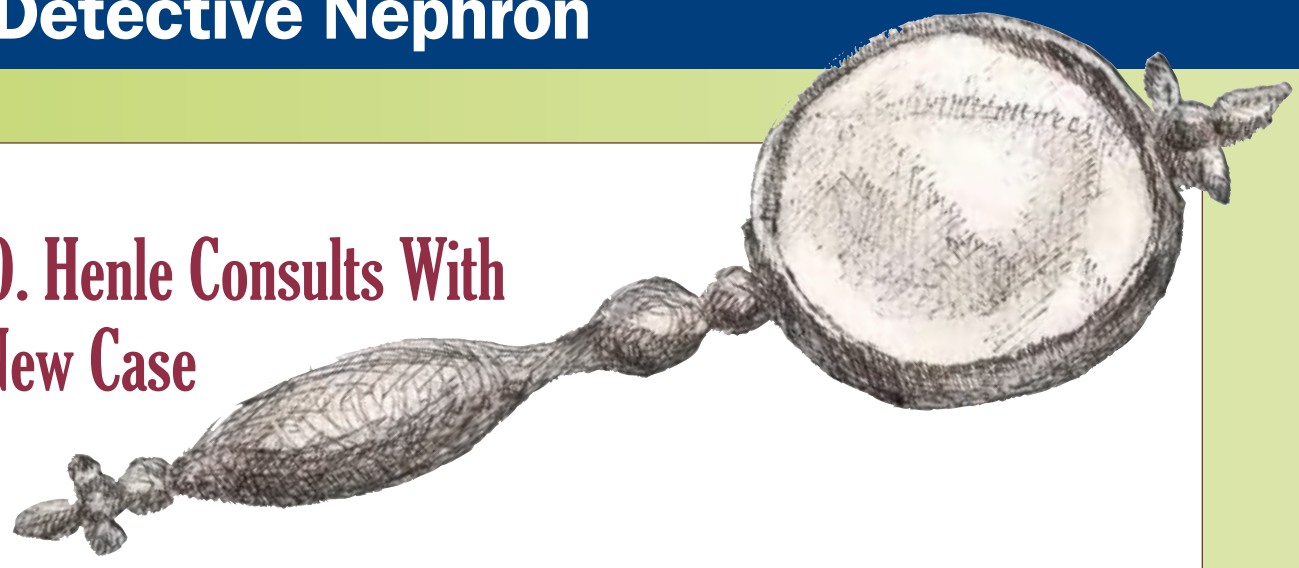
Detective Nephron



Budding Nephrologist L.O. Henle Consults With Detective Nephron on a New Case

Nephron What do you have for me, Henle?

Henle A 40-year-old female with bilateral renal infarcts.

Nephron, excited Nice work, apprentice. Let's stop right there and discuss this case with just that information.

In general, renal infarction is rare. In the young woman you are presenting, it's intriguing what might be causing this. How did she present?

Henle She was in the usual state of health until she had headaches and was admitted for a stroke due to dissection of the vertebral artery. On the floor, she developed flank pain, and a CAT scan revealed bilateral moderate size renal infarcts. She has no past medical history and she was not taking any medications.

Nephron Fascinating. The presentation is typical. Most of these patients get missed because the pain mimics that of nephrolithiasis or pyelonephritis.

Henle, eagerly Those were ruled out by urinary studies and cultures.

Nephron They were not necessary because the CAT scan already gave you the answer. We are all aware of the enormous amount of testing done in this era of medicine.

After a pause…

Nephron Let me tell you more about renal infarcts. Two very common causes are low blood flow to the kidneys or clots being thrown to the kidneys. Since you are presenting this case to me, I shall assume that those causes were ruled out.

Henle Exactly. She has no cardiac history and no history of atrial fibrillation or diffuse atherosclerotic disease. She had a cardiac echocardiogram that was negative for any clots, atrial mass, or vegetations.

Nephron Excellent. Good work, detective. Now, tell me a little about her. Does she have hypertension? And why do I care?

Henle I knew you were going to ask me this. No, she was normotensive with a blood pressure of 115/78 and a heart rate in the 80s. She was never hypo- or hypertensive.

Nephron Most reports of renal infarction are due to clot emboli or diffuse vascular disease. Other potential embolic sources could be valvular vegetations or rarely fat emboli or paradoxical embolism from a patent foramen ovale. Did she have any recent surgery of her long bones?

Henle, prepared No, and she had no patent foramen ovale on ECHO.

Nephron, *deep in thought* Good work, Henle. Now what do we do?

Henle, with a curious look Could she have an arterial dissection of the aorta? And given the fact that she is a female, she could have fibromuscular dysplasia (FMD), or she could have vasculitis, perhaps medium-large vessel like Takayasu's or polyarteritis nodosa (PAN)?

Nephron, confidently Excellent differential. Although you are missing one set of diseases, let's go through each one of these and see if we can narrow down our search.

Henle Given her normal blood pressure and equal upper and lower extremity blood pressures, I would rule out the aortic dissection. Besides she might have been sicker. The other possibilities still have to be considered.

The detective listens carefully as his apprentice thinks out loud…

Nephron Great work. Keep in mind that FMD has normal inflammatory markers and vasculitis is the opposite.

Henle, smirking Yes, detective. Her erythrocyte sedimentation rate and C reactive protein were in the normal ranges. She had normal complements and she had a negative hepatitis and antiphospholipid antibodies.

Nephron By the way, what was her renal function like?

Henle Normal.

Nephron But she is normotensive.

Henle You are correct. What…how…why…?

Nephron, very excited Let me complete your MRI and magnetic resonance angiography (MRA) findings.

Henle Go ahead as she did get one.

Nephron She likely has multiple organ infarcts and aneurysms along with renal vessel infarcts.

Henle, astounded Yes. As a matter of fact, she has multiple fusiform aneurysms and narrowings of multiple splanchnic vessels, celiac artery, superior mesenteric artery, renal arteries, and iliac arteries. She also has a thrombosed left hepatic artery aneurysm that had progressed from the CAT scan. A CT angiogram of the heart showed no cardiac vessel tears.

Nephron, calm My dear, go examine her, she has a genetic disorder that is fascinating. Examine her limbs and fingers properly.

Henle exits and Detective Nephron resumes his readings.
A few hour pass, and Henle returns to the office for discussion.

Nephron So, what did you find?

Henle, very excited She has left-sided weakness that is new on the upper and lower extremities but most importantly, she has significant skin hyperelasticity and joint hypermobility that she was able to demonstrate. I think I know what she has now. She has Ehlers Danlos Syndrome (EDS) perhaps. But why doesn't she have FMD?

Nephron Well, let's take it a step at a time. She doesn't have any inflammatory markers that suggest vasculitis, so PAN is less likely. Although I am sure they must have done a muscle biopsy.

Henle Yes, and it was negative.

Nephron Now , FMD can involve bilateral renal vessels, vertebral vessels, and splanchnic and hepatic beds as in this case. Usually, the cases occur in women but most of the time with some form of hypertension. Classically, it occurs in the middle or distal arterial segments in young patients with not many cardiac risk factors. She mostly fits the description. Vascular EDS or EDS type IV has been associated with medial fibroplasias, and it should be suspected in patients with multiple aneurysms in addition to the typical features of FMD. This is a tough case my friend. The concern is also that if this is EDS type IV, the vasculature is very fragile, and any invasive tests such as angiography and percutaneous interventions should be avoided as their risk of tear increases.

Henle listens.

Nephron Vascular EDS is an autosomal dominant disorder that is caused by heterozygous mutations in COL3A1 gene encoding for type III procollagen. This leads to excessive tissue fragility and predisposes the premature arterial, intestinal, and uterine wall for rupture. This is the worst prognosis of all the EDS types. The most common radiological findings are arterial aneurysms and dissections followed by arterial ectasias and occlusions. In terms of FMD, this patient didn't have the classic beading seen in the angiography. MRA will not be conclusive and can give many false positives due to movement creating a beading like pattern. She didn't have beading on her MRA that we know of.

Henle No she didn't.

Nephron, with confidence I assume she gave you a history of easy bruising or hematomas?

Henle Yes she did.

Nephron What was her plasma renin level?

Henle, confidently It was normal, not high, going against FMD?

Nephron Correct again, Henle. But she is not hypertensive.

They pause…

Nephron I think that you have a diagnosis of EDS type IV or vascular variant given your physical exam findings, age of presentation, imaging findings, and good history taking technique.

Two weeks later, Henle returns to present results.

Henle You are not going to believe this. The genetic test was positive. She has vascular EDS. She was advised to avoid vascular interventions or traumas. She was referred to an EDS center for further care.

Nephron, pleased Excellent.

Henle She recovered from her stroke and is being discharged. Her renal function remained normal and she never became hypertensive.

Nephron, with a smirk Again, my dear apprentice, from a diagnosis of renal infarcts, you made a diagnosis of a life-threatening systemic disorder. Always be a good detective. Observe, think, read, and apply. If it doesn't cross your mind, you will never diagnosis it. Great case, Henle. Now let's go get some coffee.

Detective Nephron was developed by Kenar Jhaveri, MD, assistant professor of medicine at Hofstra Medical School and an attending nephrologist at North Shore University and Long Island Jewish Medical Center in Great Neck, NY. The column was inspired by Muthukumar Thangamani, MD, and Alan Weinstein, MD, both of Cornell University, and Mitch Halperin, MD, of the University of Toronto.