HIATUS HERNIA*

ITS VARYING MODES OF PRESENTATION AND FREQUENT EARLY MISDIAGNOSIS

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The surgeon who operates for hiatus hernia is in a position to appraise the diagnostic efforts of his medical colleagues. This Olympian status is perhaps some compensation for the penalties of super-specialization which are progressively limiting the exercise of his diagnostic talents. The case is usually presented in fine detail and all that remains is to record the previous meandering progress of the patient from placebo to antacid to dietary stricture, often to abdominal surgery and finally to comprehensive radiological investigation.

There are several reasons why the early symptoms of hiatus hernia are treated in a desultory fashion, one being that acid dyspepsia is so common in modern life and often has a trivial cause. Consequently general practitioners are reluctant to undertake expensive investigations and a simple antacid can be counted on to provide relief. It often requires recurrent and long-persistent symptoms to stimulate inquiry, but the differential diagnosis is wide and investigations are often ill-chosen and unsystematic.

Reflux dyspepsia is not the only type of indigestion and hiatus hernia is certainly not the only cause. However, each form of dyspepsia is fairly characteristic of its basic cause and the discerning physician should be able to differentiate them by the history he elicits.[11] The dyspepsia of simple hiatus hernia is a well-defined syndrome brilliantly described by Allison[3] and its presence demands specific investigation. Unfortunately not all hiatus hernias are simple, nor do they all cause dyspepsia, and herein lies a more cogent reason for mis-investigation. When a hiatus hernia presents atypically other disease states may be closely simulated. However, there is nothing incomprehensible about its protean manifestations — there is reason and specificity behind them all.

Hiatus hernia is a comparatively 'new' disease and there has been only a short time to systematize our knowledge of the condition. The advent of fluoroscopy provided a means of investigating the cardia of the stomach during life: before this only the gross forms of hernia had been described. The condition, found at necropsy, was first mentioned in 1610 by Ambroise Paré[16] and later by Richard Bright[7] who described a 'remarkable displacement of the stomach'. It was Akerlund[1] in 1926 who differentiated the radiological appearances of hiatus hernia and Allison[2-4] who defined the symptomatology and pathological anatomy. These men created order out of chaos.

In this paper I have analysed my experience of 317 cases since 1954. These were recorded on a standard form devised specifically for hiatus hernia. When the headings are unambiguous and the scope comprehensive, this technique of recording provides an accurate means of retrospective

Fig. 1

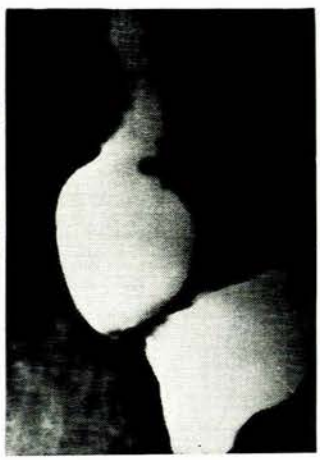

Fig. 2

Fig. 3

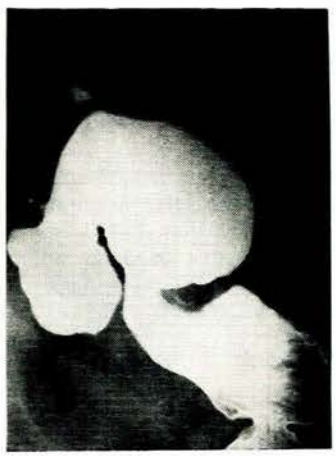

Fig. 4

Fig. 1. Diagram of sliding hiatus hernia. The oesophago-gastric junction (the cardia) forms the apex of the hernia. The stomach 'slides' bodily upwards through the oesophageal hiatus into the mediastinum.
Fig. 2. An exceptionally large sliding hiatus hernia. Note the constriction of its mid-portion which marks the oesophageal hiatus of the diaphragm. The oesophagus is tortuous because it is concertinaed by the upward displacement of the stomach. This shows that the hernia is not caused by traction of a 'short' oesophagus, but the stomach is pushed upwards by the intraperitoneal pressure.
Fig. 3. Diagram of a rolling hiatus hernia. The cardia is displaced above the diaphragm but the apex of the hernia is a pouch of stomach in front of the oesophagus. This is formed by the anterior wall of the stomach progressively rolling upwards through the hiatus into the anteriorly placed peritoneal sac. The stomach undergoes volvulus and eventually may become completely inverted above the diaphragm.
Fig. 4. Rolling hiatus hernia. The large anterior pouch of stomach lying in a peritoneal sac displaces the terminal oesophagus backwards. The pylorus lies close to the hiatus. More than half the stomach lies above the diaphragm.

*Based on a lecture delivered to the 5th Medical Students' Congress of the Pniversity of Natal, Durban, 7 May 1964.

comparison of cases. A section deals with the tentative and firm diagnoses which had been made before definitive diagnosis and another records the investigations and treatment to which the patient had previously been subjected. These sections would be of interest to the detractors of conventional medicine for they provide a chronicle of apparent inefficiency and sometimes of needless surgical intervention. Fortunately, the penalties of inaccurate or delayed diagnosis are seldom serious, so it is of no great consequence to record that the average delay between onset of symptoms and diagnosis was 7 years for men and 14 years for women.

Types of Hiatus Hernia

There are 2 basic types of hiatus hernia; the sliding variety where the cardia of the stomach forms the apex of the hernia, and the rolling variety where the anterior surface of the stomach pouches upwards through the hiatus in front of the terminal oesophagus (Figs. 1—4). They merit differentiation because of their strikingly different clinical presentation and specific complications. As far as I have been able to show[10, 12] their only structural difference is that the oesophageal hiatus of the rolling variety is larger, the patient being usually older, so that degenerative body collagen changes are more advanced. I feel that a rolling hernia often evolves from a sliding hernia. However others, notably Sweet,[17] do not agree with this concept.

Sex and Age Distribution

Eisen[8] and Allison[4] found that women were twice as frequently affected as men. This has not emerged from the present analysis where the sexes are equally represented. Below the age of 50, men predominate, whereas among the over-fifties there are more women than men (Fig. 5).

According to Allison,[4] symptoms characteristically develop in the fifties. This is illustrated in Fig. 6 depicting the ages of patients when seen by myself. However, there is often considerable delay between onset of symptoms and referral, and the majority of adults develop their first symptoms between the ages of 35 and 50.

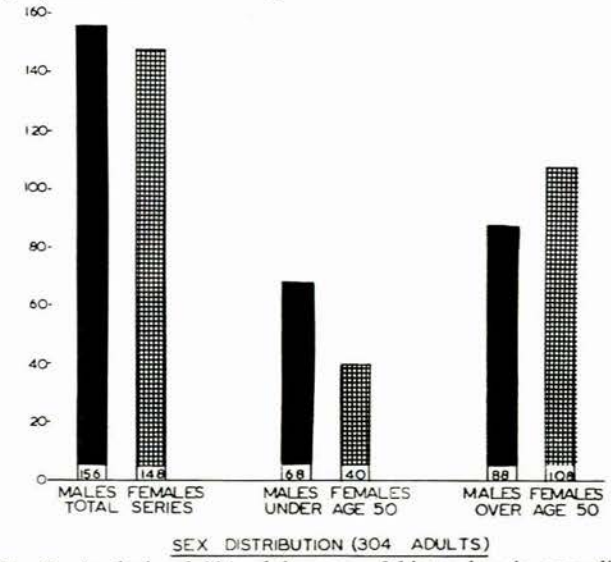

Fig. 5. Analysis of 304 adult cases of hiatus hernia according to sex.

Aetiology

A patient may be born with a hiatus hernia or it may be acquired in later life (Table I). The congenital hiatus hernia of infancy is always sliding and the symptoms tend

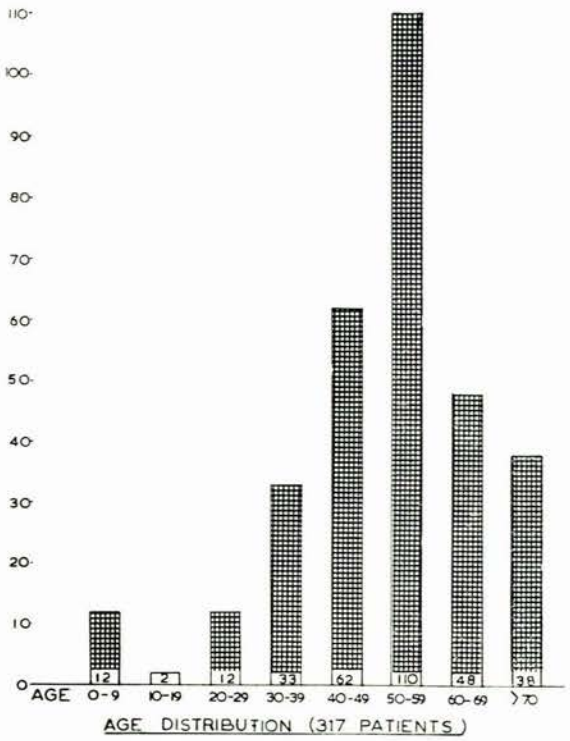

Fig. 6. Analysis of 317 cases according to age at which they were referred for surgical assessment.

to regress when the child starts to walk. Occasionally congenital hiatus hernia can be diagnosed in the second and third decades when there is a history of feeding difficulties during infancy. When symptoms develop after the fourth decade it is not usually possible to obtain a history of infant feeding difficulties. Late-onset hernias result from the combined effects of a heightened herniating force (the intraperitoneal pressure which rises in pregnancy and obesity) and weakened resistance of the hiatus and the restraining ligaments (senile degeneration or collagen softening during pregnancy).[9, 10] Occasionally hiatal incompetence may result suddenly from traumatic rupture of muscle and membrane.[14] An expanding tumour of the cardia such as a leiomyoma or a carcinoma may also disrupt the hiatus and precipitate gastric herniation.[15]

The traction or short oesophagus hernia is a definite entity though less frequent than was originally thought. It follows fibrotic disease of the oesophagus such as caustic stricture or scleroderma and is also an occasional complication of pneumonectomy, scoliosis or fibrotic lung disease. In these latter cases the traction is produced by the mediastinal displacement which carries with it the oesophagus. The common reflux stricture which complicates a sliding hernia results in fixation of the oesophagus in the shortened position. This is a complication and not a cause of sliding hernia.

BASIC CAUSE OF SYMPTOMS OF ACQUIRED HIATUS HERNIA

The following discussion is based upon analysis of the 260 adult hiatus hernias of primary origin.

Reflux. The first consequence of displacement of the cardia, is reflux of stomach contents into the lower oesophagus. Squamous epithelium is poorly adapted to withstand the digestive effects of gastric enzymes and it becomes irritated and inflamed. The basic dyspeptic symptoms of hiatus hernia (Table II) are due to this reflux and the oesophageal mucosal irritation which it causes. Furthermore, if the reflux is violent the oesophagus may distend acutely or it may react by spasm or forceful secondary peristalsis. Thoracic oesophageal colic is painful and poorly localized beneath the sternum. When gastro-oesophageal reflux is violent, the patient may describe it as vomiting. True vomiting with nausea is usually associated with gastritis and pylorospasm. Reflux, during sleep, not only causes oesophagitis but because of it, gastric contents may be inhaled. This shows itself by nocturnal choking attacks and may result in serious pulmonary complications. Oesophago-spasm may result from incoordinated contractions precipitated by reflux or may represent a reflex response to mucosal irritation or ulceration. It is a most painful condition. With the onset of oesophagitis, pain is intensified and if the inflammation spreads through the muscle into the mediastinum, pain is felt behind between the shoulder blades. Oesophageal sensation is well localized in the neck and cervical pain is a poorly recognized but not uncommon reflux symptom.

Smooth muscle spasm, particularly involving the sphincters, is often an early feature of hiatus hernia and a decided cause of symptoms. Apart from diffuse oesophagospasm the distal oesophagus may contract locally and intractably, producing cardiospasm. This results in distal oesophageal obstruction in the absence of organic stricture and without the proximal oesophageal dilatation which distinguishes achalasia cardia. In my experience hiatus hernia is always the basic cause of cardiospasm. Oesophagitis may or may not be present. Crico-pharyngeal sphincter spasm is another response to hiatus hernia. It appears to be a protective response in an attempt to limit regurgitation and inhalation. It produces a sense of obstruction in the neck which is often worrying and intractable. It is a source of diagnostic confusion because obvious causes such as an enlarged thyroid are easily excluded and all too often the physician is persuaded that this is an hysterical phenomenon. The symptom responds promptly but temporarily to the dilatation of oesophagoscopy. The pyloric sphincter is the third which may react spastically to the presence of a hiatus hernia. It is uncertain whether this is a reflex response to localized gastritis within the herniated stomach or simply associated with physical displacement of the cardia.

Haemorrhage is a complication due to ulceration of either the oesophagus or stomach. With sliding hernias, bleeding is usually slow and is due to superficial ulceration of oesophageal mucosa. Persistent oozing can lead to profound anaemia. Sudden severe bleeds follow erosion of large vessels by penetrating ulcers. These are rare in the oesophagus (unless gastric lined) and therefore complicate rolling or incarcerated hernias where the ulcer invariably lies within the stomach.[13]

The main symptoms of hiatus hernia (Tables I and II) are therefore due to:

1. Gastro-oesophageal reflux. This causes oesophagitis, oesophagospasm, stricture formation and the complication of inhalation.
2. Pylorospasm, cardiospasm and spasm of the crico-pharyngeal sphincter.
3. Ulceration. This may occur in the oesophagus or within the herniated gastric pouch.

TABLE I. AETIOLOGY OF 317 CASES OF HIATUS HERNIA

Congenital	Hiatal weakness			26	29
	Ectopic gastric mucosa			3	
Acquired	Traction	Caustic fibrosis	8	16	288
		Post-pneumonectomy	6		
		Scleroderma	2		
	Disruption	Traumatic	9	12	
	Hiatus	Tumour cardia	3		
	Hiatal degeneration and increased intraperitoneal pressure			260	

TABLE II. SYMPTOMS OF HIATUS HERNIA

Reflux dyspepsia	Epigastric discomfort
	Heart burn
	Eructations
	Acid regurgitations
	Postural aggravation of dyspepsia
Oesophageal symptoms (Stricture, spasm or distension)	Discomfort in neck
	Dysphagia
	Constrictive chest pain
	Backache
Haemorrhage (Ulceration oesophagus or stomach)	Haematemesis
	Melaena
	Anaemia
Diaphragmatic symptoms	Hiccup
Other symptoms	Vomiting
	Palpitations
	Cough
	Abdominal colic

ASSOCIATED DISEASE CONDITIONS

Certain conditions are from time to time associated with hiatus hernia:

A. *Peptic Ulceration*

1. *Ulceration within the herniated pouch of stomach* is a complication of incarcerated hernias. Gastric secretions are then trapped within the hernia for prolonged periods of time, particularly if the patient remains recumbent (Fig. 7). Rolling hernias are most likely to incarcerate because of their bulk.

2. *Duodenal ulceration* is an associated lesion which has been proved to exist in 12% of the cases analysed. There is no obvious direct association between hernia and ulcer, though it has been claimed — without, as far as I am aware, sufficient proof — that surgical relief of the hernia is followed by healing of the duodenal ulcer. A duodenal ulcer can mask the hernia symptoms particularly since pylorospasm, by increasing the regurgitating force, produces reflux dyspepsia. Unless this association is kept in mind, the duodenal ulcer alone may be treated surgically leaving the hernia and its symptoms unrelieved.

3. *Oesophageal ulcer.* Superficial ulceration of the oesophagus is a direct complication of gastric reflux. If un-

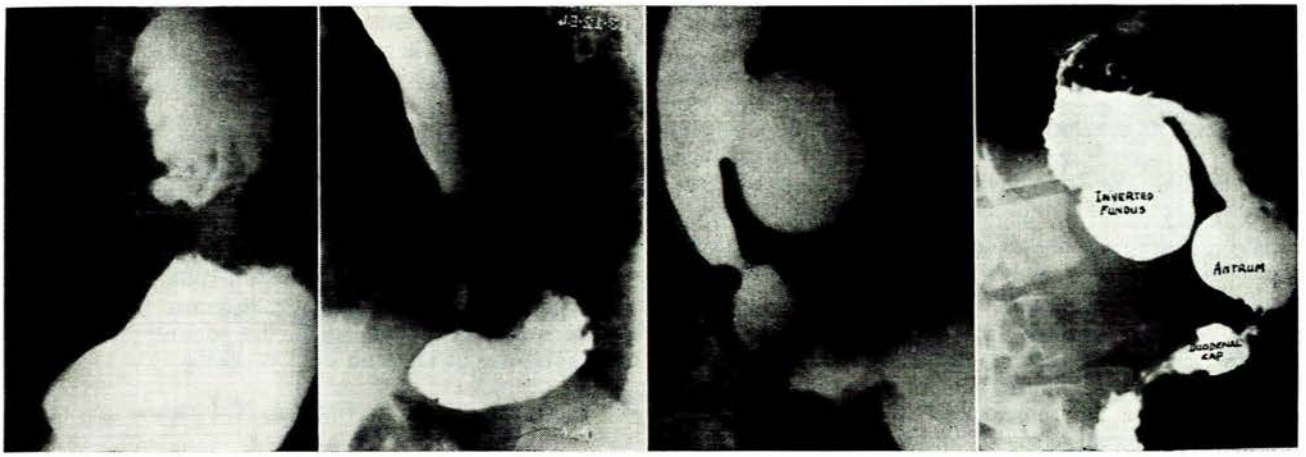

Fig. 7 *Fig. 8* *Fig. 9* *Fig. 10*

Fig. 7. Large rolling hernia showing a deep penetrating ulcer to the right immediately above the narrowing produced by the constriction of the hiatus. The coarse swollen rugae within the pouch are clearly seen. These effects are due to obstruction to emptying of the pouch and to stagnation of contents within it. This is the basic cause of haemorrhage.
Fig. 8. Sliding hiatus hernia with secondary posterior pouching of the stomach. A typical short reflux stricture of the oesophagus is present immediately above the cardia.
Fig. 9. Lower oesophageal pouch associated with a sliding hiatus hernia and a peptic oesophageal stricture. This is a pulsion diverticulum of the oesophagus in which the mucosa herniates through a deficiency in the muscular wall of the oesophagus.
Fig. 10. Lateral barium X-ray of a rolling hiatus hernia which has undergone complete volvulus into the chest. When filled with food, distended with air or obstructed, it will seriously interfere with respiratory reserve. Cardiac and pulmonary symptoms are common in these cases and often physicians and general practitioners resist surgery because they mistakenly ascribe the symptoms to primary pulmonary or cardiac diseases.

relieved, the typical localized reflux stricture immediately above the cardia will result (Fig. 8). Penetrating ulcers of the oesophagus occur only within areas of ectopic gastric mucosa and are true gastric ulcers. These may occur at the cardia but classically some distance above the apex of the hernia.[6] If a stricture forms it does so in the squamous epithelium where it merges with the gastric lining of the oesophagus.[5]

B. *Gallbladder disease*

It is not uncommon for the gallbladder to be concomitantly diseased. As a corollary, the thoracic surgeon frequently sees patients who have already had a cholecystectomy without relief of symptoms. Provided these operations are accepted as proving disease, cholecystitis or cholelithiasis has been present in 7% of my cases.

C. *Diverticulae*

Diverticulae of the sigmoid colon, small gut or oesophagus are sometimes present. Colonic diverticulitis has been found in 8 patients but we have done very few barium enemas, so that they may be much more frequent. Small bowel diverticulae have been found in 2 patients. Pharyngeal pouches have been found 4 times and lower oesophageal pouches or pulsion diverticulae 12 times. These latter are often associated with cardiospasm or reflux stricture when they presumably result from the greater oesophageal pressure necessary to overcome the obstruction (Fig. 9). The co-existence of diverticulae and hiatus hernia is not surprising since both occur in aged people.

These associated diseases are often diagnosed as the prime cause of the symptoms while the hiatus hernia is missed.

MISDIAGNOSIS

A. *Heart Disease*

Constricting precordial chest pain was a symptom of 28% of all the adults with hiatus hernia: 30% of patients with simple sliding hernias, 23% with strictures and 20% with rolling hernias were involved (Table III). Oesophageal colic can be caused by distension, incoordinated peristalsis or forceful contraction to overcome obstruction. The pain is unrelated to exercise but bears some relation to eating or recumbency. Its distribution is identical with that of cardiac pain and even though its periodicity is different, clinical diagnosis may be difficult. Hiatus hernia and coronary artery disease affect similar age groups so that the diseases may co-exist. Effort electrocardiography and barium swallow examination will establish the aetiology in the absence of myocardial ischaemia but when both are

TABLE III. CHIEF SYMPTOMS OF 260 SPONTANEOUS ADULT CASES OF HIATUS HERNIA

	Sliding hernia		*Rolling hernia*
	Reducible	*Fixed by stricture*	
Total	161	34	65
Flatulent dyspepsia	138	17	32
	84%	50%	48%
Dysphagia	32	34	34
	20%	100%	54%
Haemorrhage	10	7	31
	6%	20%	46%
Inhalation symptoms	26	7	4
	16·5%	20%	6%
Precordial chest pains	48	8	13
	30%	23%	20%

present it is the hiatus hernia which tends to be ignored. Six patients with the associated diseases have had hernial repairs and their anginal symptoms have been cured or alleviated. I have operated upon a number of patients who have suffered the penalties of incorrect diagnosis of angina pectoris for several years. They have been cured of their pains and liberated from their fears and physical restrictions.

Eight patients have undergone extensive investigation for palpitations. This symptom is usually associated with large hernias and is cured by herniorrhaphy.

On 2 occasions acute left heart failure has been firmly diagnosed because of recurrent attacks of acute nocturnal dyspnoea. Nocturnal inhalation of regurgitated gastric juices can cause the same subjective effects as cardiac paroxysmal nocturnal dyspnoea and the difficulties of diagnosis are enhanced when there is a history of precordial chest pain.

B. *Pulmonary Conditions* (*Table IV*)

The causes of the pulmonary symptoms are inhalation of regurgitated material (sliding hernias) and pulmonary compression and irritation (rolling hernias). A stomach may undergo total volvulus into the chest (Fig. 10) and then constitutes a considerable space-occupying mass of variable volume depending on its degree of distension. Cough and dyspnoea are then due to irritation and compression of the lung.

TABLE IV. PULMONARY SYMPTOMS AND COMPLICATIONS

			Stricture	*Spasm*	*Simple sliding hernia*
Atelectasis		2		1	1
Pneumonia		6	3	1	2
Lung abscess		1			1
	Diagnosed as ? pulmonary oedema	5		2	3
Choking spell 20	with ch. bronchitis	8	1	3	4
	with asthma and emphysema	3			3
	Persistent cough	4	2	1	1
Persistent irritant cough improved by herniorrhaphy or weight reduction		8	1	1	6
	Total	37			

Sliding hernias, whether simple or complicated by stricture, cause respiratory symptoms through inhalation. Lung abscess, pneumonia and atelectasis may result. Nocturnal inhalation of regurgitated or retained fluid may provoke acute choking spells. A history of nocturnal choking attacks has been obtained in 20 instances. These attacks are usually infrequent and seldom severe but they can be frightening to the patient and misleading to the doctor. They have been misdiagnosed as asthma, coronary thrombosis and acute pulmonary oedema. Chronic bronchitis, emphysema and irritant cough have been present in 28 cases (10%). Some of these patients were referred because of the pulmonary symptoms, the presence of the hiatus hernia being unknown. The response of the cough to hernia therapy, whether surgical or medical, has been so encouraging that one has to accept, in these cases, the causal relationship between the hiatus hernia and this ubiquitous symptom. Patients who develop chronic bronchitis after the age of 40 should have a barium meal as part of their pulmonary investigations. Only after extensive study could it be established that hiatus hernia and chronic bronchitis are significantly associated but on theoretical grounds it would seem valid to implicate inhalation as one of its many causes.

C. *Dysphagia and Hysteria* (*Table V*)

The oesophageal wall in the region of a reflux stricture may become thick, scarred and irregular and the X-ray may then simulate that of lower oesophageal carcinoma. Eleven patients have been referred with this diagnosis. Only on the history can oesophagospasm and rolling hernia be confused with carcinoma of the oesophagus and a barium meal should establish the diagnosis. In the actual cases confused with carcinoma, the patients had marked dysphagia, weight loss and even cachexia.

TABLE V. CASES OF HIATUS HERNIA WITH DYSPHAGIA

	Number	*Carcinoma*		*Traumatic*	*Cerebral*	*Hysteria*
		Misdiagnosis	*Present*			
Reflux stricture ..	34	6			?	
Oesophagospasm	19	3			?	?
Sliding hernia with or without oesophagitis ..	13		2	2	?	? 10
Rolling hernia ? Pressure on distal oesophagus ..	34	2	1		?	?

The dysphagia of oesophagospasm is intermittent. During the period of pain, which may last hours or days, dysphagia is severe and may even be complete. During intermissions swallowing is normal. With large rolling hernias dysphagia is variable and its nature is often difficult to elucidate. The complaint is one of discomfort and a sense of increasing fullness on swallowing.

The dysphagia of an established reflux stricture is permanent but it fluctuates in degree. This variability is due to relaxation or increase of the spasm which accompanies any irritative lesion of the oesophagus. The invariable element of spasm no matter how apparently dense the narrowing is the justification for conservative operations for reflux strictures. Abolition of reflux by hernial repair is followed by slow mucosal regeneration and when this is complete, spasm relaxes and the lumen widens. I have found it necessary to excise only one peptic oesophageal stricture during the past 10 years. The remainder have been managed by simple hernial repair combined with forcible internal dilation of the stricture.

The discomfort felt in the neck by patients with sliding hernias is often described as a swallowing difficulty. The thyroid gland, oesophageal webs or vertebral osteophytes may be mistakenly implicated but when local causes are excluded, the symptom is frequently labelled as hysterical. This is a dangerous diagnosis to which the patient may react hysterically. She has the discomfort but no one will believe it has an organic basis. Perhaps the good results of hernial repair are largely due to the sense of vindication which the patient feels. Hysteria is a common label attached to the victims of hiatus hernia. On occasions and particularly in younger women, persistent vomiting, anorexia and weight loss have been associated, so that doubtless there is justification for the diagnosis. However, as long as the hernia remains, we should be wary of overemphasizing the psychological element to the symptomatology.

D. *Haemorrhage*

Forty-eight patients have presented with bleeding. Massive haemorrhage is typical of incarcerated hernias. The first serious symptom may be haematemesis or melaena and the history of dyspepsia may then only serve to strengthen the diagnosis of duodenal or gastric ulceration. A lateral chest X-ray may suffice to establish the diagnosis if an incarcerated hernia is responsible. Treatment should then be confined to hernial repair.

Anaemia due to slow blood loss can result from either form of hernia. If the hernia is small, it is unlikely to be responsible for the bleed and of course the common association of duodenal ulceration enhances the diagnostic difficulties.[13]

SUMMARY AND CONCLUSIONS

The histories of 317 patients with hiatus hernia have been analysed. An attempt has been made to account for the frequent early misdiagnosis and mismanagement of this condition. These are due partly to the fact that the early symptoms are treated lightly by both patient and practitioner. Only when the dyspeptic symptoms become persistent and severe are investigations ordered. The specific dyspeptic features of hiatus hernia are now quite widely known and the 'typical' hiatus hernia is being diagnosed more and more readily. This does not apply to the atypical case where often the mistaken diagnoses of coronary artery disease, duodenal ulcer, cholecystitis, primary lung disease or hysteria are retained for long periods of time. The features of these conditions can be closely mimicked by hiatus hernia because its effects are exerted upon the stomach, oesophagus and lung. The symptoms produced are due to specific effects upon these organs but are nonetheless direct results of the hernia. Mismanagement is further encouraged because other disease conditions such as duodenal ulcerations, cholecystitis, coronary artery disease and diverticulitis of any part of the alimentary tract often co-exist. Associated diseases such as duodenal ulceration and oesophageal diverticulae may be directly related to the hernia while others are fortuitous and owe their co-existence to the widespread degenerative body changes which occur among the age-group of patients affected with hiatus hernia.

It has been emphasized that reflux or acid dyspepsia is specific of gastro-oesophageal reflux. Nocturnal regurgitation of undiluted gastric enzymes may produce oesophageal ulceration, and oesophageal pain or dysphagia may then dominate the symptomatology. Regurgitation at night may result in inhalation of gastric contents and only because of the secondary pulmonary effects may the patient seek medical help. Haemorrhage, when massive, is usually caused by gastric ulceration within the incarcerated pouch of stomach, but severe anaemia may result from a slow ooze from an area of oesophagitis. Pylorospasm, cardiospasm, oesophagospasm and spasm of the crico-pharyngeal sphincter may be reflex to the hiatus hernia or the reflux of stomach contents which it causes. The symptoms of these spastic states are clear-cut and often distract the diagnosing physician from the basic anomaly.

The adult forms of hiatus hernia are caused by a combination of factors of which obesity, pregnancy and senile degeneration are important. Consequently cholecystitis, duodenal ulceration, diverticulitis, coronary ischaemia and other hernias are associated conditions which serve to obscure the hiatal hernia symptoms.

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