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Operative Control of Bleeding Ulcer at Posterior Wall of Duodenal Bulb: How I Do It.

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Abstract: The most important cause of major life threatening acute upper gastrointestinal bleeding is peptic ulcer. Bleeding from a large posterior duodenal ulcer which erodes the gastroduodenal artery can be particularly severe. In bleeding peptic ulcers, definitive hemostasis can be achieved by endoscopic treatment in more than 90% of cases. Immediate emergency surgery may be necessary for bleeding refractory or inaccessible to endoscopic control. The authors reviewed surgical anatomy of gastroduodenal artery complex and demonstrated operative technique to control bleeding from an ulcer at posterior wall of duodenal bulb.

Acute upper gastrointestinal bleeding is a common medical emergency which carries hospital mortality in excess of 10%. The most important cause of major life threatening acute upper gastrointestinal bleeding is peptic ulcer¹. Significant hemorrhage is due to erosion of an underlying artery and the magnitude of bleeding is related to the size of the arterial defect and the diameter of the artery. Bleeding from a large posterior duodenal ulcer which erodes the gastroduodenal artery can be particularly severe. In bleeding peptic ulcers, definitive hemostasis can be achieved by endoscopic treatment in more than 90% of cases. However, in 1-2% of cases, immediate emergency surgery is necessary for bleeding refractory or inaccessible to endoscopic control. Surgical control of bleeding can be achieved by vagotomy and pyloroplasty with direct suture and extraluminal ligation of the gastroduodenal artery or by gastric resection².

In the emergency operation for bleeding ulcer at

posterior wall of duodenal bulb, particularly in the elderly, gastric resection has higher morbidity and mortality than vagotomy and pyloroplasty with suture ligation of bleeding ulcers^{3,4}. The major challenge facing the surgeon is the proper method of placing sutures in such an ulcer which has eroded the gastroduodenal artery complex. Gastroduodenal artery, a branch of common hepatic artery, runs downward retroduodenally and bifurcates into two branches, the right gastroepiploic and superior pancreaticoduodenal arteries. This bifurcation may occur at any level between the superior and inferior borders of the duodenum. Another anatomical characteristic of the gastroduodenal artery complex is the right angle anastomosis of the transverse pancreatic artery with the gastroduodenal artery or its branches⁵. The transverse pancreatic artery joins with the dorsal pancreatic artery in about 60% and frequently anastomoses with the great pancreatic artery⁶.

Bleeding at this T-junction creates a three-vessel situation and there are four possible ways that arterial bleeding may exist in the bed of duodenal ulcer. Rebleeding is reported as a complication following suture ligation of the bleeding ulcer at posterior wall of duodenum^{7,8}. This complication is often due to improper application of suture ligatures. To avoid early rebleeding, operative control of these three opened arteries requires separate circumferential ligation of each.

When the emergency surgery is required for a bleeding duodenal ulcer, resuscitation must be continued in the operating room. The pyloroduodenal region is opened with a longitudinal incision of a Heineke-Mikulicz pyloroplasty and the duodenal ulcer is identified. In the absence of active bleeding, the arterial perforation can be detected by the overlying thrombus. After identification of the perforated gastroduodenal artery, the three circumferential ligatures of nonabsorbable suture material should be placed. The first two transfixation sutures should be placed at superior and inferior aspect of the ulcer, for

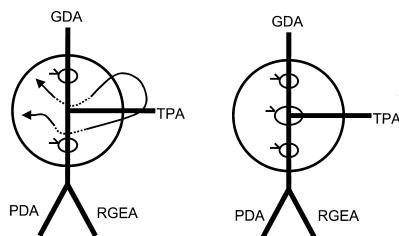


Fig. 1 Surgical anatomy of gastroduodenal artery complex at base of duodenal ulcer and the “U” stitch performed by two-end needle suturings.

(GDA = Gastroduodenal artery, PDA = Pancreaticoduodenal artery, RGEA = Right gastroepiploic artery, TPA = Transverse pancreatic artery)

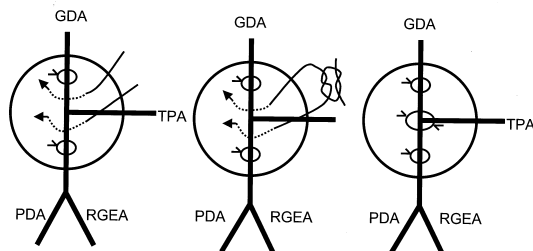


Fig. 2 Surgical anatomy of gastroduodenal artery complex at base of duodenal ulcer and the “U” stitch performed by two single-end needle suturings.

(GDA = Gastroduodenal artery, PDA = Pancreaticoduodenal artery, RGEA = Right gastroepiploic artery, TPA = Transverse pancreatic artery)

proximal and distal control of the bleeding artery. If there is an ongoing hemorrhage, the presence of a T or three-vessel complex is established. The consequent bleeding must be controlled by tying the third “U” stitch which was emphasized by Berne and Rosoff⁵. However to properly place a “U” stitch is not easy. We describe our technique to place a “U” stitch for controlling bleeding duodenal ulcer.

We use prolene 2-0 with two-end needle and grasp the needle holder in a forward position. The base of the ulcer is sutured from proximal crater to distal crater by each needle then ligatures are tied to control the transverse pancreatic artery (Figure 1). If prolene 2-0 with two-end needle is not available, we can perform this procedure by using two single-end needle nonabsorbable ligatures which are distally tied together (Figure 2). We also approximate the ulcer margins by interrupted sutures to temporarily shield the ulcer base from proteolytic enzymes. After control of the bleeding, the more distal part of the duodenum and the gastric lumen should be examined to rule out other bleeding sites. The pyloroplasty is completed in a standard fashion and truncal vagotomy is performed.

In conclusion, precise individual suture ligation of the gastroduodenal artery complex including the “U” stitch is important for the control of bleeding ulcer at posterior wall of duodenal bulb.

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