



Distinguishing Renal Cell and Urothelial Cell Carcinoma: Key Details in Gross Examination and TNM Staging

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Introduction

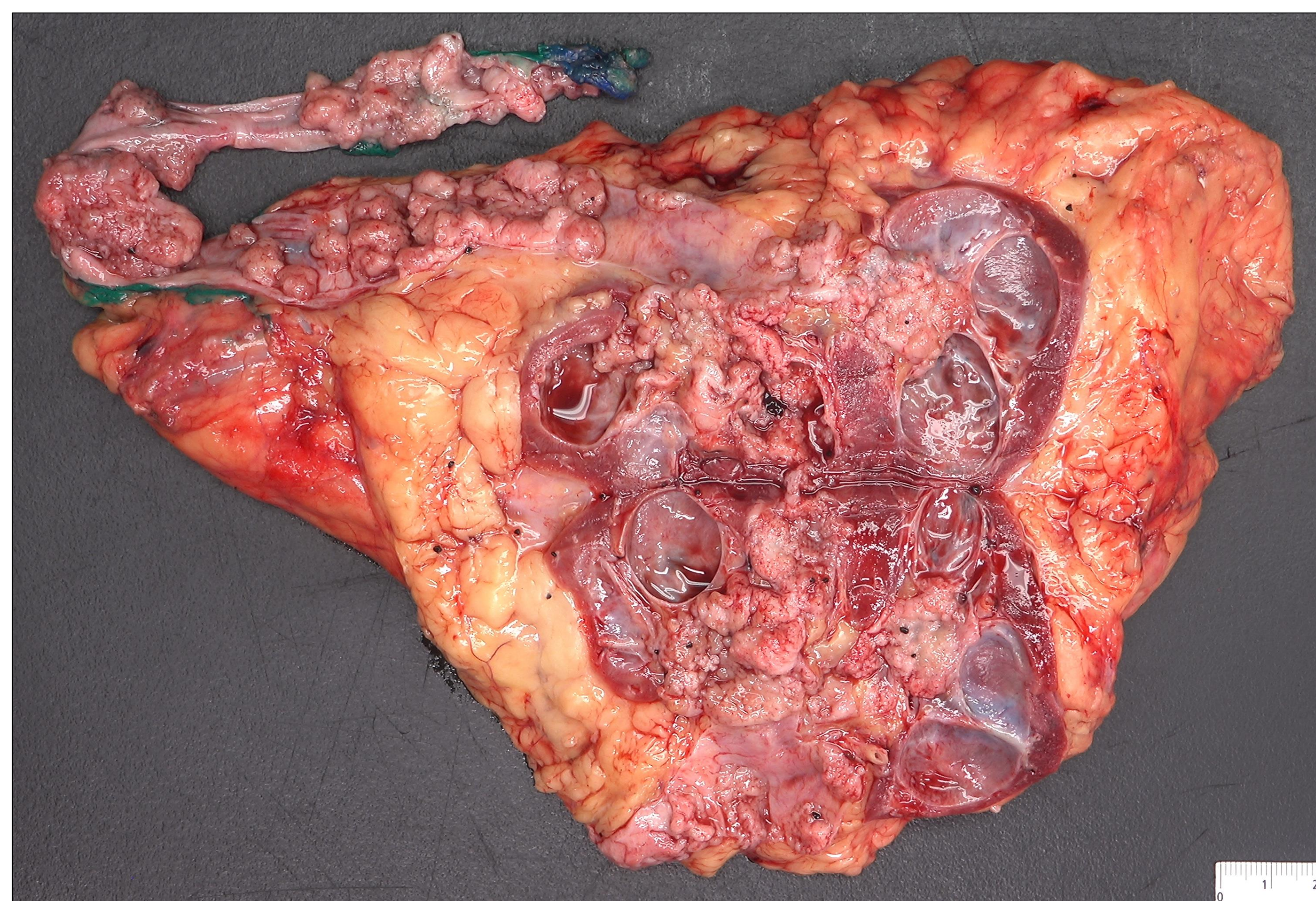
Radical nephrectomies are specimens commonly received in the pathology lab for gross examination by pathologists' assistants (PAs), majority of which include resections for renal cell carcinomas (RCC) and urothelial cell carcinoma (UCC). This poster will review the differences in tumor presentation, the TNM cancer staging criteria, and the optimal tissue sectioning for pathologic evaluation.

Urothelial Cell CA

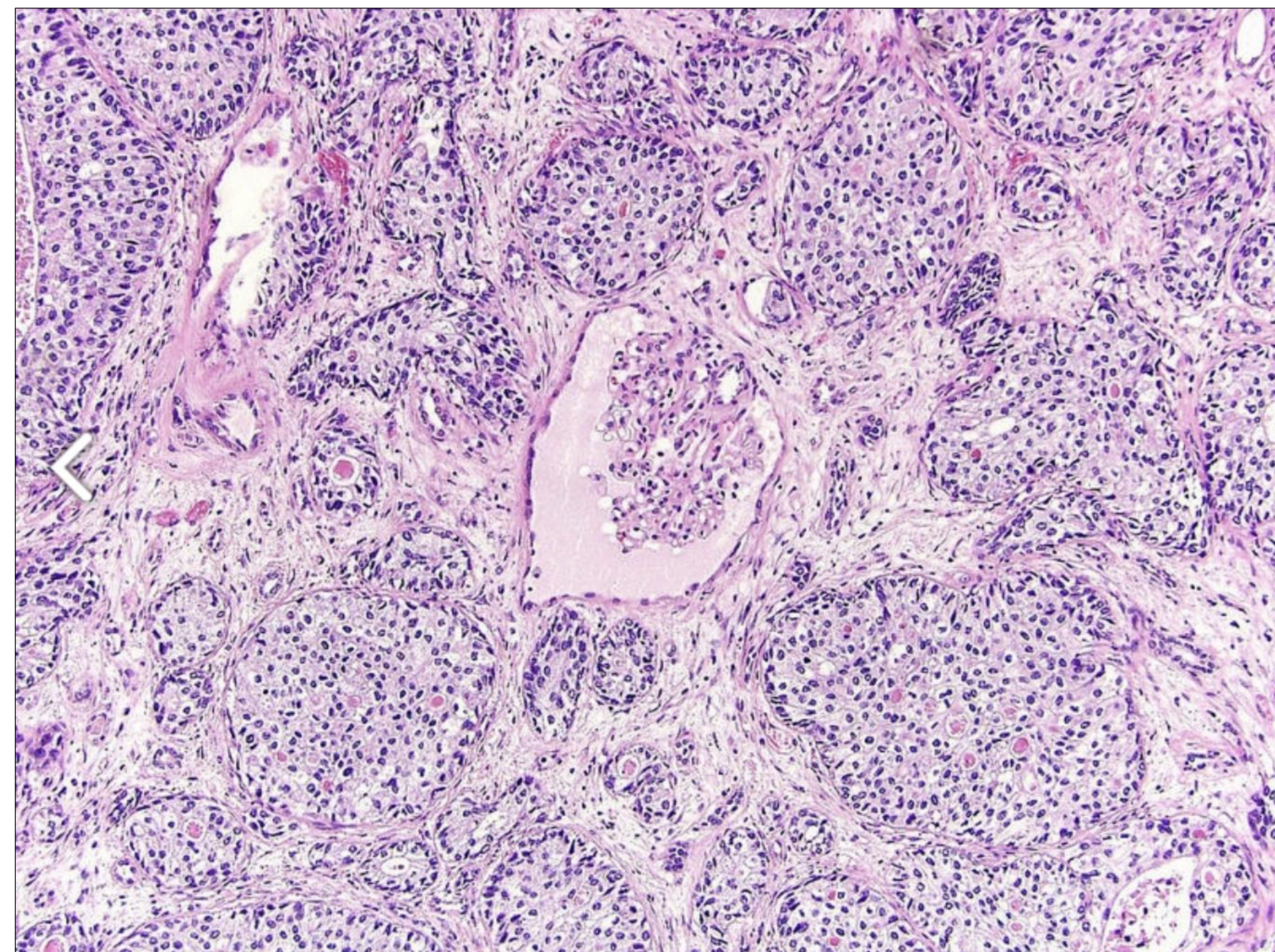
Urothelial cell carcinoma (UCC) arises from the urothelium that extends from the renal calyces to the urethra. Patients present with gross hematuria, flank pain, and a palpable mass secondary to hydronephrosis.¹ It is primarily associated with medication therapies and environmental exposures like tobacco smoking and industrial exposure to aryl amines.¹

Per the AJCC TNM staging manual for ureter/renal pelvis resection, this tumor is staged based on depth of invasion.² pT1 is for tumors invading the subepithelial connective tissue while pT2 tumors grossly invade the muscularis.² pT3 is for tumors invading peripelvic fat or renal parenchyma.² pT4 is for tumors involving adjacent organs or through the kidney into the perinephric fat.²

For gross examination, the nephro-ureterectomy specimen typically includes a bladder cuff which should be radially sectioned.³ Submitted sections of tumor should show depth of invasion into the ureter/renal pelvis wall.³ As well as documenting tumor involvement of perinephric fat and kidney parenchyma.³



Urothelial cell carcinoma with multifocal friable papillary tumors involving the ureter, renal pelvis, and renal parenchyma.
(Photo: J. Chen)



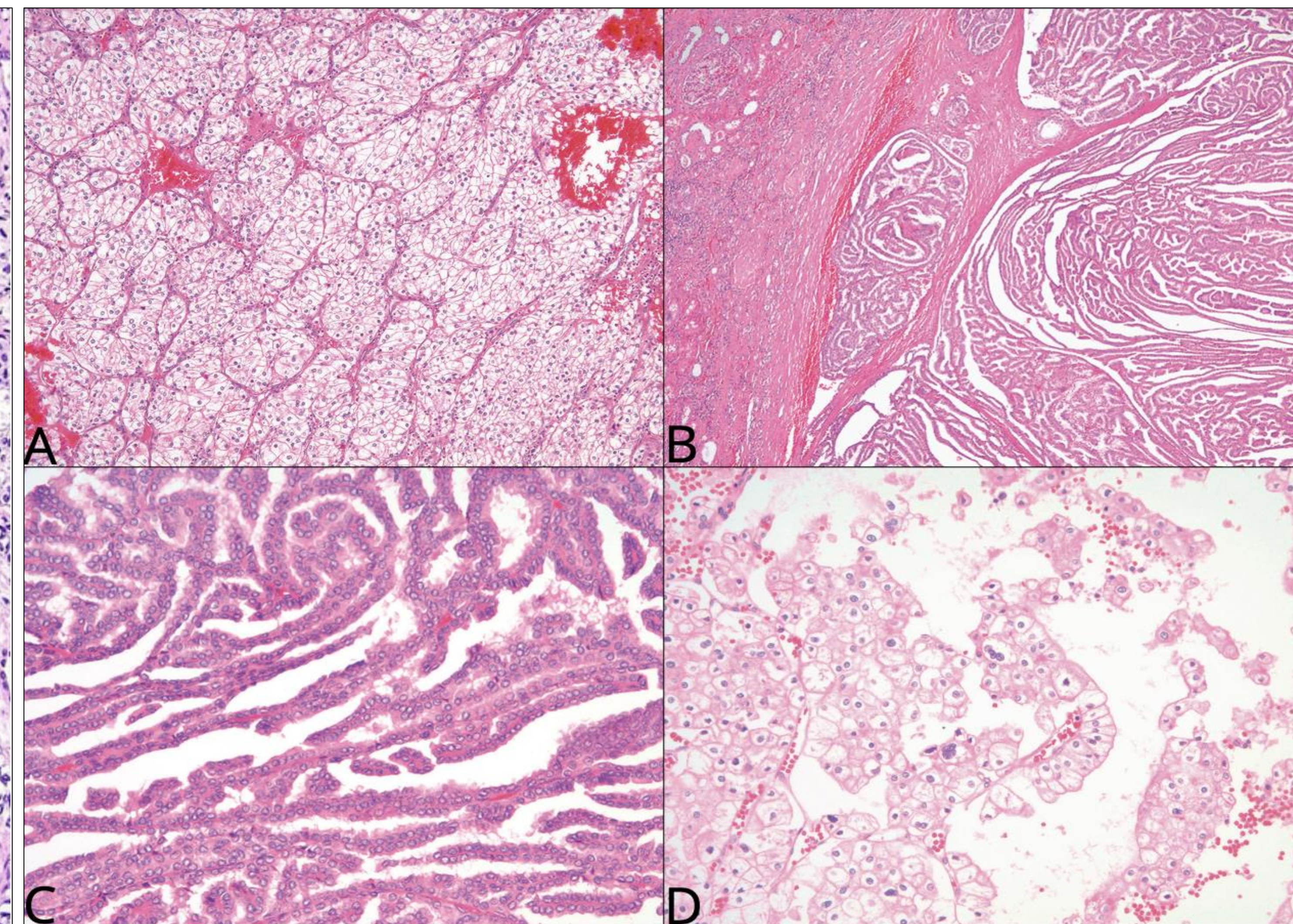
Urothelial cell carcinoma invasion into the renal pelvis with renal parenchymal involvement.
(Photo: Nicole K. Andeen, M.D. & Maria Tretiakova, M.D.)

References

1. Kumar V, Abbas AK, Aster JC, et al. *Robbins, Cotran & Kumar Pathologic Basis of Disease*. Elsevier; 2026.
2. American Joint Committee on Cancer. *Cancer Staging Manual*. 8th ed, 2017.
3. Susan, Lester. *Manual of Surgical Pathology*. 4th ed, 2023.



Renal cell carcinoma with large golden-yellow circumscribed mass involving the upper renal parenchyma.
(Photo: J. Chen)



Renal cell carcinoma subtypes: (A) Clear cell. (B-C) Papillary, and (D) Chromophobe.
(Photo: Jesse McKenney, M.D.)

Renal Cell CA

Renal cell carcinoma (RCC) arises from the kidney tubular epithelial cells. They typically form a discrete, tan-golden, and solid mass within the renal parenchyma; sometimes there can be necrosis and/or hemorrhage.¹ Patients present with costovertebral pain, palpable mass, and hematuria.¹ It's commonly linked to hereditary syndromes like Von Hippel Lindau syndrome.¹ The three subtypes of RCC are clear cell, papillary, chromophobe.¹

Per the AJCC TNM staging manual for kidney resection, this tumor is staged based on tumor size.² pT1a is for tumors ≤ 4 cm while pT1b is for tumors between 4-7 cm.² pT2 is for tumors between 7-10 cm while pT2b are for tumors > 10 cm.² pT3a is for tumors involving renal vein and perirenal/renal sinus fat.² pT4 is for tumors invading past Gerota's fascia and involving the adrenal gland.²

For gross examination of a radical nephrectomy, the renal vein should be closely inspected for any tumor thrombi.³ The tumor size should be carefully measured and sections of tumor submitted should include relationships to renal sinus and Gerota's fascia.³

Conclusion

While both UCC and RCC are common kidney malignancies, they have two different TNM staging criteria. Therefore, it's important for the PA to know the difference in order to submit the appropriate sections so that the pathologist can accurately stage the patient's tumor.