THE TREATMENT OF POSTERIOR PERFORATIONS OF THE FIXED PORTIONS OF THE DUODENUM.[1]

BY JOHN EDWARD SUMMERS, JR., M.D.,

OF OMAHA, NEBRASKA,

Surgeon to Clarkson, Douglas County, and Wise Memorial Hospitals.

RETROPERITONEAL perforations of the duodenum are of such infrequent occurrence that little attention has been directed towards their treatment. In fact, after as careful a study as my facilities afford, I have been unable to find anything written upon the subject which is at all satisfactory. During the past year Theodore Kocher has published in the *Zentralblatt für Chirurgie*, No. 2, a paper entitled "Mobilisierung des Duodenum und Gastroduodenostomie," in which he explains very fully from an anatomical and clinical standpoint how it is possible and even easy (in the absence of chronic inflammatory conditions involving the head of the pancreas, gall-ducts, stomach, and perhaps the neighboring under surface of the liver) to so free the descending as well as the lower flexure of the duodenum that, by rotating these mobilized parts towards the left, a gastroduodenostomy can be done with great ease,—the duodenum and stomach being lifted through the abdominal incision for the more proper carrying out of the technique.

Kocher was preceded in this operation, *i.e.*, "gastroduodenostomy," by Villard, Jaboulay, and Henle; but it does not appear from their writings that these surgeons fully comprehended the amount of mobility the duodenum was susceptible of *after* certain preparatory procedures. In passing, it may be noted that the intestinal end of the common bile duct has been exposed and attacked after the same preliminary freeing of the duodenum. Although it is not in my province

[1] Read before the Western Surgical and Gynæcological Association, December 28, 1903.

at this time to discuss the advantages pro and con of gastro-duodenostomy over other surgical methods, neither does the surgery of the gall-tracts fall within the scope of my paper.

I have called attention to both in order that I may emphasize a method which is anatomically and clinically applicable in the treatment of retroperitoneal perforations of the duodenum. The parts involved must be susceptible of exposure and rotation forward into the light of an abdominal incision.

Jeannel (Mikulicz, Kausch; *Handbuch der praktischen Chirurgie,* Band iii, 1903) has recently collected out of the literature thirty-five cases of injury to the duodenum. Among the subcutaneous perforating injuries he calls attention to the comparative frequency of complete tearing off of the duodenum; there were five cases,—three close behind the pylorus and two at the juncture of the duodenum and jejunum. This is explained by the fact that at these two points a freely movable part of the bowel joins a fixed portion. The incomplete ruptures are found at the lower half of the duodenum. Among twenty cases of incomplete rupture, the superior part was involved two times; at the level of the papilla of Vater, four times; below this, but still in the descending part, three times; in the inferior portion seven times. The site of the lesion was found fourteen times through the anterior peritoneal bedecked surface and only six times through the posterior wall. In all of these cases, except one, the direction of the rupture was at right angles with the long axis of the bowel. The length of the tears varied from the very smallest to those involving two-thirds of the circumference. In looking up the subject of gunshot wounds of the duodenum I ran across only one case, reported by Douglas in his recent book upon "Abdominal Surgery;" this wound involved the first part of the duodenum and was operated upon successfully.

According to Mikulicz (*Praktischen Chirurgie,* Band iii, 1903), no case of posterior perforation of the fixed portions of the duodenum has been operated upon. Cachovié (*Centralblatt für Chirurgie,* No. 25, 1903) refers to a paper written by himself, "Ueber Fistulen des Duodenum," *Archiv für klin.*

Chirurgie, Band lxix, Heft 3, in which he discussed the methods of treating these fistulæ by duodenorrhaphy, gastro-enterostomy, and jejunostomy, especially calling attention to the necessity of closing the pylorus when a gastro-enterostomy is done in order to prevent the stomach contents passing into the duodenum, and in this way preventing a closure of the fistula. Cachović reports a case operated on in July, 1902, in which, to control a circulus vitiosus, he closed the pylorus by a seromuscularis "tobacco-pouch" stitch, and likewise shut off, by the same stitch, that part of the jejunum between the gastro-enterostomy opening and that of an entero-anastomosis done four and one-half months previously. On post-mortem one and one-half months later it was found that the latter occlusion was complete, the former nearly so.

Should a contusion of the abdomen be followed by signs leading one to suspect a rupture of the duodenum, and in consequence an abdominal section be determined upon; or should a stab wound from behind or a gunshot wound from either in front or behind disclose upon section that the posterior fixed duodenum was opened, several things are to be considered in an attempt to repair the injury. First, the relations of the peritoneum in this locality; second, the size and direction of the blood-vessels. Huntington ("Anatomy of the Peritoneum and Abdomen") has shown very beautifully that in the development of the intestines and peritoneum how by rotation from left to right the duodenum becomes fixed, and only covered in front by peritoneum. The early peritoneal investment after rotation blending to the right with the parietal peritoneum, the mesoduodenal investment blending behind with the primitive parietal peritoneum.

By cutting perpendicularly through the peritoneum about three centimetres to the right of the descending portion of the duodenum and insinuating the finger behind towards the left, it is quite easy to reverse the original rotation. The descending portion of the duodenum and its lower flexure can be lifted out of the bed of loose cellular tissue formed by the fusion of the right mesoduodenum and the primitive

parietal peritoneum. This movement exposes the posterior surface of the duodenum and admits of its repair. Kocher (*Centralblatt für Chirurgie*, No. 2, 1903), "The relations of the blood-vessels determine the limit of the rotation and lifting forward of the bowel. The concave left-sided commencement of the duodenum is supplied with blood by the gastro-epiploica dextra, the chief branch of the gastroduodenalis. Important branches also go to the transverse colon over the inferior portion of the duodenum. These vessels lie under the upper layer of the gastrocolic ligament, and offer in themselves little hindrance to the lifting up of the inferior part of the duodenum from the spinal column.

"If the colon is raised, we see the colica dextra, the large branch of the superior mesenteric. The artery runs horizontally from left to right, and the branches pass down the duodenum to the lower and lateral circumference, and also to the right flexure of the colon. These vessels are not so easily lifted towards the left as those of the gastro-epiploica dextra, but nevertheless they do not prohibit the freeing of the inferior flexure of the duodenum to the extent but that the whole vertical portion or limb may be loosened and brought forward. The rotation is made with the hepatico-duodenal ligament above as a fixed point and a continuation downward of the left border of the duodenum over the head of the pancreas as an axis. The lower fixed point is determined by the location of the branches of the colica dextra which limit the rotation and lifting up of the inferior flexure and a portion of the lower duodenum."

My own work upon the cadaver convinces me that Kocher is right when he states that by this procedure no damage to blood-vessels is done, as the peritoneum is separated from in front of the right kidney, and between this and the beginning of the transverse colon and the loose cellular tissue in front of the vena cava and aorta.

One year ago I reported a case of hæmatoma which pressed from behind upon the descending duodenum and its lower angle. It caused complete obstruction of the bowel.

The tumor resulted from a contusion of the anterior abdominal wall, and could be palpated. Upon opening the abdomen, the peritoneum on the right side, *i.e.*, the primitive fused mesoduodenum and parietal peritoneum, appeared like a mesentery.

This was incised to evacuate a sufficient bulk of the clot to relieve the obstruction of the bowel. The exploring fingers could be passed freely behind the vertical portion of the duodenum.

Recently, a case of gunshot wound involving the anterior wall of the upper vertical portion of the duodenum and the posterior wall of the duodenum nearer the lower angle came under my care.

A young man, in attempting to escape from a policeman, was shot in the back by a 38-caliber Colt's revolver, the ball entering just below the twelfth rib and through the outer edge of the erector spinæ muscles, coming out in front one and one-half inches below the juncture of the ninth right costal cartilage and the right rectus muscle. One hour after the shooting the patient was etherized under customary hospital surroundings. The abdomen was opened by a vertical incision through the wound of exit. It was observed that the bullet had, in its course from behind forward, perforated the duodenum and gall-bladder. The wound in the anterior duodenal wall was sutured, likewise both holes in the gall-bladder.

Because of the bad condition of the patient, it was decided not to attempt to expose the posterior duodenal wall from in front, but rather to rely temporarily upon an incision from behind and the introduction of a gauze pack. In the carrying out of this latter procedure, I discovered, as expected, that the bullet had made a groove through the lower pole of the right kidney,—another reason for the posterior incision. A liberal gauze pack drain was introduced down to the repaired duodenal wound of exit and the wounds of the gall-bladder, and the abdomen closed so as to admit of drainage.

The patient died three days later, the post-mortem illustrating the cause of death to be a retroperitoneal phlegmonous

inflammation without peritonitis. Had the man's condition admitted, I would have sutured the wound in the posterior duodenal wall after freeing and rotating the duodenum to the left. In the light of to-day, one should in a like case, in addition to repairing the duodenal wound or wounds, occlude the pylorus by means of a purse-string stitch. Either at this same operation or as soon thereafter as reaction admitted, a gastro-enterostomy must be made. None of the procedures which I have indicated require much time or handling of the intra-abdominal contents; they are the only rational methods of treating a perforation of the posterior wall of the duodenum. It is almost impossible for a gunshot wound of either the stomach or duodenum, which perforates both walls, to be limited to those organs; therefore, under such circumstances, in addition to the repair of any intraperitoneal organs involved, proper incisions must be made to provide for the retroperitoneal drainage. Wiart and Mikulicz recommend a somewhat similar line of procedure, although they have had no experience in the practice.