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Report of a very rare complication and literature review



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Intraluminal migration of a surgical drain. Report of a very rare complication and literature review

INTRODUCTION: Gastric or intestinal foreign bodies may cause heterogeneous symptoms ranging from asymptomatic conditions to chronic pain and, in some cases, occlusion and/or perforation. There are sporadic reports of intraluminal migration of medical devices. Most commonly they are sponges, hernia meshes, gastrotomy tubes, while surgical drains are very rarely reported.

METHODS: A 79 year-old female who consulted our department in May 2009 for abdominal pain and constipation. Her symptomatology started in 2006 some months after an anterior resection for sigmoid diverticulitis associated to obstructed incisional hernia. The symptoms had begun a few months after the operation and were progressively increased month by month. An abdominal CT- scan showed the presence of an intra-peritoneal foreign body and at laparotomy a drain fragment was found inside a small bowel loop and pulled out through a small enterotomy.

RESULTS: Post-operative course was regular and the patient was discharged at 7th day.

DISCUSSION: The observation of this case and a literature review led us to analyze the origin and the clinical problems of this very rare complication. Incidence, symptomatology, diagnosis and treatment were analysed.

CONCLUSIONS: The intraluminal migration of a surgical drain is very rare. The diagnosis is easy by abdominal plan radiogram or CT-scan, but it is casually achieved, because, as it almost always occurs in case of intra-peritoneal foreign bodies, the clinical suspicion is focused on other conditions that most frequently cause abdominal symptoms. When a foreign body is found in intraluminal position and its endoscopic removal is not feasible, then surgery is mandatory and resolutive.

KEY WORDS: Abdominal foreign bodies, Drain-related complications, Surgical drain

Introduction

Acute or chronic abdominal pain is one of the most frequent causes of visit or admission to surgical departments and they can be caused by many pathological sit-

uations. Among these, the presence of foreign bodies in a hollow viscus is certainly uncommon and probably underestimated for medico-legal problems. In the literature there are some sporadic reports of different medical devices migrated into hollow viscera, most commonly sponges, hernia meshes, gastrotomy tubes, while reports of drainage tubes are definitely rare.

We know that drain placement is indeed not lacking of complications as infection, pain, visceral herniation, perforation ¹, haemorrhage, irritation to the surrounding structures, fracture, fragmentation or migration ², but the intraluminal migration of a drain is an event even rarer and allows interesting clinical and etiopathogenetic insights.

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Case report

In May 2009 A.C, a 79-year-old female consulted our department for abdominal pain and constipation. She had apacemaker and was affected by hypertension, arhythmia, nodular goiter, previous cerebral stroke. She had been already operated on anterior resection for sigmoid diverticulitis associated to obstructed incisional hernia in 2006. Few months after the colectomy she had begun to feel aspecific abdominal pains and sometimes occlusive crises. Such symptomatology had progressively increased.

At her admission clinical and laboratory data were substantially normal. At clinical examination the abdominal palpation showed pain and a mass of 2 cm of diameter in right iliac fossa. An abdominal CT- scan revealed a drain fragment in the right abdomen extended from right hypochondrium to right iliac fossa (Fig. 1).

We decided to perform a laparoscopic exploration, but it resulted challenging to localize the drain as described at CT-scan for the presence of tenacious visceral adhesions and small bowel loops dilatation. After few minutes we converted to laparotomy. The drain was found inside a small bowel loop and it was pulled out through a small enterotomy. (Fig. 2)

Postoperative course was regular without any complication. Intestinal movements started at 2nd post-operative day and the patient was discharged at 7th day.

Discussion

In literature there are several case reports concerning intraluminal migration of artificial materials into hollow viscus, but our case is quite unusual either for the kind of the device we found and for the late clinical presentation after the first operation.

Many medical devices with different mechanisms of action can penetrate the gastric or the intestinal wall.

Sponge is the most frequent intraluminal foreign body.

A Risher's review reported 69 case of complete transluminal migration in 1991³. When a sponge is left in abdomen an inflammatory response can create an abscess pocket around the sponge between the abdominal wall and the ileum resulting in a perforation of the ileum. Through this opening the sponge migrates into the lumen of the small bowel⁴.

Mesh migration following hernia repair is another uncommon complication. In these cases the erosion into a viscus can be associated with migration or can occur with the mesh in the intended position. Once occurred, infection, abscess, fistula, or obstruction are the most common sequelae. Migration to a completely intraluminal position is exceedingly rare⁵⁻¹².

Gastrostomy tube, cysto-gastric endoprosthesis and Petzer's tube transmigration have been reported, too¹³. Such devices are already partially or totally implanted into the lumen of hollow viscus and the complete migra-

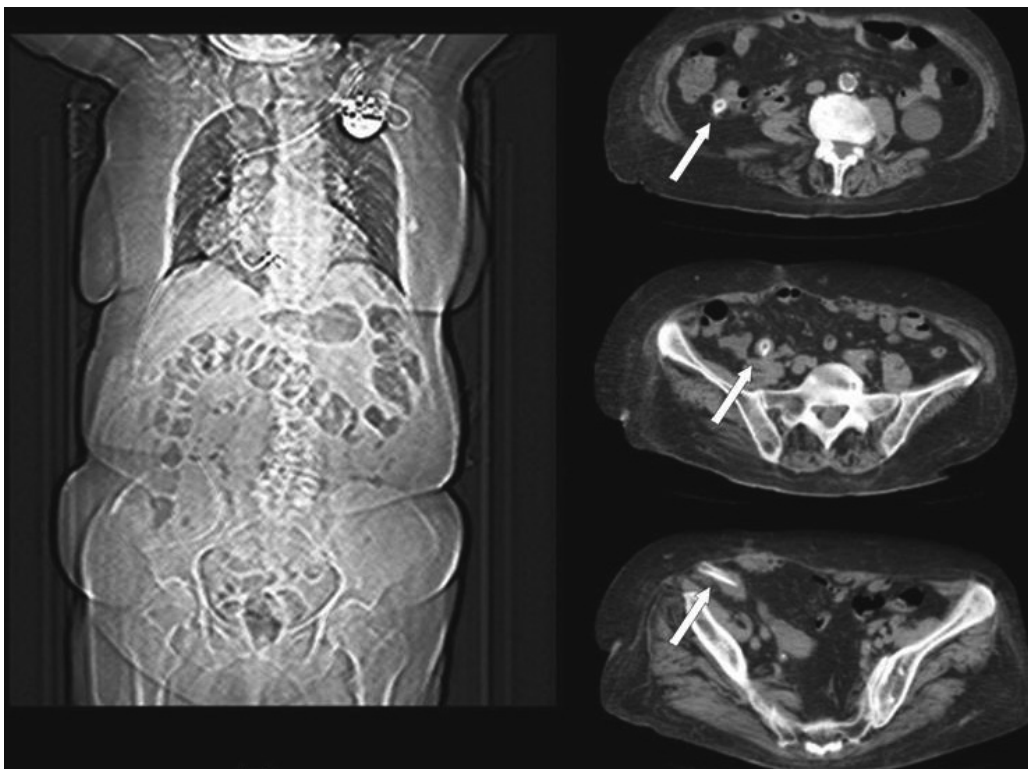


Fig. 1: Presence of an intra-peritoneal foreign body at CT-scan.

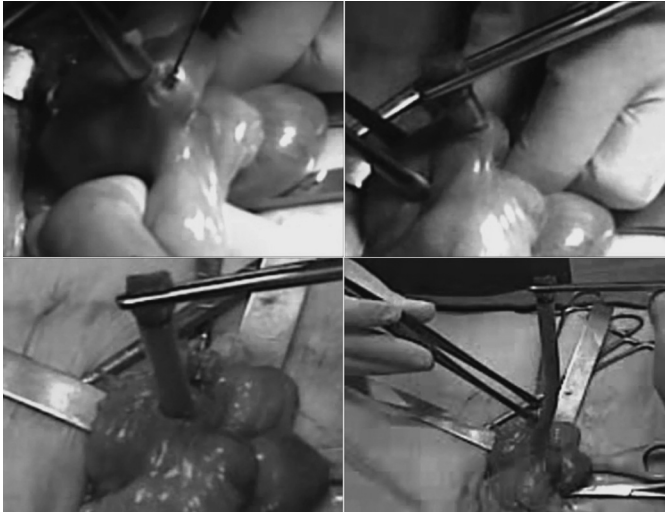


Fig. 2: Drain removal through a small enterotomy.

tion is easy to understand due to the failure of fixing systems.

After gastric banding in bariatric surgery there is an incidence of band erosion of 6.8%¹⁴, and of intragastric band migration of 3.1%¹⁵. Small undetected injuries to the gastric wall can be caused during band placement, so the band pressure can create a necrosis of the gastric wall¹⁶.

A very rare case has been reported by Takayuki Ogino¹². He removed from an intestinal loop a polytetrafluoroethylene spacer measuring 15 × 10 cm placed to prevent exposure of the small bowel to the irradiation in patient affected by local recurrent rectal cancer.

Intraluminal migration of a drain through an anastomotic site is a rare complication. In gastric surgery¹⁷ such condition can present with persistent drainage output, and diagnosis is made by radiographic studies. Peng-Sheng Lai¹⁸ reported the intraluminal migration of a drain placed after a lower esophagectomy and total gastrectomy for gastric small cell carcinoma with Roux en Y anastomosis. The drain was removed via the abdominal wound while the anastomosis was visualized endoscopically. The pathophysiology for this migration is uncertain. Because the drain is placed under direct visualization by a surgeon or under fluoroscopic guidance by an interventional radiologist, it is unlikely that the drain has an intraluminal location at the time of placement. Instead, it could migrate into the lumen in the region of the esophagogastric anastomosis at the site of a pre-existing anastomotic leak^{17,18}.

Surgical drains migrated into the lumen should be promptly withdrawn or removed to facilitate healing of anastomotic leaks¹⁷.

Some conditions can predispose the intraluminal migration of foreign bodies, such as poor nutritional status, long-term steroid use or a huge defect in the intestinal wall^{5,12}.

Based on the presence of dense intra-abdominal adhesions, we propose that in our patient the contact between the drain and intestinal wall elicited local inflammatory reaction without systemic symptoms, and then the drainage eroded the bowel and ultimately penetrated the entire wall. The course after the first operation, as the patient had referred, was uneventful and we can only suppose a subclinical anastomotic leak misunderstood by physicians.

The origin of drainage dislocation is always due to a surgeon's unknowing mistake. The drains can be fractured and retracted intraperitoneally, because they were curled, sutured loosely with an unsecured knot, or over-stretched if any excessive force was used during its removal. Leaving them for any period of time allows tissue ingrowths around the drain and its side holes, causing severe resistance on removal, with eventual breakage and retention¹⁹.

The most prominent site of fracture is at the level of the suture material securing the drain to the abdominal wall^{20,21}. Surgical drains are engineered to function to their maximal tensile strength in normal use. Dilatation or creation of new fenestrations in the drain material may serve to compromise the integrity and, therefore, predispose to drain fracture. Although the ultimate clinical course of our patient remained unchanged, we advise against the modification of surgical drains in order to prevent the morbidity associated with drain fracture²². The clinical presentation of a retained foreign body can vary from an incidental finding on plain radiograph to an intense inflammatory response with obstruction or perforation⁴.

Tandon²³ emphasized that a post-operatively retained surgical sponge, although clinically inert, may serve as a nidus for catastrophic complications. Two types of foreign body reactions may occur: (i) an aseptic fibrinous response that creates adhesions and encapsulations resulting in a granuloma or pseudotumour formation; and (ii) an exudative type of response leading to abscess formation with or without bacterial superinfection and fistula formation^{24,25}.

Septic complications are likely to present in the early post-operative period, whereas aseptic encapsulations may go undetected for years. Commonly, the body tries to extrude such retained foreign bodies along the path of least resistance, which could be either through the wound, sinus tract or rarely into a hollow viscus.

An intraluminal complete migration is much rarer than other well known drain related complications (infection, pain, visceral herniation, perforation, haemorrhage, irritation to the surrounding structures, fracture, fragmentation or migration)^{1,2}.

Drainage systems following abdominal surgery rarely cause bowel perforation²⁶. In a review of the English language literature, only eight cases of bowel perforation due to a drainage system were found. The mechanism of bowel injury caused by suction and open drains dif-

fers in that positive suction drains can draw the bowel wall into their side holes,^{27,28} whereas open drains may cause perforation for the decubitus of their tip²⁶. The late onset of perforation in our patients suggests that the long-term placement of drains may be the main causative factor. Thus, to avoid this complication, drains should be placed carefully and removed early after the drainage has decreased¹.

Another complication is retained fragments during drain extraction, sometimes requiring surgical exploration to remove the missing fragment. Although retained fragments are not common, the necessity for re-intervention represents a major complication in these patients².

The diagnosis of a drainage loss in abdomen is very simple, mostly during the first postoperative days. After months or years the diagnosis can be very hard and sometimes it is occasional. As in our experience drains are surprisingly discovered at radiographs and CT scan performed for other clinical suspects.

Although morbidity associated with surgical drains is rare, there have been reports of drain migration leading to fatal outcome²⁹. There are few reports in the contemporary literature regarding minimally invasive techniques to remove retained postsurgical drains. Almost always, the patients ended up undergoing re-exploration using formal laparotomy¹⁹.

The use of laparoscopy has been reported for removing intraabdominal foreign bodies³⁰⁻³² both intraperitoneal and intraluminal, from the stomach or bowel. For large ingested objects that cannot be retrieved by flexible endoscopy, laparoscopic gastrotomy and foreign body removal have been described³³.

In our case we started to explore the abdomen with laparoscopy, but it resulted challenging to localize the drain as described at CT-scan. The patient presented tenacious visceral adhesions for the previous colectomy. Furthermore small bowel loops dilatation did not consent a good laparoscopic exploration, so after few minutes we preferred to convert to laparotomy.

Conclusions

Gastric and intestinal intraluminal migration of foreign bodies is an uncommon complication and, among these, it is very rare to find surgical drains.

Sometimes its not easily explainable how foreign bodies, especially drains, can migrate into a hollow viscus.

When the diagnosis occurs many months or years after drain insertion, it is often casual and the physicians are regularly oriented toward diagnosis taking in account other conditions which more frequently can cause abdominal symptoms.

When a foreign body is found in intraluminal position and its endoscopic removal is not feasible, then surgery is mandatory and sometimes it can be risky and laborious in presence of adhesions or occlusive phenomena.

Riassunto

La presenza di corpi estranei nello stomaco o nel tratto intestinale può essere asintomatica o produrre segni clinici di diversa gravità (dolore cronico, occlusione e/o perforazione). In letteratura ci sono sporadiche segnalazioni di dispositivi medici migrati in visceri cavi, per la maggior parte garze, protesi per ernioplastica, tubi di gastrotomia, mentre quelle relative ai drenaggi chirurgici sono assolutamente più rare.

Abbiamo riportato un caso singolare, relativo ad una donna di 79 anni ricoverata nel maggio 2009 per dolore addominale e costipazione. Era stata già operata di resezione anteriore per sigmoidite diverticolare associata a laparocoele intasata nel 2006. La sintomatologia era iniziata alcuni mesi dopo l'intervento ed progressivamente aumentata. Alla TAC addominale era presente un corpo estraneo in addome ed alla laparotomia il drenaggio è stato rinvenuto all'interno di un'ansa intestinale e rimosso attraverso un piccola enterotomia.

L'osservazione di questo caso e la revisione della letteratura ci ha portato ad analizzare sia l'origine che i problemi clinici (sintomatologia, diagnosi e trattamento) di questa rara complicanza. La migrazione intraluminal di un drenaggio chirurgico è molto rara. La diagnosi è facile con la radiografia diretta dell'addome o la TAC, ma è raggiunta casualmente, perché il sospetto clinico è quasi sempre orientato verso altre condizioni che più frequentemente possono causare sintomi addominali. Quando un corpo estraneo si trova in posizione intraluminal e la sua rimozione endoscopica non è possibile, l'intervento chirurgico è obbligatorio e risolutivo.

References

1. Nomura T, Shirai Y, Okamoto H, et al.: *Perforation caused by silicone drains: A report of two cases*. Jpn J Surg, 1998; 28:940-42.
2. Godoy G, Katz DJ, Adamy A: *Routine drain placement after partial nephrectomy is not always necessary*. The Journal of Urology, 2011; 186, 411-16.
3. Risher WH, McKinnon WM: *Foreign body in the gastrointestinal tract: Intraluminal migration of laparotomy sponge*. South Med J, 1991; 84(8):1042-45.
4. Dhillon JS, Park A: *Transmural migration of a retained laparotomy sponge*. Am Surg, 2002; 68(7):603-05.
5. Steinhagen E, Khaitov S, Steinhagen RM: *Intraluminal migration of mesh following incisional hernia repair*. Hernia, 2010; 14:659-62.
6. Agrawal A, Avill R: *Mesh migration following repair of inguinal hernia: A case report and review of literature*. Hernia, 2006; 10:79-82.
7. Celik A, Kutun S, Kockar C, et al.: *Colonoscopic removal of inguinal hernia mesh: Report of a case and literature review*. J Laparoendosc Adv Surg Tech, 2005, 15:408-10.
8. Benedetti M, Albertario S, Niebel T, et al.: *Intestinal perfora-*

- tion as a long-term complication of plug and mesh inguinal hernioplasty: Case report. *Hernia*, 2005; 9:93-95.
9. Lange B, Langer C, Markus PM, et al.: *Mesh penetration of the sigmoid colon following a transabdominal preperitoneal hernia repair*. *Surg Endosc*, 2003; 17:157.
10. Goswami R, Babor M, Ojo A: *Mesh erosion into caecum following laparoscopic repair of inguinal hernia (TAPP): A case report and literature review*. *J Laparoendosc Adv Surg Tech*, 2007; 17:669-72.
11. Borchert D, Kumar B, Dennis R, et al.: *Mesh migration following obturator hernia repair presenting as a bezoar inducing small intestinal obstruction*. *Hernia*, 2008; 12:83-88.
12. Ogino T, Sekimoto M, Nishimura J: *Intraluminal migration of a spacer with small bowel obstruction: a case report of rare complication*. *W J Surg Oncol*, 2012; 10:30.
13. Polychronidis A, Karayiannakis AJ, Perente S, et al.: *Migration of a Pezzet tube after a feeding Jejunostomy: Report of a case*. *Surg Today*, 2003; 33:620-22.
14. Suter M, Giusti V, Héraief E, et al.: *Band erosion after laparoscopic gastric banding: Occurrence and results after conversion to Roux-Y gastric bypass*. *Obes Surg*, 2004; 14:384-86.
15. Mittermair R, Weiss H, Nehoda H, et al.: *Uncommon intra-gastric migration of the Swedish adjustable Gastric Band*. *Obes Surg*, 2002; 12:372-75.
16. Bueterm, Thalheimer A, Meyer D, et al.: *Band erosion and passage, causing small bowel obstruction*. *Obesity Surgery*, 2006; 16:1679-682.
17. Wilmot AS, Levine MS, Rubesin SE, et al.: *Intraluminal migration of surgical drains after transhiatal esophagogastricomy: Radiographic findings and clinical relevance*. *AJR Am J Roentgenol*, 2007; 189:780-85.
18. Peng-Sheng LAI, Chiao LO, Long-Wei LIN, et al.: *Drain tube migration into the anastomotic site of an esophagojejunostomy for Gastric Small Cell Carcinoma: Short Report*. *BMC Gastroenterology*, 2010; 10:50.
19. Chih-szu Liao, Min-Chieh Shie: *Laparoscopic retrieval of retained intraperitoneal drains in the immediate postoperative period*. *J Chinese Med Ass*, 2011; 74:138-39.
20. Zeide MS, Robbins H: *Retained wound suction-drain fragment. Report of 7 cases*. *Bull Hosp Jt Dis*, 1975; 36:163-69.
21. Hak DJ: *Retained broken wound drains: A preventable complication*. *J Orthop Trauma*, 2000; 14(3):212-13.
22. Campbell W, Wallace W, Gibson E et al.: *Intra-abdominal drain fracture following pancreatic necrosectomy*. *Ir J Med Sci*, 2011; 180:583-84.
23. Tandon A, Bhargava SK, Gupta A, et al.: *Spontaneous transmural migration of retained surgical textile into both small and large bowel: A rare cause of intestinal obstruction*. *British J Rad*, 2009; 82:e72-e75.
24. Sarda AK, Pandey D, Neogi S, et al.: *Postoperative complications due to retained surgical sponge*. *Singapore Med J*, 2007; 48:e160-94.
25. Kopka L, Fischer U, Gross AJ, et al.: *CT of retained surgical sponges (textilomas): Pitfalls in detection and evaluation*. *J CAT*, 1996; 20:919-23.
26. Hee RV: *Complication of drainage*. *Acta Chir Belg*, 1983; 83: 340-44.
27. Benjamin PJ: *Faeculent peritonitis: A complication of vacuum drainage*. *Br J Surg*, 1980; 67:453-54.
28. Gray AJ, Copeland GP: *Small bowel perforation following vacuum drainage*. *J R Coll Surg, Edinb*, 1985; 30:324-25.
29. Biedrzycki OJ, Lauffer GL, Baithun SI: *Fatal biliary peritonitis due to post-insertion migration of a Robinson drain tip, with erosion into the liver parenchyma*. *Am J Forensic Med Pathol*, 2007; 28(3):230-31.
30. Childers JM, Caplinger P: *Laparoscopic retrieval of a retained surgical sponge: A case report*. *Surg Laparosc Endosc*, 1993; 3:135-38.
31. McKenna PJ, Mylotte MJ: *Laparoscopic removal of translocated contraceptive devices*. *Br J Obstet Gynaecol*, 1982; 89:163-65.
32. Chin E H, Hazzan D, Herron DM, et al.: *Laparoscopic retrieval of intraabdominal foreign bodies*. *Surg Endosc*, 2007; 21:1457.
33. Nirasawa Y, Mori T, Ito Y, et al.: *Laparoscopic removal of a large gastric trichobezoar*. *J Pediatr Surg*, 1998; 33:663-65.

