BILIARY GASTRITIS
AFTER GASTRIC OPERATIONS

AN ESSAY

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In

General Surgery

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بسم الله الرحمن الرحيم

was the presence of duodenal contents in the stomach that was responsible for the symptoms after gastrojejunostomy and suggested also that the presence of "bile" in the stomach retarded gastric emptying.

Even earlier Lawson had produced animal experimental evidence that bile diverted into the stomach caused a gastritis that was reversible when the bile was later diverted away from the stomach.

The aim of this essay, is to present the various facets of "Biliary Gastritis After Gastric Operations". This includes presentation of the following: anatomy of the stomach and pylorus, physiology of gastric secretion and pyloric sphincter, incidence of the syndrome, pathogenesis and pathophysiology, pathology, clinical picture, diagnosis, and medical and surgical treatment of postoperative biliary gastritis.

ANATOMY

OF

THE STOMACH AND PYLORUS

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GROSS ANATOMY

The stomach is an expanded segment of the foregut responsible for the initial breakdown and predigestion of food (Moody and McGreevy, 1984). It is a muscular bag, fixed at both ends, mobile elsewhere, and subject to great variation in size in confirmity with the volume of its contents. It consists of fundus, body, pyloric antrum, and pylorus.

The fundus that part which projects upwards, in contact with the left dome of the diaphragm, above the level of the cardiac orifice. The body extends from the fundus to the level of the incisura angularis, a constant notch in the lower part of the lesser curvature. The pyloric antrum extends from this level, narrowing gradually towards the pylorus. The pylorus is palpably thicker than the rest of the stomach wall.

The mucous membrane of the stomach is smooth and red, in the pyloric antrum it is thrown into longitudinal folds which flatten out when the organ is greatly distended.

The stomach is completely invested in peritoneum except a bare area near the cardia on the posterior surface. The peritoneum passes in a double layer from its lesser curvature as the lesser omentum and from its fundus and greater curvature as the greater omentum (Last, 1978).

Relationships of the stomach

The upper part of the lesser curvature is overlapped in front by the sharp inferior border of the left lobe of the liver; elsewhere the anterior surface is in contact with the diaphragm and the anterior abdominal wall. The convexity of the greater curvature lies in contact with the transverse colon, the gastrocolic omentum lies in between. The posterior wall of the stomach lies with its serous coat in contact with the peritoneum of the posterior wall of the lesser sac.

If the stomach is removed, the stomach bed can be inspected. It extends on the left of the oesophageal opening to the highest part of the dome of the diaphragm. The lesser sac is limited by the attachment of the omentum to the diaphragm and to the front of the left kidney (the lienorenal ligament). The upper part of the greater curvature bulges to the left of this ligament and the stomach is here in contact with the spleen. Below this level the posterior surface of the stomach lies upon the downward sloping transverse mesocolon. Above the attachment of the transverse mesocolon the body of the pancreas lies behind the peritoneum, the tortuous splenic artery appearing above its upper border. In front of the left crus of the diaphragm lies the crescentic left suprarenal gland, closely applied to the medial border of the left kidney. To its right, in the midline, lies the aorta with the short trunk of the coeliac artery dividing into its three divisions at the upper border of the pancreas. The coeliac artery lies between the coeliac ganglia and is surrounded by the coeliac lymph nodes and the coeliac plexus.

The pylorus

It has some mobility, for it is enclosed between the peritoneum of the right extremities of both greater and lesser omenta. It hangs down over the head of the pancreas. The pylorus is a sphincter of smooth muscle. Its great thickness is due mainly to thickening of the circular muscle coat of the stomach, but is enhanced by the curling back here of many of the longitudinal fibres (Last, 1978).

Blood supply

The stomach has an interconnected blood supply which is so extensive that three of its major nutrient arteries can be ablated without incurring necrosis or even significant dysfunction.

The lesser curvature of the stomach is supplied primarily by the left gastric artery which arises from the coeliac axis. The right gastric artery, arising from the ascending hepatic artery, is usually a small vessel that provides branches to the first part of the duodenum and the pylorus. Right and left gastroepiploic arteries arise from the gastroduodenal and splenic arteries, respectively. They form an arcade along the greater curvature. The short gastric arteries arising from the splenic artery are small and relatively insignificant in terms of the amount of blood that they deliver to the most proximal portion of the body of the stomach (Moody and McGreevy, 1984) (Fig 1).

Innervation

Motor as well as secretory functions of the stomach are controlled by the autonomic nervous system.

The vagus nerve provides a predominant part of this innervation. Each vagus has a single branch within the abdomen: the hepatic arising from the left vagus, and the coeliac from the right vagus. Each vagus terminates in the anterior and posterior nerves of Laterjet, respectively. Small branches course along the smaller blood vessels as they enter the gastric wall along the lesser curvature (Fig 1). The left vagus will often divide into two or three branches before passing through the oesophageal hiatus. The right vagus may occasionally give off a small branch that courses to the left behind the oesophagus to join the cardia. This branch has been termed the "criminal nerve of Grassi" in recognition of its important role in the aetiology of recurrent ulcer when it is left undivided.

The splanchnic innervation to the stomach is lessdistinct than that of vagal origin. It has been demonstrated that some of the vagal fibres are adrenergic as well as cholinergic. The majority of the splanchnic innervation, however, appears to be adrenergic. They accompany the gastrosplenic artery and its branches, which is appropriate for their function of control of blood flow and muscular function rather than secretory events within the mucosa. There is in general, a paucity of knowledge about the precise role that local sympathetic nerves play in gastric function (Moody and McGreevy, 1984).

Microscopic Anatomy

The gastric wall consists of an external serosa which covers an inner oblique, a middle circular, and an outer longitudinal layer of smooth muscle. The

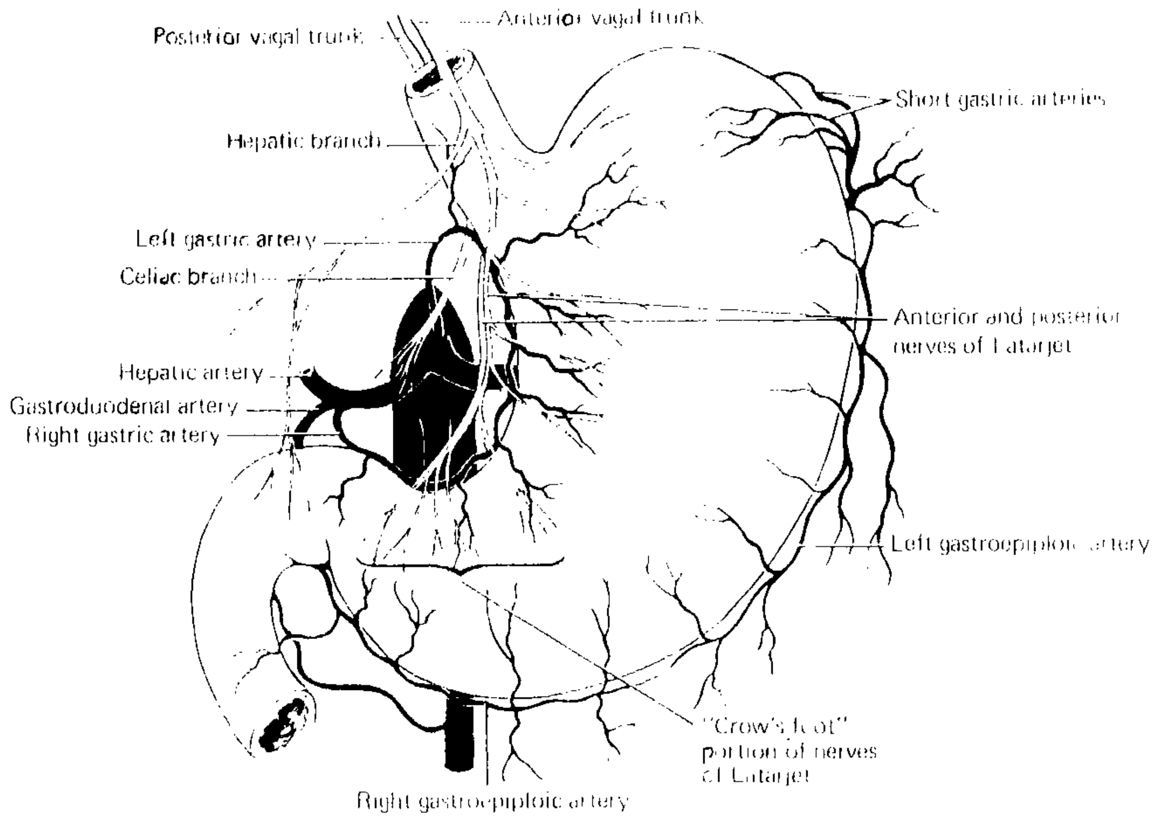

Fig.1. Blood supply and parasympathetic innervation of the stomach and duodenum

submucosa and mucosa provide a continuous inner integument that is separated by a thin sheet of muscle, the muscularis mucosa. A prominent characteristic of the mucosa is a rich mucosal capillary network. The mucosal lining of the gastric antrum is distinctly different from that of the gastric fundus. The latter has an elaborate network of glands, four or five of which join a common surface pit (Fig 2).

The gastric glands consist of six major cell types: surface, mucous neck, progenitor, chief, parietal, and endocrine cells. The surface epithelial cells are distinguished by abundant mucous granules within their apical surface. These cells are designed to protect the epithelium from ingestants and the injurious effects of gastric acid. The mucous neck cells line the entrance to gastric glands. Cells at the base of the gastric pits serve as stem or progenitor cells for the development of new surface cells and also the cells of the gastric glands. Parietal cells are the site of hydrochloric acid secretion. Chief cells are the source of pepsinogen. A variety of endocrine cells exist within the gastric gland. Some secrete gastrin or serotonin, while the function of others has not as yet been elucidated.

The antral mucosa is less specialized than that within the fundic area. In fact by light microscopy, one can only identify surface epithelial cells and mucous neck cells. There are no parietal or chief cells. Gastrin producing cells (G-cells), however, can be identified by radioimmunofluorescence (Moody and McGreevy, 1984).

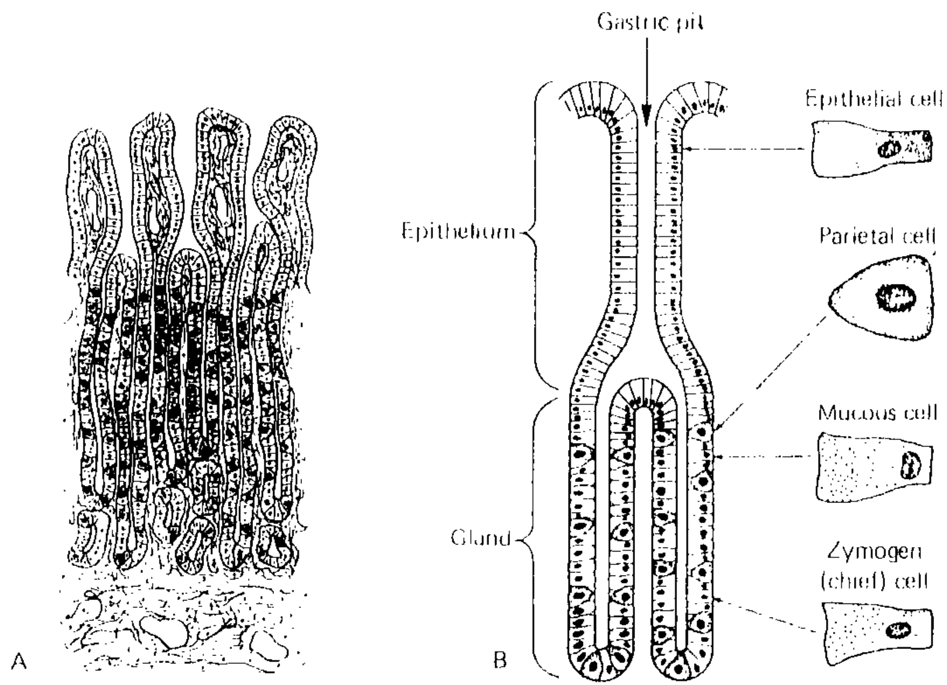

Fig. 2 Histologic features of the mucosa in the oxyntic gland area. Each gastric pit drains 3–7 tubular gastric glands. *A:* The neck of the gland contains many mucous cells. Oxyntic (parietal) cells are most numerous in the mid portion of the glands; peptic (chief) cells predominate in the basal portion. *B:* Drawing from photomicrograph of the gastric mucosa