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Atypical chest pain in a rehabilitation setting: a case study

Joseph S Oliva, BSc, DC, FCCRS(C)*

This case represents an individual who develops chest pain in a rehabilitation setting. It provides a description of possible assessments and investigations to screen for cardiovascular health. A thorough history and investigation can present a challenge in determining a definite diagnosis. Chiropractors who encounter patients in a rehabilitation program that develop chest pain must address the cardiac versus non-cardiac nature of the condition.
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KEY WORDS: rehabilitation, atypical chest pain, cardiovascular, assessment, investigations, gastrointestinal.

Le présent cas traite d'une personne qui développe des douleurs thoraciques lors d'une réadaptation. Il offre une description des évaluations et des investigations possibles en matière de dépistage en santé cardiovasculaire. Les observation médicale et investigation approfondies peuvent constituer un obstacle à l'établissement d'un diagnostic définitif. Les chiropraticiens qui rencontrent des patients qui développent des douleurs thoraciques dans le cadre d'un programme de réadaptation doivent évaluer la nature cardiaque ou non de cet état.
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MOTS CLÉS : réadaptation, douleurs thoraciques atypiques, cardiovasculaire, évaluation, investigations, gastro-intestinal.

Introduction

Chest pain on exertion is a common complaint amongst patients. Although not an initial presenting symptom, chest pain resulting from increased activity must be addressed. Angina pectoris (AP) is the most serious, although not the most frequent, cause of recurrent chest pain. As a group, musculoskeletal disorders are the most common causes of chest pain over any other disease entities. In this particular case different variables and combinations of variables expressed themselves in an atypical presentation of chest pain.

Case study

The current study concerns a 66-year-old Caucasian male who presented with soft tissue injury to the neck (WAD II classification), shoulder and upper back pain following an automobile accident.[1] This gentleman had a forty-year history of heavy cigarette smoking and surgical intervention for a peptic ulcer approximately 35 years previously. He had, otherwise, enjoyed relatively good health. He had consulted a chiropractor in the past for complaints of lower back pain and other musculoskeletal symptoms.

During examination the patient was noted to be well oriented and somewhat anxious.

Blood pressure was recorded as 130/80 mm. Hg. and pulse was regular, 70/bpm. He was 173 cms tall and weighed 77.3 kg.

Ranges of motion of the cervical spine were limited in

* Private practice, Woodbridge Rehabilitation Centre, 4600 Highway No. 7, Suite 105, Vaughan, Ontario L4L 4Y7. Tel.: 905-856-4444. Fax: 905-856-8294. E-mail olivadr@home.net

extension due to pain at the cervico-thoracic level. Kemp's maneuvre for foramenal compression in the cervical spine was positive on the right. Joint palpation findings were positive at the level of C5–6, indicative of restriction elicited tenderness. Motion palpation demonstrated restriction of the cervical spine at the C2–3 and C4–5 levels. Restrictions in the thoracic spine were noted from T1–3 to the level of T7–8. Myofascial trigger points were detected in the dorsal musculature, specifically, the trapezius and rhomboideus major musculature, bilaterally.

Lumbar spine ranges of motion were noted to be full and pain free. Motion palpation elicited pain and restriction at the L5–S1 level. The paralumbar musculature was determined to be hypertonic and tender to palpation bilaterally.

Over the next four to six weeks, treatment included passive modalities, chiropractic spinal manipulation and a rehabilitation program consisting of stretches, flexibility training and cardiovascular conditioning. The patient was evaluated prior to commencement of the rehabilitation program to identify contraindications in undertaking such a program and to identify the need for further medical evaluation. A number of forms were utilized as screening tools according to the American College of Sports Medicine Guidelines for exercise testing and prescription (ACSM, 1991 – See Appendix).

The patient provided medical clearance and submaximal exercise was initiated. On several occasions the patient developed dizziness, fatigue, reported intermittent pain substernally which radiated to the shoulders and right jaw, and complained of shortness of breath. His symptoms not only intensified on exertion while engaged in the rehabilitation program, but also intensified subsequent to normal activities at home such as gardening or while doing housework. He was referred to his medical physician for further investigations and appropriate cardiac work-up.

Medical assessment

Briefly, the results of the medical investigations are as follows:

Heart Rate: regular, 70 bpm.

Blood Pressure: 130/ 80 mm. Hg.

Chest X-rays: revealed bilateral chronic obstructive lung disease with chronic inflammatory change at the bases. Mild degenerative disc disease was incidentally noted.

Upper GI: A small sliding hiatus hernia was reported. Gastric mucosal folds were prominent consistent with hypersecretion. The duodenal cap was cited to be moderately deformed due to scaring. A peptic ulcer crater in the centre of the anterior wall of the cap was visualized.

ECG: Normal.

Echocardiogram: Ventricle: LV size and systolic function was normal. RV size and function was normal. Aortic valve trileafet mildly thickened. There was no aortic regurgitation. Mitral valve, normal with a trace of mitral regurgitation. Tricuspid valve: normal, with trace of tricuspid regurgitation.

Exercise Stress Test: Patient underwent a graded exercise test. He tolerated it to 6 minutes with the rate increased to 13 per minute. There was an appropriate blood pressure response. Electro-cardiogram was reviewed and found to be a negative stress test.

Abdominal Ultrasound: No abnormality visualized. The gallbladder had been previously excised.

Laboratory studies: see Tables 1, 2, and 3.

The patient was cleared to continue with his physical rehabilitation program. He was prescribed nitroglycerin as needed, ventolin (2 puffs q.i.d.) and atrovent. A provisional diagnosis of pulmonary emphysema was rendered.

Four weeks later the patient developed an acute attack of chest pain, fatigue and shortness of breath, and subse-

Table 1
Blood and isoenzymes = normal

CK–2 1.9 Relative CK–2 index < 2.0 or CK–2 < 5.0 UG/L		
Creatinine	65	60–120 umol/L
Sodium	142	135–145 mmol/L
Potassium	4.5	3.5–5.0 mmol/L
Chloride	101	96–106 mmol/L
LDH	137	95–170 mmol/L
CPK	77	45–225 U/L
SGOT (AST)	28	10–45 U/L

Table 2
Haematology = normal

WBC Count	4.8	4.0–11.0 g / L
Hemoglobin	148	130–180 g / L
Hematocrit	0.42	0.42–0.52 g /L

quently presented to a local emergency facility. A nitro paste and heparin was administered. Although further investigations were negative, the patient was considered high risk for likely myocardial infarction due to ongoing chest pain. He was subsequently admitted to the coronary care unit and scheduled for an angiograph and angioplasty if required.

Following extensive testing procedures, the right coronary artery was found to be 40–50% occluded. This was not felt to be severe enough to be reproductive of symptoms. He was released from hospital with a diagnosis of non-cardiac chest pain. It was recommended that his family physician further investigate the gastrointestinal system as a possible etiology for the patient's chest pain. There is a high prevalence rate of esophageal dysfunction in patient's with atypical chest pain.[2,3,4]

Discussion

Patients suspect of having chest pain are typically admitted to the coronary care unit on the basis of their history, physical examination, and ECG findings.[5,12,13] Chest pain must be differentiated as cardiac or non-cardiac. The pain quality, character and location are important. Recurrent chest pain is commonly musculoskeletal (MSK), but angina pectoris (AP) is the most serious cause.[10] Heberden's four original descriptions of angina pectoris that distinguishes it from other types of non-cardiac pain are: angina is located behind the sternum; has a strangling quality; is accompanied by mortal anxiety and is related to exertion.[5,6,11]

Chest pain of MSK etiology is characterized as being well-localized, superficial, presenting with referral patterns, loss of muscle strength, reflexive changes and objective sensory changes.[9,10] A history of trauma or findings of tenderness on palpation of the wall, with a posterior component helps differentiate MSK from AP.[8, 9, 10] Neck and thoracic root pain can also present as atypical chest pain. This condition is also referred to as pseudoangina or cervical angina if chest pain results from compression of the C7 nerve root.[16, 17] It is precipitated by fatigue, incorrect posture or movement of the involved segments and is often dull and aching in character and punctuated by brief sharp twinges of pain.[8] It may be intensified by coughing and sneezing, and the pain may last for hours.[8] Relief may be obtained through rest, analgesics, postural change, manual treatment, local heat or cold.[8,9]

Table 3
Pulmonary function: spirometry = mild obstruction

	Predictive Value	RPRE	% PRED	Post	% PRED	% CHANGE
FVC (L)	3.18	2.51	79	2.47	78	–2
FEV1 (L)	2.26	1.63	72	1.66	74	+2
FEV1 / FVC (%)	71	65	92	67.00	94	+2
FEF 25–75 (L/SEC)	3.25	1.07	30	1.09	31	+3
PEFR (L/SEC)	7.25	2.20	31	3.14	44	+43
FEF25% (L/SEC)	10.91	2.11	19	2.96	27	+41
FEP 50% (L/SEC)	3.81	2.52	79	1.94	61	–23
FEF 75% (L/SEC)	1.59	0.48	30	0.48	30	0
FIVC (L)	3.18	2.52	79	1.94	61	–23
PIFR (L/SEC)	7.21	2.26	31	2.00	28	–12
FIF 50% (L/SEC)	3.18	1.16	36	1.43	45	+24
F150/FESO		0.85		1.04		+22
Sa 02 93% Minimal drop in saturation (not significant)						

Clinically, deep, dull, aching, poorly localized pain, is often representative of visceral disorders. Gastrointestinal conditions can mimic symptoms of angina which may be difficult to differentiate.[8, 10] Conditions such as peptic ulcer, hiatus hernia, and indigestion, may sometimes be differentiated by bloating and abdominal distress and relieved by belching or through the actions of an antacid.[8]

Anginal discomfort may refer pain to both the upper and lower abdomen and may be difficult to recognize. Angina and gastrointestinal disturbances may co-exist, further complicating the matter, and as such may be clinically indistinguishable.[6,10]

In the present case study, the immediate consideration was that of angina and consequent myocardial infarction. What complicated the unraveling of the patient's diagnosis was that neither nitroglycerine nor rest were observed to relieve the patient's chest pain. The history of esophagitis, secondary to hiatus hernia was also considered but the use of an antacid was also not effective in the relief of symptoms. The critical issue was to determine if it was in fact unstable angina in order to treat and prevent a subsequent myocardial infarct.

The electrocardiogram is a helpful tool used in a battery of investigations to differentiate cardiac and non-cardiac chest pain. Transient changes in the ST segment and T wave are present in unstable angina where as nonspecific changes in the ST segment and T wave have been reported in esophagitis, peptic ulcers and cholecystitis.[2, 7]

Despite a thorough history and physical examination, in conjunction with relevant laboratory and radiographic evaluation, a definite diagnosis could not be reached. Due to the presenting symptoms, specifically that of prolonged and severe chest pain, an angiogram was performed to determine a possible cardiac etiology. Results suggested the condition was of a non-cardiac origin. The patient was released from the coronary care unit with a diagnosis of chest pain not yet diagnosed. Consequently, a gastrointestinal etiology was considered.

Conclusion

Chest pain may present during physical rehabilitation. Screening tools are effective in the documentation, screening and identifying of individuals that are at risk for cardiovascular disease. Such individuals require a more comprehensive medical evaluation.[7] It is important that chiropractors keep in mind all possible etiologies when seeing patients in order to make appropriate referrals and facilitate a patient's treatment. A thorough history, with particular attention to detailed description of chest pain often provides most of the essential information needed for a correct diagnosis. Patients with severe, protracted chest pain, may have serious underlying disease, such as myocardial infarction, pulmonary embolism, pericarditis and dissecting hematoma.[6,8]

Such patients require immediate hospitalization for diagnosis and treatment. A thorough history is of particular importance in individuals that present with atypical chest pain, as evidenced in this case, since it may be difficult to differentiate atypical presentations. It is unfortunate that the physical rehabilitation was abandoned due most likely to the patient's unexplained pain. Such patients require ongoing support and management.[11] Once a definite diagnosis is made, medical treatment can be complemented with the chiropractor's role in the reassurance, education, diet and return to physical activity of the patient.[7]

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Appendix

It is important to screen cardiovascular health and to identify any contraindications prior to any physical rehabilitation program. The American College of Sports Medicine Guidelines for Exercise Testing and Prescription (ACSM, 1991) is an effective tool in the documentation, screening and categorization of patients who are at risk and require a more comprehensive medical evaluation.[7]

1. PAR-Q (Physical Activities Readiness Questionnaire)[7]

The form obtains general information about the participant's physical condition. As the form is completed, questions are asked concerning a participant's heart problems, blood pressure, orthopedic problems, weight, smoking, diabetes, family history and arthritis. Individuals with heart, pulmonary or metabolic problems may have to limit exercise and should obtain clearance from an appropriate physician before being allowed to participate in fitness testing, exercise or rehabilitation.[7,14,15]

Patient was over the age of 65 and automatically required medical clearance

2. Cardiovascular Disease Risk Factor Analysis[7]

This form is completed simultaneously and in conjunction with the PAR-Q questionnaire, as a way to estimate an individual's risk for heart disease. The form provides additional information concerning medical clearance. Any score 33 or greater puts the patient in the "high risk" category and indicates that a medical clearance is advised prior to exercise, testing or rehabilitation. The form is also valuable in evaluating patient's health habits and influencing lifestyle changes.[7]

The patient's score was 45

3. Pre-exercise Test Questionnaire

This test provides patient's activity history, immediate pretest diet, sleep habit, health and medication history. As well, it provides information in determining the patient's exercise prescription and may be helpful in determining the efficacy of the exercise test. These forms provide important screening concerning the level of a person's health and cardiovascular risk. The patient was classified as:

Table 1: HEALTH CLASSIFICATION CATEGORIES	Apparently Healthy Individual Asymptomatic and has one major coronary risk factor
Table 2: MAJOR CORONARY RISK FACTORS	Cigarette smoker.
Table 3: MAJOR SYMPTOMS AND SIGNS OF CARDIOPULMONARY OR METABOLIC DISEASE	None
Table 4: ABSOLUTE CONTRAINDICATIONS FOR EXERCISE TESTING	None
Table 5: RELATIVE CONTRAINDICATIONS TO EXERCISE TESTING	None