CASE REPORT

Radiation Induced Duodenal Stump Blowout!

Jyosthna Elagandula¹ · K. Harish²

Received: 20 June 2015 / Accepted: 5 January 2016 / Published online: 9 January 2016
© Indian Association of Surgical Oncology 2016

Introduction

Duodenal blowout is rare but serious complication seen in 3 to 5 % of Billroth II gastric resections with mortality ranging from 12 to 80 % [1–5]. Over the past few decades the incidence of duodenal blowout has decreased as surgical intervention for peptic ulcer disease has almost vanished due to the effective medical management with proton pump inhibitors [4]. However, Billroth II resections are still performed for gastric malignancy. Duodenal blowout generally occurs between second and fifth post-operative day [2, 5]. In this case report we present a rare complication of duodenal blowout after adjuvant radiation therapy to carcinoma stomach hitherto unreported.

Case Presentation

A 70 yr. aged male was diagnosed as carcinoma stomach in the pyloric antrum and underwent Billroth II gastrectomy with D2 lymphadenectomy. Post-operative period was uneventful. Histopathology was reported as moderately differentiated adenocarcinoma with involvement of subserosa(pT3) and associated lymphovascular invasion. Seven of twentyfive lymph

nodes showed extensive metastatic deposits with extracapsular extension.

In view of lymphovascular space invasion and lymph node involvement with extracapsular extension, patient was planned for adjuvant chemoradiation [6]. After detailed explanation, patient was not willing for concurrent therapy hence the same was planned sequentially. Post surgery, on 37th day external radiation was planned to a dose of 50.4Gy in 28 fractions by IMRT technique. He developed intractable vomiting during third week of Radiation and was managed conservatively resulting in suspension of radiation for a week. One additional fraction of radiation was administered for gap correction and hence patient received a total of 29 fractions instead of 28 fractions.

Patient presented to us seven days after completion of radiation with abdominal pain, vomiting and constipation of 3 days duration and associated with abdominal distension. On examination bowel sounds were present and there were no signs of guarding or rigidity. Clinically Intestinal obstruction was suspected. Erect abdominal X-ray showed features of hollow viscus perforation(Fig 1). Exploratory Laparotomy revealed duodenal blow out (Fig 2). The perforation was sutured and drains were placed. Ryle's tube was placed in afferent loop for continuous decompression. Patient succumbed to progressive irreversible sepsis 36 h after the procedure.

Discussion

Signs and symptoms of duodenal blowout usually develop between second to fifth post-operative days after Billroth II surgery. It includes sudden severe upper abdominal pain, guarding, rigidity, fever, tachycardia, hypotension and shock like state. If there is no draining tube, biliary peritonitis develops while in the presence of draining tube bile leaks to

✉ K. Harish
drkhari@yahoo.com

Jyosthna Elagandula
jyosthna.elagandula@gmail.com

¹ Department of Radiotherapy, HCG MSR Cancer Centre, M S Ramaiah Medical College, Bangalore 560054, India

² Department of Surgical Oncology, HCG MSR Cancer Centre, M S Ramaiah Medical College, Bangalore 560054, India

Fig. 1 Erect abdomen X-ray showing air under diaphragm

exterior [2, 5, 7]. Jaundice may develop due to absorption of bile from peritoneal cavity or in advanced sepsis. On the other hand, symptoms may be subtle, with only moderate degree of pain, fever and leukocytosis. Severe electrolyte imbalances may also occur. The precipitating factors for duodenal stump blowout in the post-operative period are acute obstruction of the afferent jejunal limb at or near gastroenterostomy stoma, postoperative pancreatitis, blood clots in periduodenal area causing infection and necrosis, excessive suture closure of the stump leading to tissue necrosis, improper surgical technique, co-morbidities diabetes mellitus, pneumonia, asthma, malnutrition, hypoproteinemia [1–3, 5, 7–9]. Classical symptoms and signs of perforation were not present in this case. This could be due to post-operative adhesions (4 months 10 days) and post radiation state. Patient presented with abdominal distension which led to clinical suspicion of intestinal obstruction and later turned out to be hollow viscous perforation. In the present case none of these precipitating factors were applicable as the patient was more than 4 months post-surgical and on normal oral diet during this period. However, the initial features of obstruction and later duodenal blow out could be explained by post-operative adhesions leading to

Fig. 2 Exploratory laparotomy showing duodenal blowout with surrounding slough

sub-acute intestinal obstruction leading to duodenal blow out in view of weakened duodenal stump in the post radiation setting. This is very similar to the only late duodenal blow out described which was 45 days post-operative but without radiation [9].

The duodenal stump at primary surgery was closed using linear staples, the same was visualized during radiation planning. Care was taken to ensure that the duodenal stump dose did not exceed 45Gy. Even so, radiation could be the precipitating factor since the blowout occurred one week post radiation. However, there is no reported literature on radiation induced duodenal blowout.

Biopsy of the edge duodenal blow out was not done. The distal resected margin (near duodenal stump) was tumor free on microscopy. Tumor recurrence of upto 10.7 % are reported in autopsy studies in early 50's [10]. However, this data is not clinically relevant as surgical techniques have changed and clinical recurrence is different from that of an autopsy study. Rare cases of isolated duodenal stump recurrences have been reported, none of them leading to perforation or blow out [11–13].

Treatment of blowout consists of establishment of prompt and adequate sump drainage of the right upper abdominal quadrant, along with internal drainage of the afferent jejunal loop via either a tube gastrostomy, jejunostomy or nasogastric intubation. Perforation closure by suturing with non-absorbable material reinforced with omentum. Vigorous supportive care is stressed during postoperative period, consisting of wide spectrum antibiotics, total parenteral nutrition, electrolyte correction etc. In the present case exploratory laparotomy was done, 4–5 L of turbid peritoneal fluid was drained. Perforation in duodenal stump was identified which was closed by interrupted sutures. Omental patch could not be placed as total omentectomy was performed at the time of gastrectomy. Dense adhesions between bowel loops, flakes over the small bowel, friable intestinal wall in a post radiation setting precluded any intestinal patch over the perforation. However, afferent loop decompression was established with ryle's tube placement. The patient succumbed to sepsis as the typical presentation was masked by post radiation status resulting in late diagnosis and late intervention.

Duodenal stump blow out is rare complication with high mortality. Whenever adjuvant radiation is planned care should be taken to ensure that the duodenal stump receives low dose of radiation. High degree of suspicion is required to identify such complications early.

References

1. Raman RS, Kate V, Ananthakrishnan N (2013) A technique to prevent duodenal blowout after difficult gastrectomies. *Indian J Gastroenterol* 32(1):60–61. doi:10.1007/s12664-012-0271-4

2. Herrington J, Sawyers J (1985) Complications Following Gastric Operations. MAINGOT'S ABDOMINAL OPERATIONS, 8 edn. Appleton-Century-Crofts,
3. Griffen Jr WO (1973) Whither goest the duodenal stump blowout? Arch Surg 107(1):11
4. Tsuei BJ, Schwartz RW (2004) Management of the difficult duodenum. Curr Surg 61(2):166–171. doi:[10.1016/j.cursur.2003.06.002](https://doi.org/10.1016/j.cursur.2003.06.002)
5. Guidelines for Complications of Cancer Treatment Part A. Evidence Based Management of Cancers in India (2009). Vol. VIII
6. Macdonald JS, Smalley SR, Benedetti J, Hundahl SA, Estes NC, Stemmermann GN, Haller DG, Ajani JA, Gunderson LL, Jessup JM, Martenson JA (2001) Chemoradiotherapy after surgery compared with surgery alone for adenocarcinoma of the stomach or gastroesophageal junction. N Engl J Med 345(10):725–730. doi:[10.1056/NEJMoa010187](https://doi.org/10.1056/NEJMoa010187)
7. Zivic EJ (1969) Duodenal stump blow-out in the billroth II gastric resection. J Natl Med Assoc 61(1):17–19
8. Cvetkovic AM, Milasinovic DZ, Peulic AS, Mijailovic NV, Filipovic ND, Zdravkovic ND (2014) Numerical and experimental analysis of factors leading to suture dehiscence after billroth II gastric resection. Comput Methods Prog Biomed 117(2):71–79. doi:[10.1016/j.cmpb.2014.08.005](https://doi.org/10.1016/j.cmpb.2014.08.005)
9. Vasiliadis K, Fortounis K, Kokarhidas A, Papavasiliou C, Nimer AA, Stratilati S, Makridis C (2014) Delayed duodenal stump blow-out following total gastrectomy for cancer: heightened awareness for the continued presence of the surgical past in the present is the key to a successful duodenal stump disruption management. A case report. Int J Surg Case Rep 5(12):1229–1233. doi:[10.1016/j.ijscr.2014.11.026](https://doi.org/10.1016/j.ijscr.2014.11.026)
10. Berne CJ, Freedman MA (1951) Local recurrence following subtotal gastrectomy for carcinoma. Am J Surg 82(1):5–7
11. Lim DH, Kim DY, Kang MK, Kim YI, Kang WK, Park CK, Kim S, Noh JH, Joh JW, Choi SH, Sohn TS, Heo JS, Park CH, Park JO, Lee JE, Park YJ, Nam HR, Park W, Ahn YC, Huh SJ (2004) Patterns of failure in gastric carcinoma after D2 gastrectomy and chemoradiotherapy: a radiation oncologist's view. Br J Cancer 91(1):11–17. doi:[10.1038/sj.bjc.66018966601896](https://doi.org/10.1038/sj.bjc.66018966601896)
12. Lee J, Lee K, Kim W (2009) Duodenal stump cancer after billroth-II distal gastrectomy for gastric cancer. Gastric Cancer 12(2):118–122. doi:[10.1007/s10120-009-0511-1](https://doi.org/10.1007/s10120-009-0511-1)
13. Lee J, Lee H, Jin S, Park, Lee S, Kim W, Lee Y (2010) Recurrent gastric cancer at the duodenal stump after Billroth II subtotal gastrectomy. Korean J Gastrointest Endosc 40:266–269