

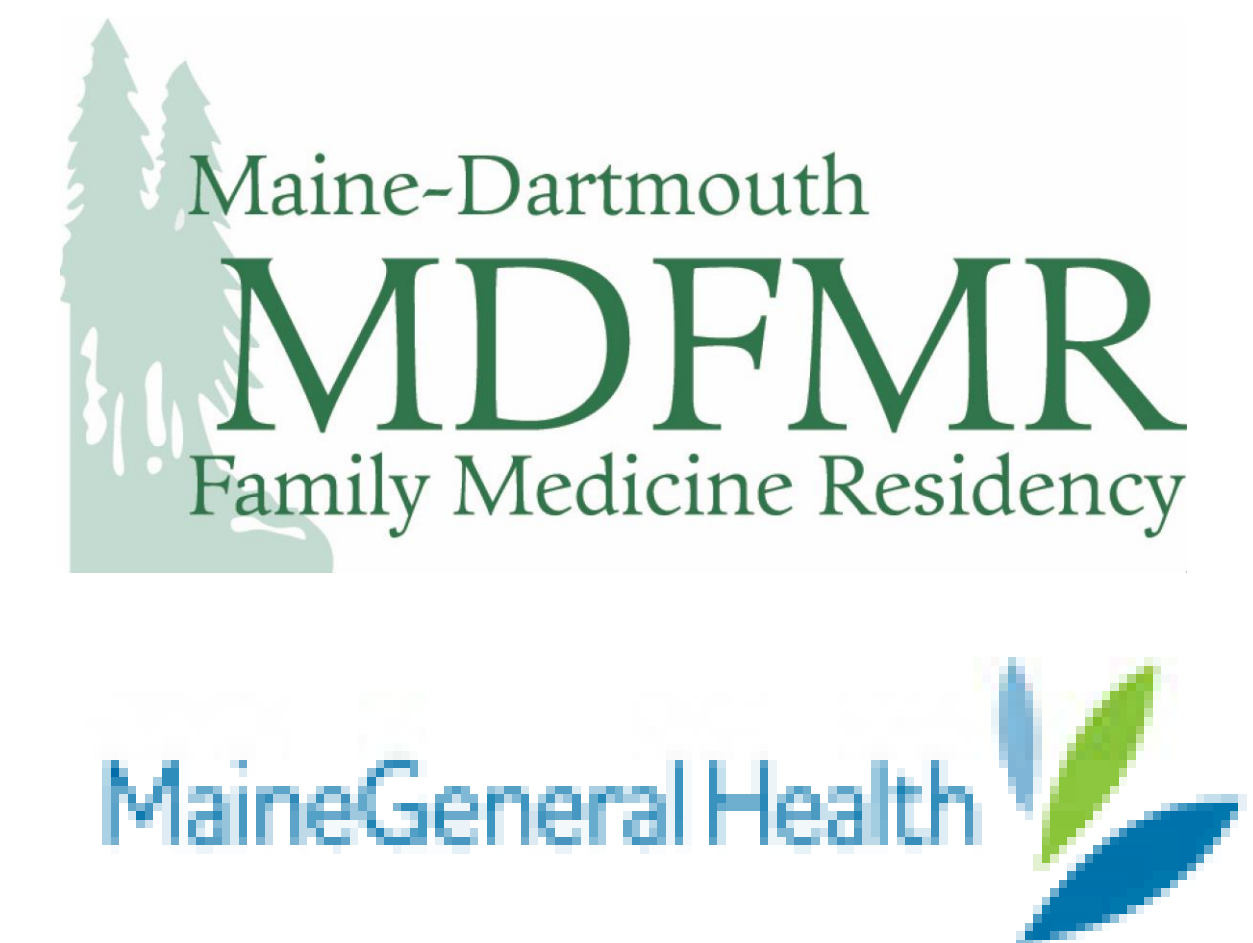


Urothelial Carcinoma in Duplex Collecting System

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Introduction

- Urothelial (formerly transitional cell) carcinoma is the most common cancer of the urinary system seen in the United States.
 - Urothelial carcinoma is most common in the bladder (94%)
 - Less commonly seen in the renal pelvis and collecting system (5%)
 - Rarely seen in the ureter (1%)
- Our patient presented with progressive hematuria and flank pain and was subsequently found to have a left sided obstructive ureteral mass in a near-complete duplex collecting system with pathology confirmed urothelial carcinoma.

Clinical Course

- A 76 year-old male with benign prostatic hypertrophy treated with finasteride and tamsulosin presented to the emergency department with hematuria and left flank pain. He underwent noncontrast CT and was found to have left hydronephrosis and a left mid ureteral mass.
- He was referred for urologic evaluation and underwent subsequent cystoscopy with retrograde pyelogram as well as left ureteroscopy with biopsy. During the procedure, the urologist identified nearly duplicated left ureters with an insertion point in the intramural portion of the distal ureter as well as a filling defect in the lower pole moiety of the mid left ureter. Additionally, there was proximal dilation of the involved left ureter, renal pelvis, and blunting of the renal calyces.
- Ureteroscopic visualization of a sessile mass was reported and multiple biopsies were taken. The initial pathology report demonstrated negative cytology and ureteroscopic biopsies demonstrated urothelial hyperplasia but no conclusive evidence of malignancy.
- Despite negative pathology results, the clinical suspicion for malignancy was still high. The patient subsequently underwent a laparoscopic nephroureterectomy with bladder cuff. The pathology of the gross specimen revealed high grade papillary urothelial carcinoma with focal invasion of the lamina propria and no evidence of deeper underlying smooth muscle ureteral involvement.
- The final staging for the ureteral cancer was PT1 pNX M0. Adjuvant Cisplatin chemotherapy was deferred due to worsening renal function. Further urologic follow up with surveillance cystoscopies will be required.

Acknowledgements

The University of New England College of Osteopathic Medicine, Maine Dartmouth Family Medicine Residency, and Maine General Medical Center. I also want to thank Dr. Lopes in Urology, Dr. Nelsen in Pathology, and Dr. Harmon in Family Medicine for their support of this case presentation.

Imaging

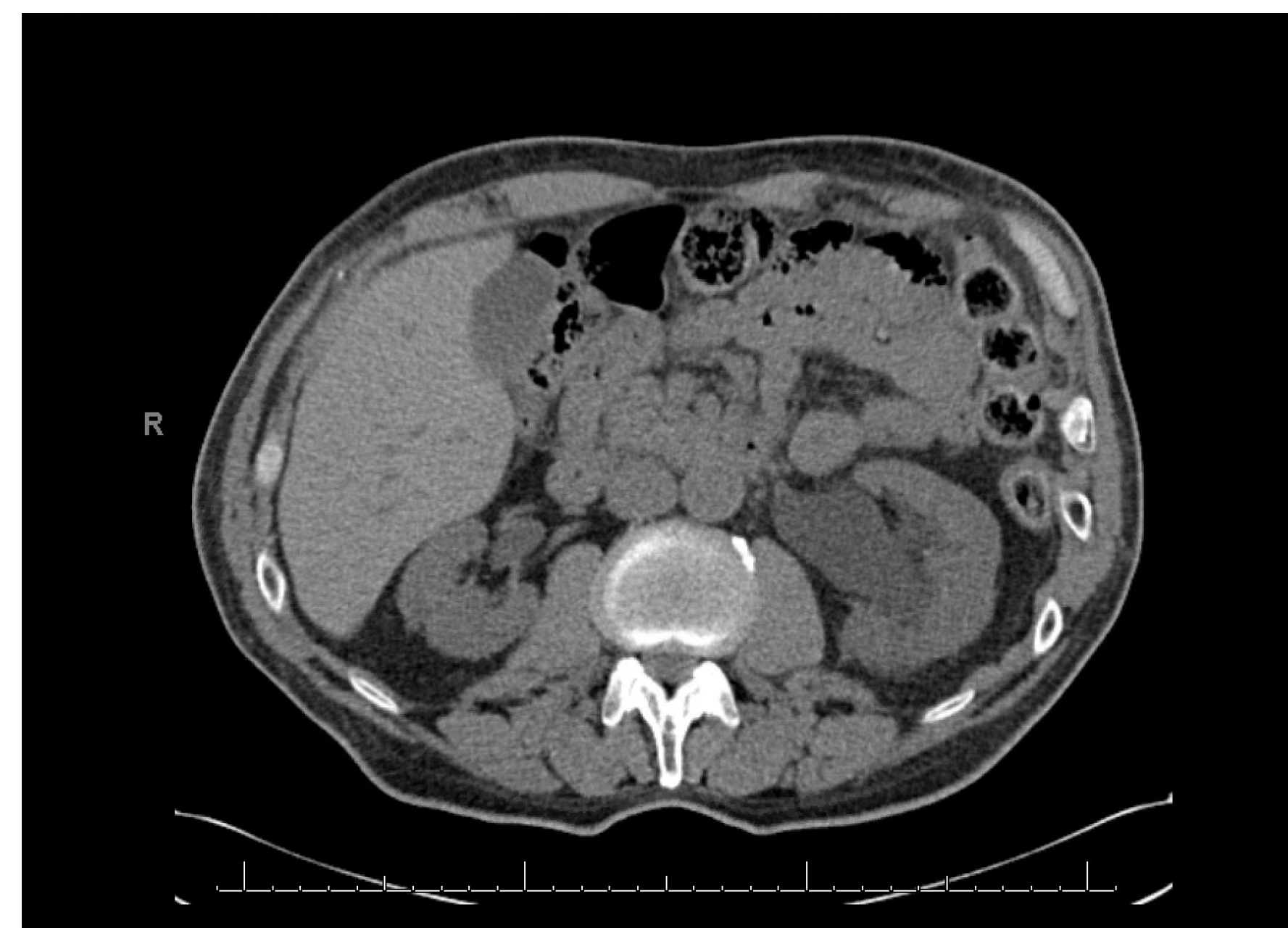


Figure 1

Initial noncontrast CT performed in the emergency department showing left hydronephrosis

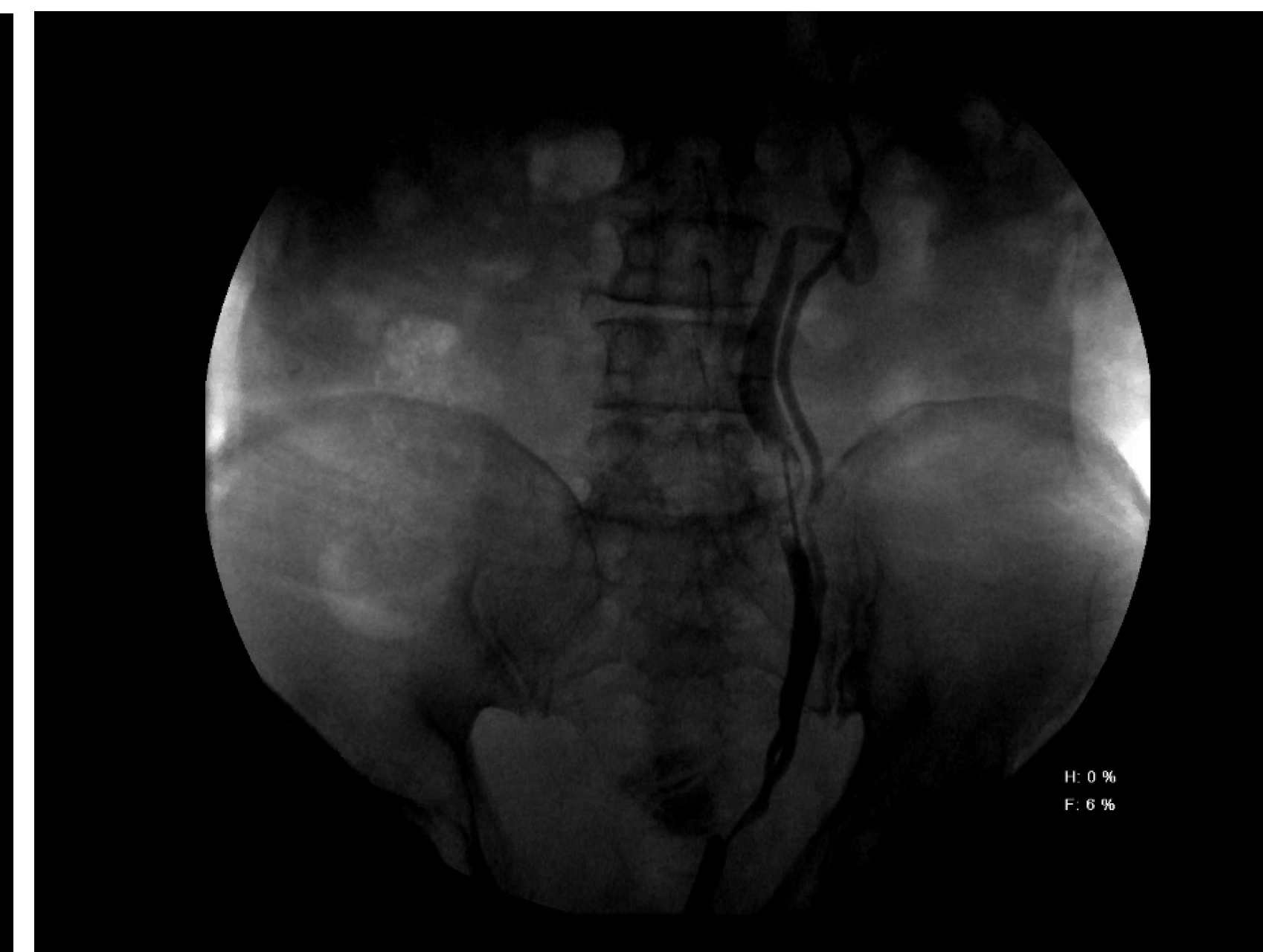


Figure 2

Retrograde pyelogram of left ureter shows a complete duplex collecting system with filling defect in lower pole.

Pathology cont.

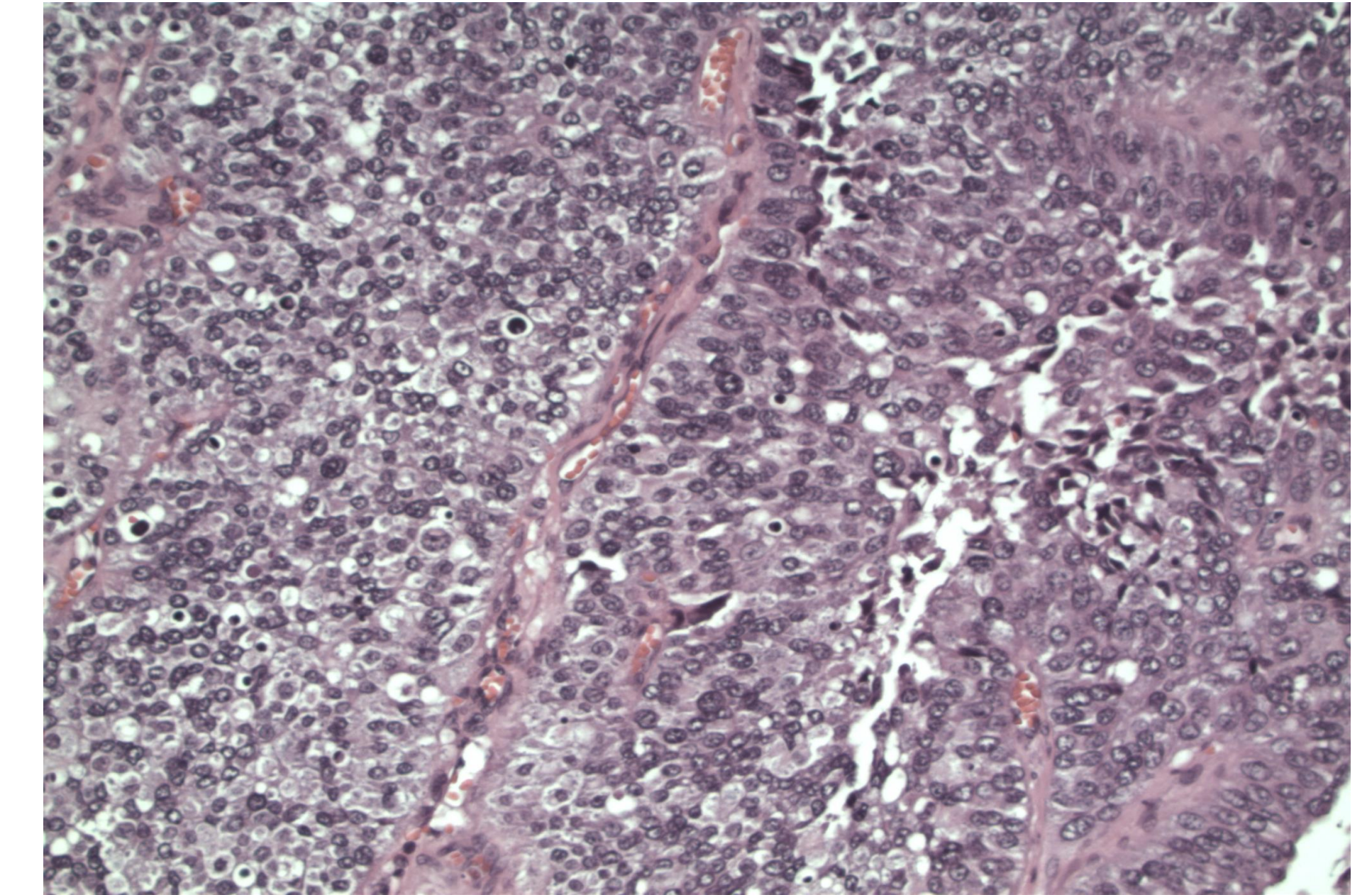


Figure 7

Microscopic image of tumor cells illustrating high grade cytology with pleomorphism and necrosis at 20x magnification

Pathology



Figure 3

Gross specimen showing a duplex collecting system with upper pole and lower pole drainage. (Image source: <https://radiopaedia.org/articles/duplex-collecting-system>)

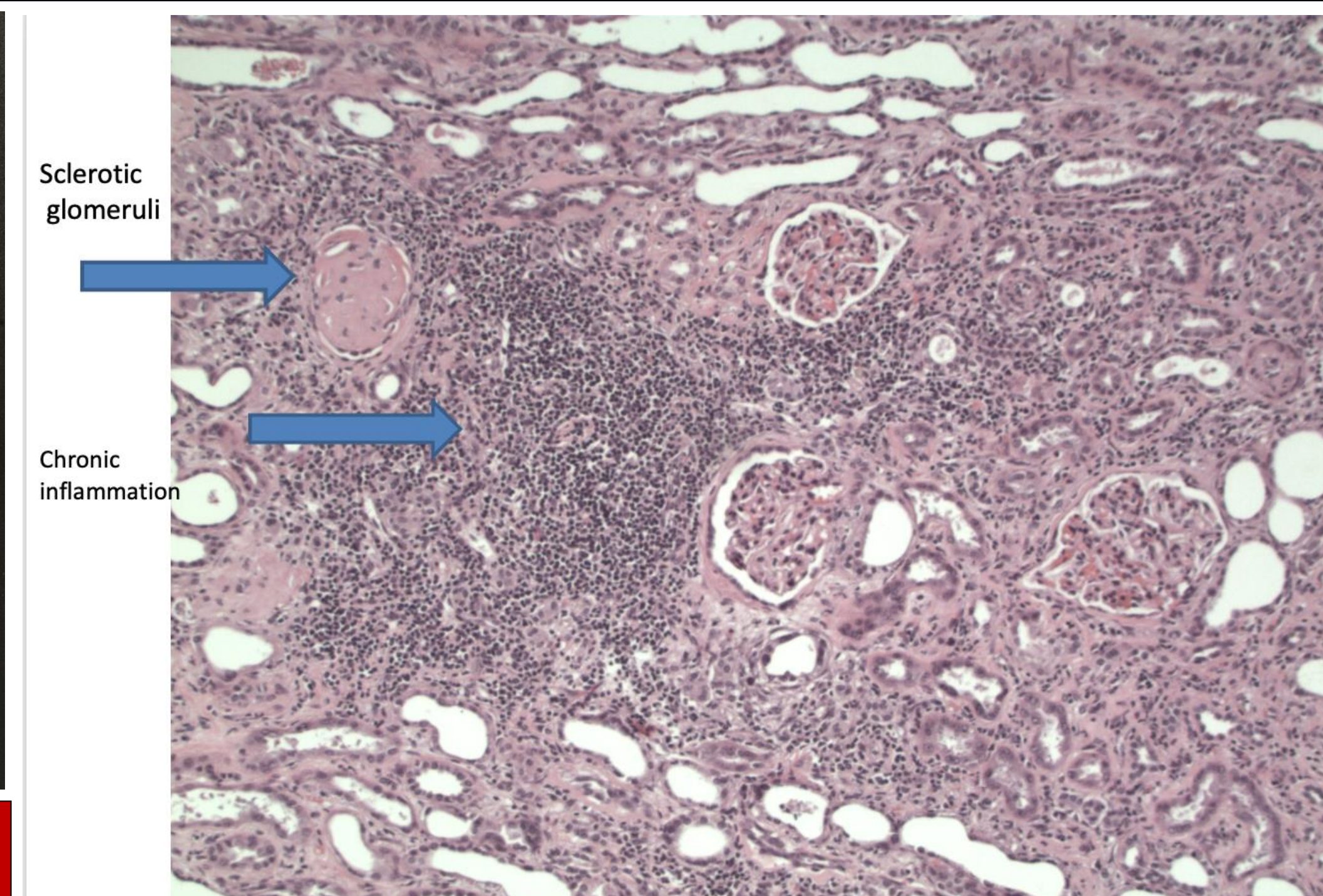
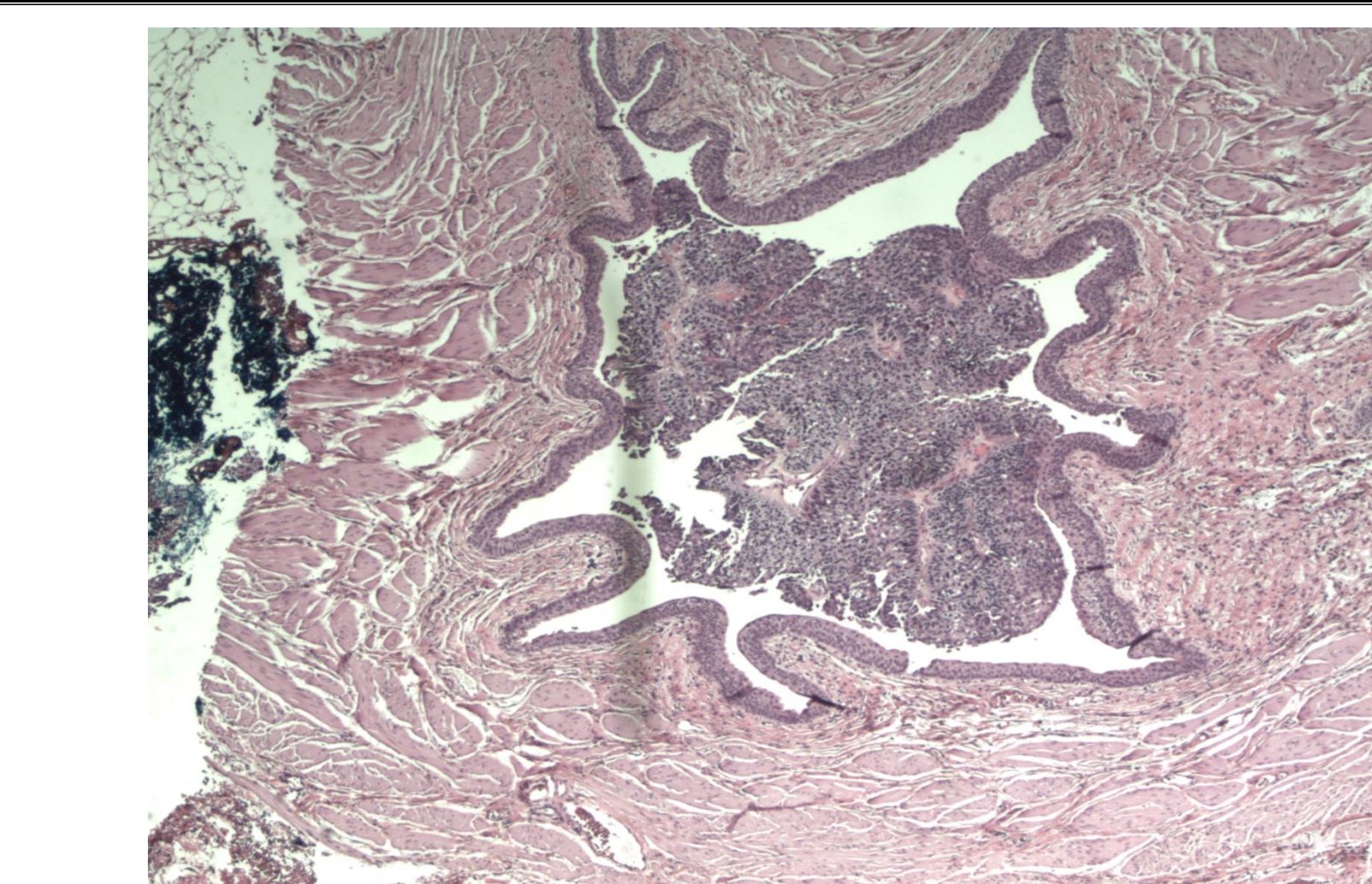


Figure 4

Microscopic image of patient's left kidney at 10x magnification



Figures 5 & 6

Microscopic image of lower pole ureter showing benign ureter and ureter with tumor at 4x magnification

Discussion

While urothelial carcinoma is most common in the urinary bladder, it can also be seen in the ureter, renal pelvis/collecting system, and (rarely) urethra. Common presenting symptoms include painless hematuria and flank pain (if associated with hydronephrosis). The most common risk factor for developing urothelial carcinoma is long term cigarette smoking. While urine cytology and ureteropyeloscopy with biopsy can confirm the diagnosis, false negative results are possible due to the tiny amount of tissue removed with ureteroscopic biopsy (due to inherently small instrumentation). Therefore, high index of suspicion and clinical judgement are important in making the diagnosis of suspected urothelial carcinoma in the upper tract. Although an anatomic anomaly such as a duplex collecting system is rare (0.7 %) in the healthy adult population, this congenital anomaly is unlikely related to the development of ureteral carcinoma in this patient. Standard of care in the surgical management of high grade urothelial carcinoma of the ureter and renal collecting system (particularly the upper ureter, renal pelvis, and calyceal system) is complete nephroureterectomy and bladder cuff excision. Downstream seeding of urothelial cancer cells places the distal ureter and cuff of bladder surrounding the ureteral orifice at risk of subsequent tumor recurrence. In fact, patients with upper tract urothelial cancer, even after successful nephroureterectomy with bladder cuff, remain at risk for bladder tumor recurrence as well as contralateral upper tract tumor recurrence and therefore require periodic surveillance cystoscopies and upper tract imaging studies as part of their overall management.

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