

hippuran elimination were determined. Changes in the various parameters could be observed from the computer readings which were not apparent from visual inspection and measurements obtained from the tracings.

#### **MANOMETRIC CHOLEDOCHOGRAPHY DURING BILIARY SURGERY**

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A METHOD OF dynamic manometry was utilized to measure both the biliary and the duodenal pressures during operative cholelithotomy using pump injections of sodium diatrizoate 45 w/v at the rate of 6.0 ml. per minute.

Thirty-two patients undergoing cholecystectomy were studied and all had a normal operative cholelithogram. They were anaesthetized with thiopentone, nitrous oxide and oxygen using mechanical ventilation.

The average choledochal resting pressure was 6.1 mm. Hg, s.d. 4.3, range 0 to 22.0 mm. Hg. Pressure waves of an average amplitude of 2.2 mm. Hg due to respiration were recorded. The resting bile duct also exhibited pressure waves actively independent of respiration and heart rate. These were of a mean amplitude of 5.8 mm. Hg and would seem to reflect activity of the choledochal sphincter.

There was no correlation between the resting pressure in the bile duct and mean duodenal pressure or muscular activity. Moreover the choledochal pressure showed no appreciable alteration during periods of intense duodenal peristalsis induced by pentazocine, 15.0 mg. i.v.

Three types of pressure filling curves were found. Type I was associated with good function at oral cholecystography. It occurred in 18 cases and would seem to represent the normal. Type II usually occurred in cases with poor or absent gall bladder function at oral cholecystography. It provides evidence for the existence of muscular hypertonia of the choledochal sphincter. These cases can be distinguished from organic narrowing of the periampullary region by i.v. propantheline bromide. Type III was encountered in seven cases, six of which showed complete non-function at oral cholecystography. It indicated a lax choledochal sphincter with free and rapid entry of dye into the duodenum.

These studies suggest that the choledochal pressures in man are in the main a product of sphincteric action. It seems that disease of the gall bladder upsets the pristine mechanism of the choledochal sphincter.

#### **DUMPING AFTER VAGOTOMY AND PYLOROPLASTY**

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ALTHOUGH THE OPERATION of vagotomy and pyloroplasty is widely used in the treatment of duodenal ulcer there have been few studies of gastric

emptying in relation to this procedure and there is little information on its long-term effect on gastric motility. Buckler<sup>1</sup> observed delayed gastric emptying, whereas Madsen and Pedersen<sup>4</sup>, George, Connell and Kennedy<sup>2</sup> and McKelvey<sup>5</sup> observed rapid gastric emptying, after vagotomy and pyloroplasty.

Using a standard meal I have studied the pattern and rate of gastric emptying before and after vagotomy and pyloroplasty.

*Method.* The method consisted of scanning the upper abdomen at intervals after the ingestion of a meal labelled with radioactive chromium<sup>51</sup>. A disappearance curve of the chromium from the stomach was obtained and from this the rate of emptying, expressed as half-life ( $T_{\frac{1}{2}}$ ) in minutes, of the meal from the stomach was calculated. The percentage of the meal which had left the stomach by the time of the first scan was also measured. This was called the initial fraction.

*Results.* Sixteen patients were studied before and after surgery. There was no great change in the  $T_{\frac{1}{2}}$ . The mean value pre-operatively was 63.5 minutes, S.D.  $\pm$  14.8, compared with 55.7 minutes, S.D.  $\pm$  23.7, post-operatively. There was a highly significant increase in the initial fraction ( $p < 0.001$ ) post-operatively compared with pre-operatively, the mean values being respectively 39.3%, S.D.  $\pm$  16.1, and 12.5%, S.D.  $\pm$  13.6.

Seven of the 16 patients experienced diarrhoea at some stage post-operatively. There was a tendency for the initial fraction to be greater and for the  $T_{\frac{1}{2}}$  to be lower in these patients than in those who had had no diarrhoea. This did not reach statistical significance.

The effect of eating the meal whilst lying on the left side and of remaining in this position between observations was studied in 11 patients who had undergone vagotomy and pyloroplasty. There was a significant decrease in the initial fraction and increase in the  $T_{\frac{1}{2}}$  compared with results obtained with normal posture. Alteration of posture had no effect on emptying in four control subjects.

*Conclusion.* The conclusion is that vagotomy and pyloroplasty alters the pattern rather than the rate of gastric emptying. There is a rapid initial dump of part of the meal from the stomach following operation. The explanation of this is not clear, but these findings merit further study particularly in relation to troublesome post-operative sequelae.

#### References

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### THE MCFARLAND BY-PASS PROCEDURE IN INFANTILE PSEUDARTHROSIS OF THE TIBIA

K. Hardinge

PSEUDARTHROSIS OF THE tibia is a rare pathological fracture followed by non-union. This study is confined to the use of the By-Pass Graft in