State of the art paper

Migration of abdominal drains into the gastrointestinal tract: unexpected complications

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Abstract

Introduction: To give an overview of the literature on intraluminal migration of the drain placed in the intraperitoneal area.

Material and methods: We present a new case of intraluminal migration of the drain placed in the intraperitoneal area and a literature review of studies published in English language on intraluminal migration of the drain placed in the intraperitoneal area, accessed via PubMed and Google Scholar databases.

Results: A 55-year-old male patient presented to our clinic with abdominal pain and jaundice who underwent pancreaticoduodenectomy having been diagnosed with carcinoma of the distal choledoch. During the patient’s follow-ups it was seen that the drain placed into the abdomen had migrated into the intraluminal area. The patient was treated successfully by the controlled removal of the drain. In addition, a total of 9 reports concerning 14 cases of intraluminal migration of the drain placed in the intraperitoneal area meeting the aforementioned criteria were included in the literature review. Eleven of these patients were male (70%), while 3 were female (30%) and their mean age was 62.5 (49–79). While 12 of these patients were treated by drain removal, 2 had surgical treatment.

Conclusions: We believe that controlled removal of the drain can safely be applied in patients whom the fistula tract has been established following upper GI system surgeries that are complicated by intraluminal drain migration.

Key words: drain, complication, intraluminal migration.

Introduction

Intraperitoneal drainage is one of the oldest methods performed in order to prevent the possible accumulation of material such as blood and fluids in the intraabdominal cavity and/or to be able to follow up anastomoses following intraabdominal surgical procedures [1]. The routine utilization of drains following intraabdominal surgical procedures still proves to be a controversial issue [2]. It is, however, seen as an indispensable part of surgery, especially pancreaticoduodenectomy, for many surgeons. Not only common surgical drain-related complications such as pain, infection, obstruction, and function loss are seen, but also rare complications such as visceral organ perforation, evisceration, and strangulation can also be observed [3–7].
Our aim in this study was to present the case of a patient who in the follow-ups was detected to have intraluminal migration of the drain placed in the intraperitoneal area following pancreaticoduodenectomy, in the light of data reported in the literature.

Material and methods

Following the hereby presented case, we found 9 articles in English on the migration of drains into hollow organs through use of the single and various combinations of the search terms “drain,” “complication,” “intraluminal migration,” and “penetration” in the databases PubMed and Google Scholar. Table I summarizes the data collected by these 9 articles (14 patients) [8–16].

Data on the age, sex, operational diagnosis, surgery performed, the diagnostic method used in the detection of the migration of the drain into the intraluminal area and the treatment method, and the type of the drain used were recorded for the cases found following the literature review.

Results

A 55-year-old male patient presented to our clinic with abdominal pain and jaundice. His physical examination revealed that sclera and skin were icteric. Among the patient’s abnormal laboratory results a pre-prandial blood glucose level of 151 mg/dl (normal: 70–110), total/direct bilirubin level of 16/10.5 mg/dl, aspartate aminotransferase (AST): 72 U/l (8–50), alkaline phosphatase (ALP): 1000 U/l (95–280), γ-glutamyl transferase (GGT): 450 U/l (7–49), and amylase level of 1624 U/l were found. His CEA and CA 19-9 levels were 450 U/l (7–49), and amylase level of 1624 U/l respectively. Also drain amylase was normal on postoperative 5th and 7th days. Oral intake was started on the postoperative 3rd day and it was gradually increased. But on the postoperative 8th day the patient had to have another CT as his fever was 39°C, had tachypnea and tachycardia, and had high infection parameters as was shown in his laboratory results (white blood cell count: 20 100/mm³, C-reactive protein: 21.16 mg/l, and procalcitonin: 3 ng/ml). The patient was subjected to exploratory surgery upon the detection of intraabdominal extraluminal collection in areas close to the anastomotic lines of pancreaticojejunostomy and gastrojejunostomy, and because he was septic. It was observed that there was a leak in the anastomosis of the pancreaticojejunostomy and that the drains were not working. The drains were replaced following drainage of the intraabdominal collection. The patient’s oral intake was stopped and was followed by total parenteral nutrition. The patient had a daily bilious output of 300–500 cc/day in the first days following the second procedure and this amount dropped to 100 cc/day. The patient, who had a lower drain output and a good general condition, was started on a water regimen on the 15th day of the second procedure, and the amount of drain output suddenly went up. The patient drank methylene blue upon suspicion of a gastroenterostomy leak, and the methylene blue was immediately detected in the drains.

It was decided that the anastomosis of gastroenterostomy should be checked through gas troscopy as the leak was still present on the 20th day of the second procedure. The results of gastroscopy revealed that the soft drain, which was sent from the right side of the abdomen, migrated from the neighboring area of the anastomotic line of the gastroenterostomy to the intraluminal area (Figure 1) and it was removed outside the lumen by pulling it approximately 5 cm backwards. A double-lumen nasojejunal tube was endoscopically placed to the distal jejunal loop for nutrition as well. Subsequently the abdominal drain was pulled back daily in a controlled manner. Following the initiation of the drain removal, the fistula flow rate decreased and the fistula was closed up with the complete removal of the drain. No abnormalities were observed in the follow-ups of the patient, and an oral contrast CT was performed on the 5th day of the drain removal. No leaks were detected (Figures 2 A, B). The patient was started on oral intake and was discharged on postoperative day 53 without any problems.

Literature review

Our research conducted without any date limitation using PubMed and Google Scholar databases revealed 9 articles written in English and 14 cases. Eleven of these patients were male (70%), while 3 were female (30%), and their mean age was 62.5 (49–79). Ten patients underwent the
### Table I. General characteristics of 14 reported cases with intraluminal migration of the drain placed in the intraperitoneal area

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Total</th>
<th>Gender</th>
<th>Age</th>
<th>Diagnosis</th>
<th>Surgery</th>
<th>Diagnostic method</th>
<th>Treatment</th>
<th>Drain type</th>
<th>Drain insertion time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eleftheriadis</td>
<td>1990</td>
<td>2</td>
<td>M</td>
<td>60</td>
<td>Gastric adenocarcinoma</td>
<td>Total gastrectomy, Roux-en-Y anastomosis</td>
<td>Endoscopy</td>
<td>Subsequent removal</td>
<td>28 Fr Argyle drainage tube</td>
<td>Primary surgery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semi-soft 32 Fr Latex tube drain</td>
<td>Primary surgery</td>
</tr>
<tr>
<td>Ravishankar</td>
<td>2001</td>
<td>2</td>
<td>M</td>
<td>49</td>
<td>Crohn’s disease</td>
<td>Gastrojejunostomy</td>
<td>Contrast study performed via the drain</td>
<td>Subsequent removal</td>
<td>ND</td>
<td>Second look surgery</td>
</tr>
<tr>
<td>Wilmot [10]</td>
<td>2007</td>
<td>4</td>
<td>F</td>
<td>62</td>
<td>Esophageal adenocarcinoma</td>
<td>Esophagogastrctomy and gastric pullthrough</td>
<td>Upper GI study (with water-soluble contrast and barium)</td>
<td>Removal</td>
<td>ND</td>
<td>Primary surgery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>65</td>
<td>Esophageal adenocarcinoma</td>
<td>Esophagogastrctomy and gastric pullthrough</td>
<td>Upper GI study (with water-soluble contrast and barium)</td>
<td>Removal</td>
<td>ND</td>
<td>Primary surgery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>65</td>
<td>Esophageal adenocarcinoma</td>
<td>Esophagogastrctomy and gastric pullthrough</td>
<td>Upper GI study (with water-soluble contrast and barium)</td>
<td>Subsequent removal</td>
<td>ND</td>
<td>Primary surgery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>55</td>
<td>Esophageal adenocarcinoma</td>
<td>Esophagogastrctomy and gastric pullthrough</td>
<td>Upper GI study (with water-soluble contrast and barium)</td>
<td>Replacing 2 new drains after 2-week follow-up</td>
<td>ND</td>
<td>Primary surgery</td>
</tr>
<tr>
<td>Karabulut [12]</td>
<td>2011</td>
<td>1</td>
<td>M</td>
<td>64</td>
<td>Rectum adenocarcinoma</td>
<td>Low anterior resection, end-to-end colorectal anastomosis, and diverting loop ileostomy</td>
<td>Observation (the drain came out from diverting ileostomy)</td>
<td>Subsequent removal</td>
<td>28 Fr silicone drain</td>
<td>Primary surgery</td>
</tr>
<tr>
<td>Bae [13]</td>
<td>2011</td>
<td>1</td>
<td>M</td>
<td>70</td>
<td>Distal cholecdochal tumors</td>
<td>Whipple</td>
<td>Endoscopy</td>
<td>Subsequent removal</td>
<td>ND</td>
<td>Primary surgery</td>
</tr>
<tr>
<td>Carlomagno [14]</td>
<td>2012</td>
<td>1</td>
<td>F</td>
<td>79</td>
<td>Sigmoid diverticulitis</td>
<td>Anterior resection</td>
<td>CT</td>
<td>Laparotomy</td>
<td>ND</td>
<td>Primary surgery</td>
</tr>
<tr>
<td>Subhash [15]</td>
<td>2013</td>
<td>1</td>
<td>F</td>
<td>55</td>
<td>Malignant MCN of the distal pancreas</td>
<td>Distal pancreatectomy, splenectomy and segmental resection of the involved transverse colon</td>
<td>CT</td>
<td>Laparotomy</td>
<td>20 Fr Foley catheter</td>
<td>Interventional radiology</td>
</tr>
<tr>
<td>Shao [16]</td>
<td>2016</td>
<td>1</td>
<td>M</td>
<td>54</td>
<td>Splenic rupture</td>
<td>Splenectomy</td>
<td>Endoscopy</td>
<td>Subsequent removal</td>
<td>Rubber drainage tube</td>
<td>Primary surgery</td>
</tr>
</tbody>
</table>
surgical procedure because of malignity (esophagus, pancreas, common bile duct, stomach, and rectum), while 4 had surgery because of Crohn’s disease, sigmoid diverticulitis, splenic rupture, and hepatic hydatid cyst. Only 3 of these patients had lower gastrointestinal (GI) system surgery.

Two of the drains, which migrated to the intraluminal area, were placed during the re-laparotomy procedures performed after complications of the first operation, and 1 was percutaneously placed by interventional radiology to replace the drain which was removed by the patient after the first operation.

When the diagnostic methods were studied, it was observed that 4 cases were diagnosed by upper GI study (with water soluble contrast and barium), 4 by endoscopy, 3 by CT, 2 by contrast study performed via the drain, and 1 by observation (the drain came out from the diverting ileostomy). While 12 of these patients were treated by drain removal, 2 had surgical treatment. Out of 12 patients who did not receive surgical treatment, 7 patients had their drains removed gradually, 4 had direct removal, and 1 was treated by direct drain removal and the subsequent replacement of the drain with 2 new drains. Those two patients who had surgery were the ones with drain migration to the lower GI system. Table 1 summarizes the demographic and clinical characteristics of the patients.

Discussion

Although abdominal drain use is a method that has been implemented for many years, its use after every surgical procedure has become an issue of controversy. In a meta-analysis published in 2004 on the use of prophylactic drain use in surgical procedures of the GI system, the authors argued that many GI procedures could be performed safely without prophylactic drains and there was a need for novel rules on prophylactic drain use for many centers. The authors also underlined the fact that randomized controlled studies on the use of prophylactic drains in especially upper gastrointestinal system procedures were needed [2].

Many surgeons prefer to use drains in pancreatic procedures because of the high risk of anastomotic leaks, especially after pancreaticoduodenectomy, in order to facilitate early diagnosis of leaks and to expedite their recovery, to decrease the frequency of postoperative collection and abscesses, and because of the fact that these leaks are potentially life-threatening [2, 6, 7].

Heslin et al. [6], however, conducted a retrospective study in which they compared the results of 38 patients who did not have drains placed during surgery and 51 patients with drains placed. The authors concluded that there were no statistically significant differences between the two groups with
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Conflict of interest

The authors declare no conflict of interest.

References

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