The Clinical Application of Intraluminal Esophageal Manometry

H.

Affolter

Basel

Key Words

Cardiospasm

Esophageal diseases

Manometry

Scleroderma

Author's address: PD Dr. H. Affolter, Medical Clinic of the University, Bürgerspital, CH-4000 Basel (Switzerland)

Intraluminal manometry is a method of recording esophageal motility [8]. Pressure parameters in the esophagus are less complex than elsewhere in the gastrointestinal tract; thus intraesophageal pressures reflect closely the activity of the muscle itself [6].

The technique is safe and relatively simple. Most authors employ an assembly of three open-ended, water-filled catheters connected to a pressure-sensitive device and a multichannel recorder. These small-caliber tubes are passed through the nose or the mouth into the stomach. With the patient in a supine position and refraining from swallowing, they are withdrawn gradually from the stomach into the esophagus, and the resting pressure profile of the gastroesophageal sphincter is recorded. Following this resting study, the procedure is repeated with the patient swallowing after each withdrawal. The pressure changes subsequent to deglutition are then recorded throughout the gastroesophageal junction and the body of the esophagus. The respiratory movements are simultaneously registered by a pneumographic belt placed around the lower thorax of the patient. This allows the separation of true motor phenomena of the esophagus from movements resulting from inspiration and expiration [2, 3]. The principal clinical usefulness of this method is to be expected in the evaluation of diseases associated with motor dysfunction of the esophagus. There are essentially three disorders in which the deviations from the normal pressure pattern are so specific as to be of diagnostic value: achalasia, diffuse spasm and scleroderma of the esophagus[2].

In achalasia, the pressure profile of the gastroesophageal junction is normal, but there is little or no evidence of relaxation of the gastroesophageal sphincter with swallowing. In the body of the esophagus, deglutition elicits simultaneous, weak and often repetitive contractions instead of peristaltic waves. The resting pressure in the tubular

Editorial

243

esophagus may be elevated due to retention of food and secretions. The denervated smooth muscular system of the esophagus is abnormally sensitive to cholinergic stimulation. The administration of Mecholyl® or Urecholine® results in a prolonged powerful contraction with a marked increase of intraluminal esophageal pressure.

In diffuse spasm of the esophagus, the tone of the gastroesophageal sphincter is usually normal, although sphincteric opening and closure are at times poorly coordinated with the esophageal

contractions. The characteristic abnormality is recorded in the body of the esophagus, where most swallowing waves are simultaneous, repetitive and of excessive amplitude and duration. Occasionally, an increase in intraluminal pressure occurs in response to cholinergic stimulation. A rare variant of diffuse spasm, the "hypertensive gastroesophageal sphincter", can be recognized by an excessive resting pressure of the sphincter in the presence of a normal or minimally disturbed esophageal peristalsis [4].

Scleroderma of the esophagus is characterized by only minimal or no pressure increase in the gastroesophageal junction, with impairment or loss of sphincteric contraction and relaxation with swallowing. In the lower two thirds of the esophagus, deglutition produces only feeble, low-amplitude, non-peristaltic contractions. No abnormality is usually seen in the proximal portion of the esophagus and the upper sphincteric area which are composed of striated muscles.

Cholinergic stimulation has no effect upon resting intraesophageal pressure in scleroderma.

While in most cases a careful history, clinical findings and X-ray examinations will allow the recognition of these disorders, there are instances when these are not conclusive. In the early stages of achalasia and scleroderma with visceral involvement, intraluminal manometry may permit a definitive diagnosis before radiological changes are sufficiently characteristic as to be diagnostic. In some patients with obscure chest pain and dysphagia due to diffuse esophageal spasm, pressure studies are the only means to establish the correct diagnosis.

Intraluminal manometry may, in addition, be useful in the evaluation of patients with sliding hiatal hernias; the strength of the gastroesophageal sphincter [10] and – to some extent – the severity of reflux esophagitis can be assessed [1]; occasionally, hernias not disclosed by radiology and endoscopy may be detected manometrically [5].

Disturbances of esophageal motor function also occur with advanced

244

Editorial

age [11], in muscular disorders such as myasthenia gravis and myotonic dystrophy [7], as well as in diabetic neuropathy and other neurological disorders involving the central or peripheral vagus pathways [7, 9]. These can be detected by esophageal pressure studies; however, their clinical significance has as yet been less fully studied. It is evident that intraluminal esophageal manometry contributes useful clinical information in a number of disorders associated with motor dysfunction of the esophagus. Nevertheless, this technique is not a routine diagnostic procedure to be employed in every patient suspected of having esophageal disease. In our experience it is most valuable in the investigation of selected patients with chest pain or dysphagia not elucidated by the standard diagnostic methods.

References

- Affolter, H.: Pressure characteristics of reflux esophagitis. *Helv. med. Acta* 33: 395–402 (1966).
Code, C. F.; Creamer, B.; Schlegel, J. F.; Olsen, A. M.; Donoghue, F. E. and Andersen, H. A.: An atlas of esophageal motility in health and disease (Thomas, Springfield, Ill. 1958).
Code, C. F. and Schlegel, J. F.: The pressure profile of the gastroesophageal sphincter in man: an improved method of detection. *Proc. Mayo Clin.* 33: 406–414 (1958).
Code, C. F.; Schlegel, J. F.; Kelley, M. L.; Olsen, A. M. and Ellis, F. H.: Hypertensive gastroesophageal sphincter. *Proc. Mayo Clin.* 35: 391–399 (1960).
Code, C. F.; Kelley, M. L.; Schlegel, J. F. and Olsen, A. M.: Detection of hiatal hernia during esophageal motility tests. *Gastroenterology* 43: 521–531 (1962).
Connell, A. M.: Recording of intestinal motility: routine or research? *Gut* 8: 527 (1967).

Fischer, R. A.; Ellison, G. W.; Thayer, W. R.; Spiro, H. M. and Glaser, G. H.: Esophageal motility in neuromuscular disorders. *Ann. intern. Med.* 63: 229–248 (1965).

Harris, L. D.: The present status of esophageal manometry. *Gastroenterology* 50: 708–710 (1966).

Mandelstam, P.; Siegel, C. I.; Lieber, A. and Siegel, M.: Esophageal motor dysfunction in diabetic neuropathy-gastroenteropathy (Abstr.). *Gastroenterology* 54: 1297 (1968).

Pope, C. E.: A dynamic test of sphincter strength: its application to the lower esophageal sphincter. *Gastroenterology* 52: 779–786 (1967).

Soergel

K. H.; Zboralske

F. F. and Amberg

J. R.: Presbyesophagus: esophageal motility in nonagerians. *J. clin. Invest.* 43: 1472–1479 (1964).