Technique

A technique for assessing pyloric reflux

PAUL GRECH *From the Radiology Department, Northern General Hospital, Herries Road, Sheffield*

In an earlier communication (Flint and Grech, 1970) it was confirmed that the pylorus is normally competent but incompetent in gastric ulcer and chronic alcoholic gastritis and often incompetent in chronic duodenal ulcer. The relationship between pyloric regurgitation and gastric ulcer was also discussed. The purpose of this paper is to give details of the technique used for assessing pyloric regurgitation and to discuss the radiology of this test.

Preparation of the Patient

No special preparation and no sedation were found necessary. The patient was prepared as for a barium meal, but a lignocaine lozenge was sucked before the examination. The procedure was explained to the patient to ensure his full cooperation.

The Tube

In the beginning I prepared the tube myself according to the methods described by Capper, Airth, and Kilby (1966) and Airth (1967) from a length of fine, soft rubber tubing of 1 mm bore. Various sizes for the mercury balloon at the end of the tube were tried. Finally I came to the conclusion that a bullet-shaped balloon passed the pylorus more easily and quickly than a smaller, spherical one. The tube (Fig. 1) is now specially manufactured.¹

The Test

The tube is swallowed in the radiology department with the patient sitting down; he is then screened in the erect position and enough length of tube is swallowed to allow the mercury balloon to pass into the duodenum. The patient lies on his right side for 15 to 20 minutes, by which time the mercury balloon is usually through the pylorus. Enough length of the tube is given so that the small marker near the tube aperture lies well within the duodenal cap. Air can be injected to ascertain the correct position (Fig. 2).

About 20 ml of a weak barium solution (1 in 3

micropaque suspension) is injected gradually and the filling of the duodenal cap and the movements of the barium bolus are observed. The examination is first carried out in the erect position and is then repeated with the patient supine.

The examination is carried out under fluoroscopy with an image-intensifier and a television output. Findings can be recorded either on conventional radiographs or on 70 mm fluorographs.

Comment

The tube was easily swallowed; out of 85 patients so far examined, only one person failed to swallow it. Since we started to use the tube illustrated (Fig. 1) it failed to pass into the duodenum in only four patients who were found to have some degree of pyloric stenosis. Once the patient was put on his right side, it was found that the tube passed through the pylorus within 20 minutes.

Fine plastic tubes were tried and found unsuitable as their stiffness interfered with the normal pyloric sphincter action and rendered the pylorus incompetent.

It was found that the rapid serial, 70 mm-intensifier fluorograph gave adequate information and on the whole was preferable to conventional radiographs. If required, the exposure can be at the rate of three to six frames per second; also there are advantages of simultaneous screening facilities. More important still, the radiation dose to the patient compared with that given by the full-size radiograph is reduced.

In 11 out of the 12 controls without dyspepsia the pylorus was competent. The twelfth was a 65-year-old woman with chronic bronchitis, who was found to have a 'mild' degree of regurgitation in the supine position. This seemed to confirm that the pylorus is normally competent (Capper *et al*, 1966). When the pylorus was incompetent, the reflux that resulted varied in amount, in type, and with the patient's posture.

Fig. 1. The tube and the aperture through which the barium runs out on injection marked by the arrow.

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¹Messrs. J. C. Franklin and Sons Ltd, Dalston, London, at a cost of 48s each tube.

Fig. 2. The passage of the mercury balloon through the pylorus. (1) Lying in the antrum; (2) changed shape, appears circular as it is seen end-on going through the duodenal cap; (3) lying in the second cap of the duodenum, but the small marker near the aperture is still in the antrum; (4) the small marker now lies freely in the duodenal cap.

Fig. 3. A contact print from a frame of 70 mm fluorography in a case of 'chronic alcoholic gastritis' showing a jet-like reflux (arrow).

Fig. 4. The duodenal cap is scarred in a case of chronic duodenal ulcer, showing a moderate amount of reflux.

It was found impracticable to measure quantitatively the amount of regurgitation that was present. So the grading into 'mild', 'moderate', and 'marked' was based on personal observation from the amount of reflux of barium into the stomach, taking into consideration the rate and the direction of any peristaltic waves along the duodenum and the behaviour of the duodenal cap. For the sake of conformity, all these examinations were carried out by one person (the author).

Two distinct types of regurgitation were noted: in the patients with gastric ulcer and the cases of chronic alcoholic gastritis the reflux appeared to be synchronous with the retroperistaltic waves. As each wave reached the duodenal cap, the latter emptied itself into the stomach, sometimes with a good jet-like action (Fig. 3). This could be described as systolic regurgitation. When such incompetence was associated with duodeno-pyloric ulceration, however, the reflux did not appear to be related to duodenal peristalsis. It behaved as a 'leak', simply due to fibrosis and scarring in the area, interfering with pyloric closure (Fig. 4).

Posture seemed to influence reflux in the cases of gastric ulcer and chronic alcoholic gastritis. Regurgitation was pronounced in the standing position, but less or negligible with the patient lying down. This could be related to the observation that retroperistaltic waves appeared to diminish when the patient was supine and also perhaps influenced by the anatomy of the duodenum. No appreciable difference in regurgitation in the two positions was noted in the patients with pyloro-duodenal deformity.

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