RADIOLOGY OF PYLORIC REFLUX

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The possibility of duodeno-gastric reflux and its effect on the stomach have interested physicians for some time. Up to a few years ago the only radiological examination for the pylorus was the standard barium meal, which cannot show whether or not such regurgitation occurs. Workers have been searching for a suitable test for pyloric function and now various types are available.

Briefly bile regurgitation can be deduced by two methods:

A) Isotopes Studies
B) Radiology.

A) *Isotopes*

Various isotopes can be used which combine with bile salts — and presumably the pancreatic juices — and their presence in the stomach can be detected and quantitatively measured. Recently Rhodes, Barnado, Phillips, Ravelstad and Hofmann (1969) measured such bilious regurgitation after labelling of the bile acid pool using ^{14}C chenodeoxycholic acid by mouth.

B) From *Radiological studies* it can be inferred that if barium, which is introduced into the proximal duodenum, pours back into the stomach, then the duodenal juice should do the same.

There are two ways for introducing barium in the proximal duodenum:

a) *Antegrade intubation* — this usually follows the technique as described by Capper, Airth and Kilby (1966).

b) *Retrograde flow* — this entails filling the duodenum retrogradely through an enterostomy or an indwelling T-tube in the common bile duct in cholecystectomized patients as described by Nelson (1969) and Beneventano and Schein (1970).

When we started doing these studies, suitable isotopes were not available for us. Besides, being a radiologist, I was

more interested in radiological investigations. Consequently we relied on radiology for testing for pyloric competence.

I tried, unsuccessfully, retrograde duodenal filling on two occasions; one through an enterostomy, where I failed to fill the proximal part of the duodenum and in the second case through a T-tube in a cholecystectomized patient. As soon as the common bile duct was filled, the patient complained of pain which became severe with further injection. Presumably this pain was due to distention of the common bile duct; as a result, the examination was discontinued.

That leaves us with the antegrade route. This is the method that we have been using in my hospital up to now. The technique is similar to that described by Capper, Airth and Kilby (1966) with some modifications (Grech 1970). In a recent series the pyloric reflux test was followed by checking for oesophageal reflux or hiatus hernia (Beeley and Grech, 1971).

Briefly the examination consists in passing a fine soft rubber tube into the duodenum through which barium solution is injected into the proximal part of the duodenum and the competence of the pylorus assessed.

The findings can be recorded by one of the following methods:

a) Cineradiography
b) Conventional radiography
c) 70 m.m. Fluorography
d) Video-tape

a) *Cineradiography* entails such a high radiation dose as to prohibit its use.

b) *Conventional radiography* shows only the static condition at the time of exposure. To be more informative, the examination should be documented throughout.

c) *70 m.m. Fluorography*. It was found that rapid serial 70mm. intensifier fluorography gave adequate information and on the whole was preferable to conventional radiography. If required, the exposure can be at the rate of three or even six frames per second. There are also advantages of simultaneous screening facilities and reduction of the radiation dose to the patient compared with cine-radiography or conventional radiography.

d) *Video-tape*. The use of video-tape recorder fed from the television system enables the examination to be recorded fully. Not only the anatomy but the whole physiological action of the pylorus can be reproduced. This can then be played back and discussed between the clinician and radiologist.

Of these four methods, I feel that video-tape recording is the most informative.

It is realised that this technique is not the ideal method for assessing pyloric reflux. Some writers maintain that intubation across the pylorus may in itself produce insufficiency. This may be true with rigid plastic tubes as their stiffness may interfere with the normal pyloric action, but a fine soft rubber tubing, as the one we use, does not appear to hinder the pylorus.

Another drawback is that this examination is carried out with the patient in a fasting state; perhaps the examination should be extended and repeated after a test meal is given.

It was found impracticable to measure quantitatively the extent of regurgitation. The amount was roughly assessed by the personal observation of the radiologist. This might cause inaccuracies especially in serial examinations.

In spite of these limitations, it is felt that the examintion is worthwhile.

It is easy to perform,

It does not consume too much time,

It is not too uncomfortable to the patient.

You do not need any special equipment, so long as your radiology department is equipped for fluoroscopy with an image-intensifier and a television chain.

The investigation can be extended to include radiological study of the stomach and duodenum and also testing for a hiatus hernia and oesophageal reflux.

Of the 12 controls that we examined by this technique, 11 showed a competent pylorus. The twelfth, who was a 65 year old chronic bronchitic woman, showed moderate reflux. This seemed to confirm Capper's *et al.* (1966) and Nelson's (1969)

previous findings showing that the pylorus is normally competent.

It was also found that pyloric reflux can occur in patients suffering from:

a) Gastric ulcer
b) Alcoholic gastritis (Flint and Grech, 1970)
c) Duodenic-pyloric ulceration
d) Chronic non-specific lung disease (Beeley and Grech, 1971).

Most of the positive findings were, in the beginning of this study, confirmed by gastroscopy and/or by the gastrocamera. I do not think that we know yet the full significance of such regurgitation. Further studies are needed and perhaps such radiological findings should be correlated to a group of patients suffering from cholecystitis and pancreatic diseases — this might help in assessing this subject better.

References

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