

**HYDRONEPHROSIS & UPJ OBSTRUCTION DUE TO AN ACCESSORY RENAL
ARTERY**

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ABSTRACT

An 80-year-old man with a cardiac pacemaker, history of type 2 diabetes mellitus, and hypertension presented to the ER with right lower quadrant pain and urinary symptoms. After a workup featuring a history, physical, blood investigations and scans, it was found that this patient had severe right sided hydronephrosis due to an ureteropelvic junction obstruction. This obstruction was likely caused by an accessory renal artery. A literature search revealed that although accessory arteries are fairly common, accessory arteries causing UPJ obstruction are not. Additional searches revealed case reports and information documenting this phenomenon. This patient had a ureteric stent placed to relieve the severe hydronephrosis but will ultimately require urology outpatient consultation to discuss a management plan regarding the artery and obstruction. If a surgical procedure is warranted, a laparoscopic pyeloplasty may be the best course of action.

CASE HISTORY

An 80-year-old male with a past medical history of a cardiac pacemaker insertion, type 2 diabetes, hypertension, and gout presented to the ER with right lower quadrant pain on June 26th. The pain had started a few days prior and was accompanied by hematuria. At that time he was diagnosed with a UTI and treated appropriately with antibiotics. The pain then subsided. The night before presenting to the ER he had extreme right lower quadrant abdominal pain that radiated to his right flank. He couldn't sleep due to the pain. He was nauseous and had small amounts of emesis. On June 26th he arrived in the ER due to the pain. He was noted to walk with a slight limp, which was new to him. He reported dysuria and urinary frequency but denied active hematuria. He also reported a decreased appetite. The only pertinent physical exam finding was on abdominal examination where he was found to have a very tender right lower quadrant and guarding. He was afebrile with stable vital signs (heart rate of 60, respiratory rate of 18, blood pressure of 109/67, and 95% oxygen saturation). The following investigations were ordered: CBC, electrolytes, liver enzymes, urinalysis, chest and abdominal x-rays, KUB, and CT scans of the abdomen and pelvis. The working differential included ruling out appendicitis and assessing for nephrolithiasis. The patient received tramadol and Tylenol 3 for pain management in the department.

Lab findings were unremarkable with the exception of the WBC and differential; WBC slightly elevated at 12.1, neutrophil percentage 87.3 and lymphocyte percentage 5.7. The absolute neutrophil count was 10.52 and the lymphocyte count was 0.69. The pertinent findings on chemistry were: glucose 13.8, urea 18.2, creatinine 163, urea/creatinine ratio 112, and the eGFR 34. However, the patient's kidney function seemed to have remained stable since December, 2017. The liver enzymes and liver function tests were normal except for an elevated lactate dehydrogenase of 571. The urinalysis was remarkable for: glucose (14mmol/L), blood (25ery/mL), and protein (>3.0g), as well as nitrites, leukocytes, RBC's, WBC's and heavy bacteria. The patient was admitted for IV antibiotics of which he received IV Pip/Tazo 2.5g Q6H.

Chest and abdominal radiographs were unremarkable. On uninfused CT, it was found that there was a right ureteropelvic junction obstruction that appeared to be secondary to extrinsic compression from an accessory renal artery, which was causing severe hydronephrosis. There was advanced ballooning and dilation of the right renal pelvis measured at 11.4x9.8 cm. The

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patient had a right ureteric stent inserted under fluoroscopy on June 27th and was feeling much better on June 28th.

LITERATURE REVIEW

The clinical question in this case involved examining accessory or aberrant renal arteries and their involvement in ureteropelvic junction obstruction (UPJO) and hydronephrosis. Searching (“Ureteral Obstruction”[Majr] AND Accessory Renal Artery on Pubmed proved to be too narrow. Many key words such as accessory renal artery, UPJO, hydronephrosis, and aberrant renal artery were tried on Pubmed and the Manitoba Libraries database with mixed results. “UPJ obstruction adult” on Pubmed yielded an article about UPJ obstruction and crossing vessels. “Accessory renal artery” on the University of Manitoba Libraries website yielded a relevant case report. “Aberrant Renal Artery AND hydronephrosis” on Pubmed yielded another relevant case report. “Accessory Renal Artery AND hydronephrosis” on Pubmed yielded a CT study about renal arteries. Another relevant case report was found by doing a Google search using “UPJ obstruction Accessory artery.” “Management UPJ Obstruction Adult” was searched on Pubmed to find a review article which summarized management of this diagnosis.

DISCUSSION

Accessory renal arteries are present in about 30% of individuals.¹ These arteries usually originate from the aorta and travel with the main renal artery through the hilum into the kidney.¹ These arteries have garnered significant interest from clinicians due to their possible role in causing hydronephrosis.¹ Arteries can cross anteriorly to the ureter and may obstruct it causing hydronephrosis.¹ An uninfused CT scan of this patient’s pelvis found a linear and slightly hyperdense structure lying inferiorly to the ureter. This structure was thought to correspond to an accessory renal artery resulting in obstruction and extrinsic compression at the ureteropelvic junction (UPJ). It is unclear from this scan the exact course of the artery, but an accessory artery crossing the UPJ causing an obstruction is quite uncommon.² UPJ obstruction has a reported incidence of 1 in 1500 people including both children and adults.³ It can be due to acquired causes such as renal calculi or a urothelial neoplasm, or congenital causes such as a horseshoe kidney, ureteral stricture, or crossing vessels.³ Adults are more likely to present with an obstruction due to acquired causes while pediatric cases are more commonly caused by anatomical variants.^{3,4} Approximately 10% of pediatric UPJ obstruction is due to extrinsic compression by an accessory artery.⁴ Interestingly, this patient has only now developed a serious complication due to his accessory artery and has not had a presentation like this before. This patient’s symptoms were in line with what would be expected of a UPJ obstruction in adults. Typical symptoms of a UPJ obstruction in the adult population include: acute renal colic, chronic back pain, frequent urinary tract infections, pyelonephritis, and hematuria.⁵ In order to deal with the severe hydronephrosis, the patient had an emergent urologic procedure in which a ureteric stent was inserted to relieve the acute obstruction and subsequent hydronephrosis. This procedure was performed as a temporary measure to relieve the presenting symptoms and prevent renal damage; however, the patient would require an outpatient urology consult to determine if a more long-term solution would be required to prevent further obstruction by the accessory artery.

It is unknown at the moment if this patient will need surgery for the obstruction or not. Some indications for surgery would include persistent obstructive symptoms, impaired kidney

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function, development of hypertension, and renal calculi.³ The gold standard procedure for UPJ obstruction has been open pyeloplasty, but now minimally invasive procedures such as laparoscopic pyeloplasty and endopyeloplasty are offered as first line treatment.⁶ Laparoscopic pyeloplasty has a success rate of 90-100%.⁶ The accessory artery in this patient could pose an issue during an endopyeloplasty. One study found that the success rate went from 86% to 42% for this procedure if a crossing vessel was present.⁶ Due to the presence of a possible crossing vessel, this patient would likely be offered a laparoscopic pyeloplasty over an endopyeloplasty if surgery was indicated.⁶ Regardless of the procedure, it would be important for the surgical team to be familiar with the unique vessel anatomy of this patient to prevent possible bleeding complications, which could be done through CT angiography.¹

CONCLUSION

This case report details an 80 year old man suffering from a case of new onset ureteropelvic obstruction due to an accessory renal artery. Although accessory arteries are common, it is unusual for them to be a sole cause of obstruction and hydronephrosis. This patient's condition improved with placement of a ureteric stent. Outpatient urology consultation is the next appropriate step to determine a more definitive solution for this condition. This case highlights how a common anatomical variant can cause unexpected medical complications.

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