Malignant Coloduodenal Fistulas-Review of Literature and Case Report

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Abstract Colo-duodenal fistula is an uncommon complication of malignant and inflammatory bowel disease. Presentation varies from upper abdominal pain, feculent vomiting and diarrhea associated with foul eructation's. Occasionally patients presents with gastro-intestinal bleed. The contact of duodenal bile salts with colonic mucosa frequently leads to diarrhea, so also duodenal colonization with colonic pathogens frequently leads to malabsorption and severe foul eructations. The diagnosis is established either by gastrointestinal contrast studies or contrast enhanced C. T. Scan. Gastroduodenoscopy can demonstrate the fistulous communication or direct invasion and it can also be helpful in obtaining a histological diagnosis. Surgical treatment includes Right Radical hemicolectomy combined with Pancreatico duodenectomy in operable patients and Intestinal bypass for inoperable ones.

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Right Radical hemicolectomy combined with wedge excision of Duodenum is a suitable alternative in select cases. We report an unusual case of locally advanced carcinoma hepatic flexure of colon with direct invasion of duodenum. Extended right radical hemicolectomy with wedge excision of second part of duodenum was done as an alternative to combined radical hemicolectomy with Pancreatico duodenectomy.

Keywords Colon Carcinoma · Duodenal invasion ·
Colo–Whipples · Colo duodenal fistula

Background

Colo- duodenal fistula is a rare complication of malignant and inflammatory bowel disease [1]. The principal causes of entero – enteric fistula in order of frequency are Crohn's disease, diverticular disease, colo-rectal malignancy, radiation enteritis, tuberculosis and actinomycosis [2]. The most unusual cause of Colo duodenal fistula reported in literature is due to biliary stent migration in an inoperable carcinoma pancreas [3]. Malignant entero – enteric fistulas are usually from ileum or jejunum to colon and primary is frequently located in the sigmoid colon [2]. In entero-enteric fistulas significant metabolic and nutritional deficiencies are seen if large lengths of bowel are bypassed [2, 4, 5]. Cases with malignant colo-duodenal fistulae can present with symptoms of the primary, fistula or from metastatic disease. The fistula often results in diarrhea and vomiting with dramatic weight loss. Upper abdominal pain is usually present as is general malaise due to the presence of the disease and from the metabolic sequelae it causes. The diarrhea relates to colonic bacterial contamination of the upper intestines rather than to a pure mechanical effect. Vomiting may be feculent or truly fecal associated with foul eructation. We

Fig. 1 Contrast enhanced C.T. scan of abdomen showing a mass lesion in hepatic flexure of colon with loss of fat plane between colon and duodenum

present an unusual case of malignant colo duodenal fistula secondary to a carcinoma of hepatic flexure – colon treated by Right Radical Hemicolectomy combined with wedge excision of duodenum.

Case History

A 42 year old gentleman presented with chief complaints of periumbilical pain, weakness and lassitude of 1 year duration. He had no bowel symptoms. Physical examination revealed severe pallor. Abdominal examination showed a lumpish feel in the right hypochondrium. His systemic examination was normal. Hemogram confirmed anemia [hemoglobin – 5.8 gm / dl & PCV 18.7% & CEA – 16.9 ng / ml]. Colonoscopy confirmed a fungating ulcerated mass in

Fig. 2 Contrast enhanced C.T. scan of abdomen showing a mass lesion in hepatic flexure of colon with suspected invasion of duodenal wall - fistula

Fig. 3 Intraoperative photograph showing carcinoma hepatic flexure of colon invading the duodenum

ascending colon extending to hepatic flexure of colon; endoscopic biopsy was confirmative of adenocarcinoma colon. A contrast enhanced C. T. Scan Abdomen showed asymmetric hypo dense mural thickening in the distal third of ascending colon with pericolic stranding, there was associated loss of interface with second part of duodenum suggestive of direct infiltration – fistula?. Gastroduodenoscopy confirmed the presence of an ulcerative lesion on the lateral wall of second part of duodenum - suggestive of direct infiltration; however endoscopic biopsy did not confirm malignancy. He was diagnosed as Adenocarcinoma of hepatic flexure (Colon) with direct invasion of duodenum and planned for right extended radical hemicolectomy with Pancreatico – duodenectomy. After prior optimization which included blood transfusion and correction of electrolyte derangements he underwent exploratory laparotomy via a midline abdominal incision – there was a large growth in the ascending colon extending to the hepatic flexure – superficially involving the gerotas fascia and directly invading the lateral concave aspect of second part of duodenum. The right colon was mobilized from the retroperitoneum; gerotas fascia was included in the

Fig. 4 Intraoperative photograph demonstrating coloduodenal fistula

Fig. 5 Intraoperative photograph showing right radical hemicolectomy with wedge excision of anterior, lateral and posterior wall of second part of duodenum

resected specimen. This was followed by division of the transverse mesocolon up to the anterior surface of pancreas. The vascular pedicles of ileocolic, right colic and middle colic artery sparing the left branch were ligated and divided. The colonic growth was left attached to the second part of duodenum which was excised widely with a 1 cm margin. The duodenum was mobilized with an extended Kocher manoeuvre and closed primarily along the transverse axis in two layers taking care not to compromise the lumen. The abdomen was closed over no 28 French tube drain kept in the hepato renal pouch. His intra and post operative period was uneventful. Gastrograffin studies done on 10th post operative day demonstrated good gastric emptying with no evidence of anastomotic leak. He was started on oral feeds from the 10th post operative day and was discharged by 15th post operative day. The final Histopathology reports are as follows: Mucin secreting adenocarcinoma of colon – Hepatic flexure. The tumor invades the serosa and the wall of duodenum. The proximal and distal margins and duodenal excision margins are free. Lymph node status: 0/17. The final TNM: T₄N₀M₀. In view of which he was advised adjuvant chemotherapy. He was advised and received received 6 cycles of Adjuvant 5 – FU & Leucovorin. He has been on regular follow up and at 1 year is disease free.

Fig. 6 Completed end to end repair of duodenum

Discussion

Haldane in 1862 reported the first Colo duodenal fistula in the Edinburgh Medical Journal [6]. His patient had a malignant fistula arising from the hepatic flexure. One report estimated the incidence of duodenocolic fistula in the United States to be 1 in 900 colorectal carcinomas [7]. Reports of malignant fistulae are sporadic in the literature. They are usually secondary to a colonic primary rather than an upper gastro-intestinal malignancy and due to their rarity are usually reported as a single case. Colo-duodenal fistulas are associated with advanced carcinomas of the hepatic flexure. Hershenson documented only one case among 8,100 autopsies [8]. In present days, these fistulae rarely occur because of an earlier discovery and resection of the tumor, therefore only isolated reports appeared [1]. These malignant causes, other than colonic carcinoma, include carcinoma of the gall bladder [9, 10] carcinoma of the duodenum [11] and even from metastatic disease of the esophagus [12].

Benign causes reported include benign duodenal ulceration [13], Crohn's disease [14–18], gallstones [19–21], a pancreatic pseudocyst rupture [22–24] and stent migration [3]. Rarer causes have been noted due to tuberculous disease, typhoid ulceration, non specific inflammatory lesions and secondary to complicated appendicitis. A ruptured duodenal diverticulum was the first report of a benign cause for colo-duodenal fistula in 1863 [25].

Radiology is useful to delineate the fistula as the difference in surgical management between a gastro-colic and a duodeno-colic fistula is profound. In the reports, barium enema seemed more likely to delineate the fistula than barium meals. More recently, CT scanning is of great value in assessing metastatic spread as well as assessing the local invasion of the primary.

Treatment of malignant colo-duodenal fistulae depends on the extent of the primary tumor, the presence of metastatic disease and the general condition of the patient. Pre operative optimization is mandatory and includes correction of fluid, electrolyte disturbances along with blood transfusion. Some patients present with gross weight loss from malnutrition (not just dehydration). Malnutrition is due to the malabsorptive state that the bacterial overgrowth causes in the small bowel [26]. These patients may benefit from pre-operative total parenteral nutrition (TPN) [27]. The complexity of the pancreatico - duodenal area makes the operative management challenging. There are various curative operations reported, all of which include a right hemicolectomy. Izumi reviewed a series of 34 cases of malignant colo-duodenal fistulae in Japan, and their survival with en bloc pancreatico duodenectomy ranged from 7 days to 4 years (median=10 months) [28]. Chang treated 20 of his patients with right hemicolectomy

with partial duodenectomy and primary closure of the duodenal wall defect [29]. Ellis used a jejunal loop to close the duodenal wall defect. (30) Definitive surgery involves resection of the tumor and the fistula en-block. Colectomy with partial duodenectomy and primary duodenal closure of the duodenal defect has been reported with minimal duodenal involvement [30, 31]. Highest survival rates have been reported when Colectomy is combined with pancreatico-duodenectomy (Whipple's Procedure) due to resection of the tumor and the fistula as well as adequate regional lymph node dissection [28]. However Colectomy combined with segmental duodenal resection and primary end to end anastomosis is a useful alternative in select cases, not compromising the oncologic clearance. Palliative surgery is indicated in extensive retroperitoneal involvement of the primary tumor and includes Ileotransverse anastomoses along with gastrojejunostomy which relieves the symptoms of malignant duodeno-colic fistula [32]. Some authors advise utilizing the exclusion bypass principle in specially selected patients [26]. This principle entailed isolating the affected portions of the colon from the remaining large intestine and anastomosing it to itself thus minimizing the bacterial contamination of the upper tract with avoidance of potential closed-loop obstruction. The survival of patients with malignant colo-duodenal fistula is usually less than 12 months when treated with such palliative operations as Ileotransverse colostomy with gastrojejunostomy [5, 33].

Conclusion

Malignant Colo duodenal fistula is a very rare entity seen with locally advanced Carcinoma of hepatic flexure of colon with direct invasion of the concave part of duodenum. The standard surgical treatment includes right radical hemicolectomy with en bloc pancreatico duodenectomy, however in a few select cases right radical hemicolectomy with enbloc wedge excision of duodenum is a feasible option. Localized wedge excision of duodenum along with right radical hemicolectomy decreases the risk of post operative morbidity and enhances recovery in a potentially moribund patient necessitating early adjuvant treatment (Figs. 1, 2, 3, 4, 5 and 6).

Conflict of interest The author(s) declare that they have no competing interests.

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