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Patient with signs and symptoms of myocardial infarction presenting to a chiropractic office: a case report

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A 53-year-old female presented to a chiropractic office with signs and symptoms of heart attack (myocardial infarction). Although she was complaining of neck and upper back pain, the cause of her condition was due to an incident of acute myocardial infarction (MI). Other than anterior chest pain, patients with MI could experience pain over lower jaw and teeth, both arms, shoulders, neck, upper back and epigastrium. Recognizing the possible underlying cause of the patient's complaints, and directing them toward the appropriate venues of therapy is essential. Due to the fact that heart attacks are underestimated in women within a certain age group, their detection is also less frequent. To emphasize this fact, presentation, incidence, epidemiology, examination, laboratory findings, and risk factors for the myocardial infarction (MIs) are discussed in this paper.
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KEY WORDS: chiropractic, ischemic heart disease, myocardial infarction, heart attack, chest pain.

Une femme de 53 ans s'est présentée en consultation dans un cabinet de chiropratique pour recevoir des traitements, mais, en fait, elle montrait des signes et des symptômes d'une crise cardiaque (infarctus du myocarde). Même si elle se plaignait de douleurs au cou et dans la partie supérieure du dos, son état était dû à un infarctus du myocarde (IM). Outre les douleurs rétrosternales, les patients victimes d'un IM peuvent ressentir de la douleur à la mâchoire inférieure et aux dents, aux bras, aux épaules, au cou, dans la partie supérieure du dos et dans l'épigastre. Il est essentiel de cerner la cause sous-jacente possible des malaises d'un patient et de le diriger vers les ressources appropriées. Comme les crises cardiaques sont sous-estimées chez les femmes appartenant à un certain groupe d'âge, on les détecte également moins souvent. C'est dans ce contexte que suit une discussion sur le tableau clinique, l'incidence, l'épidémiologie de l'IM, ainsi que sur l'examen physique, les examens de laboratoire et les facteurs de risque.
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MOTS CLÉS : chiropratique, cardiopathie ischémique, infarctus du myocarde, crise cardiaque, douleurs rétrosternales.

Introduction

Although coronary artery disease has long been known as the leading cause of death among middle-aged men, it is an equally or even more important cause of death and disability among older women. In 1988, forty-one per cent of deaths among Canadian women – 37,000 per year – occured from heart disease or stroke, seven times the number of deaths due to breast cancer.[1] In 1991, cardiovascular disease (heart disease, stroke, and atherosclerosis) accounted for a greater proportion of deaths in women (46%) than in men (40%).[2] In 1997, cardiovascular disease

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was the leading cause of death in Canada (36%).[3] According to the American Heart Association, each year cardiovascular diseases claim the lives of about 448,000 men and 478,000 women. This is more than 10 times the number who die of breast cancer. Yet women consistently voice much more concern over the latter.[4]

The symptoms of heart disease in women may be different from men. While the first sign of heart disease in men is often a heart attack (myocardial infarction), heart disease in women usually presents far less dramatically. Women are more likely to experience vague pain or discomfort in the chest, neck, back and arms which tends to come and go for months or even years before it is diagnosed.[5] Sixty-three percent of patients who seek chiropractic care present with musculoskeletal problems.[6] Combining the incidence of heart disease in women and its possible musculoskeletal presentation, increases the likelihood of a patient presenting with neck and upper back pain secondary to underlying heart disease in chiropractic settings.

To emphasize the typical presentation of a patient, possibly experiencing a heart attack, a case of a 53-year-old female is described below. The incidence, prevalence, possible signs and symptoms, examination, laboratory findings, and risk factors are briefly discussed.

Case report

A 53-year-old female yoga instructor was experiencing insidious neck and upper back pain over a period of two days. She recalled no trauma or particular incident that could have caused the pain. She appeared tired and fatigued with complaints of dull and achy pain over the neck and upper back which was expanded over both shoulders and chest area. She had no arm pain or numbness. She also complained of stomach flu and abdominal pain over the last 2–3 weeks. She stated that she had been unable to eat due to lack of appetite. However she had been able to consume copious amounts of water. She appeared physically fit and was a long term chiropractic maintenance patient. The possibility of an internal problem aside from her musculoskeletal pain were discussed with her. Following the chiropractic visit she was unable to contact her family doctor and decided to visit the emergency room. Upon admission, laboratory assessment indicated that she had experienced a heart attack 36 hours prior to her admission. She was kept in the hospital for further observation.

Discussion

Although heart disease has largely been considered a "male-oriented disease", and heart attack rates in women are known to lag behind those in men, after a certain age coronary artery disease is seen to affect both sexes equally. It is interesting to know, however, that there is no accurate model for heart disease in women. Until now most attention was directed to men. With respect to heart studies, women have been under-represented, under-investigated, under-diagnosed, and according to some authors, under-treated.[7] Most people consider breast cancer as the chief killer of women while in fact cardiovascular disease is the leading cause of death among women. Based on 1988 Canadian statistics, 41 percent of deaths among women – 37,000 a year – occured from heart disease and stroke, seven times more than the number of breast cancer.[1] In 1997, cardiovascular disease (heart disease and stroke) was the leading cause of death in Canada (36%).[3] For men of all ages, 36% of deaths are attributable to cardiovascular disease, while in women the percentage is slightly higher, at 38%. In women, the proportion of all deaths due to cardiovascular disease increases after menopause. In men, the percentage of all deaths due to cardiovascular disease increases steadily from age 35 to 84.[3] Although the percentage of all deaths due to cardiovascular disease for women has decreased from 46% to 38% over the last 6 years, the number of deaths per year has been increasing from 37,000 to 39,619 for 1997.[3]

Myocardial infarction occurs due to narrowed or blocked coronary arteries. Coronary arteries lie on the surface of the heart and supply it with oxygen. The source of oxygen, however, may be altered if fatty deposits (plaque) are produced, causing atherosclerosis. Extensive atherosclerosis reduces blood flow to the heart, causing chest pain and shortness of breath.[1]

This shortness of breath and chest pain is usually more prominent during physical activities (exertional angina). Myocardial ischemic pain is usually described as a pressing, squeezing, or a weight-like heaviness on the chest. Unfortunately, non-cardiac disorders such as pleuritis, peptic ulcer disease, gastritis, cholecystitis, esophageal spasm, and musculoskeletal disorders can mimic cardiac pain.[8] Myocardial ischemic pain is usually greatest in the central precordium and may be demonstrated by the patient by placing a clenched fist over the sternum.[8]

Myocardial infarction in women does not tend to con-

form to the above classic description, however, which is largely derived from data on men.[9]

In addition to exertional angina, women are more likely to experience angina at rest, with mental stress, or during sleep.[10] Other than anterior chest pain, women may experience pain in locations such as the lower jaw and teeth, both arms, shoulders, neck, upper back and epigastrium.[10] Women are more likely to have dyspnea, palpitations, presyncope, fatigue, sweating, nausea, or vomiting as chest pain equivalents.[11] Women also experience more silent MIs; nearly half of the MIs occur in women are unrecognized.[12]

Women substantially underestimate their own risk of coronary artery disease and tend to attribute their symptoms to other disease processes.[13]

One obvious difference between coronary artery disease in men and women is the older age at which it strikes females. The protective effect of estrogen is believed to play a key role by controlling harmful cholesterol, and assisting in maintaining vasodilation of the coronary arteries. Once estrogen production ceases, however, women tend to have reduced effect of this natural protection. By the age 50–55, women start to catch up to men in coronary heart disease rates. By the age 65–70, heart attack rates are similar in both sexes with one in three affected by coronary disease.[1,5]

Prognosis, long term management and rehabilitation

Studies show that about one-third of those suffering a heart attack die before reaching hospital. When a woman has a heart attack her prognosis is even worse than man's, and she is more likely to die during her first attack. Also more women than men suffer a second heart attack shortly after her first attack, and more women die within a year of their first heart attack.[1] In a study of patients between 65 and 84 years admitted to hospital with heart failure, more than one-third were readmitted with recurrent heart failure within 1 year, and 16% were readmitted within 30 days.[14] In another study contributing factors to readmission of patients with heart failure included: noncompliance with medications, dietary indiscretion, inadequate discharge planning or follow up, lack of social support, and failure to seek medical attention when heart failure symptoms began.[15]

Cardiac rehabilitation is recognized as a critical factor in all cardiovascular patients. Complete cardiac rehabilitation consisting of exercise training, risk factor modification, cardiac education and counselling has shown to improve functional capacity, enhance return to work, improve quality of life, and most importantly, reduce all-cause mortality, sudden death and fatal MI.[16,17,18]

After a first heart attack, women are less likely than men to attend cardiac rehabilitation. Women are less often referred, are less motivated, have more caregiving duties and fewer family supports. Women are also more likely to suffer continued angina, are older and more frail, and may feel guilty about their illness. Recently, new specialized programs are being designed and oriented toward women's needs.[1]

Warning signs and symptoms

In men, a heart attack may often be the first clue to heart trouble, while more women tend to get angina as a preliminary or warning symptom. When men complain of angina, it follows a classic, more easily recognized pattern described as squeezing or crushing pain and heaviness on the left side of the chest, (perhaps radiating to the shoulder or left arm), often brought on by exercise and relieved by rest. In women, angina is often atypical and does not follow any recognizable pattern. Women with angina may just complain of a little neck-ache, occasional pain in the back or breast or tingling in the fingers.

Women may be misdiagnosed and sent home and not thoroughly investigated for coronary heart disease.[7] Therefore, it is essential to investigate patients who present with any of the following signs and symptom:[5]

1. Pain or discomfort in the chest brought on by activity and relieved by rest.
2. Vague discomfort in the chest that does not go away with rest.
3. Sudden, severe, crushing chest discomfort that may move to other parts of the body.
4. Heaviness, pressure, squeezing, fullness, burning, tightness or other discomfort in the chest, shoulder, arm, neck or jaw regions.
5. Unusual pain spreading down one or both arms.
6. Nausea, vomiting and indigestion.
7. Shortness of breath, pallor, sweating, weakness or unusual fatigue.
8. Difficulty carrying out activities which used to be easy.
9. Feeling of extreme anxiety, denial or fear.

Examination

The patient is usually restless, apprehensive, pale, diaphoretic, and in severe pain. The skin is usually cool and peripheral or central cyanosis may be present. The pulse is thready and the blood pressure is variable; however, many patients initially have some degree of hypertension unless cardiogenic shock is developing. Arrhythmia is common: bradycardia or extrasystoles may be observed early in the course of myocardial infarction. The heart sounds are usually somewhat distant; the presence of a 4th heart sound is almost universal. There may be a soft systolic blowing apical murmur at the apex.[8]

For some causes of chest pain, the findings on the physical examination are extremely important; while for others one must rely heavily on the history and diagnostic test.

Table 1
Possible causes of chest pain

Non-Cardiac	Cardiovascular	Gastrointestinal	Pulmonary
Ankylosing spondylitis	Coronary artery disease	Cholelithiasis	Mediastinal emphysema
Arthritis (RA, OA, infectious, psoriatic, manubriosternal, sternoclavicular)	Idiopathic hypertrophic subaortic stenosis	Esophageal perforation	Neoplasm of lung, Pleura, & Mediastinum
Condensing osteitis of clavicle	Dissecting aortic aneurysm	Esophageal spasm	Pleuritis
Costochondritis	Dressler's syndrome	Esophageal reflux	Pneumomediastinum
Costovertebral arthritis	Coronary artery spasm (Prinzmtal's angina)	Esophagitis	Pneumonia
Epidemic myalgia	Mitral valve prolapse	Gas entrapment syndrome	Pneumothorax
Fibromyalgia	Myocarditis	hiatal hernia	Pulmonary embolism
Precordial catch syndrome	Pericarditis	Mallory-Weiss syndrome	Pulmonary hypertension
Psychogenic regional pain syndrome		Pancreatitis	
Herpes Zoster		Peptic ulcer	
Neurofibromatosis			
Slipping rib syndrome			
Sternal Wire sutures			
Sternalis syndrome			
Tietze's syndrome			
Thoracic disc disease			
Trauma			
Xiphoidalgia			

For example, a patient with angina pectoris frequently fails to show any abnormality on physical examination; while a patient with myocardial infarction may present with signs of congestive heart failure, such as a third heart sound, rales and rarely, pedal edema.[19]

Neuromusculoskeletal examination

When a patient with primary or secondary complaint of chest pain presents to a chiropractic office, it may be useful to organize the history taking and physical examination in terms of location, pattern, character and duration of pain. Neuromusculoskeletal cause of chest pain can be exposed by trying to mechanically reproduce the patient's exact complaint with respect to location and quality of pain. Chiropractor's skills in neurological, orthopaedic and palpatory examination should be optimized to detect possible non-neuromusculoskeletal causes of chest pain.[19,20,21]

Researchers at the Philadelphia College of Osteopathic Medicine (PCOM) conducted a randomized control study in which 62 subjects (25 subjects had confirmed acute MI, 15 subjects had cardiovascular disease other than MI, and 22 subjects with no known heart disease as controls) were seen by osteopathic physicians for palpation of the thoracic paravertebral soft tissue at T1 through T8. They found that the control group had low incidence of palpable changes throughout the thoracic dorsum, and these changes were uniformly distributed from T1 to T8. Examination of the group with myocardial infarction disclosed a significantly higher incidence of soft tissue changes (increased firmness, warmth, ropiness, oedematous changes, heavy musculature), confined almost entirely to the upper four thoracic levels. Statistically significant differences were found at T1 to T4 on the left and at T4 on the right for the MI group when compared to the other two groups. The 15 patients who had cardiovascular disease other than MI also showed significantly different changes on palpation compared with the group with myocardial infarction.[22] In a follow-up study, the same researchers at the Philadelphia College of Osteopathic Medicine (PCOM) found that the soft tissue changes were significantly reduced in the eight MI patients who returned for re-examination.[21] As it was illustrated in this study a readily palpable somatic component might be an important sign during routine physical examination, alerting the examining physician to pursue a diagnosis of unrecognised myocardial infarction.

Laboratory findings

The most important laboratory procedure in the patient with suspected acute myocardial infarction is analysis of the ECG (electrocardiogram). In acute transmural myocardial infarct (Q-wave infarct) the initial ECG may be diagnostic, showing abnormal deep Q-waves and elevated ST segments in leads subtending the area of damage, or the ECG may be strikingly abnormal with elevated or depressed ST segments and deeply inverted T-waves without abnormal Q-waves.[8] Nontransmural infarcts (non-Q-Wave infarcts) are usually in the subendocardial or mid-myocardial layers, and are not associated with diagnosic Q waves on the ECG and commonly produce only varying degrees of ST segment and T-wave abnormality.[8]

Resting and exercise electrocardiogram are indicated for the patient with possible angina pectoris. Coronary angiography and radionuclide studies are used for the diagnosis and management of coronary artery disease. Echocardiography is the best test for assessing patients with pericarditis and mitral valve prolapse.[24]

Routine laboratory examination reveals abnormalities compatible with tissue necrosis. Therefore, about 12 hours after myocardial infarction, ESR (Erythrocyte sedimentation rate) is increased, WBC (white blood cell) is usually elevated, and differential WBC count shifts to the left.[8]

Myocardial enzymes

Within 6 hours of myocardial necrosis, CK-MB (myocardial component of creatine kinase) is found in blood. Elevated levels persist for 36 to 48 hours after myocardial infarction. Elevation of CK with > 40% MB in combination with clinical findings is diagnostic of myocardial infarction. Repetitive measurement of CK-MB for every 6 hours for the first 24 hours will confirm or reject the diagnosis. Serum lactic dehydrogenae (LDH) rises later and persists longer in serum (7–9 days) than CK-MB. Combining repetitive CK-MB, LDH, and myocardial imaging results are useful with suspected MI patients who are seen some time after the onset of signs and symptoms.[8]

Differential diagnosis

Chest pain could be related to cardiovascular, gastrointestinal, pulmonary, neuromusculoskeletal, and a number of other causes. Some of the possible causes are listed in table 1.[19]

Diagnosis

Typical MI is diagnosed from the history, confirmed by the initial ECG and its subsequent evolution, and supported by the serial enzyme changes. Otherwise, the patients must be classified as having had a possible or probable MI. However, it is wise to consider MI in all men over age 35 and all women over 50 when their major complaint is chest pain.[8]

Risk factors

The following are the most classic coronary artery disease risk factors and preventive strategies which are similar for women and men:[23,24,25] Smoking; high cholesterol; high blood pressure; diabetes mellitus; physical inactivity; family history of heart disease; increasing age; obesity; and negative effects of stress. For women, additional risk factors may include reduced estrogen levels triggered by menopause or other factors; oral contraceptive use for greater than 10 years (especially if begun under 35 years of age); and elevated triglyceride levels.[5]

Oral contraceptives

The rate of coronary heart disease is low among women of childbearing age. Among women 35–44 years of age, the annual incidence is 1 per 1,000; among women 45–54 years of age, the incidence is 4 per 1,000.[26,27] The older high-dose oral contraceptives increased the risk of cardiovascular disease by raising LDL cholesterol levels and lowering HDL cholesterol levels, reducing glucose tolerance, raising blood pressure and promoting clotting mechanisms.[28] The relative risk of myocardial infarction was elevated among women who used these oral contraceptives. The composition of oral contraceptives has changed considerably since they were first introduced. Current estrogen and progestin levels have been reduced, and their effect on lipoprotein levels is slight.[29] The results of some recent case-control studies suggest that oral contraceptives containing lower doses of steroids may carry less risk of coronary heart disease.[30]

Alcohol consumption

Although heavy alcohol use increases the risk of death from cardiovascular complications, there is much evidence suggesting that low to moderate daily consumption of alcohol provides protection against coronary heart disease in both men and women.[31]

Low-dose aspirin

Meta-analyses of randomized trials involving people with a history of occlusive vascular disease have demonstrated that aspirin reduces the incidence of subsequent myocardial infarction, stroke, and death by about 25 percent in both men and women. Similarly, aspirin has a clear benefit in men and women with acute evolving myocardial infarction.[32]

Antioxidant vitamins

It has been hypothesized that antioxidants such as beta carotene, vitamin E, and vitamin C may reduce the risk of cardiovascular disease. Research has demonstrated that such vitamins inhibit either the oxidation of low density lipoprotein cholesterol or its uptake in the coronary artery endothelium.[33]

Postmenopausal hormone-replacement therapy

There is compelling evidence that postmenopausal hormone-replacement therapy reduces the risk of coronary heart disease. A review of 31 observational studies estimated a statistically significant 44 percent reduction in the risk of coronary heart disease among postmenopausal women receiving estrogen-replacement therapy.[34]

Summary

Insidious onset of neck and upper back pain, secondary to heart problems paint a possible clinical complication of patients seeking chiropractic care. As in the case outlined above, recognizing the possible underlying cause of the patient's complaints, and directing them toward the appropriate venues of therapy is essential.

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