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Case Report

An unusual cause of syncope: Inferior vena cava compression by a massive renal cyst ☆

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ABSTRACT

Syncope is a commonly encountered symptom that accounts for up to 3% of all emergency department visits in the United States [1]. The differential diagnosis for patients presenting with syncope is often broad and can involve multiple distinct organ systems. This case details the hospital course of an 83-year-old male with a complicated past medical history who initially presented for syncope. Following an extensive work up it was eventually elicited that this patient had an unusual etiology of syncope, a 19 cm x 24 cm renal cyst that was compressing the inferior vena cava (IVC).

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Introduction

Syncope, defined as a sudden loss of consciousness associated with the inability to maintain postural tone is a common medical problem. Between 15% and 39% of individuals will experience a syncopal event in their life [2]. Syncope represents a significant burden to the medical system, as approximately 40% of individuals who present to the emergency department with a syncopal event are ultimately admitted to the hospital with an average day length of stay of 5.5 days [3]. The prognosis for patients with syncope varies widely based on etiology. It is especially important to differentiate cardiac causes of syncope from noncardiac causes as their treatments and out-

looks are very different. The estimated mortality for cardiac causes of syncope is between 18% and 33% while the mortality for non-cardiac causes of syncope is between 0% and 12% [4]. Imaging is an important tool in the workup of syncope with specific studies and modalities indicated depending on clinical presentation, physical exam, and history and physical. For suspected cardiac causes of syncope echocardiogram is frequently performed. If cerebrovascular etiology is high on the differential a computed tomography (CT) of the head, magnetic resonance imaging or magnetic resonance angiography (MRI/MRA) of the brain or carotid doppler ultrasound may be indicated. Unfortunately, extensive testing rarely leads to a definite diagnosis as most syncopal events are vasovagal in nature. In the presented case, a patient with numerous poten-

Abbreviations: IVC, Inferior Vena Cava; CT, Computed tomography; MRI, Magnetic resonance imaging; MRA, Magnetic resonance angiography; EKG, Echocardiogram; HOCM, Hypertrophic obstructive cardiomyopathy; ADPKD, Autosomal Dominant Polycystic Kidney Disease.

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tial causes for syncope underwent an extensive work up, including multiple imaging studies. He was ultimately found to have a rare cause of syncope, a massive renal cyst compressing his inferior vena cava, and diminishing cardiac preload.

Case report

An 83-year-old male with a past medical history of metastatic prostate cancer (involving inguinal lymph nodes and bone), seizure disorder, and prior right thalamic infarct with residual left-sided weakness presented to the emergency department (ED). Patient had an appointment with his oncologist earlier on the day of admission. While being medic transported back to his house, he was noted to be altered with a Glasgow Coma Scale of 6 (E4 V1 M1). Patient was subsequently immediately transported to the emergency department.

Upon arrival patient was mildly confused however was alert and oriented. The last thing that he remembered was getting into the medic transport van and sitting down. Patient stated that prior to losing consciousness he felt extremely warm. Upon awakening he endorsed feeling very confused. Of note, patient stated that several times over the past 6 months he had fallen while walking to get his mail. During these times he stated that as he walked to his mailbox, he fell backwards on concrete, hit his head, and lost consciousness. He initially attributed these episodes to leg weakness.

Upon presentation, patient denied shortness of breath, chest pain, palpitations, and speech difficulties. He endorsed weakness, abdominal distention, constipation, and leg swelling. Vital signs included a blood pressure of 156/76, pulse in the mid-40s to low 50s, temperature of 98.7, respiratory rate of 13, and oxygen saturation of 100%. Physical exam revealed abdominal distention and moderate bilateral lower extremity edema. The patient did have chronic left-sided weakness from a remote cerebrovascular accident that was unchanged compared to prior documentation. Complete blood count was unremarkable. His hemoglobin was moderately low at 9.3 (Reference range: 13.2-16.6 gm/dL) but was at his baseline. Electrolytes were within normal limits. Creatinine was mildly elevated at 1.5 (Reference range 0.7-1.3). Glucose was normal at 118. Cardiac enzymes were within normal limits and urine drug screen was negative. Mental status and bradycardia improved shortly after administration of a 500 mL fluid bolus.

The patient underwent a comprehensive syncope evaluation including electrocardiogram (EKG), echocardiogram, orthostatic testing, electroencephalogram, head computed tomography, basic laboratory workup, and medication review. The evaluation did not identify a clear etiology. However, during his work up, a massive (24 × 19 cm) renal cyst was identified on abdominal CT (Figs. 1 and 2). Subsequent venous phase CT angiography of the abdomen and pelvis revealed notable extrinsic compression of the left common iliac vein and lower infrarenal inferior vena cava (Fig. 3). These findings raised suspicion for inferior vena cava insufficiency and subsequent reduction in cardiac preload, potentially resulting in syncope. Additionally, there was concern that the large renal cyst could be compressing the vagus nerve, leading to hypotension, and bradycardia.



Fig. 1 – Axial contrast enhanced abdominal CT at level of renal cyst.



Fig. 2 – Sagittal contrast enhanced abdominal CT at level of renal cyst.

Prior to discharge the patient underwent drainage of the cyst with a 19-gauge Yueh catheter needle system. About 2700 mL of non-clotting, bloody colored fluid was removed (Fig. 4). Definitive management options included regular drainage, drain placement, and decortication. Considering the patient's age and comorbidities, he chose to undergo regular drainage for the time being without plans of drain placement or decortication.

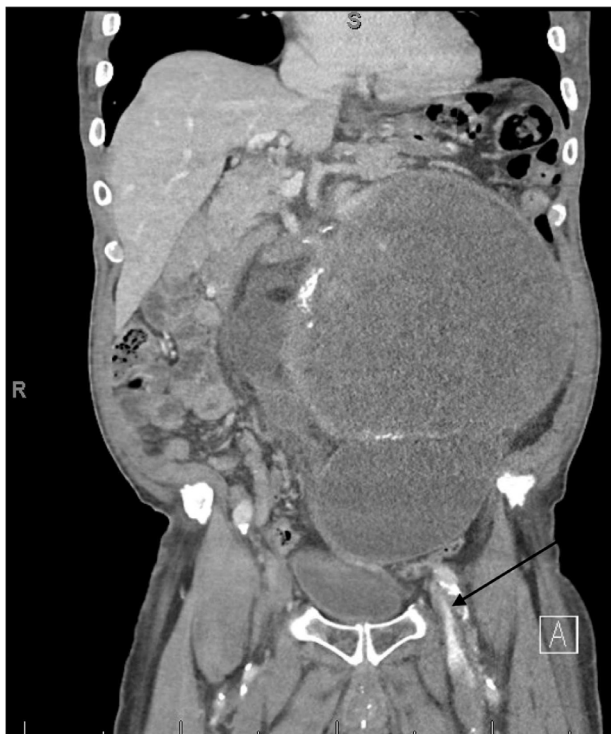


Fig. 3 – Coronal contrast enhanced abdominal CT at level of renal cyst demonstrating left common iliac vein compression.

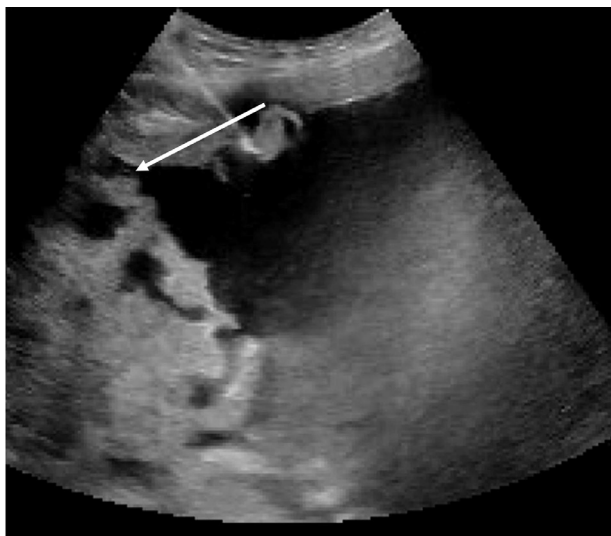


Fig. 4 – Intraprocedural ultrasound of cyst drainage.

Discussion

Due to its associated relatively high mortality risk, cardiac causes of syncope are generally the first to be evaluated when a patient presents to the emergency department. Cardiac syncope can be further divided into structural and electrical etiologies [2]. Electrical abnormalities, including tachyarrhythmia,

bradyarrhythmia, and inherited channelopathies can often be elicited relatively quickly due to the availability of ECG and telemetry. In this case, the patient was initially mildly bradycardic, raising some concerns for electrical abnormality. However, as the patient was in sinus bradycardia advanced arrhythmias were unlikely.

Echocardiogram is the imaging modality most frequently utilized and best suited for quickly identifying structural cardiac pathology. One study has shown that echocardiography was able to confirm a diagnosis in 48% of patients with syncope overall and 77% of patients with cardiac specific syncope [5]. Cardiac CT and MRI can also be useful in determining cardiac causes of syncope, especially in cases of myocardial pathology. Common causes of structural cardiac disease that can lead to syncope include aortic stenosis, hypertrophic obstructive cardiomyopathy (HOCM), and pulmonary embolism. Imaging is crucial in diagnosis of these pathologies with echocardiogram and cardiac CT able to determine aortic stenosis and HOCM while CT angiography of the chest can be utilized to diagnose pulmonary embolism.

Definitive diagnosis in this case was difficult as the patient did not have a clear, cardiac etiology for syncope. However, he did have multiple potential causes of syncope and syncope mimics. Most concerning, this patient had a remote history of seizure disorder. There is significant overlap between the presentation of seizure disorders and cardiovascular syncope. It is crucial to differentiate between these two underlying etiologies as treatment and outcomes are very different. Diagnosis is complicated by the fact that symptoms commonly associated with seizure, including myoclonic jerks, and tonic spasms are not uncommon in cardiovascular syncope. In this case, it was determined that seizure activity was less likely due to a normal electroencephalogram [6].

Although much less common than cardiac syncope there have been multiple other recorded instances of exceptionally large intrabdominal cystic structures causing syncope. In a similar case from the Netherlands, a 75-year-old male experienced recurrent syncope upon lying down. Abdominal CT ultimately showed a large renal cyst that compressed the IVC when the patient was in the supine position [7]. A case from the United States detailed a patient with multiple large, painful hepatic cysts and recurrent syncope. It was determined that the etiology of this patient's syncope was vasovagal due to pain from hepatic capsular stretch caused by the cysts [2]. A related case details recurrent syncope due to IVC compression from severe pectus excavatum [8]. A study of patients with autosomal dominant polycystic kidney disease (ADPKD) observed that 33% had severe IVC compression [9]. Additionally, ADPKD subjects greater than 40 years old had a 12-fold higher risk of IVC compression [9].

Renal cysts are common in the general population and prevalence increases with age. About 1.7% of individuals aged 30-49 have renal cysts with prevalence increasing to 25% in individuals over 50. Renal cysts account for up to 70% of all renal masses [10]. Male gender, hypertension and a history of smoking have been associated with a higher prevalence of renal cysts. Simple renal cysts are benign and classified as Bosniak I lesions on cross sectional imaging. On CT simple cysts have thin, imperceptible walls and are round. On MRI they will demonstrate a low T1 signal, high T2 signal and have no evi-

dence of enhancement postcontrast [11]. Ultrasound findings of a simple cyst include a round anechoic structure, imperceptibly thin walls, and posterior acoustic enhancement. Renal lesions with these characteristics have less than a 1% chance of malignancy [11]. Due to their low risk of malignant transformation, most renal cysts do not require additional management or follow-up. When indicated, management options include aspiration with or without sclerotherapy, decortication, or nephrectomy. Percutaneous aspiration has been found to have a slightly higher recurrence rate than laparoscopic decortication [11]. Due to the patient's advanced age and multiple comorbidities, he elected to undergo simple aspiration despite the high likelihood of recurrence.

Conclusion

This case details an uncommon etiology of a common presenting complaint. Although rare, intrabdominal cystic causes of syncope should be considered in the appropriate clinical setting. Cross sectional imaging is critical in obtaining an accurate diagnosis in these cases.

Patient consent

Patient consent for participation in research obtained at time of admission and located in patient chart.

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