

Clinical physiology and pharmacology case study

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Annie is an elderly lady who lives with a one-eyed cat and a budgie. She is rather overweight and sometimes out of breath.

Annie is very involved in the community, helps with many voluntary activities organized by the local Community Volunteers office and is generally considered quite active for a woman of over 70 years of age. Annie has had mild asthma for some years, but it troubles her very little and is well controlled.

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However, Annie has noticed this winter that there is a tightness or ache in her chest. When she walks back from shopping and climbs the hill to her house. On very cold days this is much worse and sometimes the sensation builds up from a dull ache to a real pain, which appears to spread down her left arm; it usually disappears after she has rested for a few minutes and had a cup of tea.

Nannies doctor diagnoses angina and prescribes glycerol Trinitarian (GET) tablets, which are to be dissolved under the tongue, not swallowed.

IQ What are the physiological characteristics of the coronary circulation? SQ Describe the innervations of the heart. SQ How is the blood flow to cardiac muscle controlled? SQ Explain why there is chest pain when Annie climbs the hill, especially in cold weather. SQ What electrocardiogram (ECG) changes would you expect to occur during an angina episode? SQ GET is commonly prescribed for angina. What is its pharmacological action?

SQ Nat are the adverse effects of the nitrate drugs? Part 2 Annie goes back to her doctor 18 months later. She reports that the pain in her chest is now coming more frequently.

She has given up her voluntary work as she cannot now manage to walk up the hill and climb the stairs to the Community Volunteers' office. She also reports that she doesn't obtain adequate pain relief from the GET prescribed. The doctor notes the worsening of her symptoms and suspects that she might not be obtaining pain relief from GET because she is swallowing the tablets.

He decides to prescribe her an alternative anti-angina agent. SQ Explain the types and common causes of angina. SQ Why might swallowing the GET tablets limit Annie's pain relief? QUO Would the beta-blockers (beta-blockers) antagonist be suitable medication for Annie? Give reasons for your answer.

IQ 1 What is the pharmacological action of propranolol? IQ 2 How can angina be distinguished from myocardial infarction? QUO A third type of agent available for the treatment of angina is a calcium channel blocker. Explain the pharmacological action of calcium channel blockers.

The executive's medical check-up review mechanisms which control blood pressure (BP) and the ideal range for adult explain the mechanism of action of agents currently available to treat hypertension; explain how intransitive agents may cause postural hypertension; outline lifestyle factors which affect BP. Rhea chief executive of a European company, Sam Smart, is now 60 years old and has high-profile, stressful job with frequent travel and business entertaining.

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He enjoys the good life and his weight has increased significantly over the years. Cam's wife tries to help him lose weight by preparing sensible meals, but he eats out so often that her efforts are without effect.

However, Sam feels pretty fit on the whole, except for occasional mild asthma attacks, usually following a chest infection. This is well controlled with an inhaled beta-2-agonist (P2 agonist). Sam missed his check-up with the company doctor last year because of a delayed return from a business trip. At his most recent medical, two years ago, Cam's BP was a little higher than expected, 145/93 mmHg.

At the time the doctor advised Sam to modify his lifestyle to help lower his BP.

However, Cam's self-control was never very good and, although he tried to eat and drink sensibly for a while, he soon went back to his old ways. IQ What is the normal BP range for Cam's age group and what mechanisms maintain the BP in this range? SQ Does stress affect BP? How might Sam decrease his stress level? SQ If BP continues to rise and is not treated, what adverse effects (including tissue damage) may occur? SQ It is usual to start treating hypertension with either a beta-blocker (β -blocker) or a thiazide diuretic.

What is the mechanism of action of the beta-blockers (β -blockers) antagonists (β -blockers)? Sam is available for his medical this year, but arrives late and in a rush. He has enjoyed a big lunch – steak and chips with deep-fried onion rings, followed by Jam sponge pudding and custard. He has

drunk most of a bottle of wine plus a brandy, and so is easily able to produce a urine sample.

The company doctor checks Cam's " eight and BP and sends blood and urine samples for analysis. Sam now weighs 99 kg(220 lb), his urine appears normal but his plasma cholesterol is rather high at 6.5 mmol l⁻¹ (ideal value