



# Taking it to Heart: Cases in Heart Disease



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## Case 1

On a routine followup visit for hypertension, Mrs. A, 70, mentions she has recently been having chest discomfort at night. She describes it as pressure and says it usually fades after about 10 minutes. There are no associated symptoms. She walks a mile every day and has never had this discomfort on exertion. She smokes 10 cigarettes a day.

On exam, you find her blood pressure well controlled on hydrochlorothiazide and there are no other abnormalities. She asks if this might be angina. You are wondering this as well. Also, your differential diagnosis includes gastro-esophageal reflux disease and anxiety.

Would you refer Mrs. A for a stress test?

**For a case discussion, see page 86.**

## In this article:

1. What is the difference in the prognosis of CAD between men and women?
2. What are the diagnostic tools?
3. Which treatments are recommended?
4. What are the effects of oral contraceptives on the heart and blood vessels?

## Case 2

A 30-year-old female accountant, new to your practice, is thinking about starting oral contraceptives (OCPs). She smokes a pack of cigarettes a day and has been unable to quit. She has been previously in good health and has a normal physical exam.

She is concerned that she might be at risk of stroke or blood clots if she uses OCPs and smokes, and wonders how serious these risks are. What do you tell her?

**For a case discussion, see page 87.**

## CAD in Women

The epidemiology, pathophysiology, typical presentation, laboratory evaluation, and prognosis of coronary artery disease (CAD) differ significantly between men and women.<sup>1</sup> Before menopause, women have a much lower incidence of CAD than men. After menopause, the yearly incidence of CAD is higher in women than in men and the prevalence in women catches up to that of men by about age 60. Every year, there are more deaths due to CAD in women than in men. CAD is the leading cause of death for both sexes. Risk factors for men and women differ as well. For women, diabetes is a more important risk factor. High-density lipoprotein cholesterol (HDL-C) appears to be a more important risk factor than low-density lipoprotein cholesterol (LDL-C) for younger women.

### How do women present differently from men?

Women have more micro-vessel disease, more coronary vasospasm, and more single-vessel CAD than men. They are also more likely than men to present for the first time with angina rather than myocardial infarction (MI). Women are just as likely as men to have effort angina, but are more likely to have angina at rest, during



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### Discussion of Case 1

Mrs. A's pain is not typical exertion angina, but because of her age and coronary risk factors, you remain concerned about nocturnal ischemic chest pain. You refer her to an internist, who agrees, and arranges stress testing within the week. She achieves a good workload of 9 metabolic equivalents and has 2 mm of down-sloping ST depression in the inferior leads at peak exercise, without symptoms. She has a good heart rate and blood pressure response to exercise. The test is read as positive.

The internist recommends therapy with acetylsalicylic acid, nitroglycerin as needed, and a nocturnal nitro patch. She agrees to quit smoking as well. As her stress test had no adverse prognostic indicators and her symptoms are minimal on medical therapy, non-invasive confirmatory testing and angiography are not recommended at present.

sleep, or with emotional stress. During MI, women have more nausea, jaw, neck, or back pain, but less diaphoresis than men.

### What is the prognosis?

Prognosis differs between the sexes as well. For chest pain, in general, women have a better prognosis than men. When unstable angina is the clinical diagnosis, women have a higher frequency of normal or non-occlusive CAD on

*Today's formulations of oral contraceptives pose a lower risk for MI, but a higher risk for DVT and PE.*

angiography. In the case of chronic, stable angina, prognosis for both genders is similar. Prognosis for MI, however, may be worse in women as they tend to be older and have more co-morbidity.

### What are the diagnostic tools?

When CAD is suspected, women will have more ST-T wave abnormalities on electrocardiogram (ECG) than will men (30% versus 20%).<sup>2</sup> The false positive rate for stress testing is about 20% higher in women than in men, although this may be due to a lower incidence of disease in studied groups, which have mostly looked at younger women. The false negative rate is about the same (15% to 20%). Thus, the stress test can be a good technique for ruling out CAD when it is considered moderately likely. A stress test carries the same prognostic importance for women as it does for men.

#### Discussion of Case 2

For this woman, the risk of pregnancy outweighs that of MI or stroke. The risk is less than 1 in 2,500 per year of use for either of the latter two outcomes. The risk of DVT or PE is slightly higher; 1 in 1,000 to 2,000, but is irrespective of her smoking status. There is only a 1 in 100,000 to 200,000 chance of fatal PE. She should not be prescribed OCP after age 35 if she continues to smoke, largely because of the risk of MI.



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## CAD in Women

Some sources recommend stress imaging, such as sestamibi or stress echo, as a first-line test because of its greater accuracy in women.

A major disadvantage of these tests is that they are less readily available than stress ECGs.

### What are the treatments for women and men?

Women and men with CAD should receive similar medical and non-medical therapy. However, for women, there is much less convincing data that LDL-lowering therapy is as effective for primary or secondary prevention of MI or death.

### What are the effects of OCPs?

The cardiovascular and thrombotic risks of OCPs have been well studied.<sup>3</sup> Many case-control studies, with millions of patient-years of data, have shown increased risk of deep venous thrombosis (DVT), stroke, MI, and hypertension in OCP users.<sup>4</sup> When expressed as a relative risk, these numbers look impressively dangerous, especially for smokers. However, the event rates are so low that the absolute risks are much less impressive, as further discussed below. It should be kept in mind that most large, long-term studies used higher-dose formulations of OCPs. Today's formulations probably have a different risk—lower for MI but higher for DVT and pulmonary embolism (PE). This different risk is, so far, not conclusive enough to affect guidelines for treatment.

#### *Myocardial Infarction*

The risk of MI is significantly increased for smokers age 35 or older. The number of patients taking OCPs needed to cause one MI, [*i.e.*, the number needed to harm (NNH)], is 2,500.<sup>3</sup> This statistic includes the newest OCP formulations. Otherwise, the risk of pregnancy outweighs the risk of MI due to OCPs. There is some suggestion that lighter smokers (< 15 cigarettes per day), over age 35, may safely be prescribed OCPs.<sup>5</sup>

#### *Stroke*

For both ischemic and hemorrhagic strokes, the risks are much lower than that of MI for women taking OCPs. The effect of smoking on that risk is not as clear. The risk does, however, increase for women over 35 and for hypertensive patients. The NNH is 25,000 to 50,000 patients for one year to cause one stroke.<sup>3</sup>

#### *DVT/PE*

DVT/PE are more common events for OCP users, but in this case, smoking does not amplify the risk. Newer formulations appear to be more risky. The NNH is 1,000 to 2,000 patients for one year to cause DVT or PE.<sup>3</sup> For fatal PE, the NNH is 100,000 to 200,000 patients. The risk increases for patients who have hypercoagulable states, but screening for these states prior to OCP prescription has been shown not to be cost-effective.

#### *Hypertension/Cholesterol*

OCPs raise blood pressure about 5 mmHg, on average, and this makes one out of every 250 users hypertensive.<sup>3</sup> Blood pressure returns to normal levels once OCPs are stopped. Estrogens raise HDL-C and lower LDL-C, as do newer

## Take-home message

- Women have more micro-vessel disease, more coronary vasospasm, and more single-vessel CAD than men. Women are also more likely to present with angina than with MI for the first time.
- The stress test is a good “rule out” test for women when CAD is considered moderately likely.
- Women with CAD present with “atypical” chest pain more often than do men.
- There is an increased risk of DVT, stroke, MI, and hypertension in women who use OCPs.
- The risk of MI is significantly increased for smokers age 35 or older who are taking OCPs.

progestins. Older progestins raise LDL-C and lower HDL-C. The net effect on the lipid profile appears to be minimal to beneficial. The increased risk of MI and stroke is thought to result from increased thrombogenesis. CME

### References

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## Taking it to heart: Cases in Heart Disease

### 1. When should I proceed with testing for coronary artery disease in women with atypical chest pain?

Women with atypical chest pain who are post-menopausal, or who have significant coronary risks, still have a moderate probability of ischemic heart disease and should be strongly considered for further testing [*i.e.* beyond a simple electrocardiogram (ECG)].

Note that pain felt at night, or in the jaw or back, is actually more typical of coronary ischemia in women than it is in men.

As presented at the University of Manitoba

**CME for Family Physicians: Women's Health Issues**

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### 2. Are stress tests as useful in women as they are in men?

Stress tests have a higher false positive rate in women, but the false negative rate is about the same. Thus, stress testing is a reasonable “rule-out” test, but not as good a “rule-in” test.

A positive stress test result may lead to more accurate testing, such as a sestamibi scan or a stress ECG. Stress tests provide useful prognostic information, such as exercise capacity and heart rate/blood pressure product, that is similar for men and women.

### 3. Which women are at prohibitively high risk of cardiovascular complications from oral contraceptives (OCPs)?

Women who smoke and are over age 35 have a risk of myocardial infarction (MI) that is prohibitive, that is, it is worse than the risk of pregnancy.

Women with a history of deep venous thrombosis (DVT) should generally not be prescribed OCPs. A family history of DVT or pulmonary embolism is likely not enough to preclude prescription of OCP or to justify a hypercoagulability workup prior to prescribing OCPs.

For an in-depth article on Cases in Heart Disease, please go to page 85.