, were specifically identified and reviewed.

**Results:** Among the 1,159 patients, 113 were female (9.7%) and 1,046 were male (90.3%). The average age was 47.8 years for females and 58.6 years for males. Hernia types included 838 inguinal (72.3%), 267 femoral (23.1%), and 54 recurrent (4.6%). Specific hernias identified included 4 cases of Amyand's hernia (0.34%), 2 cases of Littre's hernia (0.17%), and 1 case of Richter's hernia (0.08%). Surgical approaches consisted of 83.7% open surgery and 16.3% laparoscopic procedures, with meshplasty performed in 96.5% of cases. Complications were infrequent: seroma in 3.9%, hematoma in 1.8%, wound infection in 2.8%, and recurrence in 0.4%. Specific hernias required additional procedures such as appendectomy for Amyand's hernia and diverticulectomy for Littre's hernia, with no complications reported during follow-up.

**Conclusion:** Inguinal hernias often contain omental tissue, but special hernias like Amyand's (appendix), Littre's (Meckel's diverticulum), and Richter's (intestinal wall) necessitate thorough examination. Amyand's hernia, which can range from incidental findings to acute appendicitis, benefits from mesh repair and appendectomy if needed. Littre's hernia requires diverticulectomy in addition to hernia repair. Richter's hernia, presenting with varied symptoms, should be managed with direct inspection and appropriate repair. The increasing use of minimally invasive techniques may lead to a higher incidence of Richter's hernia. Tailoring surgical strategies to the type of hernia ensures optimal outcomes.

# ÖΖ

Amaç: Bu çalışma inguinal herni nedeniyle son üç yılda opere edilen hastalardaki özel fitikları gözden geçirmek ve güncel literatüre dayalı cerrahi yönetimini ve karar alma süreçlerini analiz etmeye amaçlamaktadır.

Yöntem: 1 Ocak 2021 ile 31 Aralık 2023 tarihleri arasında Servergazi Devlet Hastanesi'nde kasık fıtığı ameliyatı geçiren 1159 hastada retrospektif olarak incelendi. Hastaların demografik verileri, fıtık tipleri, yerleşim yerleri, cerrahi yöntemler, hastanede kalış süreleri ve komplikasyonlar analiz edildi. Amyand, Littre ve Richter gibi özel fıtıklar tanımlandı ve incelendi.

**Bulgular:** 1159 hasta arasında 113'ü kadın (%9.7) ve 1046'sı erkekti (%90.3). Kadınlarda ortalama yaş 47.8, erkeklerde ise 58.6 idi. Fıtık tipleri arasında 838 inguinal (%72.3), 267 femoral (%23.1) ve 54 nüks herni (%4,6) idi. Belirlenen spesifik fıtıklar dört Amyand (%0,34), iki Littre (%0,17) ve bir Richter (%0,08) herni idi. Cerrahi yaklaşımlar %83,7 açık ve %16,3 laparoskopikti; vakaların %96,5'inde greftli onarım yapılmıştı. Komplikasyonlar oranları düşüktü; %3.9'unda seroma, %1,8'inde hematom, %2,8'inde yara enfeksiyonu ve %0,4'ünde nüks herni görüldü. Spesifik fıtıklar, Amyand için apendektomi ve Littre için divertikülektomi ile birlikte greftli onarım tercih edilmişti. Richter hernisine mesh plug uygulanmıştı. Spesifik fıtıkların 10.gün ve birinci ay takiplerinde hiçbir komplikasyon bildirilmedi.

**Sonuç:** İnguinal hernilerde fıtık kesesi içerisinde sıklıkla omental doku bulunur, ancak Amyand (apandisit), Littre (Meckel divertikülü) ve Richter (bağırsak duvarı) gibi özel fıtıklar dikkatli inceleme gerektirir. Herni kesesi içerisinde saptanan dokuya göre tedavi stratejisi değişmektedir. Greftli veya anatomik onarım cerrahın peroperatif bulgularına göre karar vermesi gereken bir durumdur.

Key words: Amyand's hernia, Littre's hernia, Richter's hernia, Inguinal hernia

Anahtar kelimeler: Amyand fıtığı, Littre fıtığı, Richter fıtığı, inguinal herni

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# Introduction

nguinal hernia is the most common type of hernia and represents a significant condition within the field of general surgery, with over 20 million hernia repairs performed worldwide annually [1-3]. The primary risk factor for the development of an inguinal hernia is a reduction in collagen synthesis. Additional risk factors include advanced age, male gender, connective tissue disorders, significant weight loss, and obesity. Conditions that elevate intra-abdominal pressure, such as heavy lifting, persistent coughing, constipation, and difficulty urinating, are also considered predisposing factors for inguinal hernia [1, 2]. An indirect hernia occurs when protrusion happens through the internal inguinal ring, while direct hernias emerge from the posterior wall of the inguinal canal, specifically within the Hesselbach triangle. Direct hernias typically have fewer complications due to their larger necks. Reducible inguinal hernias are often characterized by an inguinal bulge, with contents that can either spontaneously return to the abdomen or do so under pressure. Complications arise when the hernia contents become trapped or incarcerated, with strangulation leading to compromised blood supply, which can result in obstruction, bowel necrosis, and perforation [1-5]. The lifetime incidence of inguinal hernia is 27-43% in men and 3-6% in women. Inquinal hernias are almost always symptomatic, with surgery being the primary treatment option. Although a small percentage of patients may be asymptomatic, approximately 70% of these individuals will undergo surgery within 5 years [1-5]. Additionally, there are specific types of hernias that are named based on the shape of the hernia or the organ involved, rather than their anatomical location. These include Richter's hernia (RH), which involves the incarceration of a portion of the intestinal wall; Littre's hernia (LH), characterized by the presence of Meckel's diverticulum within the hernia sac; Amyand's hernia (AH), where the appendix vermiformis is involved in the inguinal hernia; and Lassus hernia, defined by the compression of the ovary into the inguinal hernia [6-11]. The aim of our study is to review specific hernia cases among patients who underwent inguinal hernia surgery in the past three years and to discuss the surgical decisionmaking process during this period, supported by

## relevant literature.

# Material and Methods

The study was designed retrospectively. Records from the hospital automation system of 1,159 patients who underwent surgery for inguinal hernia between January 1, 2021, and December 31, 2023, at the General Surgery Department of Servergazi State Hospital were examined. The analysis included patients' ages, genders, types of hernias, hernia localizations, types of surgeries (elective vs. emergency), surgical methods, hospital stays, and complications. Only patients with complete and verified record-archive information were included in the analysis. Patients who had surgeries for other types of hernias (e.g., umbilical, epigastric, incisional) at our hospital were excluded from the study. The results will be presented using descriptive statistics, including averages, minimum-maximum values, and percentages. Special hernias in the study were defined as those involving the appendix vermiformis, Meckel's diverticulum, or a singlelayer intestinal wall within the hernia sac. Ethical approval for the study was obtained from the Pamukkale University Non-Interventional Clinical Research Ethics Committee (E-60116787-020-501276).

# Results

Between January 1, 2021, and December 31, 2023, the Department of General Surgery at Servergazi State Hospital conducted 1,159 procedures for patients with inguinal hernias. Of these patients, 113 were female (9.7%) and 1,046 were male (90.3%). The mean age of female patients was 47.8 years (range 32-75 years), while the mean age of male patients was 58.6 years (range 18-96 years). The distribution of hernia types was as follows: 838 patients (72.3%) had inguinal hernias, 267 patients (23.1%) had femoral hernias, and 54 patients (4.6%) had recurrent hernias. In terms of hernia location, 705 patients (60.9%) had right inguinal hernias, 330 patients (28.5%) had left inguinal hernias, and 124 patients (10.6%) had bilateral hernias.

Surgical approaches included elective procedures for 1,102 patients (95.1%) and emergency surgeries for 57 patients (4.9%) due to suspected strangulation. Of the total procedures, 970 (83.7%) were performed using open surgery, while 189 (16.3%) were laparoscopic. Meshplasty was performed in 1,118 patients (96.5%), and suture repair was conducted in 41 patients (3.5%). The average hospital stay was 1.7 days. Postoperative complications included seroma in 3.9% of patients, hematoma in 1.8%, wound infection in 2.8%, and hernia recurrence in 0.4% (Table 1).

Variables	Data			
Mean age (min-max)				
Female	47.8 (32-75)			
Male	58.6 (18-96)			
Gender n (%)				
Female	113 (%9.7)			
Male	1046 (%90.3)			
Hernia type n (%)				
Inguinal	838 (%72.3)			
Femoral	267 (%23.1)			
Recurrent	54 (%4.6)			
Hernia site, n (%)				
Right	705 (%60.9)			
Left	330 (%28.5)			
Bilateral	124 (%10.6)			
Operation timing, n (%)				
Elective	1102 (%95.1)			
Urge	57 (%4.9)			
Operation type, n (%)				
Open	970 (%83.7)			
Laparoscopy	189 (%16.3)			
Repair Technique, n (%)				
Mesh	1118 (%96.5)			
Suture	41 (3.5)			
Special hernia	7 (%0.6)			
Length of hospitalization,				
Mean (min-max)	1.7 (1-6)			
Complications, n (%)				
Seroma	46 (%3.9)			
Hematoma	21 (%1.8)			
Wound infection	33 (%2.8)			
Recurrence	5 (%0.4)			

Table 1. The demographic and surgical data of the 1159 patients

Specific hernias were identified in 7 patients (0.6% of all procedures): 4 male patients (mean age 42.4 years) had Amyand's hernia (AH) (0.34%), 2 patients had Littre's hernia (LH) (0.17%), and 1 female patient had Richter's hernia (RH) (0.08%) (Table 2 and Figure 1). Patients with AH and LH underwent appendectomy and

diverticulectomy, respectively, in addition to graft repair. Histological examination of appendectomy specimens revealed acute appendicitis in one case, while no ectopic tissue was found in the diverticulum of the LH cases. In the case of RH, intestinal perfusion was assessed as adequate, and the hernia was successfully reduced and repaired with a mesh plug. The average hospital stay for these specific hernia cases was 3.57 days. During hospitalization, patients received intravenous cefazolin sodium every 8 hours for antibiotic prophylaxis and were prescribed a 5-day course of oral cefuroxime upon discharge. No complications were observed during the 10-day and 1-month postoperative follow-up visits.

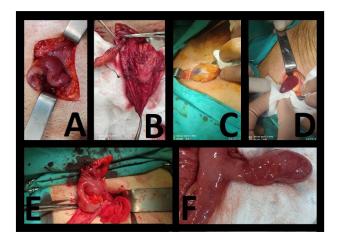


Fig 1: Peroperatif images of special hernias. A & B: Amyand's hernia (Appendix vermiformis in the hernia sac), C & D: Richter's hernia (intestinal wall in the femoral hernia sac), E & F: Littre's hernia (Meckel diverticula in hernia sac)

### Discussion

Abdominal hernia is characterized by the protrusion of intra-abdominal organs through a defect in the abdominal wall for any reason. Hernias commonly occur in the groin area, with the omentum frequently found within the hernia sac. Rarely, the appendix vermiformis (Amyand's hernia), Meckel's diverticulum (Littre's hernia), and a segment of the intestinal wall (Richter's hernia) may be located within the hernia sac [1, 4, 5].

Amyand's hernia (AH) refers to the presence of the appendix vermiformis within the inguinal hernia sac. First described by Claudius Amyand, a surgeon for King George II, in 1735, AH was documented in this context in the literature [8, 9, 12, 13]. The

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Patient No	Age	Gender	Localization	Hernia type	Timing of surgery	Surgical treatment	Hospital day	Pathology
1	37	Male	Right	Amyand	Elective	Appendectomy, mesh herniographi	3	Normal appendix vermiformis
2	44	Male	Right	Amyand	Urge	Appendectomy, mesh herniographi	4	Acute appendicitis
3	54	Male	Right	Amyand	Urge	Appendectomy, anterior mesh repair	3	Normal appendix vermiformis
4	22	Male	Right	Amyand	Elective	Appendectomy, mesh herniographi	3	Normal appendix vermiformis
5	46	Female	Right	Littre	Urge	Meckel diverticule excision, mesh herniographi	4	Meckel diverticula
6	55	Male	Right	Littre	Elective	Meckel diverticule excision, mesh herniographi	4	Meckel diverticula
7	73	Female	Left	Richter (Femoral)	Urge	Reduction, mesh plug	4	-

Table 3. Losanoff Amyand hernia classification and management

Clasification	Description	Management	
Туре	Normal appendix in an inguinal hernia sac	Reduction, appendectomy in young, mesh	
		hernioplasty	
Type 2	Acute appendicitis within an inguinal hernia sac,	Appendectomy, primary repair of hernia, no	
	no abdominal sepsis	mesh replacement	
Type 3	Acute appendicitis within an inguinal hernia sac,	Laparotomy, appendectomy, primary repair of	
	peritoneal sepsis	hernia, no mesh replacement	
Type 4	Acute appendicitis within an inguinal hernia,	Manage as types 1 to 3 hernia, investigate or	
	related or unrelated abdominal pathology	treat second pathology as appropriate	

true incidence of AH is difficult to determine, with rates in retrospective inquinal hernia series ranging from 0.14% to 1.3%. Appendicitis within an inguinal hernia is even rarer, occurring at a rate of 0.07%-0.13% according to large retrospective studies [8, 12, 13]. AH can occur across all age groups, from newborns to the elderly [12]. It is more common in men than in women, with a male-to-female ratio of approximately 7:1 [8]. In elective cases, the presence of the appendix in the hernia sac is often incidental. In contrast, emergency cases present with various symptoms such as lower right quadrant pain, a tender and irreducible groin lump, skin edema and erythema, and scrotal pain [8]. In our study, AH was detected in two cases during elective surgery and in two cases during emergency surgery due to incarcerated inguinal hernia. Losanoff et al. [14] classified AH into four subtypes based on clinical symptoms and the status of the appendix (Table 3). Singal et al. [15], using the Rikki modification of Losanoff's classification, added incisional

hernias with protruding vermiform appendix as a fifth type of AH. According to this classification, three cases in our study were type 1, and one case was type 2. Since no patient exhibited signs of acute appendicitis during surgery, all cases underwent appendectomy and mesh hernioplasty. One case was subsequently reported to have acute appendicitis in the pathology report, and no complications were noted during the postoperative period.

Meckel's diverticulum is a congenital true intestinal diverticulum arising from the antimesenteric border of the small intestine, containing all bowel tissue layers, and is the most common gastrointestinal malformation [6, 7, 16-18]. Littre's hernia (LH) refers to any hernia containing a Meckel's diverticulum (MD) and is named after French surgeon Alexis de Littré, who first reported it in the 1700s. LH has a slightly higher incidence in females, with a ratio of 1.2:1. Femoral hernias are more common in females, while inguinal

hernias are more common in males. LH is exceedingly rare, with an estimated incidence of 0.09% of strangulated or incarcerated hernias in the literature [17]. Treatment for LH involves both hernia repair and removal of the Meckel's diverticulum [18]. In our study, one male and one female patient had LH. The female patient underwent emergency surgery for an incarcerated right inguinal hernia with signs of mechanical bowel obstruction, while the male patient had an electively reducible inguinal hernia. Both patients received open surgical diverticulectomy and mesh repair, with pathological examination of the diverticula showing no ectopic mucosal tissue.

Richter's hernia can occur at any typical hernia site but is more likely to present in small hernia rings with rigid fascial defects. Common locations include the inguinal canal (12%-36%), femoral ring (36%-88%), and abdominal wall incision (4%-25%). Less common types include umbilical, obturator, supravesical, spigelian, triangle of Petit, and sacral foramen hernias [19]. Richter's hernia is more prevalent in elderly patients, particularly those aged 60-80 [20]. The incidence of RH has recently increased with the rise of minimally invasive surgeries [20-22]. The clinical presentation can vary depending on the degree of bowel obstruction and includes cramp-like abdominal pain, nausea, vomiting, and sometimes swelling [10, 19, 20]. RH requires surgical intervention, with direct inspection being necessary to assess bowel viability. Preliminary attempts at manual reduction should be avoided. In our study, a 73-year-old patient with left groin pain and swelling underwent surgery for suspected strangulation. There was no ischemia observed in the bowel wall during the operation, and the hernia was reduced and repaired with a mesh plug.

Limitations: This study has several potential limitations. Notably, the limitations include the small sample size, the relatively short follow-up period, and, most significantly, the exclusion of hernias other than inguinal hernias. The specific hernia rates that might be observed if all types of hernias were included could differ from those reported in this study.

Conclusion: The content of the hernia is primarily composed of omental tissue. However, before

reducing the hernia, it is crucial to open the hernia sac and inspect it for specific types of hernias. Treatment strategies for specific inguinal hernias vary depending on their contents. Amyand's hernia (AH) can present with a wide range of clinical manifestations, from being an asymptomatic incidental finding during elective hernioplasty to causing acute appendicitis with perforation and abscess formation within an incarcerated hernia. The Losanoff and Basson classification system provides valuable guidance for surgical decisionmaking. In cases involving appendicitis, prosthetic mesh can be used if the surgical field is relatively clean. The choice between mesh or anatomical repair for Littre's hernia depends on perioperative Prophylactic diverticulectomy findings. is recommended as Meckel's diverticulum may contain ectopic tissue. Additionally, it is anticipated that the incidence of Richter's hernia will increase with the rise in minimally invasive surgeries.

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