Case Report

Amyand's Hernia: A Case Report and Review of Japanese Literature

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Abstract

Amyand's hernia is an extremely rare type of inguinal hernia that involves herniation of the appendix. Here, we report a case of Amyand's hernia in a 77-year-old man. The patient had developed a painful swelling in the right inguinal region 3 years ago; the swelling could be manually reduced but became increasingly painful over time. The hernia was intraoperatively identified as an external inguinal hernia containing the ileocecum and an uninflamed appendix. Only weak adhesions were present between the appendix and hernial sac; therefore, the appendix could be easily separated and was replaced within the abdominal cavity. The mesoappendix was not involved, and an appendectomy was not required. The inguinal hernia was repaired in a radical operation using a direct Kugel patch. The patient's postoperative course was favorable, and he was discharged 3 days after the surgery. Postoperative infection of the surgical site did not occur.

Key words: Amyand's hernia, inguinal hernia, appendix

Introduction

Adult inguinal hernia is a frequently encountered condition in surgical practice, but herniation of the appendix - a condition called Amyand's hernia - is extremely rare. Here, we report a case of Amyand's

hernia and review the relevant literature.

Case Report

The patient was a 77-year-old man with a painful swelling in his right inguinal region. In November 2004, he had undergone a subtotal gastrectomy for the resection of gastric cancer. He noticed a painful swelling in his right inguinal region in January 2007. The swelling in the groin increased in size 2-3 times in a year; at that time, the swelling could be manually reduced. However, in about November 2009, the bulge in the right groin area became more prominent while standing or moving, because of a gradual increase in size and pain, the patient was hospitalized for surgical repair of the hernia in March, 2010.

A physical examination at admission yielded the following findings: height, 169 cm; weight, 58 kg; temperature, 36.2 °C; and blood pressure, 170/90 mm Hg. An enlargement was detected in the right inguinal region.

The results of initial blood tests were within normal limits. Abdominal computed tomography (CT) showed a soft tissue shadow in the subcutaneous fatty tissue of the anterior abdominal wall in the right lower quadrant. On the basis of the CT findings, we diagnosed an inguinal hernia, but no appendiceal impaction was detected (**Fig. 1**). The patient then underwent surgery to correct the hernia. Upon incising the external oblique aponeurosis, the hernial sac was found to protrude through the inguinal ring, displacing the inferior epigastric vessels and indicating that this was an external inguinal hernia. The hernia sac was palpated to determine its contents and whether it communicated with the abdominal cavity. Upon palpation, a moderately firm, funicular structure was detected. We then carefully incised

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Fig. 1 Abdominal computed tomography: A small right inguinal hernia is seen, but its contents - the appendix are not clearly visualize.

Fig. 2 Operative findings: The hernial sac is opened. Weak adhesions are seen, but there is no inflammation of the appendix.

the hernia sac, and observed the ileocecum and a normal, uninflamed, long appendix; the mesoappendix was not involved. On the basis of these findings, we diagnosed an Amyand's hernia (**Fig. 2**). The appendix had adhered to the hernial sac but was not inflamed. We therefore separated the appendix from the hernial sac and replaced it in the abdominal cavity. We then performed a hernioplasty using a direct Kugel patch. The patient's postoperative course was good, and he was discharged 3 days after the surgery.

Discussion

The appendix is an extremely rare component of inguinal hernias; the first such hernia was reported by Amyand et al. in 1736¹⁾. Wakeley et al.²⁾ have reported that in a series of 1232 inguinal hernias, only 12 were Amyand's hernias (0.97%), and that associated appendicitis and incarceration occurred in only 4 cases. In addition, inflammation of the hernial sac because of acute appendicitis has been reported to occur in 0.13% – 0.19% of cases²⁾.

We searched Ichushi Web for articles containing the keywords "inguinal hernia, appendix, the impaction." We found 60 reports, including ours, of Amyand's hernia published between 1983 and June 2010 (**Table 1**). A distinct male predilection for Amyand's hernia was noted, with the sex ratio being approximately 5:1; the average patient age was 62.6 years. Three patients presented with ileus; all patients had a swelling in the right inguinal region; and many

experienced groin aches. However, findings specific for appendicitis were not reported. Inflammatory reaction was detected in 29 of 34 case reports in which laboratory findings had been mentioned. Impacted inguinal hernia was preoperatively diagnosed in all but 4 patients. The presence of the appendix in the hernial sac was preoperatively determined in only 13 patients. Appendiceal enlargement was noted in 2 patients. In the present case, palpation of the hernial sac during the operation indicated the presence of a funicular structure, possibly the appendix. We therefore opened the hernial sac carefully so as not to damage the appendix. Further, retrospective examination of the preoperative CT scan suggested the presence of a funicular structure in the hernial sac, but a definitive preoperative diagnosis was difficult. Thus, Amyand's hernia is often diagnosed during surgical repair of an inguinal hernia. However, because appendiceal impaction can be diagnosed preoperatively and because of the utility of CT imaging^{3,4)}, it may be possible to diagnose Amyand's hernia preoperatively when a hollow lamellar structure terminating in the cecum is detected on abdominal CT.

The treatment of Amyand's hernia involves a hernioplasty and may involve an appendectomy. The indication for an appendectomy should be based on intraoperative findings such as inflammation of the appendix, incarceration of the appendix, severity of adhesions, and mobility of the appendix. If appendi-

Table 1 Reported cases of Amyand's hernia in Japan

Year	Reporter	Age	Sex	Preoperative diagnosis	Inflammatory reaction	Surgery approaches	Appen-decotomy	Operation (hernia)
1985	Kubota	3	M	Appendicitis	(-)	laparotomy	(+)	IIRR
1989	Nishina	65	F	RIHI	(+)	gro+lapa	(+)	IIRR
1989	Kuwahara	81	F	RIHI	(+)	gro+lapa	(+)	Bassini
1990	Komuro	0	M	RIHI	(+)	groin	(+)	RIH
1990	Tanaka	88	M	RIHI	(+)	groin	(+)	RIH
1993	Imai	42	F	RIHI	(-)	gro+lapa	(+)	Bassini
1994	Ishihara	60	M	RIHI	(+)		(+)	McVay
1994	Kajimoto	83	M	RIHI			(+)	RIH
1995	Kazui	63	M	Recurrent RIHI		groin	(+)	RIH
1998	Uchida	36	M	RIHI	(-)	groin	(+)	IPTR
1998	Hirano	0	M	RIHI	(-)	groin	(+)	
1999	Koide	71	F	RIHI, abdominal wall abscess	(+)	gro+lapa	(+)	RIH
1999	Masuyama	80	M	Recurrent RIHI (Appe)	(-)	groin	(+)	IPTR
1999	Kihana	69	M	RIHI (Appe)	(+)	groin	(+)	IPTR
2000	Tamura	85	F	Appendicitis	(+)	gro+lapa	(+)	RIH
2000	You	52	M	Appendicitis	(+)			
2001	Sakakibara	72	M	RIHI	(+)	gro+lapa	ICR	Mesh
2001	Inagi	65	M	RIHI		gro+lapa	(+)	IPTR
2002	Kawai	43	M	RIH	(-)	groin	(+)	MP
2002	Kishibuchi	82	M	RIH	(+)	gro+lapa	(+)	PHS
2002	Shimizu	82	F		(+)		(+)	RIH
2002	Shimizu	74	M	RIHI (Appe)			(+)	MP
2002	Hayakawa	77	M	RIHI		groin	(+)	RIH
2002	Souma	77	M	RIHI	(+)	groin	(+)	IPTR
2003	Ueda	92	F	RIHI (Appe)		gro+lapa	(+)	
2003	Shimogo	55	M	RIHI (Omen)		groin	(+)	RIH
2003	Shimogo	52	M	Cord hydrocele		groin	(+)	RIH
2003	Ueno	70	M	RIHI	(+)	groin	(+)	IPTR
2004	Morohashi	73	F	RIHI (Appe)	(+)	gro+lapa	(+)	HRL
2004	Shitegawara	0	M	RIHI	(+)		(+)	HRL
2005	Ikeda	0	M	RIHI	(+)	groin	(+)	HRL
2005	Tanioka	64	M	RIHI (Appe)				
2006	Wada	0	M				(+)	RIH
2006	Ariyoshi	90	F	RIHI		laparotomy	(+)	RIH
2006	Sato	87	M	Recurrent RIHI (Appe)			(+)	TF
2006	Mizunuma	80	M	RIH (Cecum)	(-)	groin	(+)	DKP
2007	Aoba	78	M	RIHI (Appe)	(+)	groin	(+)	McVay
2007	Sakai	67	M	RIHI	(+)	groin	(+)	MP
2007	Yonezawa	61	M	RIHI (Omen)	(+)	groin	(+)	Bassini
2007	Suwa	71	F	RIHI (Appe)	(+)	gro+lapa	(+)	RIH
2007	Hosono	88	M	RIHI	(+)	groin	ASR	McVay
2007	Hanashiro	70	M	RIHI (SI)	(+)			MP
2008	Yoshikazu	47	M	RIHI	(-)	laparotomy	(+)	Kugel
2008	Iwama	68	M	RIHI	(+)	laparotomy	(+)	
2008	Matsuoka	54	M	RIHI	(+)	groin	(+)	MP
2008	Kurio			RIHI	(-)	groin	(-)	PHS
2008	Kurio			RIHI (Appe)	(+)	groin	(+)	McVay
2009	Aoki	81	M	Recurrent RIHI	(+)	gro+lapa	(+)	Marcy
2009	Nozaki	70	M	RIHI	(-)	gro+lapa	(+)	IPTR
2009	Watanabe	60	M	LIHI (Cecum)	(-)	groin	(+)	IPTR
2009	Inoue	77	M	RIHI	(+)	groin	(+)	MP
2009	Horiike	69	M	RIHI	(+)	groin	(+)	IPTR
2009	Maesawa	48	M	RIHI	(+)	gro+lapa	(+)	
2009	Yoshida	69	M	RIHI	(+)	groin	(+)	IPTR
2009	Ariyoshi	90	F	RIHI (Appe)	(+)	laparotomy	(+)	IIRR
2009	Ariyoshi	81	M	RIHI (Appe)	(-)	groin	(+)	MP
2009	Ohtsu	50	M	RIHI (Appe)	(+)	gro+lapa	(+)	IPTR
2009	Maeno	72	M	RIHI	(-)	groin	(-)	RIH
2009	Yoshida	69	M	RIHI	(+)	groin	(+)	IPTR
2010	Our case	77	M	RIH	(-)	groin	(+)	DKP

RIHI : Right inguinal hernia incarceration, SI : Small intestine, gro+lapa : groin+laparotomy, ASR : Appendix segmental resection, MP : Mesh plug, IIRR : Inner inguinal ring reefing, HRL : High rank ligation, TF : tension free, RIH : Repair of inguinal hernia

citis is absent, if the hernial sac does not show any appendiceal adhesions and the appendix can slide within the sac, or if only the tip of the appendix is within the hernial sac and can be easily reduced, then only a radical inguinal hernia repair without an appendectomy should be performed. In the case of our patient, about half of the appendix had adhered to the hernial sac, but the appendix was not inflamed and only minor adhesions were present. We therefore performed only inguinal repair and not appendectomy. Whereas it is thought with adaption of the appendectomy because appendicitis may be caused by influence of inflammation by the hernioplasty and by the appendiceal abrasion operation when appendix stick together for hernia. Of 50 case reports in which the surgical approach had been mentioned, both groin surgery and laparotomy were performed in 15, only the former was performed in 30, and only the latter was performed in 5. The indication of abdominal surgery depended on the perioperative findings. Of 55 patients who underwent appendectomy, prophylactic resection was performed in 12 patients, and the tension-free method was used in 5 patients. In 1 patient, infection of the surgical site occurred in the early postoperative period requiring removal of the artificial materials used for hernia repair⁵. In another patient, the appendix was not inflamed and was therefore replaced within the abdominal cavity; however, this patient subsequently developed appendicitis⁶. Thus, the efficacy of appendectomy during the repair of Amyand's hernia in the absence of appendiceal inflammation is unclear. However, we think that prophylactic appendectomy should not be performed owing to the associated risks of infection and other complications.

Even when the tension-free method was used with prostheses such as a mesh, the frequency of wound infection was very high, approximately 50%⁷, and hence, surgeons often opted for iliopubic tract repair or the McVay method^{8,9}. However, the tension-free method with prostheses such as a mesh plug and the

Kugel patch has been successfully used for the treatment of incarcerated Amyand's hernias in which both the appendix and mesoappendix were inflamed. Further analysis is required to determine the appropriate surgical treatment of incarcerated Amyand's hernias with inflammation of the appendix and mesoappendix.

In the 1960s, Carey¹⁰ reported that 3 of 6 patients with perforation of the vermiform appendix died postoperatively; however, the postoperative outcomes in recent years have been more favorable.

Although inguinal hernia is a very common condition, surgeons should exercise caution while treating inguinal hernias that contain funicular structures and impacted inguinal hernias without symptoms of ileus.

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