PHARYNGO-ŒSOPHAGEAL DIVERTICULUM

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PHARYNGEAL pouch was first observed by Ludlow in 1767. The essential feature of the condition is a herniation of the mucosa of the lower pharynx through the triangle of Zenker, the upper and lower boundaries of which are respectively formed by the oblique fibres of the thyro-pharyngeus and the transverse fibres of the crico-pharyngeus. It is considered by some that this hiatus in the pharyngeal musculature forms an area of potential weakness. The pouch, the wall of which consists of mucosa and of pharyngeal aponeurosis, is situated between pretracheal and prevertebral fasciae. Initially the protrusion takes place in the median plane posteriorly but, because the upper thoracic œsophagus is firmly attached to the vertebral bodies, the pouch must necessarily deviate to one or other side—more frequently the deviation takes place to the left.

The generally accepted theory concerning the ætiology of the condition assumes the presence of inco-ordination of the act of swallowing. The importance of this factor is suggested by the long history of dysphagia in most cases. Normally the transverse fibres of the crico-pharyngeus act as a sphincter at the entrance of the œsophagus—Jackson's œsophageal pinchcock—and should relax during deglutition, when the upper, propulsive, oblique fibres of the thyro-pharyngeus contract. If the transverse fibres fail to relax, there may be great elevation of the intra-pharyngeal pressure. Keith measured the pressure generated in the pharynx on deglutition and found that it rose to a maximum of 45 mm. mercury. Such intermittent pressure, if unduly sustained, would undoubtedly produce strain at the point of obstruction. Repetition of intermittent impulses of high pressure lead to a bulging of mucosa through the thin, unsupported area of the aponeurotic triangle on the posterior wall. The pouch is thus a pulsion or false diverticulum. Once formed, the hernial protrusion tends to increase progressively in the direction of the mediastinum.

Recently some doubt has been cast on the validity of the aforementioned theory. There is full accord as to the place at which the protrusion occurs and the manner in which it develops. The assumption, however, that the triangle of Zenker constitutes a point of weakness is disputed, and it is thought that an acquired defect accounts for the herniation. Supporting this view is the fact that its occurrence in young subjects has

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never been reported, apart from cases where there is an organic stenosis of the upper end of the œsophagus. Most examples of pharyngeal diverticula have been found in adults past middle life and the incidence is greater in males than in females (3 : 1). King is of the opinion that the pressure of the lower end of the cricoid cartilage against the spine has a causative relationship to the formation of diverticula. It is only after mature development of the larynx that it is large enough to create sufficient pressure against the cervical vertebrae, and the area at which all diverticula of this type develop is where the lower border of the cricoid cartilage rests against the cervical spine. However, the upper portion of the posterior surface of the cricoid cartilage does not rest against the spine, as does the lower portion, and it is at the inferior border of the cartilage that herniation occurs.

At the site of all intervertebral joints there is a slight ridge, and it was found at operations and at post-mortem dissections that in nearly every case of pharyngo-œsophageal diverticulum the lower border of the cricoid cartilage rested against the ridge of the fifth cervical vertebral joint. It has been assumed, therefore, that the pressure of this ridge against the lower border of the cricoid cartilage results in thinning of the inferior constrictor muscle and the posterior pharyngeal wall at this point of pressure. The relative position of the cricoid cartilage to the vertebrae and their joints depends on the stature of the person, the length of the neck and the degree of curvature of the cervical spine, and it is thought that the last-mentioned factor explains the frequent occurrence of diverticula in the elderly patient. Arthritic changes in the cervical spine very often produce an increased anterior curvature, or it may be the result of a compensatory lordosis in the progressive kyphosis of the thoracic spine of the patient past middle age. If the curvature becomes more pronounced, the cricoid cartilage rests more firmly against the spine.

Another factor in support of this theory is that diverticula occur three times as frequently in men as in women. The male larynx is, on the average, one and a half times the antero-posterior diameter of the female. Men are more muscular and the larynx is consequently held more firmly in contact with the spine.

The firmness and intimacy with which the larynx is held in contact with the spine can be gathered from cases reported in the literature. For example, compression fractures of the fifth cervical vertebra with slight anterior displacement of the body of the vertebra have by pressure caused a bilateral recurrent nerve paralysis. Again, cases are on record where a nasal feeding tube has produced in debilitated patients decubitus ulcers in the œsophagus and hypopharynx on the posterior surface of the cricoid cartilage. Records also relate the production of a uni- or bilateral cord paralysis by a feeding tube. Surgical literature abounds with

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reports of such complications, and they confirm the intimate relationship between spine and cricoid cartilage.

Whether this explanation is correct or not, it is impossible to say at the present stage of our knowledge ; but I think it should be taken into consideration, as the assumption of a congenital hiatus is not entirely satisfactory. It certainly fails to explain many facts, e.g. why it never occurs in the child and why it is more common in the male sex. It will require very thorough clinical and post-mortem observation in the future to put the ætiology on a more definite basis.

Case Reports

Mrs. N. W., 72 years of age, was admitted to the wards of the E.N.T. Department on 19.4.49.

History.

The patient had difficulty in swallowing for several years. To begin with the attacks of dysphagia were only of short duration and occurred only at long intervals. As time went on, the attacks of dysphagia became more frequent and troublesome. Four years ago she had to be admitted to the same wards, because her complaint had become very marked. Both a straight X-ray and radiography after an opaque meal revealed no abnormality. The patient was œsophagoscoped and an area of inflammation was seen in the post-cricoid region. Because of its resemblance to a malignant condition, a piece of the tissue was removed for biopsy. The Pathologist's report read as follows: " There is some hyperplasia of the squamous epithelium of the œsophagus, but no evidence of malignancy."

During the period that followed her discharge from the Infirmary until her readmission on the above date, she continued to have periods of dysphagia. About a fortnight prior to her admission, she felt that " something got stuck in her throat " while eating a meat dish, and complained of a sudden sensation of pain in the region of her suprasternal notch. As the discomfort did not show any signs of improvement in the following two weeks, she came to the Infirmary.

Examination.

The general condition of the patient was poor, she appeared toxic, her tongue was dry and furred. No abnormality was found on examination of her neck. Her breathing was slightly laboured. T. 98·6°, P. 110, R. 24. The blood examination showed a mild secondary anæmia and a leucocyte count of 12,500 per c.mm.

Respiratory System.

The percussion note was impaired over the bases of both lungs and the respiratory movements were somewhat diminished. The breath sounds were distant and weak and the conduction of the spoken voice was diminished. It was thought that the condition was one of bilateral pleural effusion.

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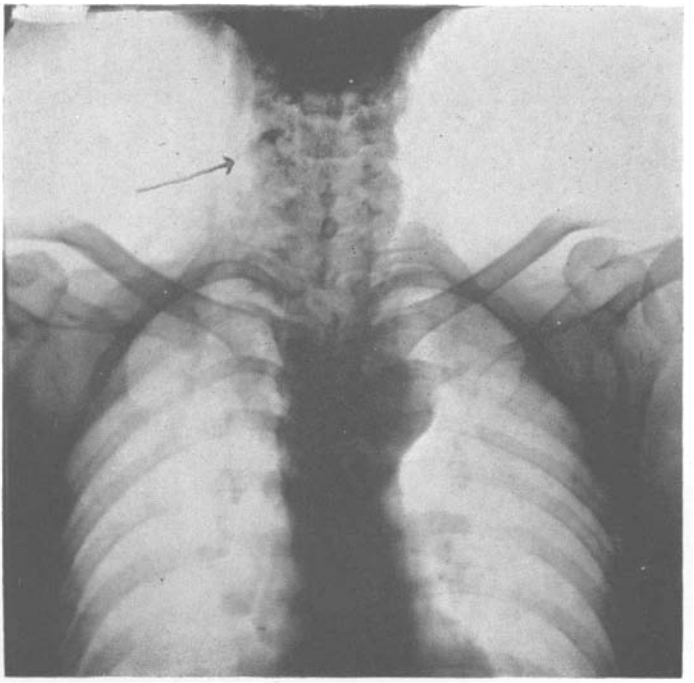


FIG. 1.
Pharyngo-œsophageal Diverticulum in antero-posterior view.

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FIG. 2.
Pharyngo-œsophageal Diverticulum in lateral view.

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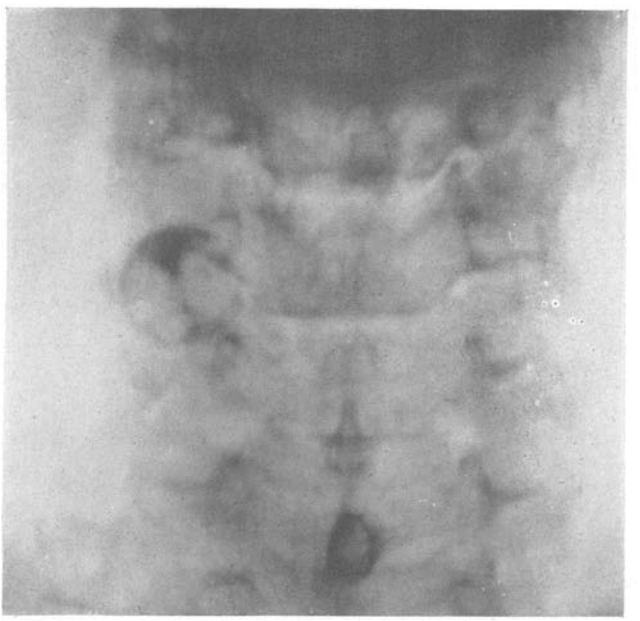


FIG. 3.
Enlargement of Diverticulum.

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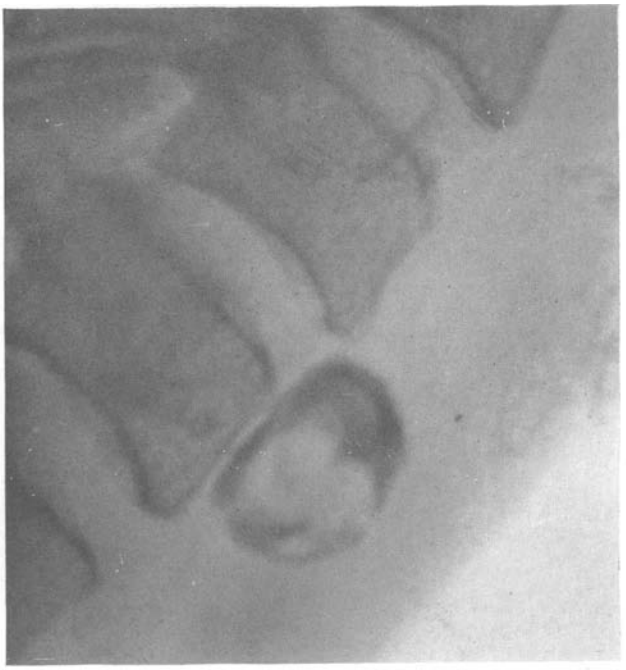


FIG. 4.
Enlargement of Diverticulum.

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The other systems showed no gross abnormality. Indirect laryngoscopy showed nothing abnormal. Radiological examination was carried out. The films showed a roundish opacity, within which were translucencies and which was situated just to the right of the fifth and sixth cervical vertebrae (Figs. 1 and 2). The presence of an opaque foreign body was excluded and, considering her previous history, the diagnosis of pharyngo-œsophageal diverticulum was made (Figs. 3 and 4). A barium swallow was not carried out, because the patient was not considered fit to be taken to the X-ray Department, which is a considerable distance away from the E.N.T. wards.

Although the patient's poor general condition was fully appreciated, it was decided that a laryngoscopy was advisable because of the patient's continuous complaint of pain in her neck and the possibility of the presence of a foreign body, not opaque to X-ray. This was carried out with a minimal amount of disturbance to the patient.

There was no foreign body at the pharyngo-œsophageal junction. In the post-cricoid region there was a raised, red, œdematous area, which bled easily on touch and which showed in its centre what appeared to be a shallow, oval ulcer, and which was considered to be the opening into the diverticulum. However, the possibility of an ulcerating malignant neoplasm of the post-cricoid region was considered and great care was taken in removing a piece of the tissue for biopsy. Histological examination, however, showed only inflammatory changes and no evidence of malignancy. The patient's condition deteriorated and she died two days later.

A post-mortem examination was performed and the relevant points were as follows :

On the right lateral wall of the œsophagus at the level of the lower border of the cricoid cartilage, there was a shallow, oval ulcer measuring about ½ cm. in its longer diameter. This ulcer had an opening into a diverticulum, which was lying parallel to the œsophagus and extended on its right side downwards for about 5 cm. and upwards for about 2 cm. This diverticulum was lined with epithelium and was of the "pulsion" type. It contained pus, and fibrinous exudate was adherent to its wall. Near its lower end it had a small perforation and the thick pus had tracked downwards parallel to the œsophagus and on its side to the hilum of the right lung, where infection of both pleural cavities had occurred. There was a mediastinitis surrounding this abscess track. A second abscess was present in the muscles of the neck anterior and lateral to the right lobe of the thyroid gland and was well encapsulated. The pus was thick and of greenish colour. The œsophagus distal to the orifice of the diverticulum was of normal structure.

There was a bilateral empyema of the pleura covering the basal lobes of both lungs. There was no pneumonia in the basal lobes and the empyema was clearly related to the mediastinal infection.

Comment

The diagnosis of pharyngo-œsophageal diverticulum was made, but was not confirmed by demonstration of the pouch after an opaque meal. As it turned out, it was fortunate that the barium meal could not be given,

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because the contrast fluid would have found its way into the mediastinum. Without this essential examination other conditions, such as calcified aberrent thyroid adenoma and a calcified lymph gland, had to be taken into consideration. For practical purposes, however, the last-named conditions could be excluded, as her previous history pointed to the diagnosis of diverticulum.

The diverticulum had probably perforated at the time when she thought that something had become impacted in her œsophagus and felt the severe pain in the region of the supra-sternal notch. It was more in the nature of a slight leak. The possibility that a bone may have produced the perforation was considered, but no foreign body was found at the autopsy. Her general condition, although very poor, did not lead one to suspect the gravity of her complications, both intrathoracically and in the neck, which must have existed for some time, as could be concluded from the quality of the pus and the encapsulation of the abscess. The pain she complained of in the neck was to a great extent due to this abscess.

As in most cases, the symptoms only became obvious at an advanced age. As mentioned before, the condition occurs more frequently in the male sex and is situated more commonly to the left of the vertebral column. In these respects our patient shows a digression from the typical textbook case. It is a point of interest that four years ago, and at her recent examination, the tissue changes in the post-cricoid region so closely simulated malignancy on direct examination that both times biopsy specimens were taken for histological examination. It is a well-known fact, of course, that the mucous membrane of diverticula in this region suffers from a chronic inflammatory change, which must be regarded as precancerous, for malignant disease, extremely rare in the male hypopharynx, is not uncommon in pouches of long duration. The death of the patient was the result of toxæmia, which led eventually to cardiac failure.

Summary

The pathology and pathogenesis of pharyngo-œsophageal diverticulum are discussed. An acquired mechanism in its production is suggested, in contradistinction to the present-day theory of a congenital weakness of the posterior pharyngeal wall.

A fatal case of a perforated diverticulum is described and the relevant post-mortem findings mentioned.

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