

## MEDICAL GRAND ROUNDS

Parkland Memorial Hospital  
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### Dysphagia of Esophageal Origin

#### CASE #1: A Classical Case of Symptomatic Tertiary Contractions

The patient is a 46-year-old white male who was first seen by the GI Service because of recurrent chest pain and dysphagia. The patient's health has generally been good, but approximately 11 years ago he began to have episodes of chest pain. For the most part these attacks occurred at night either just after he went to bed or they would awaken him from a sound sleep. He would develop moderately severe chest pain of a "squeezing" or "constricting" nature retrosternally. There was no radiation of the discomfort into his neck, arms, back, or shoulders and there was no associated heartburn or regurgitation of gastric contents. At first these episodes were infrequent, but gradually they increased in frequency, occurring almost nightly. He would obtain relief by walking about for 10 to 15 minutes.

During the first 7 years of this patient's illness he experienced no difficulty in swallowing, but for the last 3 years dysphagia became an increasingly severe problem. Initially he had the greatest difficulty with liquids; swallowing either hot or cold drinks would trigger episodes of severe chest pain and the fluid would commonly regurgitate into his mouth. More recently he has had dysphagia toward solids; however, fluids still give him the greatest difficulty. Attacks are episodic and irregular in severity; at times he can swallow both liquids and solids normally. Pain is invariably associated with attacks of dysphagia. Emotional stress and fatigue seem definitely to enhance the frequency of attacks.

X-ray examination has repeatedly shown tertiary contractions of the esophagus and esophagoscopy is negative. Therapy with a variety of drugs has not been helpful, but repeated esophageal dilatations (as often as every 2 weeks) have brought a moderate degree of relief.

#### CASE #2: Symptomatic Tertiary Contractions Misdiagnosed as Coronary Insufficiency Syndrome

The patient was a 41-year-old white male seen because of recurrent attacks of substernal discomfort. The patient stated that he had been in generally excellent health until approximately a year and a half before, when he first noted attacks of substernal discomfort. These attacks typically came on late in the evening, and on only one occasion were associated with exertion. Each attack would last for no longer than 10 to 15 seconds, was associated with a "tight" or "constricting" sensation in the chest with radiation to the left shoulder and left arm and would disappear spontaneously. X-ray examination of the thorax, esophagus, and stomach revealed no abnormality and electrocardiograms showed no diagnostic changes.

Because of continued attacks of discomfort, further work-up eventually revealed esophageal pressure studies typical of diffuse spasm and it could be shown that the attacks of pain coincided with these periods of abnormal esophageal motility. At no time in this patient's history did he have dysphagia.

CASE #3: A Patient With a Lower Esophageal Ring Misdiagnosed as a Hiatus Hernia

The patient is a 61-year-old white male who was in generally excellent health until approximately 3 years prior to being seen by the GI Service. At that time he described an attack of dysphagia which occurred while he was eating meat and which was associated with a "sticking" sensation in his lower mid-chest. He retched repeatedly and was finally able to bring up the offending piece of meat. During the ensuing two years he had several similar episodes which were always brought on by eating a rubbery solid food such as meat. He never had dysphagia toward liquids.

Because of these symptoms he was diagnosed as having a hiatus hernia and surgery was recommended. It should be emphasized that he never had signs or symptoms of esophageal regurgitation, i.e., heartburn or esophageal reflux. Immediately following repair of his hiatus hernia, he noted that he had the same symptoms still. On repeat examination some months later a lower esophageal ring was demonstrated; under the fluoroscope a solid bolus could be shown to clearly become impacted in the narrowed ring structure. There was no evidence of gastroesophageal reflux in this patient despite repeated attempts to produce reflux of gastric contents into the esophagus under fluoroscopy. The patient has done well with no therapy by simply carefully chewing his food.

CASE #4: A Case of Lower Esophageal Ring Diagnosed as an Emotional Problem

The patient is a 47-year-old white female seen because of a history of intermittent dysphagia. The patient's history goes back approximately 3 years, when she began to experience episodic dysphagia characterized by a sensation of sticking of food in the chest which seemed to be related to periods of emotional stress. These attacks of dysphagia characteristically occurred only toward solid foods, and in particular meat. She never experienced these symptoms when swallowing liquids. In between attacks she was free of all symptoms.

7. She had been examined innumerable times and upper gastrointestinal films were said to be negative. The intermittency of the symptoms suggested a lower esophageal ring, and examination of the lower esophagus with particular attention to the possibility of this lesion revealed a classical lower esophageal ring the lumen of which was approximately 12 mm. across. The patient was treated with pneumatic bag dilatation and has had no further difficulty.

8. Engelking, F. J.: Esophageal motility. *Physiol. Rev.* 31:442, 1951.

This superb, up-to-date review covers in considerable detail the normal and various aspects of esophageal innervation and motility both in the normal patient as well as in various disease states. An attempt is made to correlate function, motility records, and anatomic structures of the esophagus.

9. Atkinson, M., P. Kramer, S. M. Myrman, and F. J. Engelking: Normal pharyngeal swallowing. I. Normal pharyngeal mechanisms. *J. Clin. Invest.* 37:1007, 1962.

This publication describes the normal pharyngeal mechanisms of normal swallowing. A detailed analysis is given of the mechanics of swallowing in the pharynx, hypopharynx, and superior esophagus. The authors conclude

References

I. General Reviews

1. Ingelfinger, F. J.: Disorders of esophageal motor functions. *Adv. Int. Med.* 8:11, 1956.  
This publication is probably the most up-to-date and concise review of the normal swallowing mechanisms, cardiospasm, diffuse spasm, lower esophageal ring, and peptic esophagitis.
2. Osborne, G., P. T. Savage and S. L. Strange: One hundred consecutive cases of dysphagia: Some problems in diagnosis. *Clin. Radiology* 11:250, 1960.  
This publication reviews the causes of dysphagia in 100 consecutive cases. It is notable in that the authors fail to diagnose lower esophageal ring and diffuse spasm in any case despite the fact that several of their case reports strongly suggested one of these two lesions.
3. Schatzki, R.: Esophagus: Progress and problems. *Am. J. Roentgenol.* 94:523, 1965.  
A particularly good review with respect to the controversial points concerning lower esophageal ring and diffuse spasm of the esophagus.
4. Ingelfinger, F. J., P. Kramer, L. Souther and R. Schatzki: Panel discussion on diseases of the esophagus. *Am. J. Gastro.* 31:117, 1959.
5. Hardy, J. D. and J. H. Conn: Diseases of the esophagus: An analysis of 308 consecutive cases. *Ann. Surg.* 155:971, 1962.
6. Hightower, N. C.: Esophageal motility in health and disease. *Dis. of the Chest* 28:150, 1955.
7. Ingelfinger, F. J.: Swallowing disorders in clinical practice. *Med. Sci.*, p. 451, April 10, 1960.

II. Esophageal Anatomy and Physiology

8. Ingelfinger, F. J.: Esophageal motility. *Physiol. Rev.* 38:533, 1958.  
This superb, up-to-date review covers in considerable detail all of the various aspects of esophageal innervation and motility both in the intact, normal patient as well as in various disease states. An attempt is made to correlate function, motility records, and anatomic structures of the esophagus.
9. Atkinson, M., P. Kramer, S. M. Wyman, and F. J. Ingelfinger: Dynamics of swallowing. I. Normal pharyngeal mechanisms. *J. Clin. Invest.* 36:581, 1957.  
This publication describes the normal pharyngeal mechanisms which initiate swallowing. A detailed analysis is given of the pressure phenomena found in the pharynx, hypopharynx, and superior esophageal sphincter.

10. Fleshler, B., T. R. Hendrix, P. Kramer, and F. J. Ingelfinger: The characteristics and similarity of primary and secondary peristalsis in the esophagus. *J. Clin. Invest.* 38:110, 1959.  
This publication describes in detail the characteristics of normal primary and secondary peristalsis in the esophagus.
11. Kramer, P., M. Atkinson, S. M. Wyman, and F. J. Ingelfinger: The dynamics of swallowing. II. Neuromuscular dysphagia of the pharynx. *J. Clin. Invest.* 36: 589, 1957.  
An analysis of 7 patients with poliomyelitis, myasthenia gravis, and dystrophica myotonica with respect to disorders of swallowing.
12. Fleshler, B., T. R. Hendrix, P. Kramer, and F. J. Ingelfinger: Resistance and reflex function of the lower esophageal sphincter. *J. Appl. Physiol.* 12: 339, 1958.
13. Segal, C. I., and T. R. Hendrix: Evidence for the central mediation of secondary peristalsis in the esophagus. *Bull. Johns Hopkins Hospital* 108: 297, 1961.
14. Van Derstappen, G., and E. C. Texter, Jr.: Response of the physiologic gastroesophageal sphincter to increased intra-abdominal pressure. *J. Clin. Invest.* 43:1856, 1964.
15. Harris, L. D., and C. E. Pope: "Squeeze" versus resistance: An evaluation of the mechanisms of sphincteric competency. *J. Clin. Invest.* 43:2272, 1964.  
These authors successfully attack the concept that the absolute value of the intersphincteric pressure measured by open-end catheters can be equated to sphincteric resistance.
16. Cohen, B. R., H. P. Lazar, B. S. Wolf, and H. D. Janowitz: The clinical value of esophageal motility study. *J.A.M.A.* 187:819, 1964.
17. Harris, L. D., W. D. Ashworth, and F. J. Ingelfinger: Esophageal aperistalsis and achalasia produced in dogs by prolonged cholinesterase inhibition. *J. Clin. Invest.* 39:1744, 1960.
18. Ingelfinger, F. J., P. Kramer, and G. C. Sanchez: The esophago-esophageal vestibule, its normal function and its role in cardiospasm and gastroesophageal reflux. *Am. J. Med. Sci.* 228:417, 1954.
19. Donald, D. E.: Esophageal dysfunction in the rat after vagotomy. *Surgery* 31: 251, 1952.
20. Palmer, E. D.: An attempt to localize the normal esophagogastric junction. *Radiology* 60:825, 1953.  
In this study silver clips were placed, through an esophagoscope, at the junction of the esophageal and gastric mucosa. Movement of these clips with reference to the diaphragm was then studied in a variety of different experimental situations. This author concluded that "under physiologic conditions, the mucosa of the esophagogastric junction region appears to be mobile over

the underlying tissues, and to be capable of considerable automatic migration...."

21. Van Trappen, G., E. C. Texter, C. J. Barborka, and J. Vandenbroucke: The closing mechanism of the gastroesophageal junction. Am. J. Med. 28:564, 1960.

This is an excellent review of the mechanisms which account for the lower esophageal barrier. Included are discussions of 1) the anatomic sphincter, 2) the flap valve mechanism, 3) the diaphragmatic pinchcock, 4) the cardiac rosette, and 5) the physiologic sphincter.

22. Hwang, K., M. I. Grossman, and A. C. Ivy: Nervous control of the cervical portion of the esophagus. Am. J. Physiol. 154:343, 1948.

### III. Tertiary Contractions and Cardiospasm of the Esophagus

23. Osgood, H.: A peculiar form of esophagismus. The Boston Med. and Surg. J. 120:401, 1889.

This is probably the first description of the symptoms associated with tertiary contractions of the esophagus. Six cases are described in which the patients experienced dysphagia, particularly toward liquids, substernal pain, and a sensation of impending suffocation.

24. Barsony, T., and F. Polgar: Symptomlose und funktionelle Spliseröhendivertikel. Fortschr. Roentgen. 36:593, 1927.

25. Teschendorf, W.: Die Röntgenuntersuchung der Speiseröhre. Ergebn. d. med. Strahlenforsch. 3:175, 1928.

These two references by Barsony, et al. and by Teschendorf represent the earliest roentgenographic descriptions of lower esophageal diffuse spasm.

26. Moersch, H. J., J. D. Camp: Diffuse spasm of the lower part of the esophagus. Ann. Otology, Rhinology, and Laryngology 43:1165, 1934.

This is one of the earliest combined clinical and roentgenographic studies of symptomatic tertiary contractions of the esophagus.

27. Sheinmel, A., C. A. Priviteri, and M. H. Poppel: A study of the effect of certain drugs on curling of the esophagus. Am. J. Roentgenol. 62:807, 1949.

28. Eskridge, M., and J. D. Peake: Curling of the esophagus. South. Med. J. 46:213, 1953.

29. Kramer, P., and F. J. Ingelfinger: I. Motility of the human esophagus in control subjects and in patients with esophageal disorders. Am. J. Med. 7:168, 1949.

30. Schmidt, H. W.: Diffuse spasm of the lower half of the esophagus. Am. J. Digest. Dis. 6:693, 1939.

This publication represents one of the early, excellent descriptions of the symptom complexes as well as the abnormalities of motility noted on esophagograms found in the clinical syndrome of diffuse spasm of the esophagus.

31. Crichton, T.V.L., and H. J. Shaw: Abnormal ring contractions of the thoracic esophagus with an account of familial manifestations. *Brit. J. Surg.* 42:46, 1954.
32. Ismay, G.: Painful spasm of the esophagus ("corkscrew" esophagus). *Brit. Med. J.* 2:697, 1952.
33. Necheles, H., H. Laski, L. D. Elegant, and R. Baum: Medical treatment of cardiospasm. *Am. J. Digest. Dis.* 2:121, 1954.
34. Creamer, B., F. E. Donoghue, and C. F. Code: Pattern of esophageal motility in diffuse spasm. *Gastroenterology* 34:782, 1958.  
This paper represents a critical analysis of the motility abnormality found in diffuse spasm of the esophagus when studied by open-tip pressure recorders. They demonstrate the nonpropulsive, repetitive pressure waves and show that in most patients with this disorder the lower esophageal sphincter opens normally.
35. Nagler, R., H. M. Spiro: Serial esophageal motility studies in asymptomatic young subjects. *Gastroenterology* 41:371, 1961.
36. Zboralske, F. F., J. R. Amberg, and K. H. Soergel: The presbyesophagus: Cine-radiographic manifestations. *Radiology* 82:463, 1964.

#### IV. Lower Esophageal Ring

37. Ingelfinger, F. J., and P. Kramer: Dysphagia produced by a contractile ring in the lower esophagus. *Gastroenterology* 23:419, 1953.  
This report describes 6 patients, all males, who developed sudden, intermittent dysphagia which was attributed to the presence of a lower esophageal ring. This is the first such case report in the literature.
38. Schatzki, R., and J. E. Gary: Dysphagia due to a diaphragm-like localized narrowing in the lower esophagus ("lower esophageal ring"). *Am. J. Roentgenol.* 70:911, 1953.  
This is a case report of 5 additional patients who had dysphagia probably on the basis of a lower esophageal ring.
39. Wolf, B. S.: The definition of a sliding hiatal hernia (Editorial). *Am. J. Digest. Dis.* 5:168, 1960.  
In this editorial, Dr. Wolf puts forth the concept that the lower esophageal ring represents the junction of the esophagus and stomach and therefore is an excellent diagnostic criterion for the presence of a hiatus hernia.
40. Kramer, P.: Frequency of asymptomatic lower esophageal contractile ring. *New Eng. J. Med.* 254:692, 1956.  
100 consecutive patients, without esophageal symptoms, were examined for the presence of a lower esophageal ring. In 6 patients, such a ring was found indicating an incidence of approximately 6%.

41. Macmahon, H. E., R. Schatzki, and J. E. Gary: Pathology of the lower esophageal ring. New Eng. J. Med. 259:1, 1958.  
This represents the first postmortem demonstration of a lower esophageal ring. Pathologically, the ring represented a mucosal fold covered by esophageal mucosa above and gastric mucosa below.
42. Schatzki, R., and J. E. Gary: The lower esophageal ring. Am. J. Roentgenol. 75:246, 1956.
43. Wilkins, E. W., and M. K. Bartlett: Surgical treatment of lower esophageal ring. New Eng. J. Med. 268:461, 1963.
44. Trinkle, J. K.: Lower esophageal ring, surgical management of a case. Ann. Surgery 155:207, 1962.
45. Stiennon, O. A.: The anatomic basis for the lower esophageal contraction ring; Plication theory and its application. Am. J. Roentgenol. 90:811, 1963.
46. Harris, L. D., J. E. Kelly and P. Kramer: Relation of the lower esophageal ring to the esophagogastric junction. New Eng. J. Med. 262:1232, 1960.  
This is a critical reference in that it demonstrates that the physiologic lower esophageal sphincter is clearly below the level of the lower esophageal ring.