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Calculation Skills: Raynaud's Phenomenon

Raynaud's phenomenon is a condition caused by vasospasm of the arteries which blocks the blood flow to the extremities, usually the fingers and/or toes but may also affect the ears, nipples, lips and nose (NICE, 2014). The condition can be triggered by stress, anxiety and cold temperatures (NHS Choices, 2015). Primary Raynaud's refers to the condition which develops without any underlying cause, whilst secondary Raynaud's is mainly caused by an underlying connective tissue disorder (NICE, 2014). Patient's with Raynaud's present with colour changes to the affected area (white, then blue, then red), often along with pain, numbness and pins and needles (NHS Choices, 2015).

Question 1

The prevalence of Raynaud's phenomenon is said to be between 3% and 21% (Carpentier, 2006). Based on these figures:

(i)   What is the mean percentage of people affected by Raynaud's?
(ii)   How many people in 1500 would be affected based on the lowest estimated percentage?
(iii)   How many people in 1500 would be affected based on the highest estimated percentage?

Question 2

Judy is a 39 year old social worker. After making the recommended lifestyle changes, she has not seen any improvement in her condition and is to be prescribed prophylactic immediate-release nifedipine. She is required to start with the lowest recommended dose of 5mg (JFC, 2017), three times daily. 5mg capsules are available at a cost of £5.73 for 90 capsules.

(i)   How many capsules will Judy need for the 16 days treatment until her next appointment?
(ii)   What will be the cost of this period of treatment (based on price per tablet rounded up or down to nearest pence)

Question 3

Due to limited response to her initial treatment, Judy's nifedipine is increased in the weeks following her review appointment. She takes 10mg 3 times daily for 14 days, 15mg 3 times daily for 14 days and has been taking 20 mg 3 times daily for the last 7 days. Capsules are available in 5mg, 10mg, and 20mg strengths.

(i)   How much nifedipine in total (in grams) has Judy taken since commencing the treatment with nifedipine?
(ii)   Assuming Judy took her nifedipine using the minimum number of capsules required to make up the dose, how many nifedipine capsules has she taken in total?

Question 4

After a period of remission, Kim (a 29 year old writer) has presented again with Raynaud's. Due to suffering adverse effects from the immediate release nifedipine previously, she is to be prescribed modified-release off-label. She commences on the lowest recommended dose of 20mg modified-release nifedipine once daily. 20mg capsules are available at a cost of £5.41 for 60 capsules.

What would be the difference in cost between seven days treatment with the lowest daily dose of modified-release nifedipine and the lowest daily dose of immediate-release nifedipine? (Based on price per tablet)

Question 5

Nice (2014) advise that up to two thirds of patients being treated with nifedipine suffer adverse effects. Based on your answer to question 1 (ii), how many of those patients will suffer adverse effects from nifedipine?

Answers

Question 1

    (i)   Mean percentage = (3% + 21%) ÷ 2 = 12%
    (ii)   Number of people in 1500 that would be affected based on the lowest estimated percentage: 3% of 1500
                 1% = 1500 ÷ 100 = 15
                 3% = 3 x 15 = 45
    (iii)   Number of people affected based on the highest estimated percentage: 21% of 1500
                 21 x 15 = 315

Question 2

    (i)   Capsules required = 1 (capsule) x 3 (daily) x 16 (days) = 48
    (ii)   Cost per capsule = £5.73 ÷ 90 = 6p (rounded down)
                 Cost per 16 days = 6p x 48 = £2.88

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    (i)   First 16 days = 48 x 5 = 240mg
                 Next 14 days = 42 x 10 = 420 mg
                 Next 14 days = 42 x 15 = 630mg
                 Last 7 days = 21 x 20 = 420mg

Total = 240 + 420 + 630 + 420 = 1710 mg / 1.710g

(ii)   First 16 days = 48
Next 14 days = 42
Next 14 days = 42
Last 7 days = 21
Total = 48 + 42 + 84 + 21 = 195 capsules

Question 4

Cost of modified-release capsules:

1 day's treatment = £5.41 ÷ 60 = 9p (rounded down)

7 day's treatment = 7 x 9p = 63p

Cost of immediate-release capsules:

1 day's treatment = 3 x 6p = 18p

7 day's treatment = 7 x 18p = £1.26

Difference in cost = £1.26 – 63p = 63p

Question 5

Nice (2014) advise that up to two thirds of patients being treated with nifedipine suffer adverse effects. Based on your answer to question 1 (ii), how many of those patients will suffer adverse effects from nifedipine?

Total people = 45

2/3rds = 30

References

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