

Elevated Creatinine Scenario:

A 63-year-old male is being seen in urgent care for a refill on his medications, including an ACE inhibitor, Carvedilol, Metformin, Lipitor and Celebrex. The patient has a history of hypertension, type 2 diabetes mellitus, and osteoarthritis, and he used to see his primary care doctor on a regular basis until he ran out of insurance 6 months ago. The patient had refills on his medicines until last month, so he continued to take them, is here for more refills, and thinks that all his medical conditions are fairly stable, and his lifestyle is quite healthy. The patient does not remember his last lab results from 6 months ago, but he recalls that his doctor told him that his kidneys were taking a hit from diabetes and high blood pressure. At urgent care, the patient's finger stick lab tests are available, including blood sugar, serum creatinine and HgbA1C. These show that the patient's blood sugar is 190 gm/dl, creatinine is 2.9 mg/dl and HgbA1C is 7.9%.

Using the Epi-logical Approach, what should be the probable diagnoses?

Based upon this patient's risk factors, chronic intrinsic renal pathology secondary to medical conditions, such as diabetes and hypertension, is likely, especially when he has hinted at mild baseline renal dysfunction. Based upon age and gender, a prostate pathology can be considered as well, although the patient seems to be quite asymptomatic. An acute event such as recent gastroenteritis and/or use of a nephrotoxic agent may have precipitated a decline in renal function. Therefore, the clinician must consider all differentials on the clinical mind map as probable.

How should a clinician address urgent/emergent situations?

The clinician can review the patient's vitals and general appearance. The patient's blood pressure is 165/90, heart rate is 88 beats/minute, Temperature 98 F, O2 sat 98% on room air, Respiratory rate is 16/minute and his BMI is 32. The patient appears quite comfortable and he seems to be oriented in time, place and person.

Based upon this, the clinician can conclude that the patient is not in an urgent or emergent situation.

Weighing and Removing Anchor Bias:

The Clinician's Questions	The Patient's Responses	How does this information help with the weighing process?
Do you have any additional medical problems?	I had a heart valve replacement several years ago, but I have not had any subsequent problem related to this procedure.	The patient does not seem to have any additional risk factors for kidney disease.
When did you last take your medications?	I have been out for one to two weeks. I took my last blood pressure medicines 10 days ago and the diabetes medicine 6 days ago. I ran out of	The rise in blood pressure may be acute because the patient ran out of his medicine or he has had a steady rise in his blood

	cholesterol medicine 3 days ago and took my last pain medicine yesterday.	pressure causing ongoing renal damage. Celebrex (a COX-2 inhibitor) might have been causing slow damage as well.
Did you take any new medicine or supplement over the last few days? Or undergo a procedure that we are not aware of?	I did not take any other pill, but I had a root canal done 2 weeks ago. They gave me a lidocaine injection, but nothing else.	The patient does not seem to have been exposed to any additional external nephrotoxic agents.
Have you had any recent illness, such as a stomach virus with diarrhea, or vomiting, or any other infection?	No, I have been fine.	Pre-renal causes are not likely.
Have you noticed any problem with urination, such as difficulty emptying your bladder, weak stream, or frequent night-time urination?	Yes, actually I was going to set up an appointment for that after I get insurance. I have been getting up at night, and I have noticed that it is hard for me urinate. My older brother has the same problem, and he is taking a prostate medicine.	The patient might have developed a prostate pathology leading to post renal disease. Examples include prostate hyperplasia, nodule and/or cancer. Typical benign prostate hyperplasia leads to a larger size than prostate cancer.
How long have you noticed these symptoms?	These have been going on for several months even before I stopped seeing my doctor, but I never brought it up.	A large prostate may be causing post renal disease.
How severe is this problem? Do you feel that you cannot empty your bladder at all, or it is about 50%, or less or more?	I feel that there is always some residual amount. I would say that about 20% is always left behind. That's why I keep going.	This is obviously not anuria. So even if post renal disease is a factor, it is only contributory, not the sole cause of renal dysfunction.
Do you have any swelling in your feet, shortness of breath or abdominal fullness?	No. I haven't noticed anything like that.	The patient has not yet developed any volume overload related symptoms of renal failure.
Do you feel excessively tired, or have any skin problems such as bruising, or color change?	I do feel very tired and get short winded when I walk on my treadmill. So, I am not exercising, but I have not noticed any skin problems.	The patient might have developed anemia due to kidney disease, which is causing fatigue. Symptoms related to platelet dysfunction (bruising) and/or uremia (color change) have not developed yet.

At this point, the clinician can hypothesize that the patient has multiple morbidities leading to renal disease. The clinician can perform a physical exam and gather more data in terms of lab testing.		
Physical Exam		
General appearance		
HEENT	Normal, normal pupil size and dilatation, no bruit, normal oropharyngeal mucosa	Neutral
Nervous system	Grossly unremarkable	Neutral
Cardiovascular	S1+S2+0 Rate and rhythm normal	Neutral
Respiratory Exam	Normal air entry. No abnormal breath sounds.	Neutral
Abdominal Exam	Normal bulge, no tenderness, no fluid thrill	Conditions involving liver such as Hepatorenal syndrome are less likely
Lower extremities	1+ pitting edema. Normal skin color. Pedal pulses normal. Sensory exam normal.	Conditions which can cause volume overload are now more likely
Digital rectal exam	Symmetrically enlarged and non-tender prostate. No discrete nodules.	Neutral – most likely incidental finding
Additional labs		
Complete blood count	Normal hemoglobin, white cell count with diff and platelets	Neutral
Complete metabolic panel	Sodium 136, K 4.9, BUN 32, Creatinine 3, and glucose 189. Remaining chemistry normal.	Intrinsic renal or intra-renal pathology
HgbA1C	7.8 %	Diabetes likely a contributing factor for causing kidney disease
PSA	3.6	Neutral
Urinalysis	Normal color, pH and specific gravity. No WBCs or RBCs. Positive for proteinuria. Urinalysis reveals negatively birefringent crystals.	Nephropathy secondary to a systemic process (diabetes) likely. Tubulo-interstitial nephritis or ATN less likely

At this point, the clinician can conclude that creatinine elevation is caused by multiple morbidities including diabetic nephropathy, hypertensive nephropathy, and possibly hyperuricemia. Uric acid levels are drawn and are in fact elevated. This patient has multiple

conditions which place him at risk for hyperuricemia, including obesity and a history of cardiac valve replacement. His final diagnosis is chronic kidney disease secondary to multiple co-morbid conditions.