

Estrogen and Palpitations: Is There Something Latent?

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Background

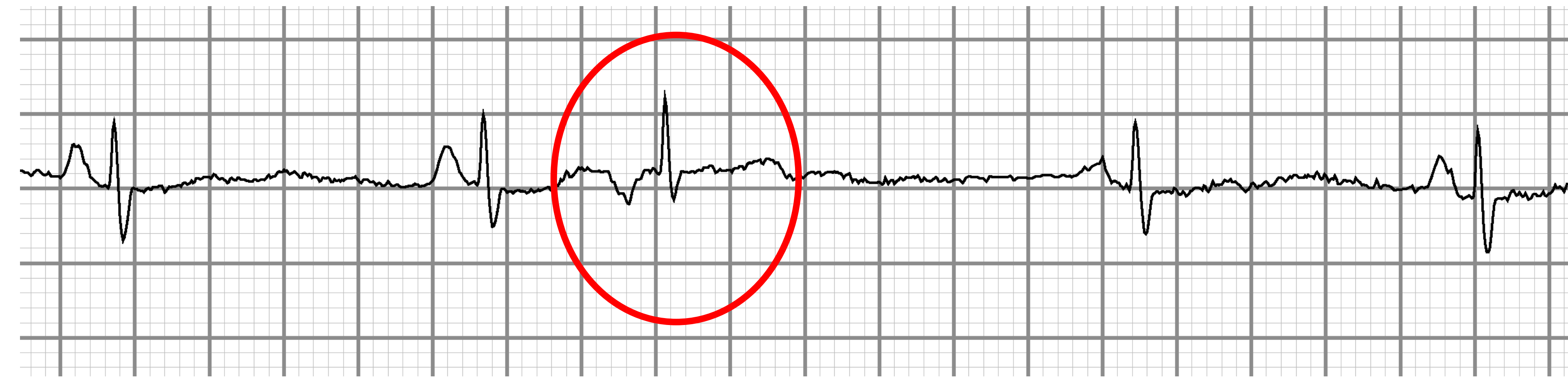
Hypoestrogenic state in postmenopausal women has a wide array of effects on the cardiovascular system. Significant gender-based differences in coronary artery disease, left ventricular hypertrophy and cardiac remodeling post myocardial infarction have been well documented. Hormone replacement therapy (HRT) has been shown to reduce coronary heart disease and ameliorate vasomotor symptoms related to hypoestrogenism including hot flashes and palpitations.

Clinical Case

A 56 year-old woman with a past medical history of gastritis, hyperlipidemia, resolved mild COVID-19 infection, latent tuberculosis, hypothyroidism presents for a chief complaint of three weeks of palpitations. She experiences the symptoms daily, without association with activity or position. Review of symptoms is otherwise notable for persistent fatigue after COVID-19 infection and light-headedness associated with palpitations; she has not experienced syncopal symptoms, shortness of breath, or chest pain. The patient's medications include levothyroxine 75mcg for hypothyroidism, omeprazole 20mg twice daily, estradiol-norethindrone acetate 1-0.5mg daily for post-menopausal vasomotor symptoms. She was also started on rifampin 600mg daily for treatment of latent tuberculosis two months prior.

Clinical Case

Laboratory data from two weeks preceding this encounter revealed an unremarkable complete blood count and complete metabolic panel; last thyroid stimulating hormone level was 2.92. ECG in the office showed multiple premature atrial complexes (PAC) as shown in the sample ECG below (3rd QRS is preceded by a PAC).

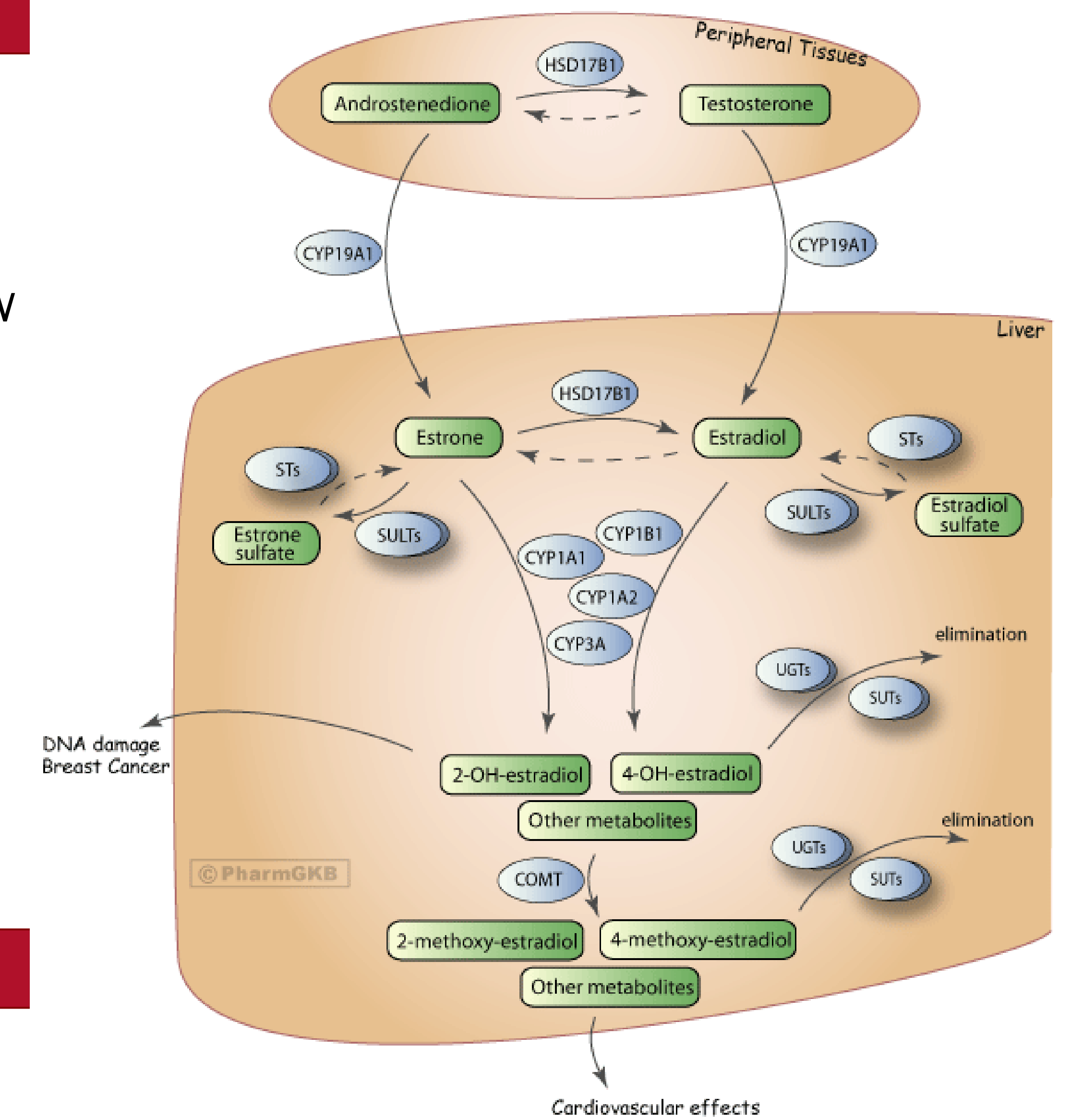


Discussion

Rifampin, a medication used in the majority of antitubercular treatment regimens is a well-documented potent inducer of the cytochrome P-450 oxidative enzymes with numerous clinically relevant drug interactions. The first step of estrogen metabolism in the liver is hydroxylation, mediated by cytochrome P450 enzymes (as shown in the figure below). Further, palpitations are known to be a symptom associated with hypoestrogenemia in post-menopausal women. In this patient who was recently started on rifampin for treatment of latent tuberculosis, it can be reasonably postulated that plasma estrogen levels were decreased due to more rapid metabolism. Hormone replacement therapy should be optimally titrated in these patients with close attention paid to potential drug interactions. The preferred treatment includes uptitrating HRT while the patient is on rifampin therapy, as was recommended in this patient with close gynecologic follow up.

Conclusion

Rifampin is a known inducer of the CYP450 enzymatic system. In the absence of more common causes of palpitations such as electrolyte abnormalities, thyroid abnormalities, or electrophysiological cardiac lesions, hyperproteinemia should be considered in patients on HRT who recently started rifampin therapy for treatment of latent tuberculosis.



References

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