# Differentiation of "Esophageal" and "Cardiac" Chest Pain

Peter M. Schofield, MD, Peter J. Whorwell, MD, Philip E. Jones, MD, Nicholas H. Brooks, MD, and David H. Bennett, MD

Between 10 and 20% of patients referred for coronary angiography because of chest pain are found to have normal coronary arteries.[1] Some of them have esophageal dysfunction[2] while others have been shown to have abnormal left ventricular function.[3] This study determines whether patients with esophageal dysfunction could be distinguished from those without an esophageal abnormality on the basis of their clinical history.

*We studied 63 patients (40 women and 23 men, ages 30 to 68 years) with chest pain typical of angina pectoris and normal coronary angiograms. A questionnaire, modified from that used by Master,[4] was used to record details of the patients' chest pain before further investigations were undertaken. The questionnaire included 28 questions regarding the pain's site (7), character (4), radiation (8), precipitating factors (5) and relieving factors (4), as well as 5 questions regarding the presence or absence of dysphagia (solids), dysphagia (liquids), odynophagia, heartburn and regurgitation. Subsequent investigations, as described previously,[3,5] included esophageal manometry, esophageal pH monitoring and quantitative assessment of left ventricular regional wall motion. The percentage of systolic shortening in 7 hemiaxes was calculated from the resting left ventricular angiogram. A hypokinetic segment was defined as a hemiaxis with <2 standard deviations from the normal mean.[6] In addition, the participation of a control group of 21 patients who had angina pectoris and significant coronary artery disease completed the questionnaire.*

From the Regional Cardiac Unit and Department of Gastroenterology, Wythenshawe Hospital, and the Department of Gastroenterology, Withington Hospital, Manchester, England. Manuscript received January 11, 1988; revised manuscript received and accepted March 21, 1988.

*Group 1 comprised 36 patients with esophageal dysfunction (19 had both dysmotility and gastroesophageal reflux, 12 had esophageal dysmotility alone and 5 had gastroesophageal reflux alone). Of the 27 patients in group 2, 22 had left ventricular dysfunction as defined by abnormal regional wall motion and 5 had normal left ventricular and esophageal function. Four patients had both esophageal dysfunction and abnormal left ventricular regional wall motion in group 2. The only difference in chest pain characteristics between group 1 and 2 was the frequency of radiation through to the back, which was significantly more common in patients with esophageal dysfunction [27 of 36 (75%) vs 6 of 27 (22%), respectively, $p < 0.01$]. Radiation to the back was also more frequent in group 1 compared with the control group [1 of 21 (5%), $p < 0.001$]. There was no significant difference in the frequency of symptoms suggestive of an esophageal disorder (dysphagia, odynophagia, heartburn or regurgitation) experienced by patients in group 1, group 2 and control group. The most common symptom experienced was heartburn, which occurred in 56% of patients in group 1, 64% in group 2 and 33% in the control group. An abnormal ST-segment response during treadmill exercise testing occurred in 39% of patients in group 1 and 56% in group 2.*

All of the 63 patients in the present study who had normal coronary angiograms complained of chest pain typical of angina pectoris. Of these, 57% had esophageal dysfunction, which was demonstrated to occur simultaneously with their usual chest pain in most cases. Provocation with intravenous edrophonium during esophageal manometry and treadmill exercise testing at the time of esophageal pH monitoring helped to confirm the association between symptoms and the esophageal abnormality.[5] Esophageal pain, therefore, may mimic "cardiac" chest pain. Our patients were a selected group of patients with-

in the spectrum of esophageal disease who presented with chest pain rather than symptoms more suggestive of an esophageal disorder.

The present study has found that the only feature of the chest pain differentiating patients with an esophageal abnormality from those with presumed myocardial ischemia associated with either left ventricular dysfunction or coronary artery disease was radiation through to the back. In patients with angina pectoris and normal coronary angiograms, therefore, radiation of pain through to the back implies an esophageal abnormality and suggests the search for an esophageal disorder. This characteristic of the chest pain had a sensitivity of 75% and a specificity of 78%. It was not possible to differentiate patients with normal esophageal function (the majority of whom had left ventricular abnormalities) from those with coronary artery disease on the basis of the clinical history.

**1.** Kemp HG, Vokonas PS, Cohn PF, Gorlin R. *The anginal syndrome associated with normal coronary arteriograms: report of a six-year experience. Am J Med 1973;54:735–742.*

**2.** Alban Davies H, Jones DB, Rhodes J. *"Esophageal angina" as the cause of chest pain. JAMA 1982;248:2274–2278.*

**3.** Schofield PM, Brooks NH, Bennett DH. *Left ventricular dysfunction in patients with angina pectoris and normal coronary angiograms. Br Heart J 1986;56:327–333.*

**4.** Master AM. *The spectrum of angina and non-cardiac chest pain. JAMA 1964;187:894–899.*

**5.** Schofield PM, Brooks NH, Colgan S, Bennett DH, Whorwell PJ, Bray CL, Ward C, Jones PE. *Left ventricular function and esophageal function in patients with angina pectoris and normal coronary angiograms. Br Heart J 1987;58:218–224.*

**6.** Leighton RF, Wilt SM, Lewis RP. *Detection of hypokinesis by a quantitative analysis of left ventricular cineangiograms. Circulation 1974;50:121–127.*