

Lecture N. 25

PSEUDO-ANGINAL PAIN OF ESOPHAGEAL ORIGIN

One of the delicate and difficult challenges faced by a esophageal diseases center is the study of patients referred by cardiology units. These subjects have usually experienced chest pain that evokes the clinical picture of angina pectoris and prompts their hospitalization in cardiology wards or even coronary care units (CCR), despite cardiologists not finding any signs of ischemic cardiopathy.

This phenomenon is relatively frequent and fluctuates depending on the study between 10 and 40%. De Meester already in 1982 found that 50% of the patients released from a CCR without cardiopathy had instead esophageal disease. Although it is nonetheless clearly evident that a certain number of cases of chest pain may be induced by diseases other than cardiac and/or esophageal disorders (e.g., vertebral reasons, other gastroenterological causes, etc.), in the majority of cases the esophagus is responsible for the pain. Cardiac disease and esophageal alteration may, nevertheless, coexist, and may be pathogenetically linked: in such cases it is obvious that the cardiological disorder is the primary concern.

This Lecture will explore only that population of patients released from a cardiology ward without any ascertained cardiological alterations and in whom that share of subjects with an esophageal source of pain can be identified.

It is not always possible to gather anamnestic information that is helpful for a diagnosis. In the event this does happen, many patients would most likely not see a cardiologist, or in any case, an esophageal pathology would be suspected sooner.

Normally, these patients have experienced one or more episodes with all of the features of angina pectoris originally outlined by Heberden:

- retrosternal pain;
- sense of constriction;
- anxiety and sense of imminent death;
- relation with fatigue;
- onset at night or in early morning.

Nevertheless, if anamnestic details are further probed, it is possible that symptoms referable to esophageal disease emerge:

- epigastric and/or retrosternal pyrosis;
- odynophagia;
- retrosternal pain after ingestion of very cold, acidic or, if solid, poorly chewed substances;
- regurgitation of acidic or sour substances;
- coughing fits during sleep;
- laryngitis or pharyngitis of unknown origin;
- fits of dysphagia;
- dyspepsia with a sense of slow digestion;
- pain in the “mouth of the stomach”, see ensiform apophysis.

It is clear that in the best of cases, only one of these signs is present and not in a constant way.

We must on the other hand acknowledge that all of Heberden’s classic signs of cardiac angina can be explained pathogenetically from an esophageal perspective. In fact, the shared esophageal and

cardiac innervation justifies the analogies of pain and, hence, the sense of constriction and anxiety fall among the symptoms of many esophageal disorders and often into the habitus of these patients, in whom a psychological component is very important.

In GERD patients, the reflux of gastric material into the esophagus often occurs concomitantly with physical exertion or at night, thereby justifying the pain from exertion and its onset at night. In any case, as a norm all of the considerations emerge at best subsequently, and in this event they lose all diagnostic value. It is for this reason that the contribution of instrumental semiotics becomes essential.

What exactly are the esophageal alterations with pathogenetic relevance to pseudo-anginal pain? We can say that these alterations normally result from a functional disease of the esophagus. This would therefore exclude an organic pathology, which can only exceptionally impact on the pathogenesis of pseudo-anginal pain.

With this in mind, it becomes important to quickly review the key elements of esophageal function. The esophagus is endowed with motor activity that is fundamentally characterized by a basic tonic pressure and by a propulsive, peristaltic-like function which, during swallowing, move the food bolus and clean the lumen of the esophagus itself: this action is known as *esophageal clearing*. The final portion of the esophagus is endowed with a functional valve called the lower esophageal sphincter (L.E.S.), which opens only swallowing, thereby allowing the bolus to enter the stomach, but in resting conditions remains closed so as to prevent the reflux of gastric material into the esophagus.

Patients with pseudo-anginal chest pain generally have two types of alterations: acid reflux into the esophagus and another type of esophageal motility disorder.

The incidence of motility disorders with reflux varies greatly according to patient population, from 8 to 58% of cases. It is estimated that in nearly half the patients with pseudo-anginal pain of esophageal origin, the cause of the pain is not gastroesophageal reflux. In our experience, as well, this finding was confirmed. This fact should be borne in mind, because many tend to overestimate the importance and the frequency of gastroesophageal reflux in the genesis of thoracic pain. As a consequence, when reflux is not demonstrated the esophagus as the source of pain is often ruled out. On the contrary, as we pointed out above, such pain may well be caused by disturbances and disorders that are purely and primarily related to motility.

Now let us look at the first condition: gastroesophageal reflux. This usually causes pain, both for the simple contact of acidic gastric juices with the esophageal mucosa and for the motor reaction to the reflux arising from attempts at clearing, which can often be excessive or uncoordinated. It is important to point out that this marked algogenic response is characteristic of acid reflux: the same does not happen with alkaline reflux, which, because it does not exert the same response, is even more harmful to the esophageal mucosa.

Acid reflux is always the consequence of a failure of the L.E.S., which is often accompanied by a sliding hiatal hernia. The diagnostic technique to ascertain pathologic gastroesophageal reflux, and hence the possible cause of the chest pain, is long-term (24-hour) esophageal pH monitoring. This can be performed without excessively troubling the patient, who can, at home, conduct all his/her routine daily activities. It thus becomes possible to detect those refluxates that arise under particular conditions, such as certain postures - e.g., "*tying shoes*" - physical exertion, defecation, smoking, etc.. Of course, the patient must keep a diary about what happens during these 24 hours, beginning with his/her subjective sensations, especially those relating to the pain felt. If we associate the pH tracing to the

ECG tracing we have esophageal and cardiac parameters in parallel, and we can thus discover whether the pain coincides with a drop in esophageal pH or with a drift in the ST segment.

The phenomenon may also be induced with Bernstein's test: this entails the instillation into the esophagus of a mild solution of HCl unbeknownst to the patient, followed by the instillation of saline solution as placebo. The onset of pain correlated to the drop in pH may have diagnostic significance. There's no doubt in this sense that the onset of pain without provocative tests corresponding to a spontaneous esophageal reflux registered in the tracing of a 24-hour pH monitoring will have even more meaningful.

The use of isotopes in the study of gastroesophageal reflux for diagnostic purposes has the advantage of being less invasive and there is consensus that it is a valid method; however, it cannot equal the reliability of long-term pH monitoring, which is able to provide more information over a longer period of time.

Motility diseases of the esophagus that may be found in subjects with pseudo-anginal chest pain generally entail increased peristaltic contraction pressure for lengthy periods, or motility coordination phenomena these features often co-exist. Such pictures of altered functions frequently constitute characteristic types that can at times be identified radiologically or with the use of isotopes, but whose precise - especially pathogenetic - collocation is established by manometric studies. Like pH monitoring, this test, too, can be performed over a prolonged period of time, thanks to the noteworthy improvements in probes and the digitalization of data. The examination has thus become more reliable and thorough than in the past, when it was hardly manageable and poorly tolerated by patients, thereby limiting its use.

Below are some of the pictures of these serious motility alterations that can be seen in patients with pseudo-anginal syndromes (see the Notes at the close of this Lecture):

- diffuse esophageal spasms
- hypertense LES
- dyschalasia LES
- vigorous achalasia
- various disorders not classifiable under motility incoordination

Esophageal, epiphrenic and esophageal-pharyngeal diverticula are also an expression of a motility incoordination disorder, either primary or secondary to gastroesophageal reflux.

An important, and still unanswered question regards the cause - effect relationship between pain and the motility disorder. This problem is less relevant in cases in which gastroesophageal reflux has been demonstrated. In truth, the manometric examination may - and not rarely - be performed in a stage that is not painful. Indeed, this rule of thumb. If pain arises during pH monitoring and corresponds to dyskinetic pictures all is well; if this does not occur, however, then we can confirm the link between the two phenomena. Moreover, at times during pH monitoring pain may be absent, as may esophageal motility alterations (which can, nonetheless, be detected in subsequent tests). We know, in fact, that these motility disorders may be episodic, as may pain. As a result, difficulties in interpreting these conditions emerge.

As already pointed out, the possibility we have nowadays to prolong manometric studies should reduce the incidence of unresolved, or in anyway dubious, cases. Another technique, which continues

to be studied as a tool to clarify these intricate situations, entails the use of provocative tests, i.e., evoking the couple pain - esophageal dyskinesia by means of physical or pharmacological agents. A number of methods have been proposed for this purpose, including primarily:

- swallowing ice water;
- endoesophageal instillation of acidic solutions;
- bethancho;
- pentagastrin;
- ergometrin
- edrophonium.

When there is reasonable certainty that the pain symptomatology is caused by these esophageal disorders the problem must be faced with therapy. The cure for gastroesophageal reflux may be medical and is based on well-known concepts:

- diet;
- posture;
- H₂ receptor antagonists
- antacids
- chelating agents
- metoclopramide
- proton pump inhibitors (PPIs)

In the event these fail, surgical therapy can in most cases resolve the problem. The operation that ensures better and more durable outcomes, in our experience too, is the Nissen-Rossetti total fundoplication. This procedure actually reconstructs an active anti-reflux valve with autologous material. It is relatively easy to perform, entirely via the abdomen by means of video-laparoscopy; as such, it can be performed even in patients with compromised respiratory conditions.

When a significant delay in stomach emptying is present (as often occurs), it may become useful to associate gastric drainage, which may range from the weakening of the pyloric ring to more complex operations, e.g., extramucosal duodenal myotomy.

Other surgical methods to treat this disease have now and then been proposed. It is not, however, in my view necessary to dwell on the prevalently surgical details of these. Here I have proposed the technique adopted by us and the majority of surgeons.

Treatment of primary esophageal motility disorders, that is, without reflux, creates greater problems. Paradoxically - but then again not so much so - the same drugs that act on the smooth musculature and are used for true angina pectoris also exert activity on the esophagus, above all in the distal segments. And this evidently represents a further pitfall when assuming that esophageal pain is cardiac pain. The pharmacological agents that may be used to treat primary esophageal dyskinesia include:

- nitrates (both short- and long-acting);
- calcium channel blockers (nifedipine, verapamil, etc.);
- other vasodilators.

Some drugs that act on motility coordination, such as metoclopramide, domperidone and

cisapride, do not always exert a valid action on the esophageal musculature. It must be said, however, that patients with serious esophageal dyskinesia all suffer from pre-existing psychological disorders: indeed, one often has the impression that this factor is the most important pathogenic element in the syndrome. In fact, the natural course of the disease shows periods of serious subjective and objective alterations interspersed with periods of near normality.

The news that the anginal crisis is not an expression of cardiopathy usually constitutes a noteworthy therapeutic element for most of these patients. Subjects, once relieved, can often live with their esophageal disorders. In some cases, however, this does not happen, and medical or in any case pharmacological therapy is unsuccessful. At this point surgery becomes necessary.

Since the circular musculature of the esophagus is the element on which the dyskinesia rests, at least as far as its consequences are concerned, surgical therapy is aimed at the functional abolition of the circular fibers by means of their interruption. This is achieved by longitudinal myotomy of the esophageal wall, the extension of which depends on indications. The following are the procedures, all possible with video laparoscopic techniques, that are most widely used:

- diffuse esophageal spasm: myotomy along the arch of the aorta to the cardias (with or without fundoplication);
- hypertense LES: extramucosal cardiomyotomy (Heller) + fundoplication;
- dyschalasic LES: idem.

A case apart is represented by vigorous achalasia, in which the uselessness of medical therapy is now a given and for which the best and most definitive results are obtained with the Heller myotomy, i.e., extramucosal cardiomyotomy together with antireflux fundoplication. This procedure is simple, performable by abdominal video laparoscopy, is practically risk-free and yields excellent long-term outcomes.

Acceptable results have also been achieved by surgeons using pneumatic dilation of the LES. This technique, however, carries some risks and does not always produce definitive results.

In conclusion, it can be said that chest pain mimicking cardiac anginal pain is a relatively frequent phenomenon. The esophagus is often responsible for this symptom, be it as a result of pathological gastroesophageal reflux or caused by primary motility disorders. The advent of more reliable diagnostic techniques allows an improved definition of the problem from both an interpretative/diagnostic perspective and, consequently, from a therapeutic vantage point.

Note: for pH monitoring and manometry tracings, as well as other data see the following Lectures on this website:

- No. 13 - Motility Disorders of the Esophagus - 1
- No. 14 - Esophageal Achalasia
- No. 15 - Gastroesophageal reflux disease

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