



Please note – this learning resource has been produced by the GUMS Academic Team. It is possible that there are some minor errors in the questions/answers, and other possible answers that are not included below. Make sure to check with other resources.

Scenario 1:

Stem 1: Ned Ron presents to your clinic. He has had congestive cardiac failure for 10 years. This was caused by long standing cardiac hypertrophy due to aortic stenosis.

Q1: Define ejection fraction

Q2: Ned Ron had aortic stenosis. Complete the following table by outlining the hypertrophic consequence of this:

	Aortic stenosis	Aortic regurgitation
Type of hypertrophy that will result?		
How are the sarcomeres added?		
Does this lead to systolic or diastolic dysfunction?		

Q3: A naive bond student asks you ‘what about non-valvular causes of heart failure’? Fill in the following table, looking at other causes of heart failure:

	Concentric cardiac hypertrophy	Previous MI
Type of heart failure (systolic or diastolic) that will result?		
Comment on the ejection fraction (and link this to the examples above)		



Q4: Name a synonym for diastolic and systolic heart failure

Stem 2: Ned Ron comes back to your clinic later complaining of urinating infrequently. You take some bloods and find the following:

- Elevated Cr
- Elevated urea
- BUN:Cr > 15
- FENa < 1%
- Urine Osm > 500

Q5: Given his history of heart failure, what is the most likely diagnosis? Briefly explain

Q6: Contrast the ratio of BUN to creatinine reabsorption in someone without kidney issues (i.e. what is the normal BUN:Cr ratio)

Q7: Outline the pathophysiological mechanism for increased BUN:Cr ratio in patients with pre-renal AKI

Q8: Briefly explain how the following would also lead to pre-renal AKI:



Stem 3: Ned Ron soon develops the following findings after his findings:

- BUN:Cr < 15
- FEFNa > 2%
- Urine Osm < 500
- Hyperkalaemia
- Metabolic acidosis
- Casts in urine

Q9: What is the most likely diagnosis? What has caused this?

Q10: Explain his FEFNa and urine Osm, as well as the reason there are casts in the urine

Stem 4: Ned Ron later presents to clinic with a fractured neck of femur. His kidney function has continued to deteriorate. He is found to have chronic kidney disease

Q11: List the major findings in CKD:

Q12: Explain the mechanisms for the following:

- Hyperkalaemia
- Hyperparathyroidism

Q13: Explain how his CKD can make his heart failure worse

W1: the patient had BPH? List the main complications

W2: is a renal colic in a ureter or chronic BPH more likely to cause elevated Cr? Why?



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Year 1 Peer Based Learning 2018

Renal System



Scenario 2:

Four patients: Kate, Duncan, Victor and Patricia all come into your clinic. Duncan has end-stage hyperaldosteronism and is about to die. The others all don't cope well. Kate has an opioid overdose, Victor has a panic attack and Patricia starts drinking a lot of coke, aggravating his diabetes which gives him DKA.

Q1. Outline the pathophysiology of these four conditions, in terms of the acid base disorder it will cause:

Q2. Outline the following findings in each of the four acid-base disorders: pH, pCO₂, HCO₃⁻ and compensation



Scenario 3:

You are on the renal ward at GCUH. You have a few patients who have various kidney diseases each presenting with symptoms of the nephrotic syndrome.

What are the components of the filtration barrier in the kidney?

Explain the mechanism leading to each of the following symptoms of the nephrotic syndrome. (*Hint: remember that the nephrotic syndrome involves derangement of the kidney filtration barrier*)

Proteinuria	
Peripheral oedema	
Lipiduria	
Decreased prothrombin time	
Increased risk of infection	

A Bond student also on placement with you suggests to the consultant using IV saline and albumin to treat some of these patients. The consultant asks if you agree? Explain your answer.



Some of these patients go on to develop various other complications. Explain the mechanism of the following signs and symptoms for THESE patients.

Unilateral calf pain and swelling at rest	
Dyspnoea, stony dull percussion note and decreased breath sounds at the base of the lungs bilaterally	
Sudden onset flank pain with an acute decline in GFR	

What if another patient (not necessarily with nephrotic syndrome) presented with the following findings on urine dipstick analysis? Indicate whether they are normal or not, and indicate a possible cause (other than filtration barrier problems or medications)?

	Is this normally found in urine?	If not, describe a possible cause of the pathology (other than a filtration barrier problem)
Bilirubin		
Urobilinogen		
Glucose		
Haemoglobin		



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Another patient presents with suprapubic pain, dysuria, urinary urgency and frequency. Their urine dipstick is positive for nitrites and leukocytes. Explain why.