Radiology-Pathology Presentation

4/28/2014

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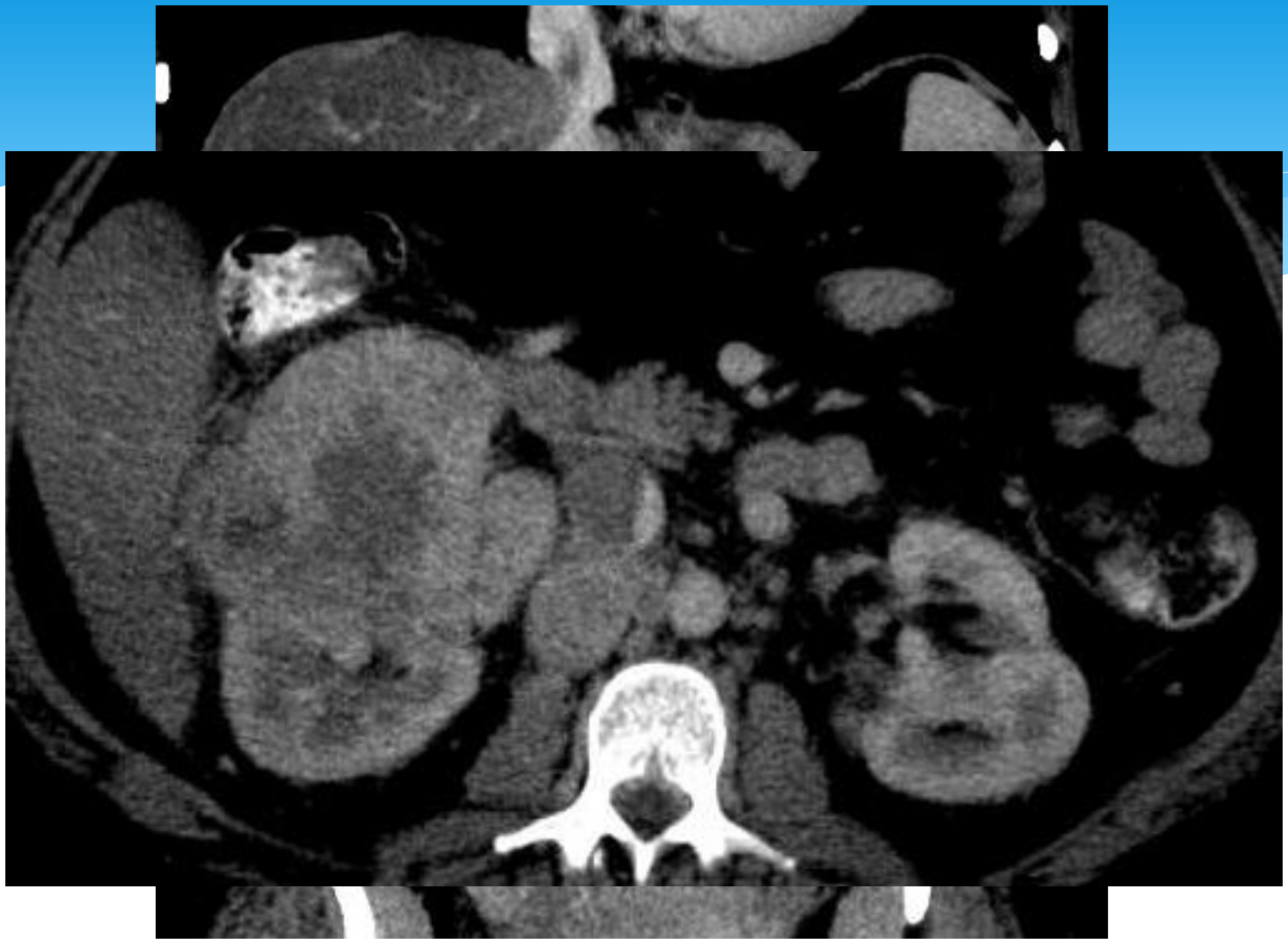
Case 1

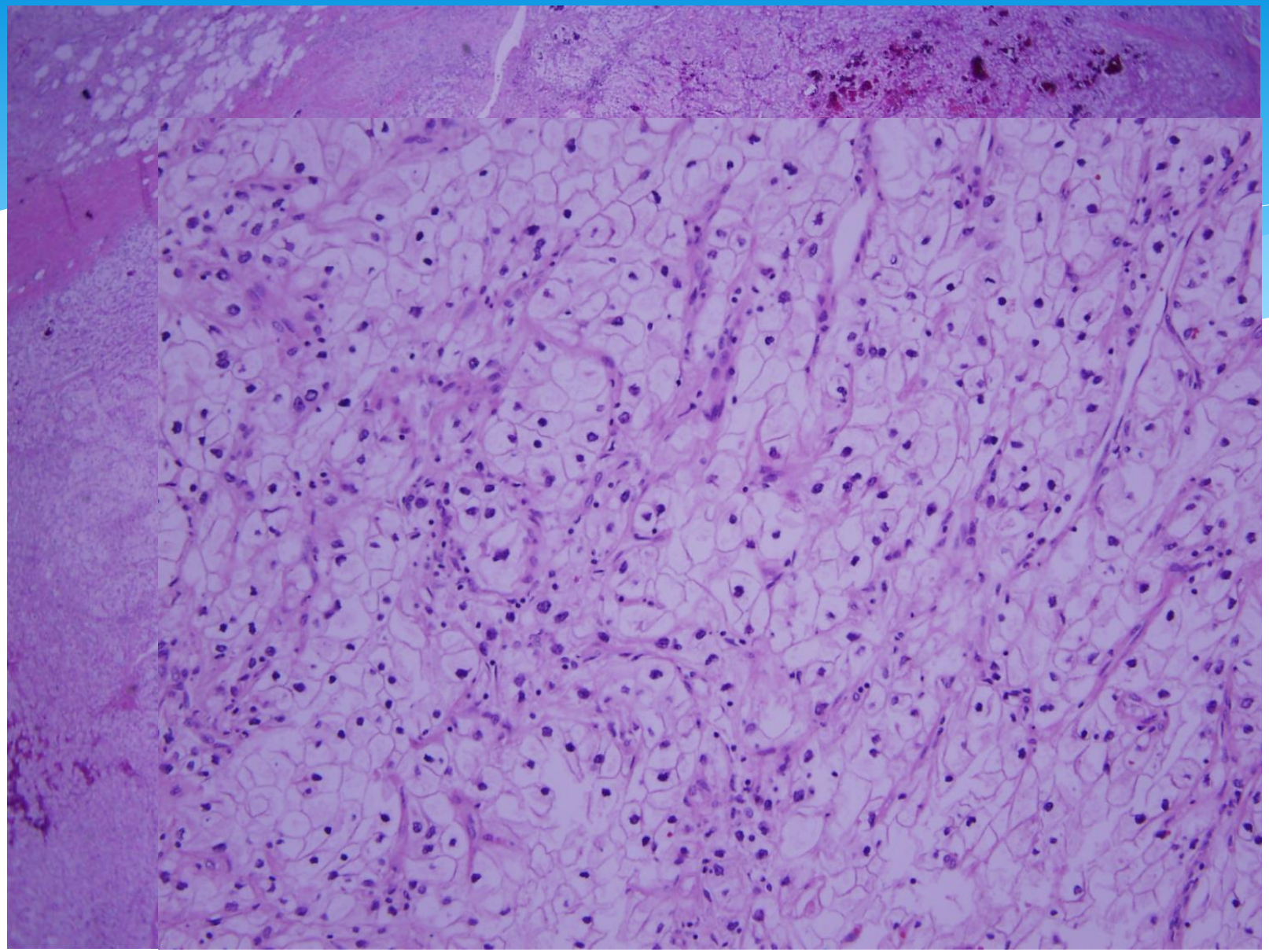
Radiologic Procedure	Rating	Comments	RRL*
CT abdomen without and with contrast	9	Should include precontrast and postcontrast, including nephrographic phase. Multiplanar reconstructions and 3D volume-rendered images are helpful for surgical planning.	☢☢☢☢
CT abdomen with contrast	8		☢☢☢
X-ray chest	8		☢
CT chest without contrast	8	Can identify subtle pulmonary nodules, mediastinal lymphadenopathy, and bone and subcutaneous metastases. Confirms or excludes metastases seen on chest radiograph.	☢☢☢
CT chest with contrast	8		☢☢☢

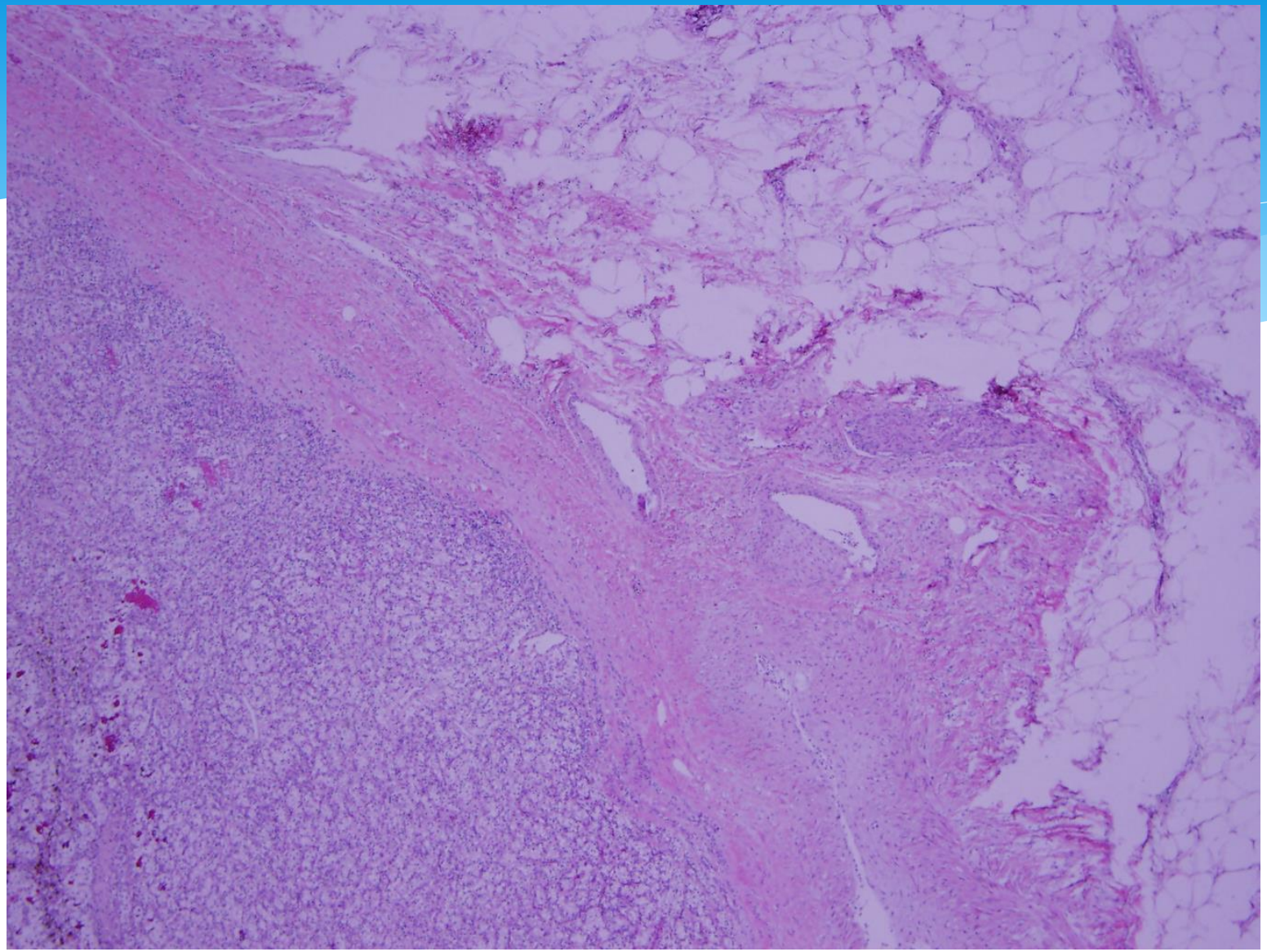


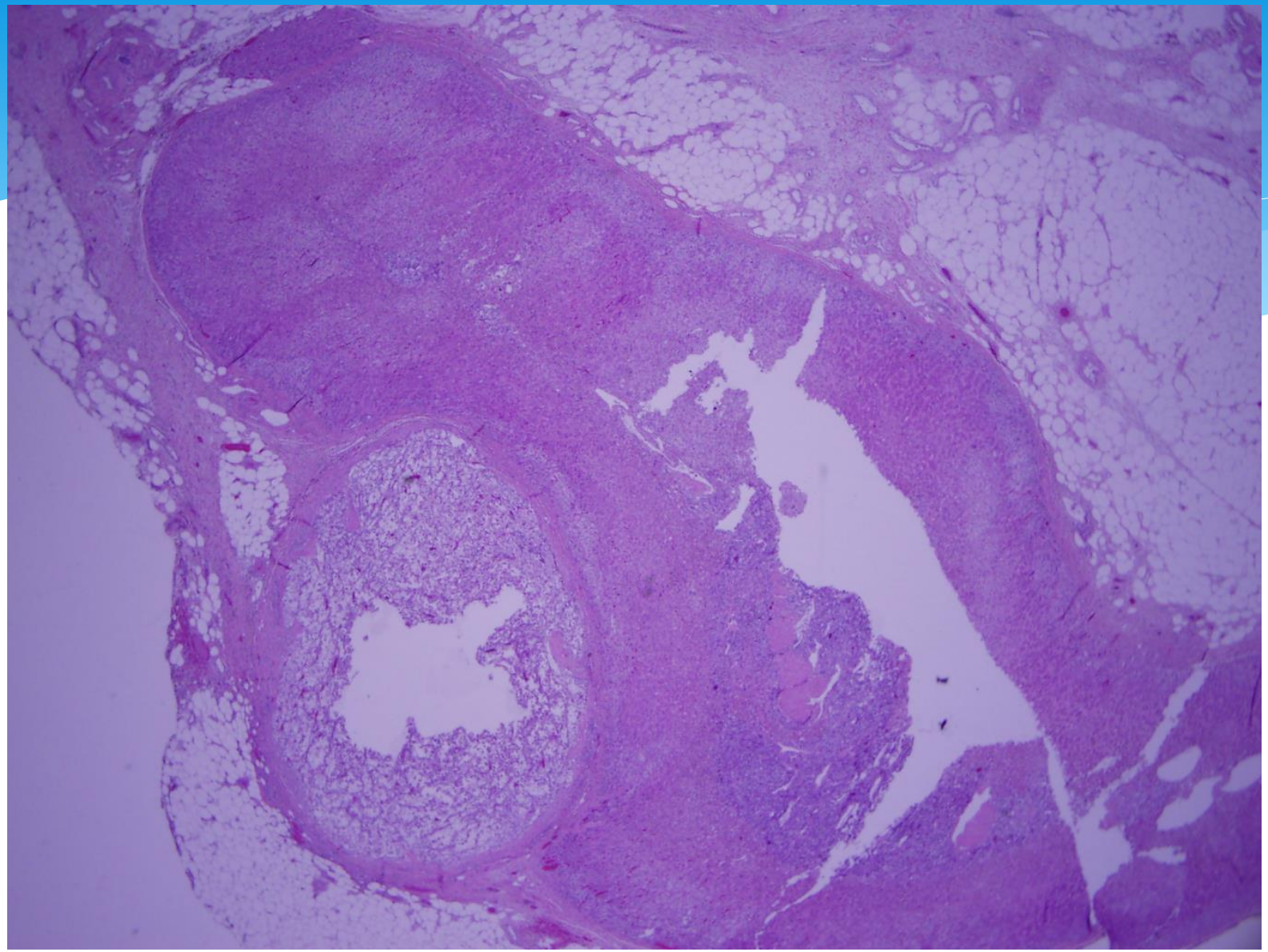
Case 1: What is the best next step?

A. Yellow ANCR
B. Partial nephrectomy
✓ C. Core biopsy
D. 1 a.m. STAT IR consult for Hickman placement


CM
0 1 2 3 4
BS-14-09907
BWH Pathology







BS-14-09907

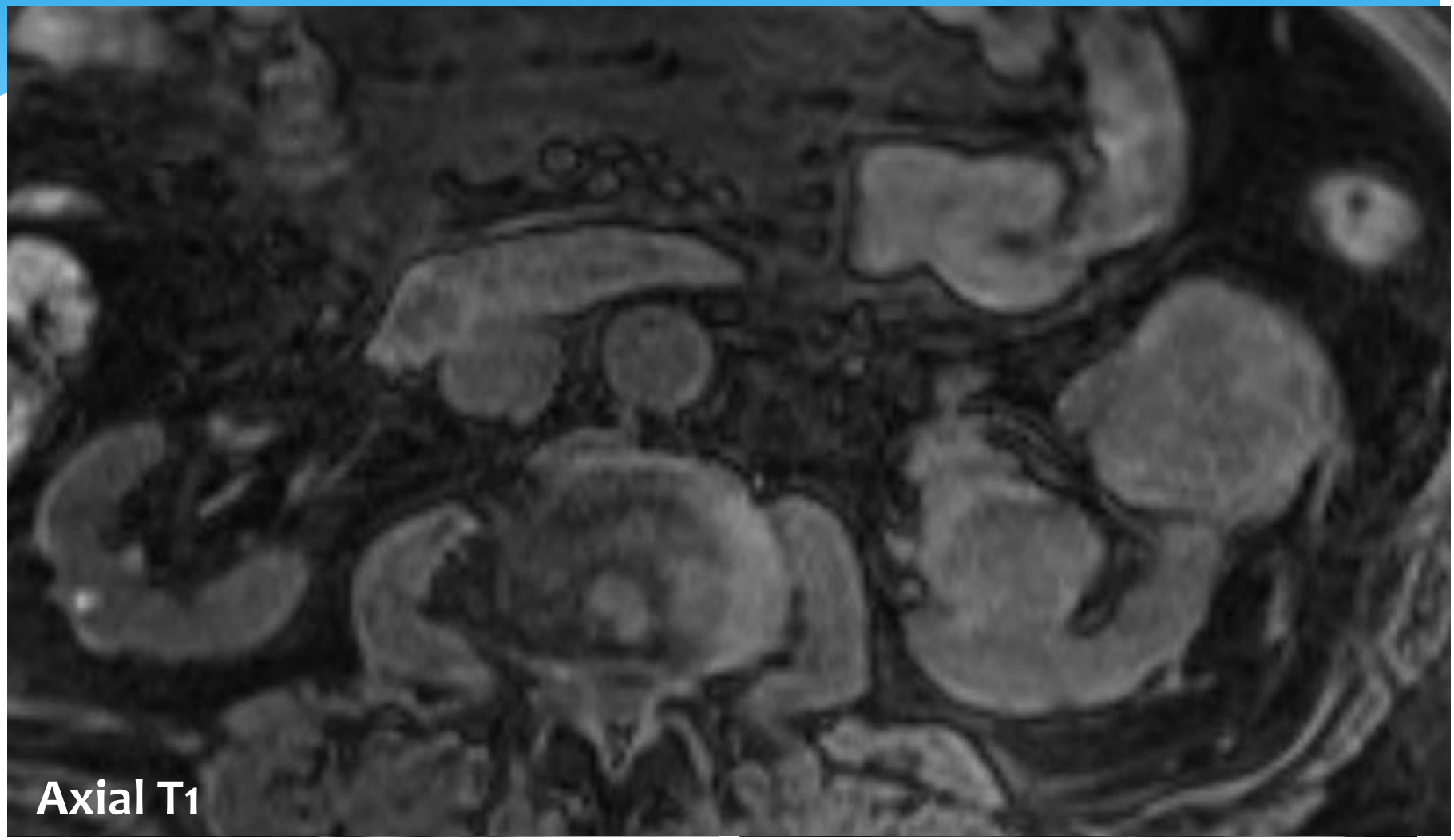
A. SPECIMEN DESIGNATED "KIDNEY, PARTIAL OR TOTAL RESECTION":
RENAL CELL CARCINOMA CLEAR CELL TYPE (9.8 cm), Fuhrman nuclear grade III (of IV).
Necrosis is present.
Tumor is present in the renal vein, including invasion of the renal vein wall, and is present at the en face resection margin.
The renal artery and ureter resection margins are negative for tumor.
Tumor invades hilar adipose tissue.
Tumor invades through the renal capsule into perinephric soft tissue.
Tumor directly invades the adrenal gland.
The inked soft tissue resection margin is negative for tumor.
Lymphovascular invasion is present.
The inked soft tissue resection margin is negative for tumor.
The non-neoplastic kidney will be evaluated by Renal Pathology, and the findings will be reported in an addendum.

Case 2

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen without and with contrast	9	Either CT or MRI is appropriate. Thin-section CT.	☢☢☢☢
MRI abdomen without and with contrast	8	Either CT or MRI is appropriate. See statement regarding contrast in text under "Anticipated Exceptions."	O
US kidney retroperitoneal with Doppler	8	To clarify mass that is probably a hyperdense or simple cyst.	O
Biopsy and aspiration kidney	5	Depends on clinical scenario. The appearance and size of mass. US, CT, or MRI may be used for image guidance.	Varies
MRI abdomen without contrast	3	Can be useful to characterize simple cysts.	O
Tc-99m DMSA scan kidney	1	May be useful to rule out pseudomass of functioning renal tissue.	☢☢☢
Arteriography kidney	1	To rule out arteriovenous malformation, arteriovenous fistula, or renal artery aneurysm.	☢☢☢
X-ray intravenous urography	1	May be helpful to differentiate parenchymal masses from collecting system masses.	☢☢☢
CT abdomen with contrast	1		☢☢☢
CT abdomen without contrast	1		☢☢☢

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level


Axial T1

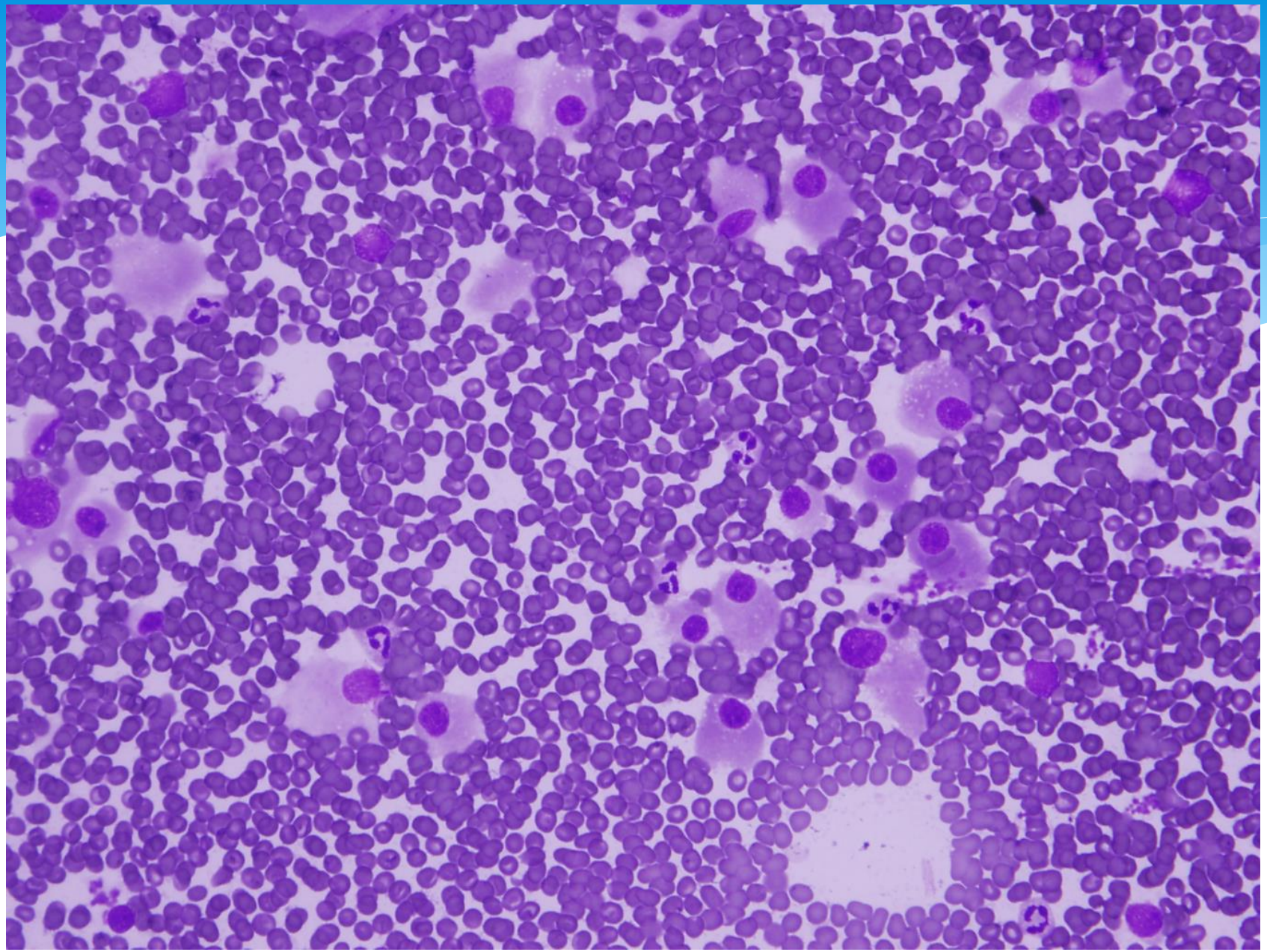
What is the best next step?

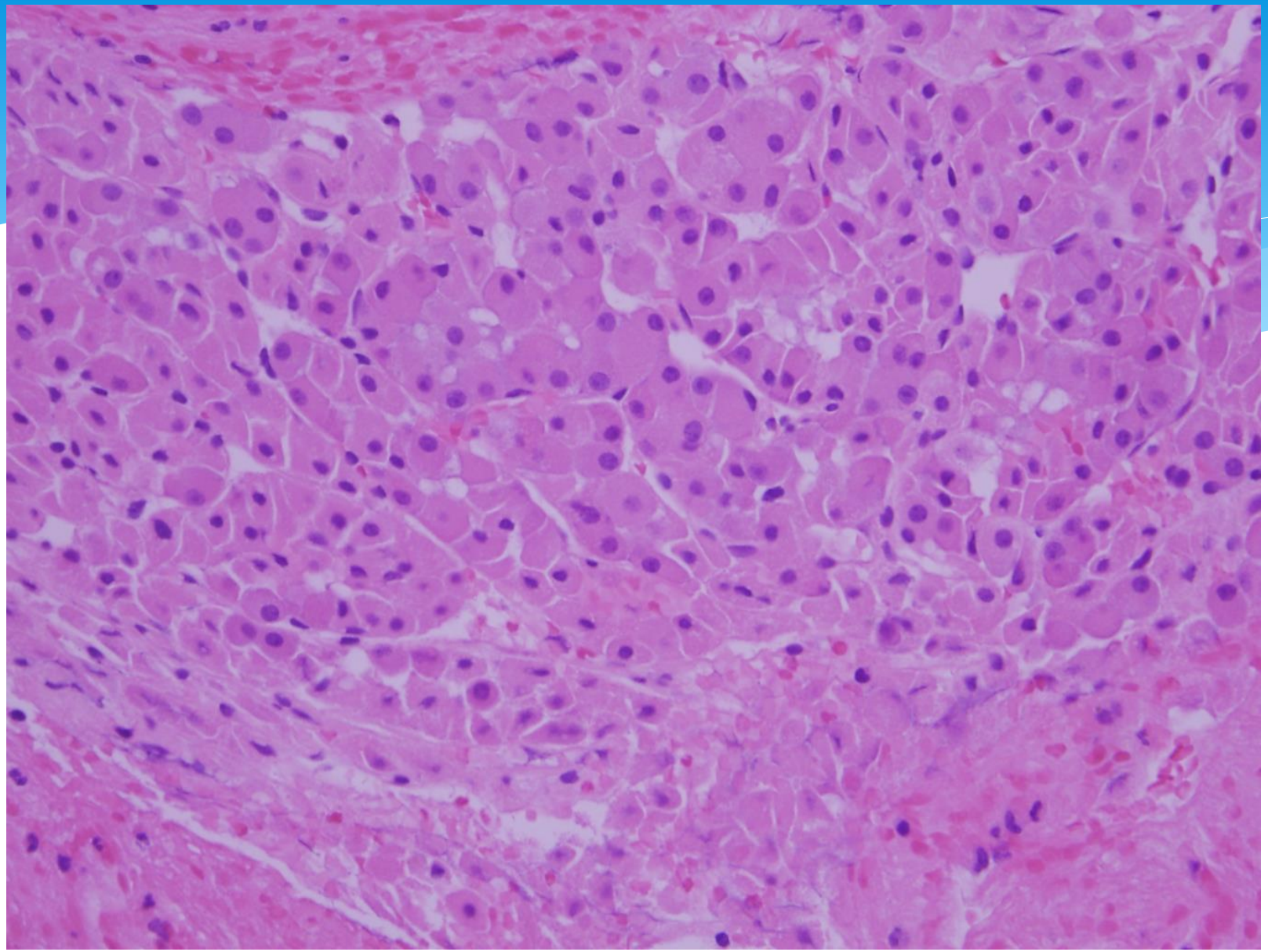
A. Relay the critical finding to the team by phone and document this in the report, but no ANCR

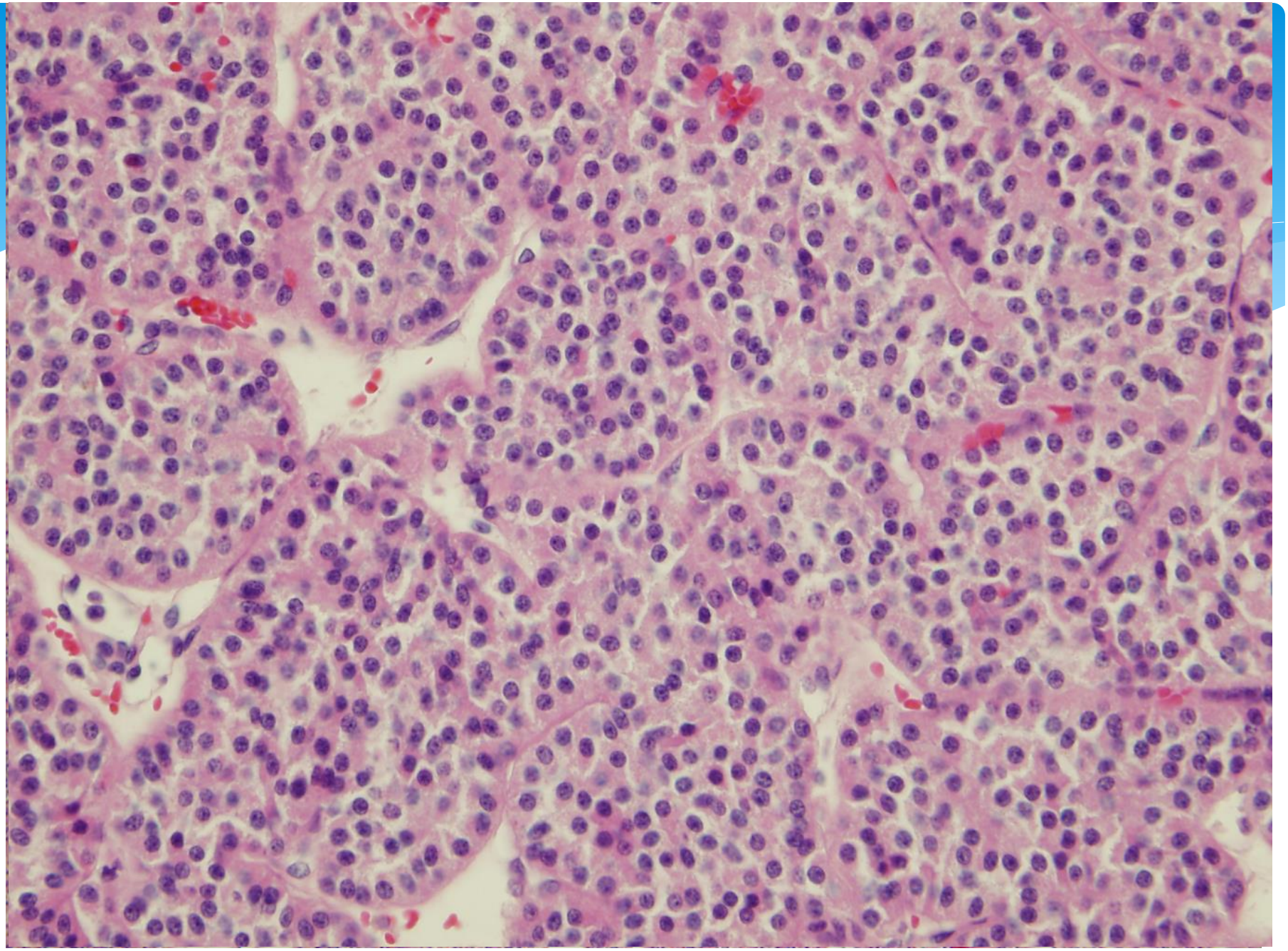
✓ B. Biopsy

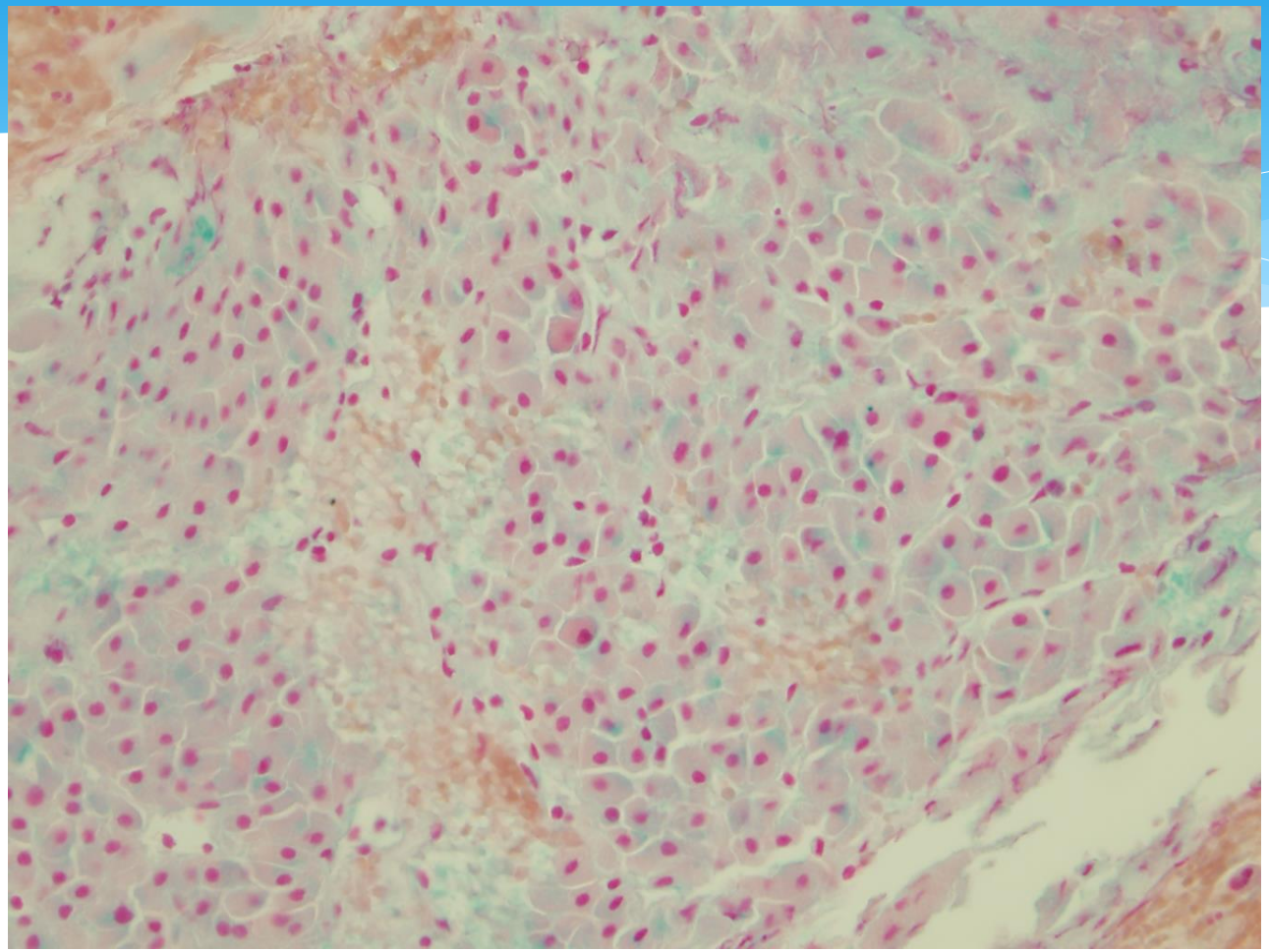
C. Left radical nephrectomy

D. Repeat MRI in 3-6 months









BC-09-52227

FINE NEEDLE ASPIRATION, LEFT KIDNEY

FINAL CYTOLOGIC INTERPRETATION
INTERPRETATION:
NO MALIGNANT CELLS IDENTIFIED.

DIAGNOSIS:

ONCOCYTOMA

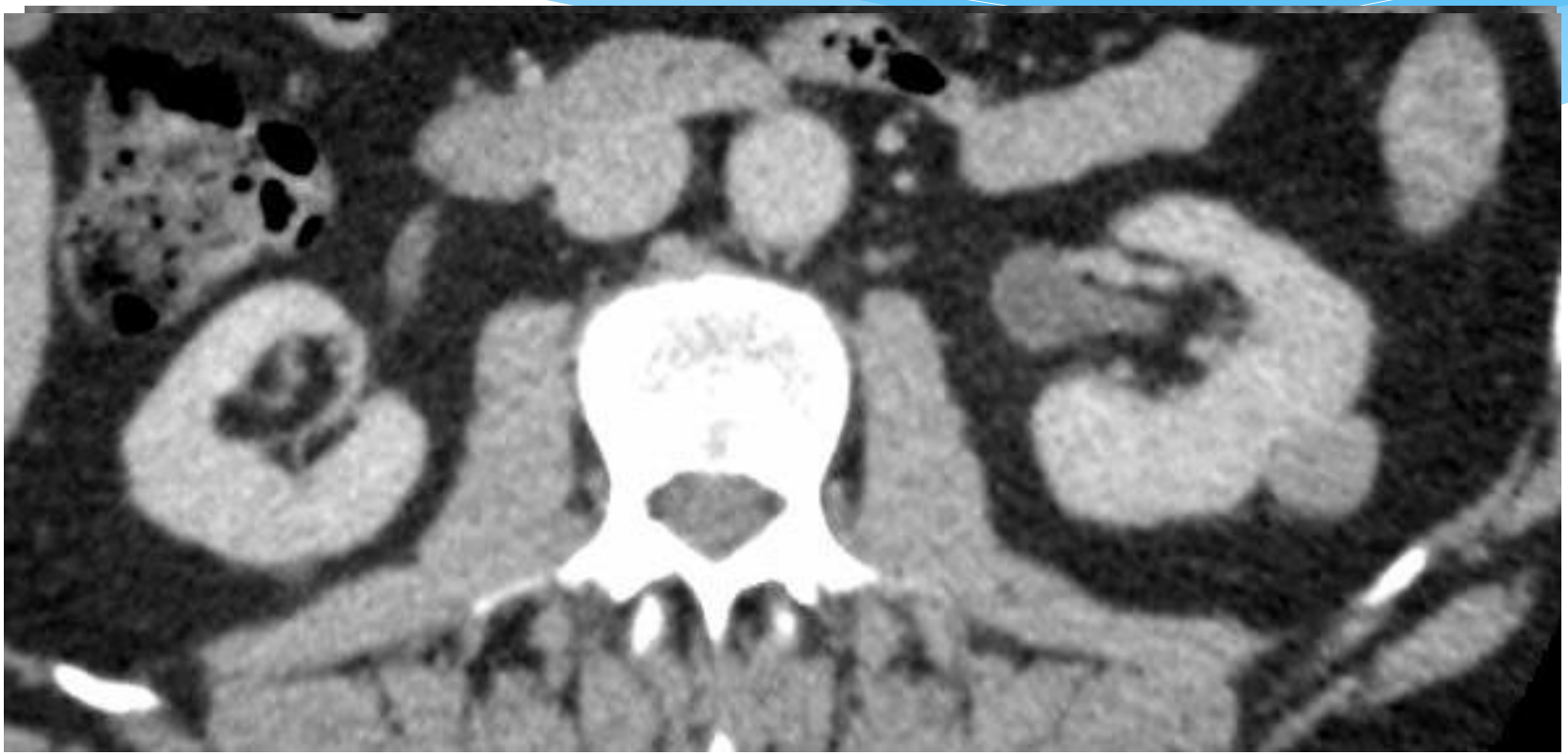
Note: Hale's colloidal iron stain does not show the pattern of staining observed in chromophobe renal cell carcinoma. Immunostains show that the tumor cells are positive for S100A1 and c-kit and negative for RCC and vimentin. A few cells show staining for CK7. FISH evaluation on an additional ThinPrep has been reported separately.

Case 3

* 68-year-old man presented to OSH with 3 days of

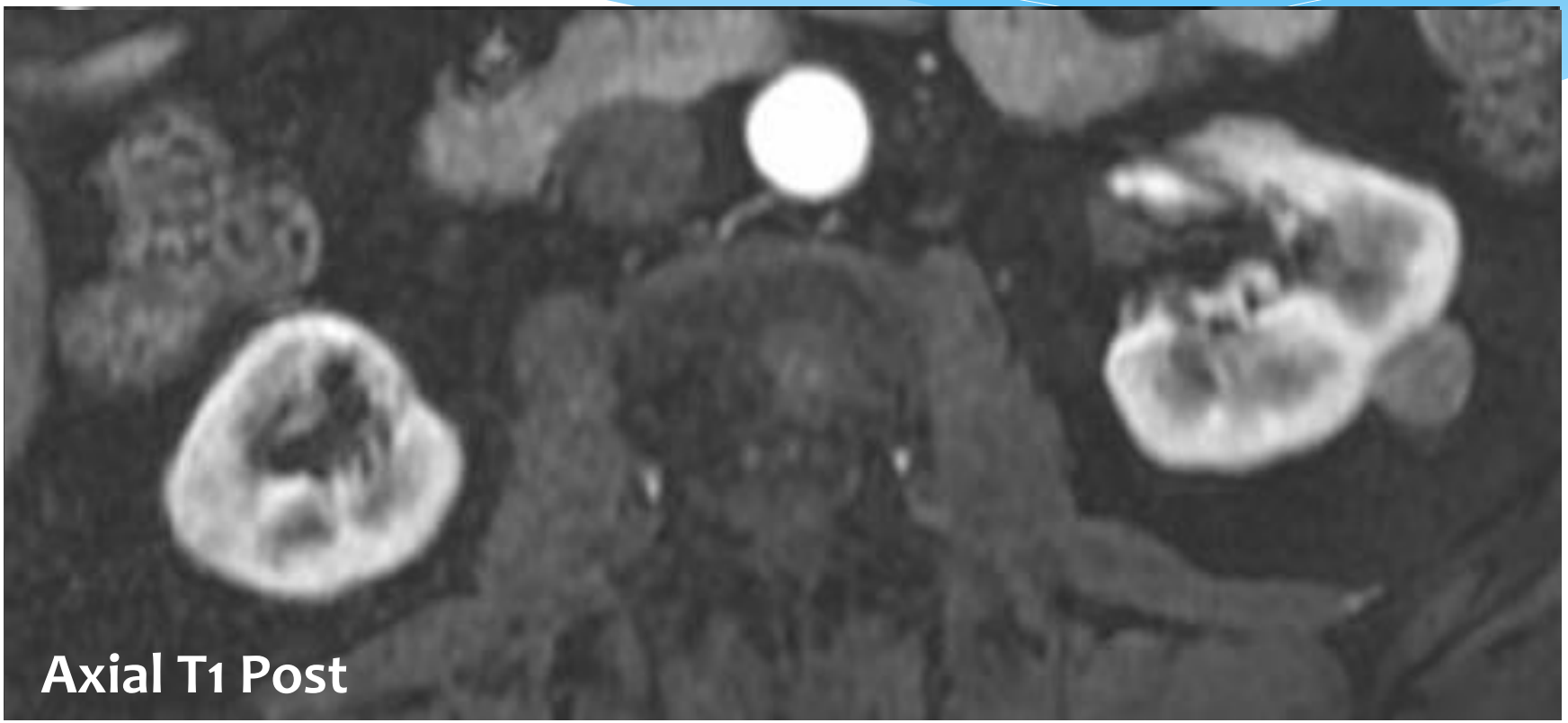
Radiologic Procedure	Rating	Comments	RRL*
CT abdomen without and with contrast	9	Either CT or MRI is appropriate. Thin-section CT.	☢☢☢☢
MRI abdomen without and with contrast	8	Either CT or MRI is appropriate. See statement regarding contrast in text under "Anticipated Exceptions."	O
US kidney retroperitoneal with Doppler	8	To clarify mass that is probably a hyperdense or simple cyst.	O

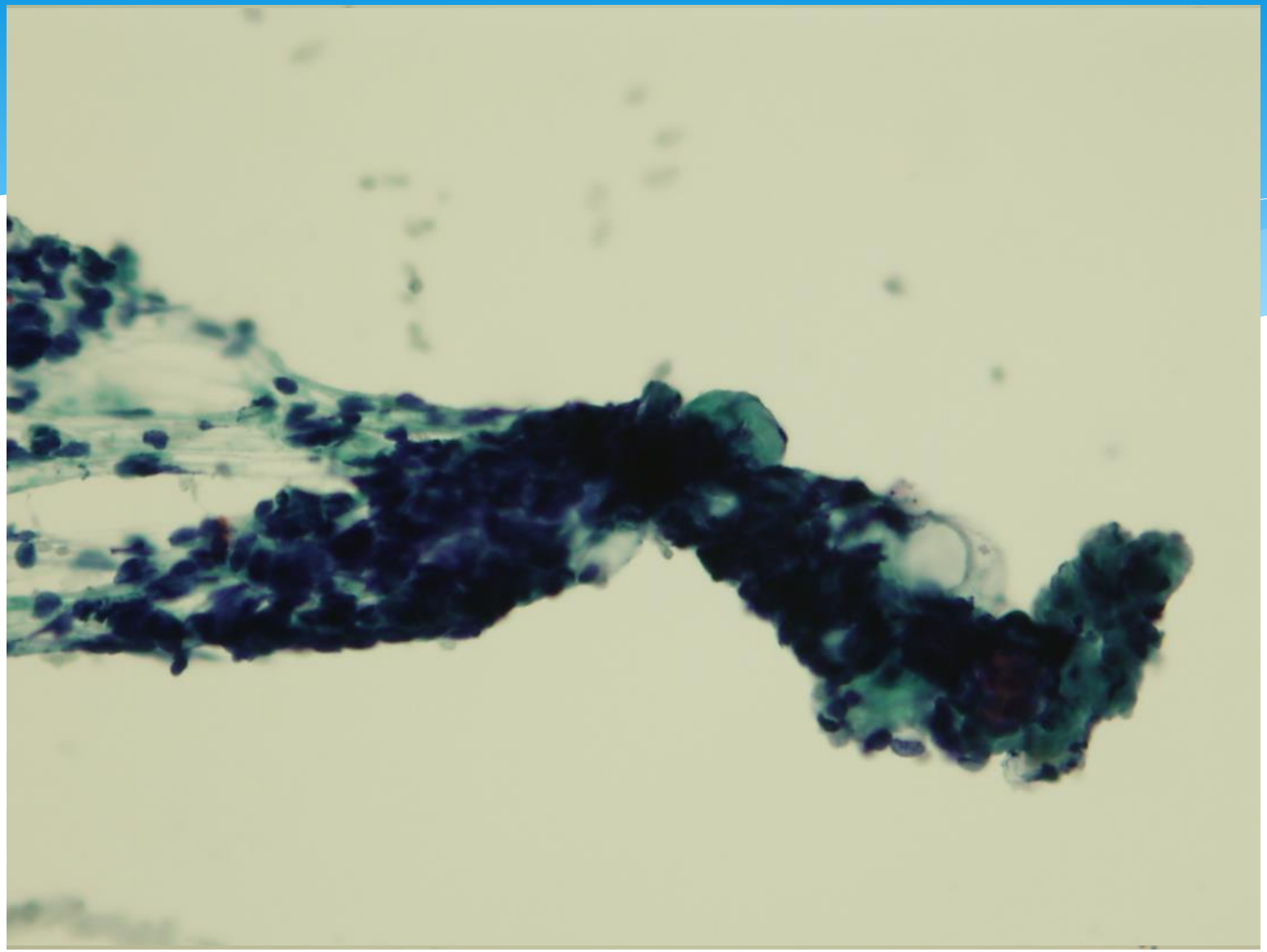
* Patient transferred to BWH, cooled down with antibiotics, and abdomen/pelvis CT with and without contrast ordered:

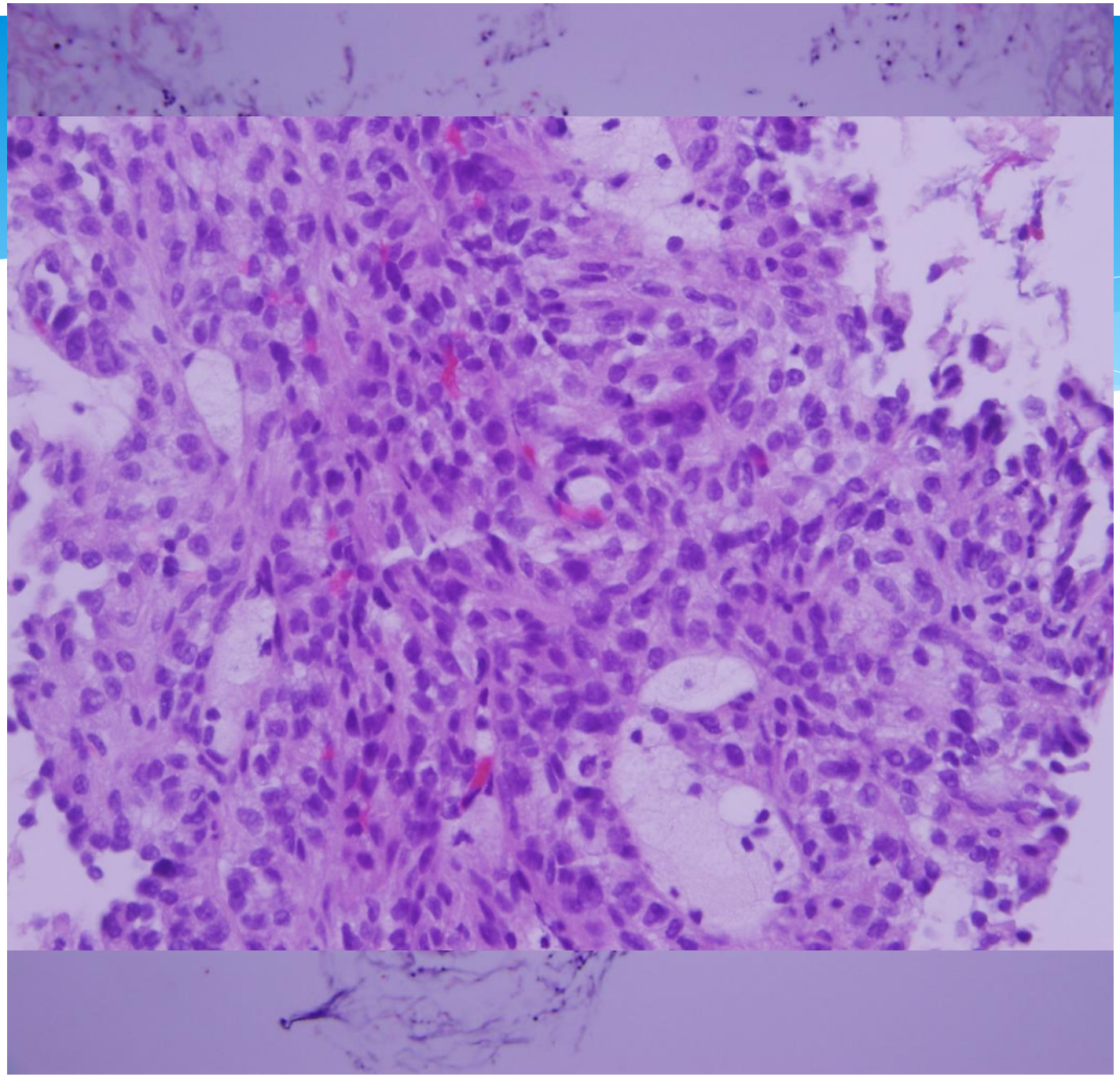


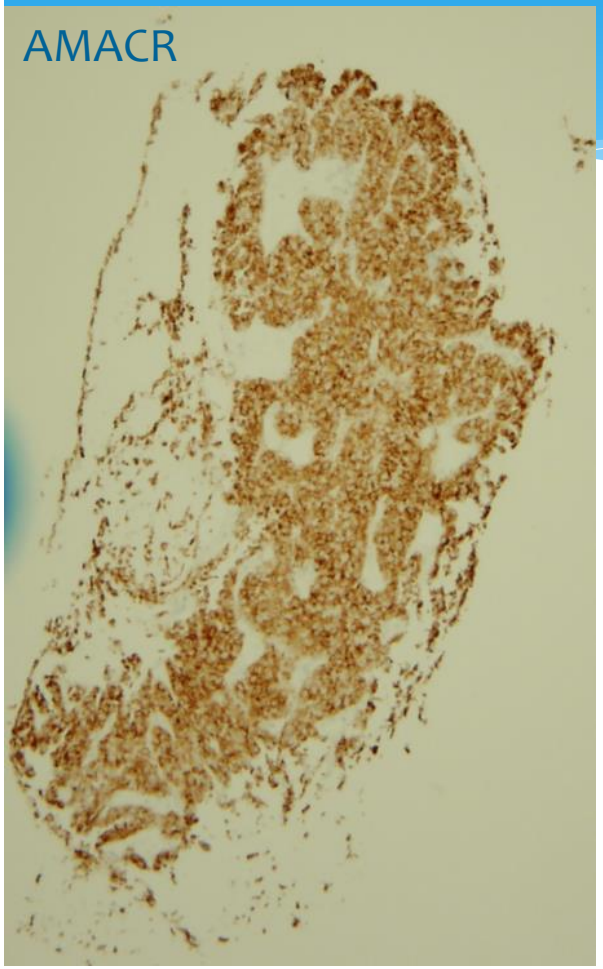
What of the following is not a reasonable management option?

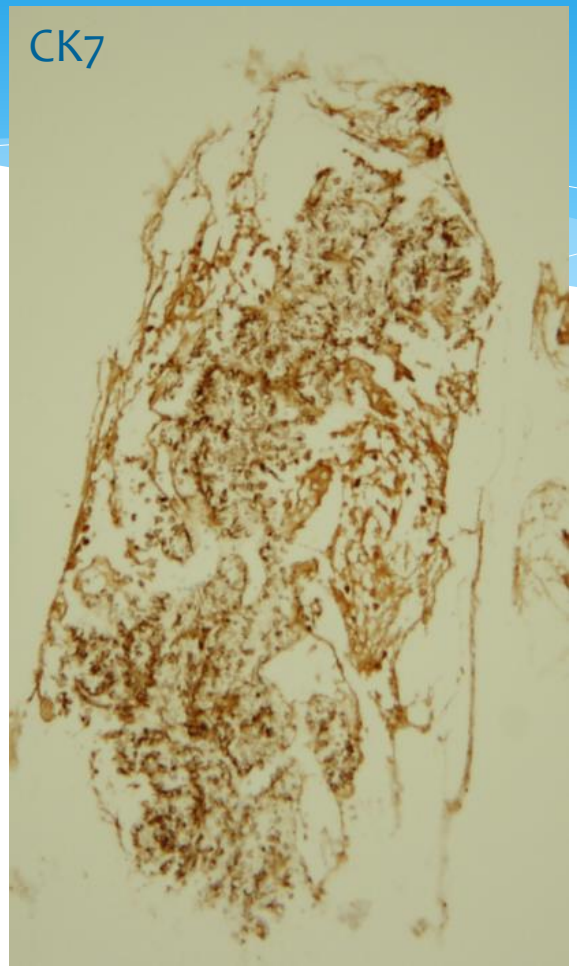
A. MRI in 3-6 months
B. Biopsy
C. Yellow ANCR
✓ D. Bilateral radical nephrectomy

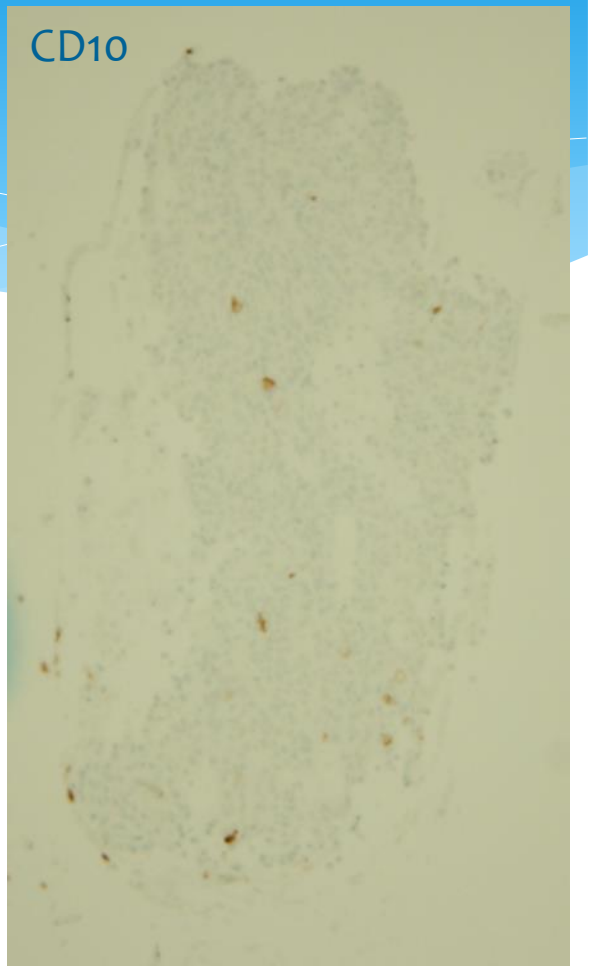

Axial T1 Post






AMACR


CK7


CD10

BC-11-40028

FINE NEEDLE ASPIRATION, LEFT KIDNEY

FINAL CYTOLOGIC INTERPRETATION

INTERPRETATION:

POSITIVE FOR MALIGNANT CELLS.

Most consistent with ***PAPILLARY RENAL CELL CARCINOMA***.

NOTE: Immunohistochemical stains performed on cell block sections reveal the following profile in the neoplastic cells:

POSITIVE: CK7, AMACR

NEGATIVE: CD10

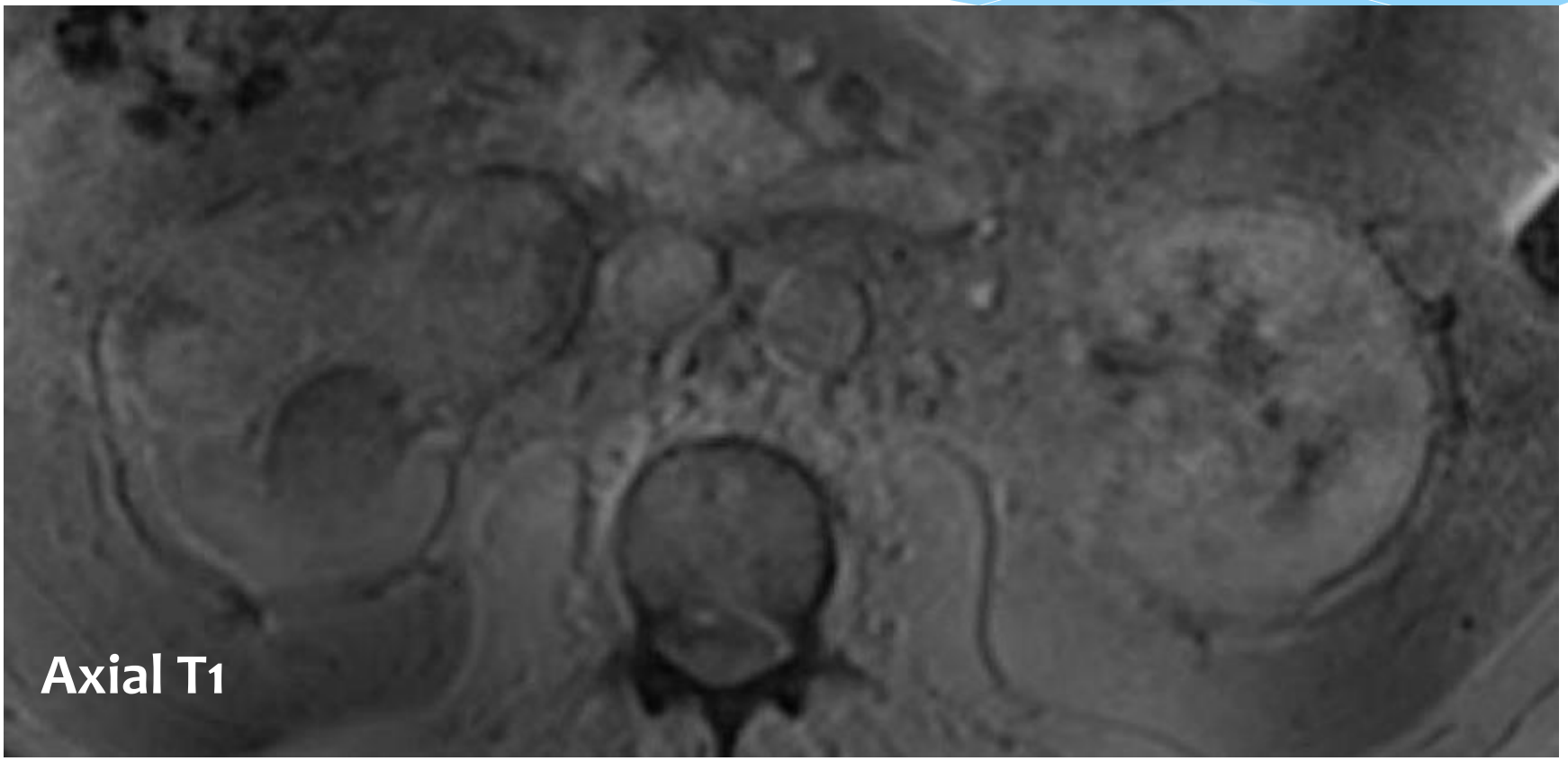
The cytomorphology and immunoprofile support the interpretation above.

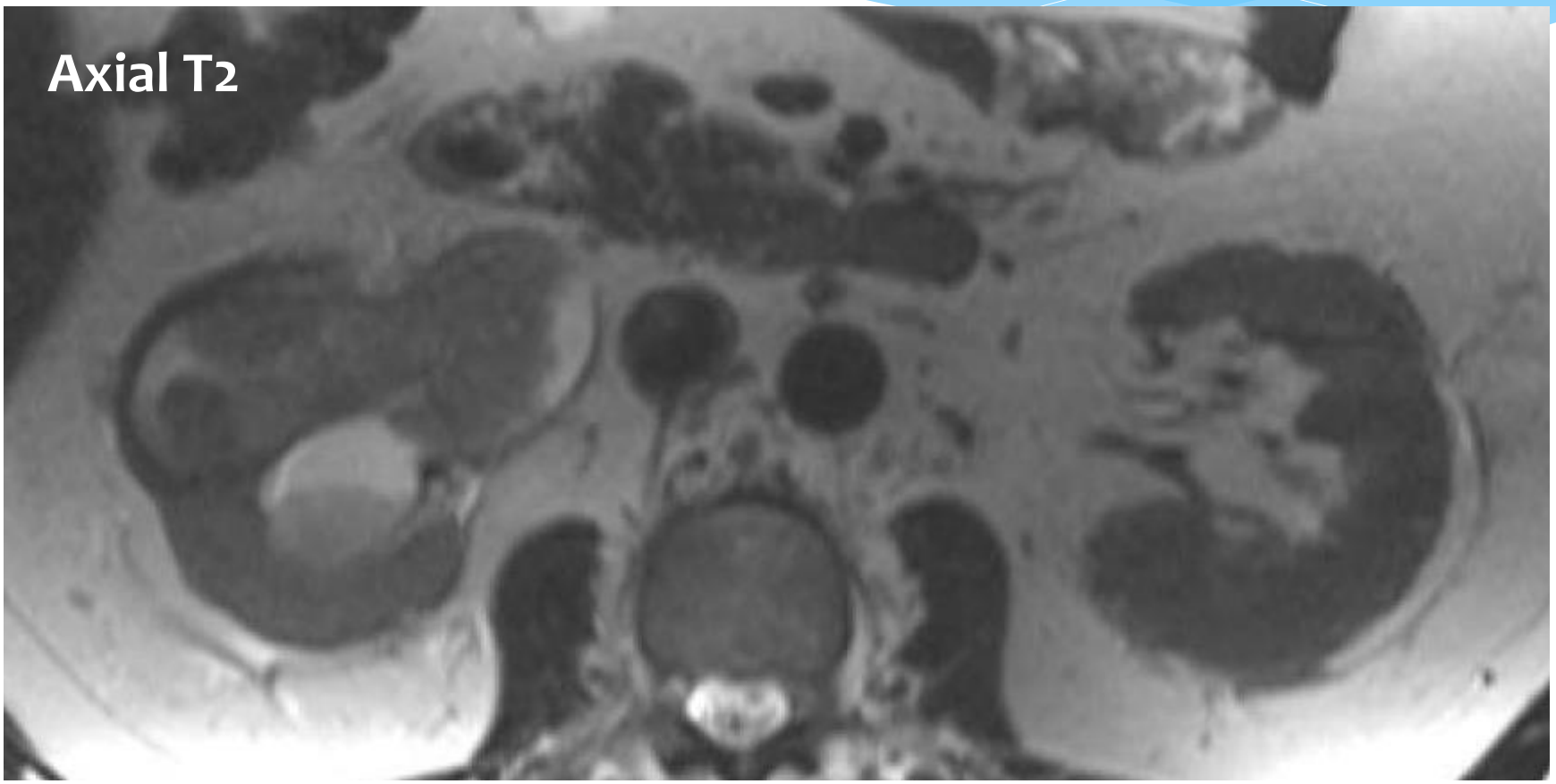
What is the best management option?

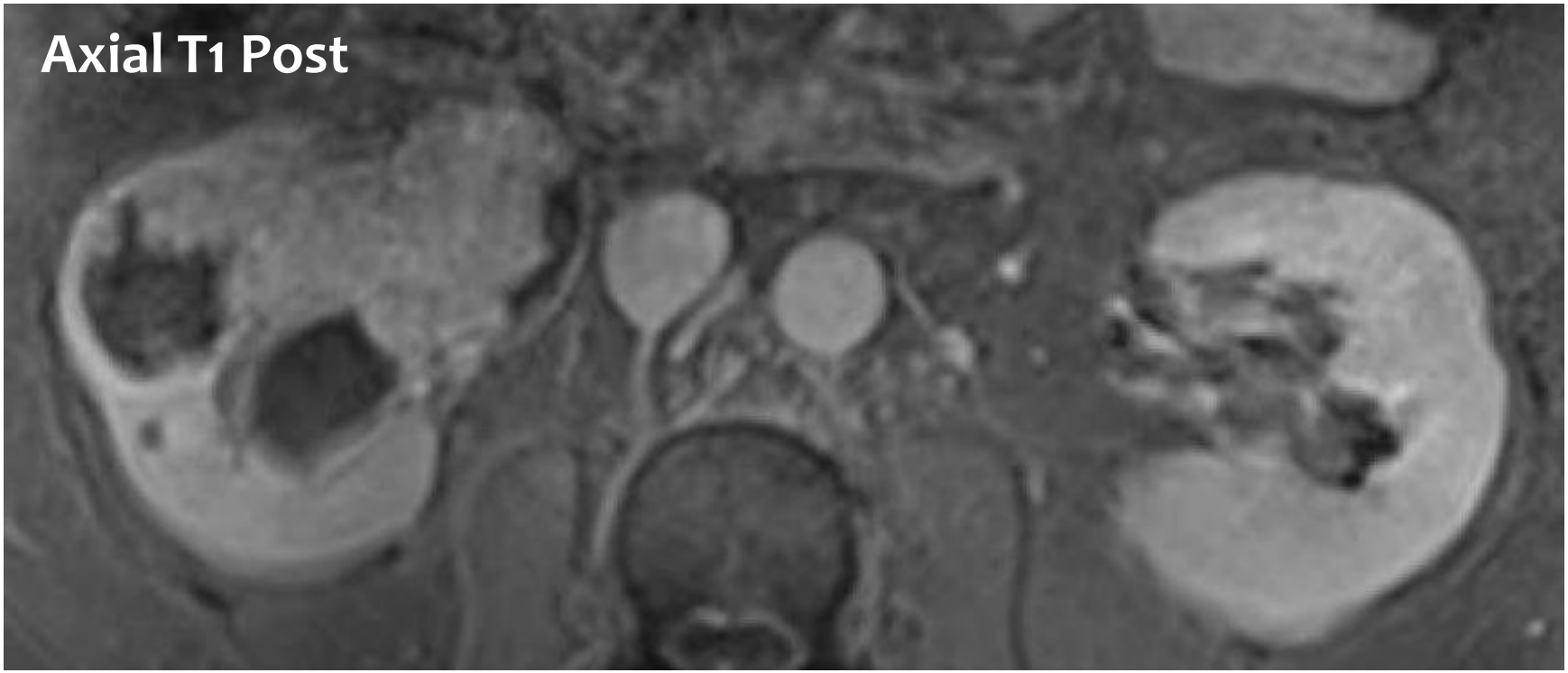
A. Bilateral radical nephrectomy
B. ✓ Cryoablation of bilateral lesions
C. Orange ANCR
D. Repeat MRI in 6 months
E. Bilateral partial nephrectomy

Case 4

* 64-year-old man presented with hematuria and right flank pain.
  * History of chronic renal insufficiency (Cr ~2.0), nephrolithiasis status post shock wave lithotripsy, and bladder papillary TCC status post TURBT one year prior.
* MRI abdomen/pelvis with and without contrast revealed:


Axial T1


Axial T2


Axial T1 Post

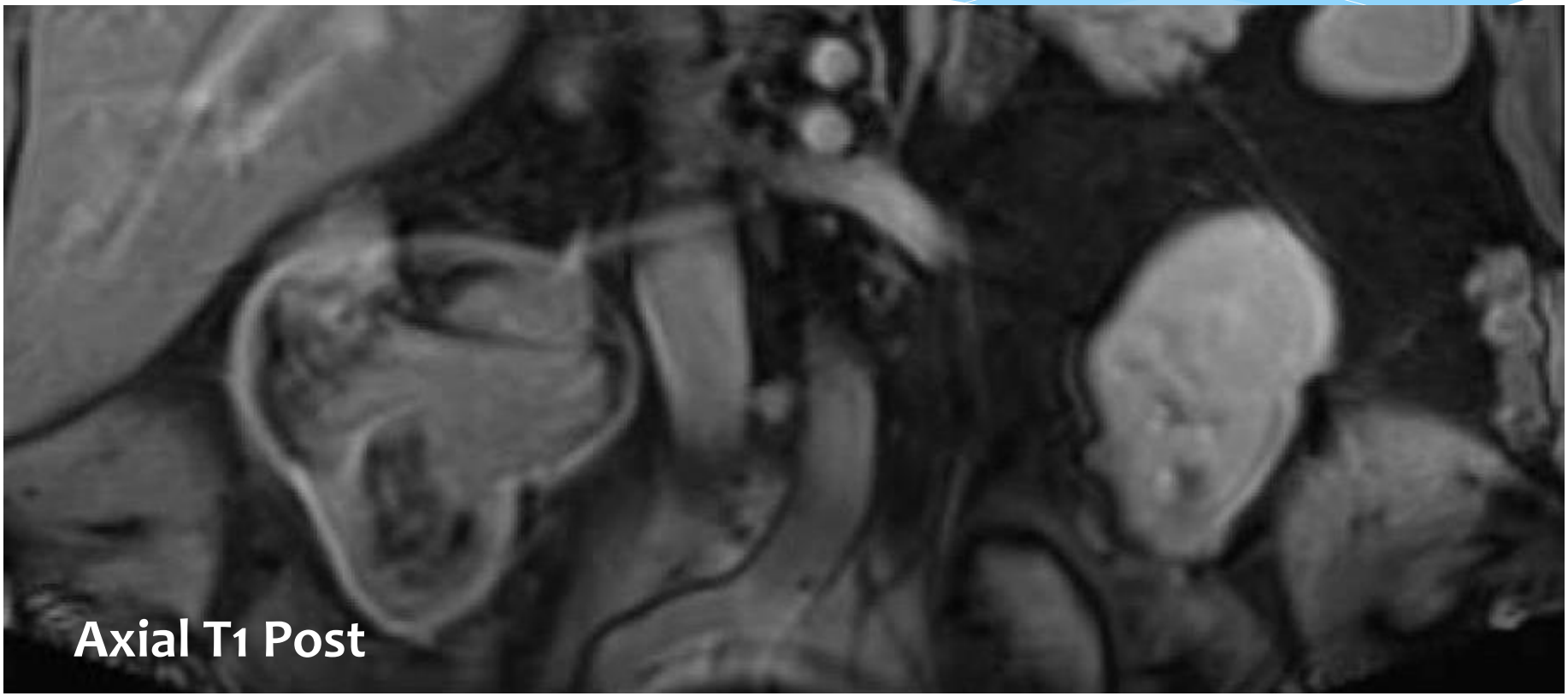
All of the information required for a definitive diagnosis is present?

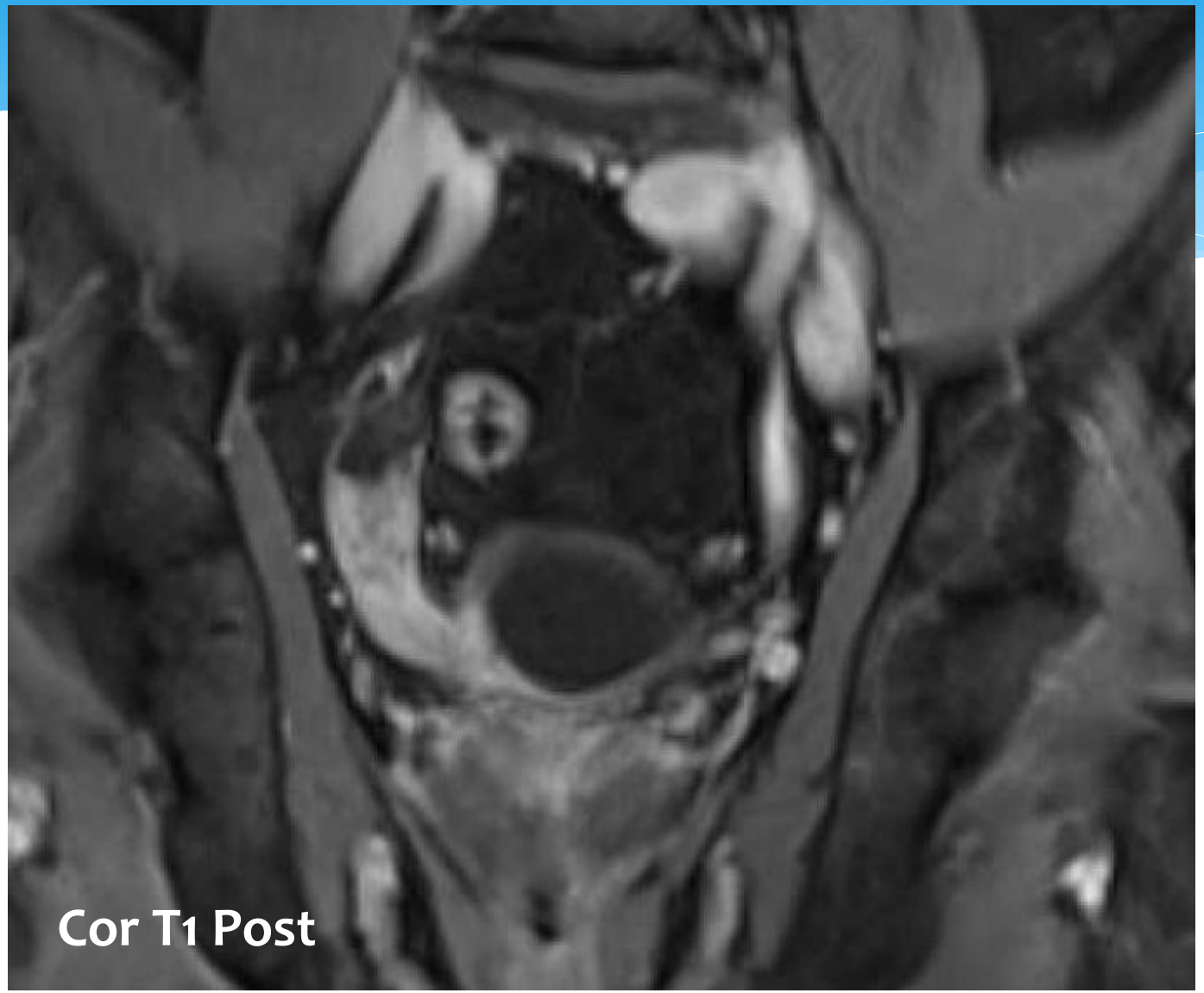
A. True

✓ B. False

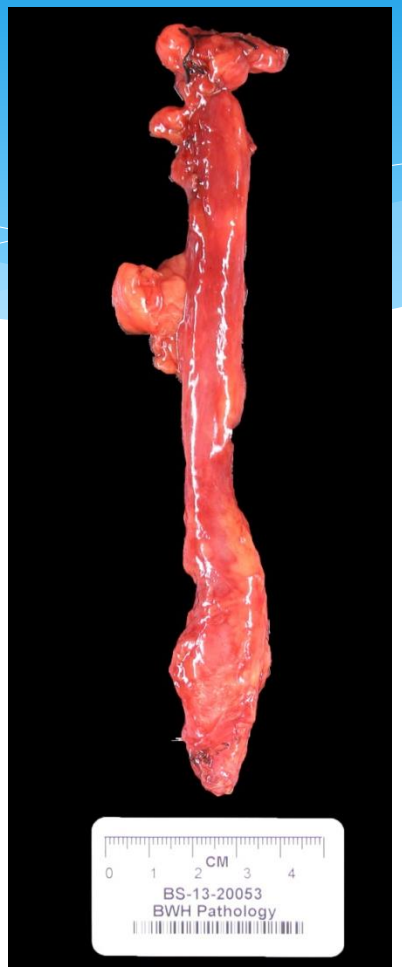
Case 4

Radiologic Procedure	Rating	Comments	RRL*
X-ray chest	9	Preoperative screen.	☢
CT abdomen and pelvis without and with contrast	8	Perform as CT urogram (CTU) to include excretory phase for locoregional staging and upper-tract screening. Noncontrast images helpful for assessing enhancement of abnormalities.	☢ ☢ ☢ ☢
MRI pelvis without and with contrast	8	Best test for determining T-stage. Can be complementary to CTU (CTU better for upper-tract assessment). See statement regarding contrast in text under "Anticipated Exceptions."	O


Axial T1 Post


Cor T1 Post


0 1 2 3 4
CM
BS-13-20053
BWH Pathology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CM
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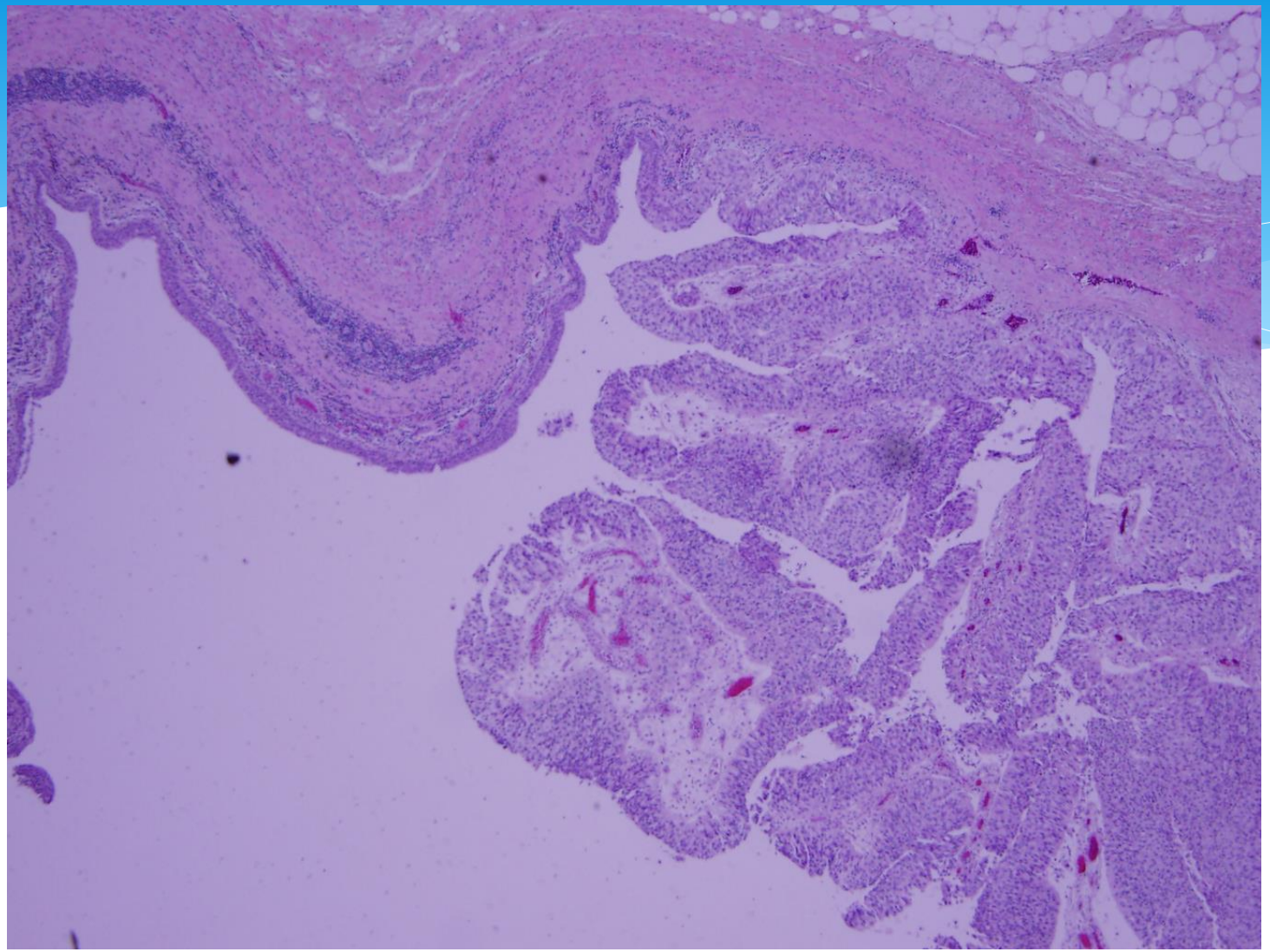
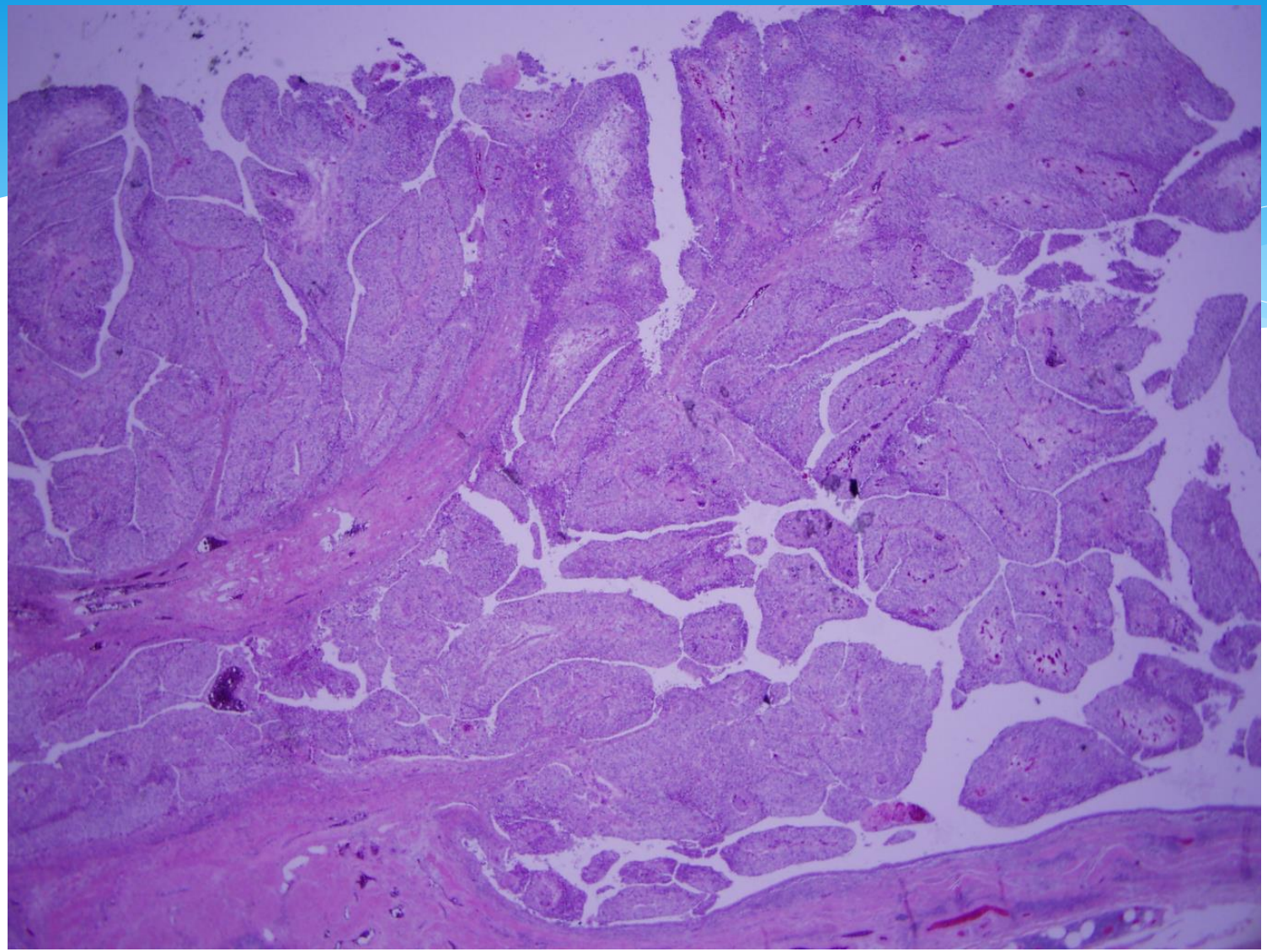
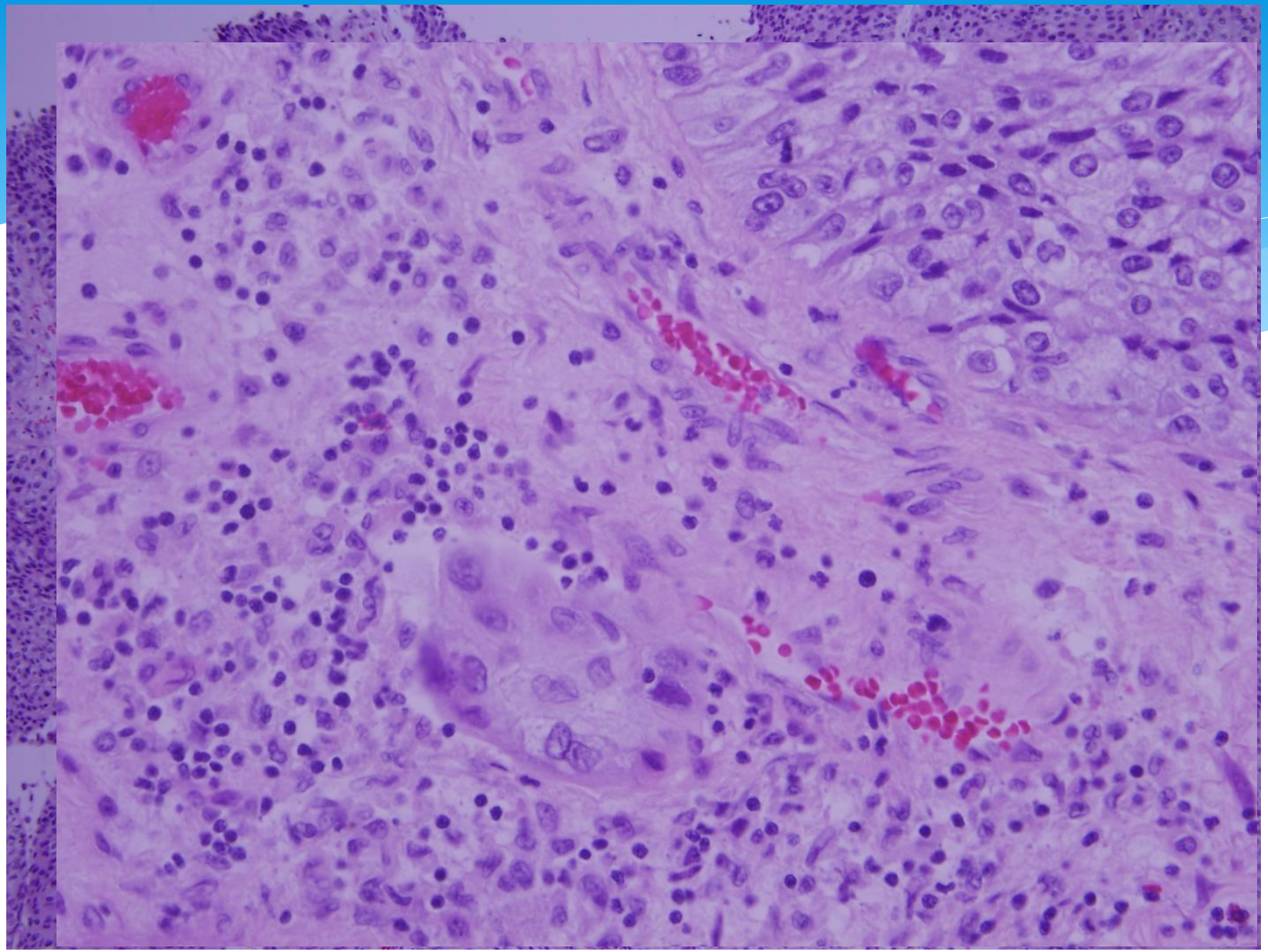
BWH Pathology







BS-13-20053

B. RIGHT KIDNEY AND PROXIMAL URETER:

INVASIVE PAPILLARY UROTHELIAL CARCINOMA (7.3 cm), high grade (former WHO Grade 3 of 3) involving renal pelvis and ureter.
Tumor focally invades renal parenchyma (microscopic foci <0.1 cm, levels examined).
No lymphovascular invasion.
Tumor is present at the ureteral resection margin (see Part D for final margin status).
Renal vein and artery margins are negative for tumor.
The non-neoplastic kidney will be evaluated by Renal Pathology, and the findings will be reported in an addendum.
AJCC Classification (7th edition): pT3 NX.

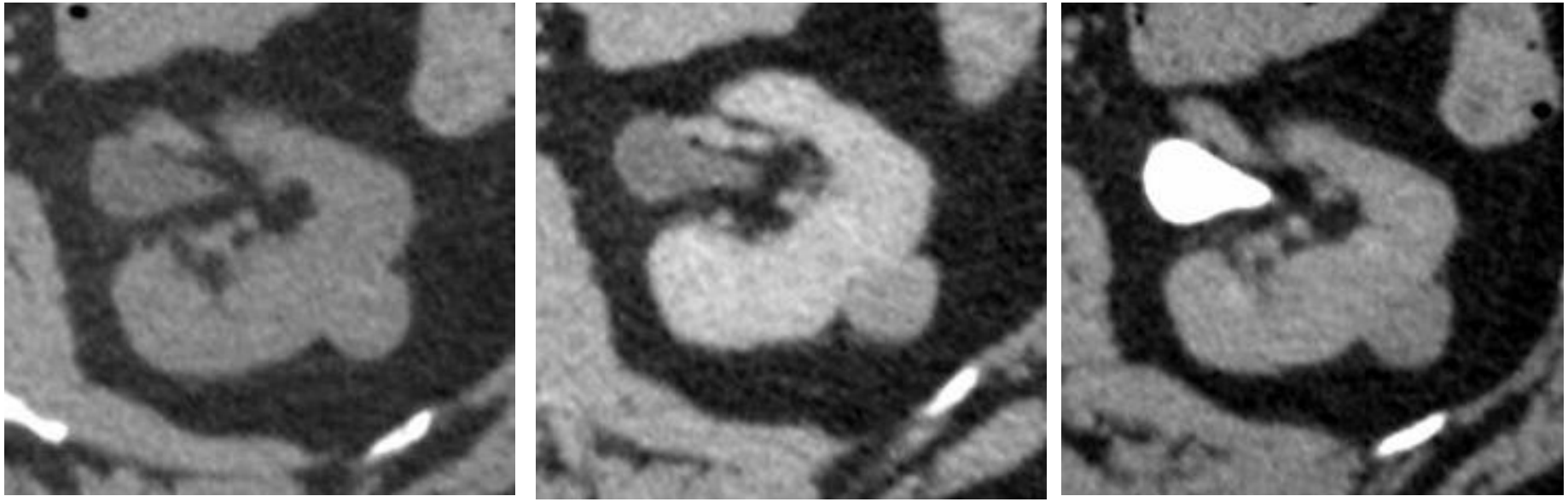
C. DISTAL RIGHT URETER (18.3 cm):

PAPILLARY UROTHELIAL CARCINOMA (3.7 cm), high grade (former WHO Grade 3 of 3).
No invasion into subepithelial connective tissue present.
Tumor is present at the distal resection margin.
Foreign body giant cell reaction present.

Imaging Features of RCC

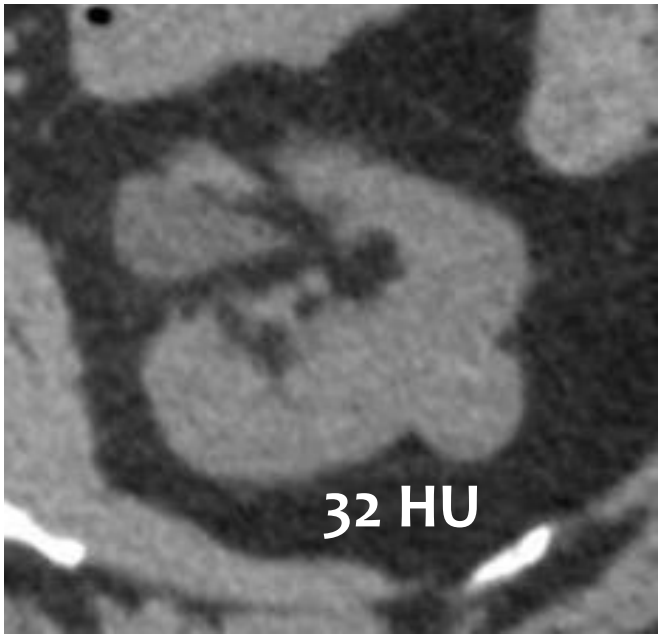
CT Imaging Features of RCC

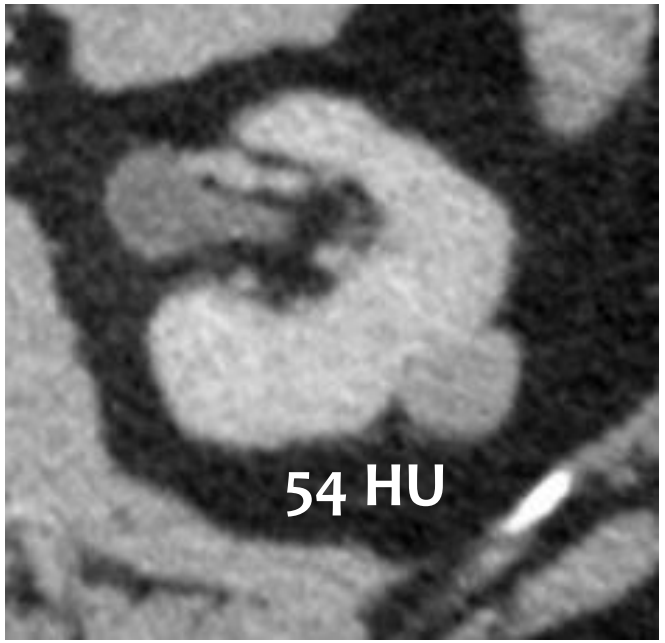
* Multiphase CT is preferred for diagnosis and staging



CT Imaging Features of RCC

* Varied appearance on NECT, enhances on CECT, typically increasing by ≥ 20 HU





CT Imaging Features of RCC

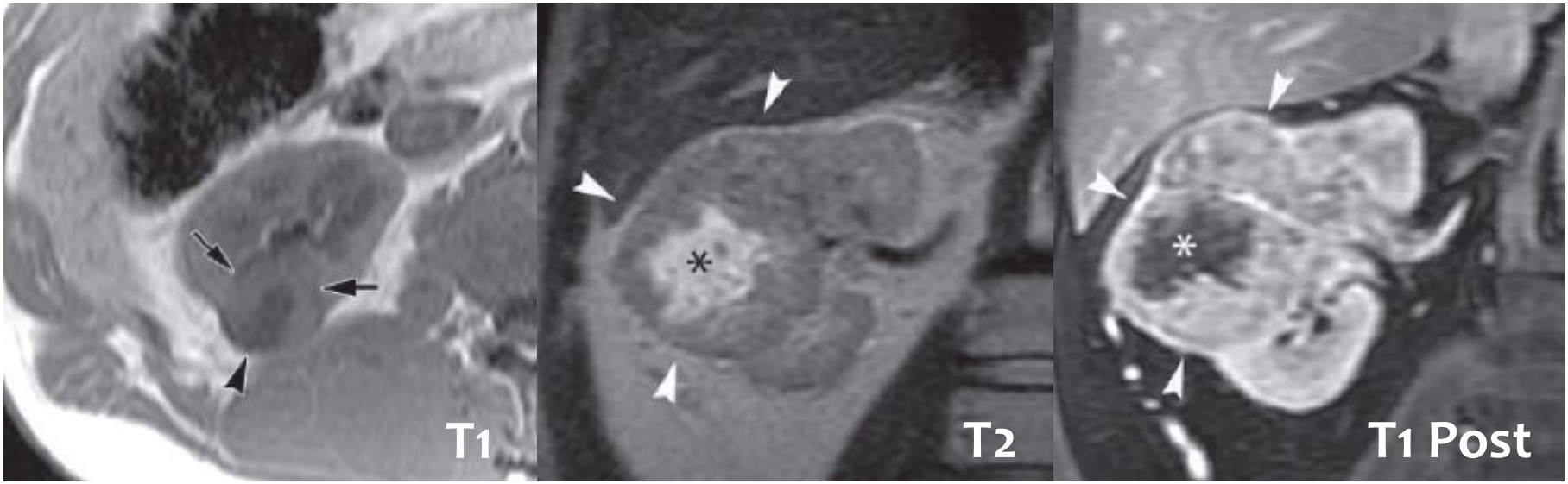
* Heterogeneous enhancement due to hemorrhage/necrosis
* Alters renal contour

CT Imaging Features of RCC

* Tumor extension into the renal vein and IVC

MR Imaging Features of RCC

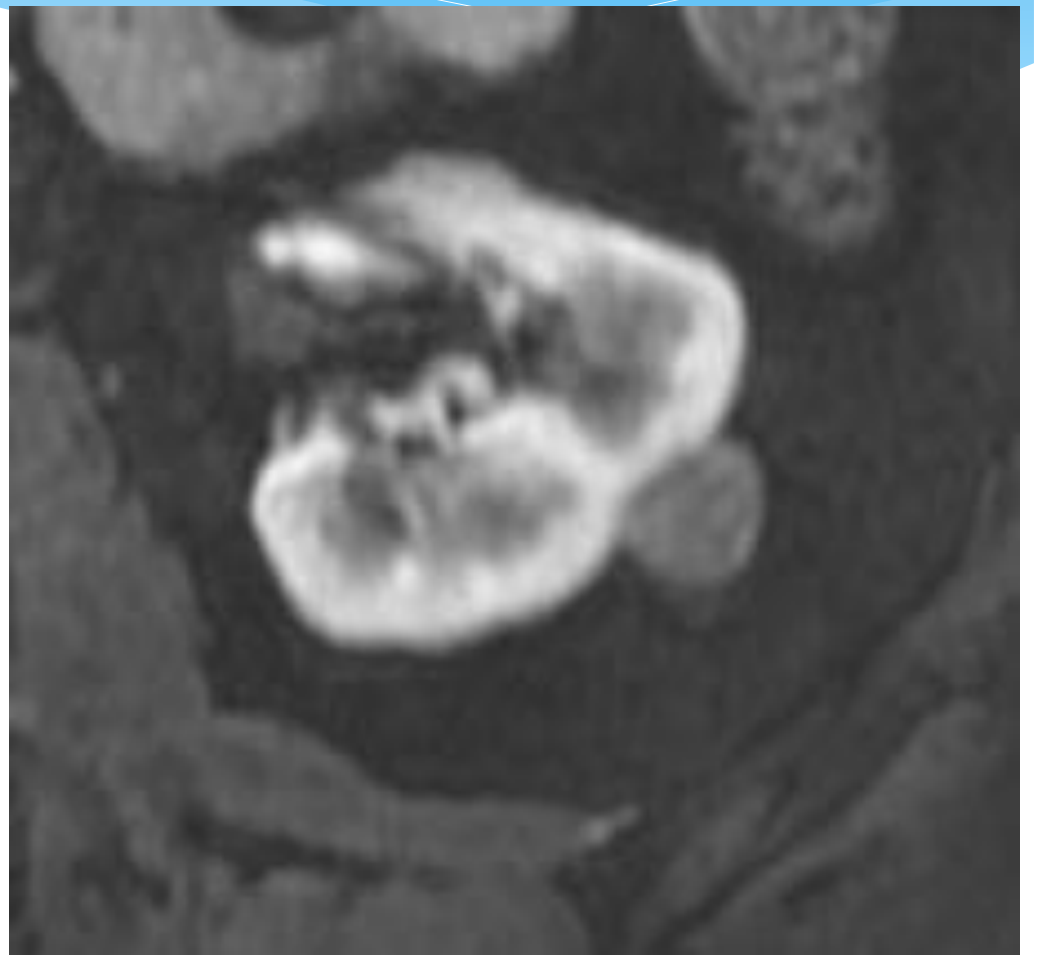
* Ideal for staging RCCs
* Typically isointense to renal cortex on T1 and T2
* Enhances, usually less than normal renal parenchyma
* ± central necrosis



Pedrosa et al., 2008, Radiographics; 28:985-1003

MR Imaging Features of RCC

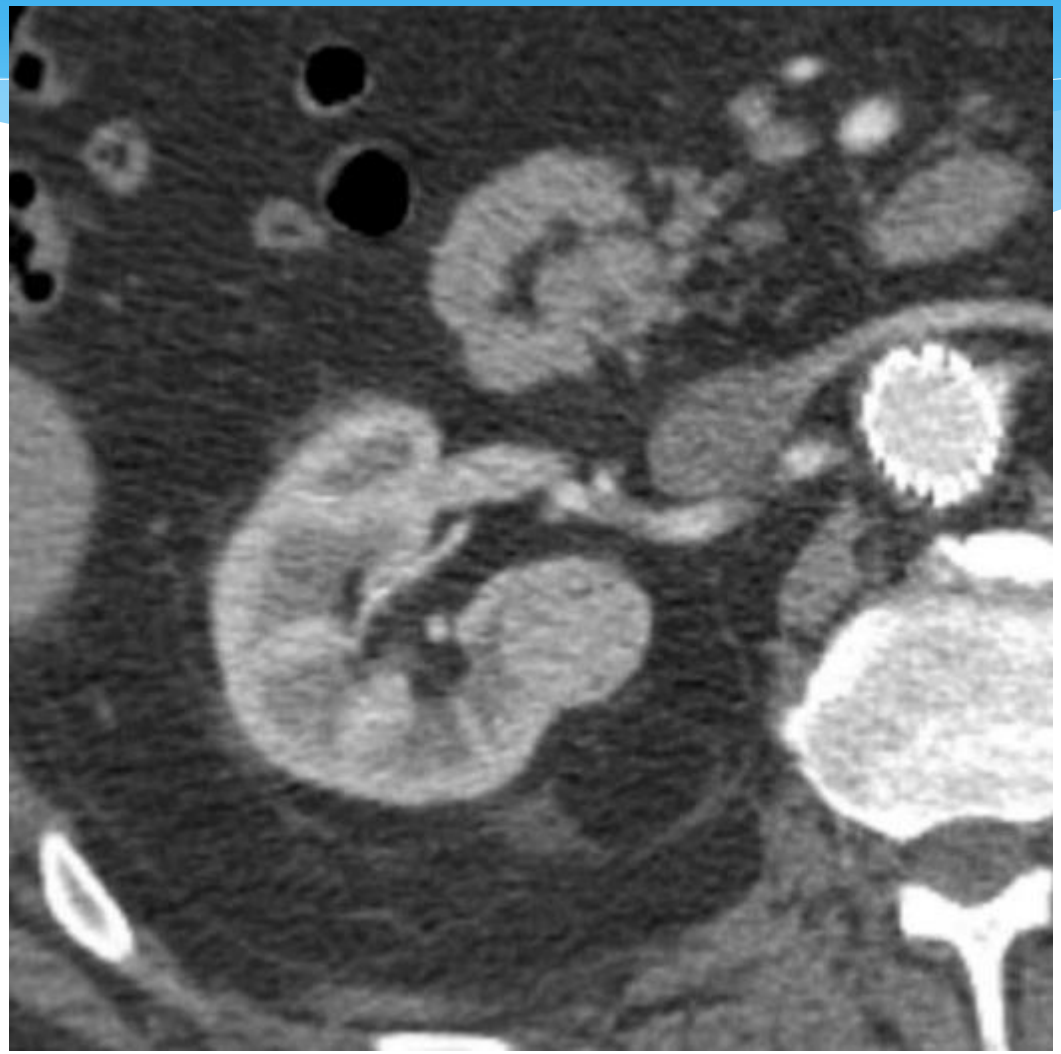
* Papillary RCC is often hypovascular with low-level homogenous signal/enhancement
* → often mistaken for a benign lesion



Imaging Features of Oncocytoma

CT Imaging Features of Oncocytoma

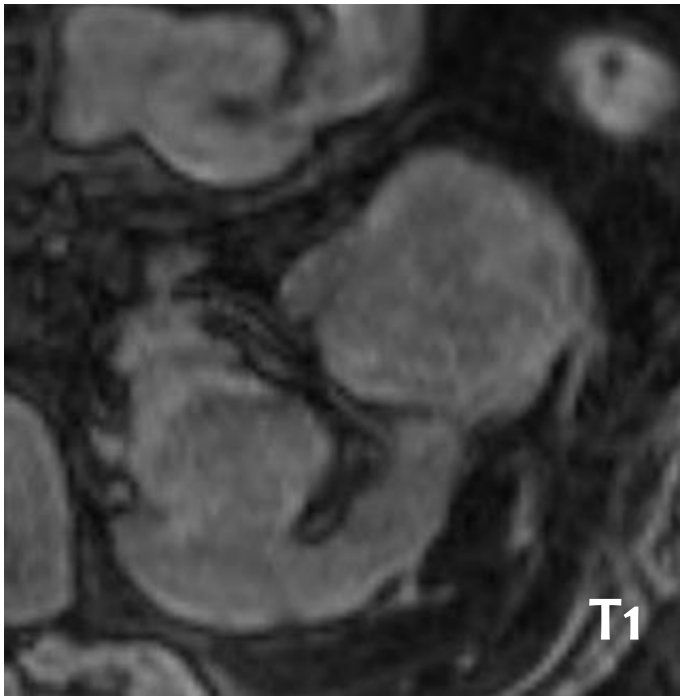
* Homogeneously enhancing masses
* Up to 50% have hypoattenuating central scar which may be confused for central necrosis seen in RCC

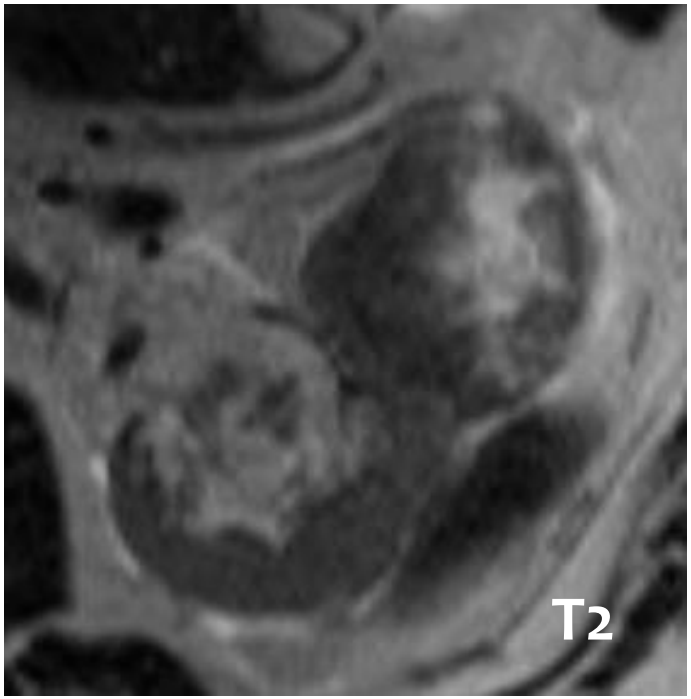


statdx.com, *Renal Oncocytoma*

MR Imaging Features of Oncocytoma

* Hypo- to isointense relative to cortex on T1
* Iso- to slightly hyperintense on T2
* Nonenhancing central scar; stellate pattern with low T1 and high T2 signal
* Hypointense capsule





Imaging Features of Oncocytoma

* Be aware that *all* oncocytoma imaging features are nonspecific and do not confer benignity.
* Surgical resection is preferred as biopsy can produce unreliable results (classically confused with chromophobe RCC).

Imaging Features of Renal Pelvis Transitional Cell Carcinoma

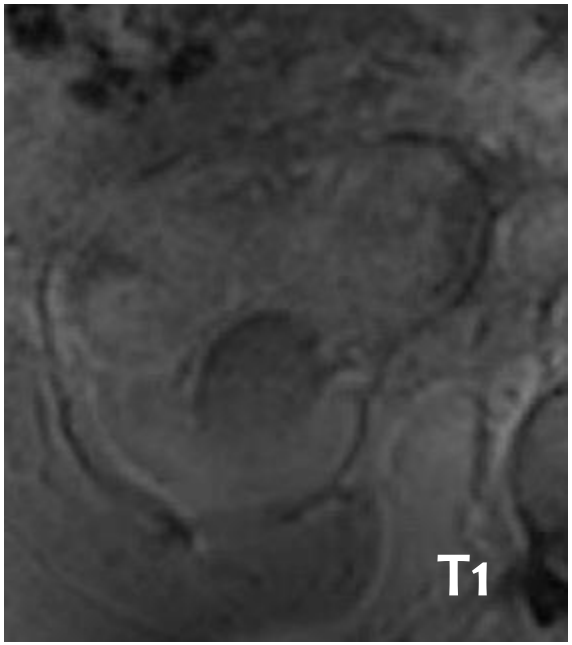
CT Imaging Features of Renal Pelvis TCC

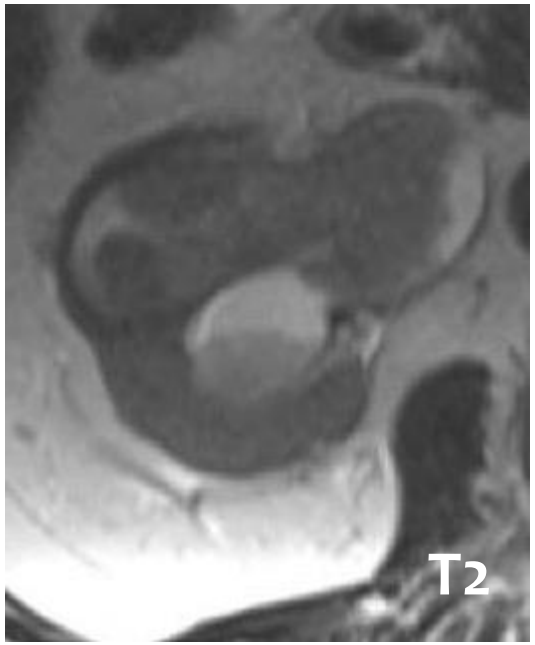
* Soft tissue mass projecting into the renal pelvis
* Heterogeneous appearance if invasive
* ± oncocalyx and hydronephrosis
* Look for multifocal lesions!

statdx.com, *Transitional Cell Carcinoma, Kidney*

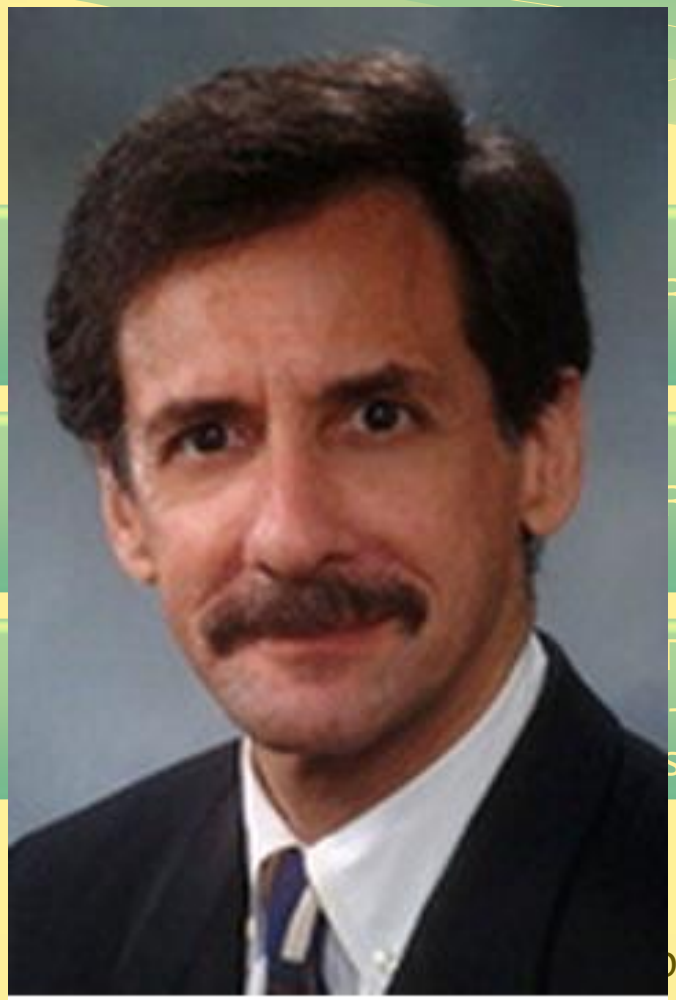
MR Imaging Features of Renal Pelvis TCC

* Same general features as CT plus:
  * Iso- to hypointense on T1
  * Iso- to hyperintense on T2
  * Variable contrast enhancement





General Approach to Solid Renal Masses



Solid renal lesion

RCC

Resection

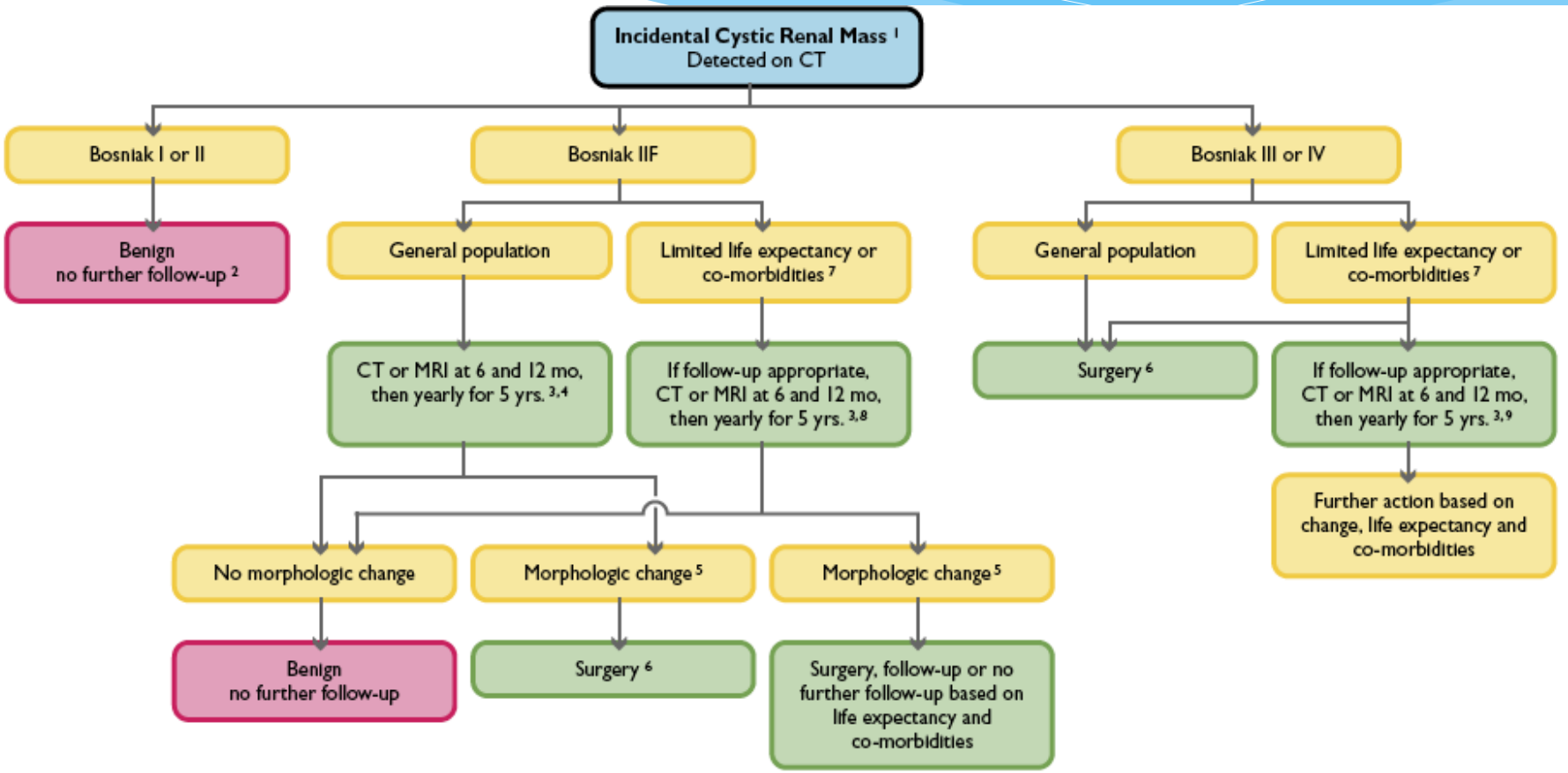
RCC

Resection, can consider biopsy

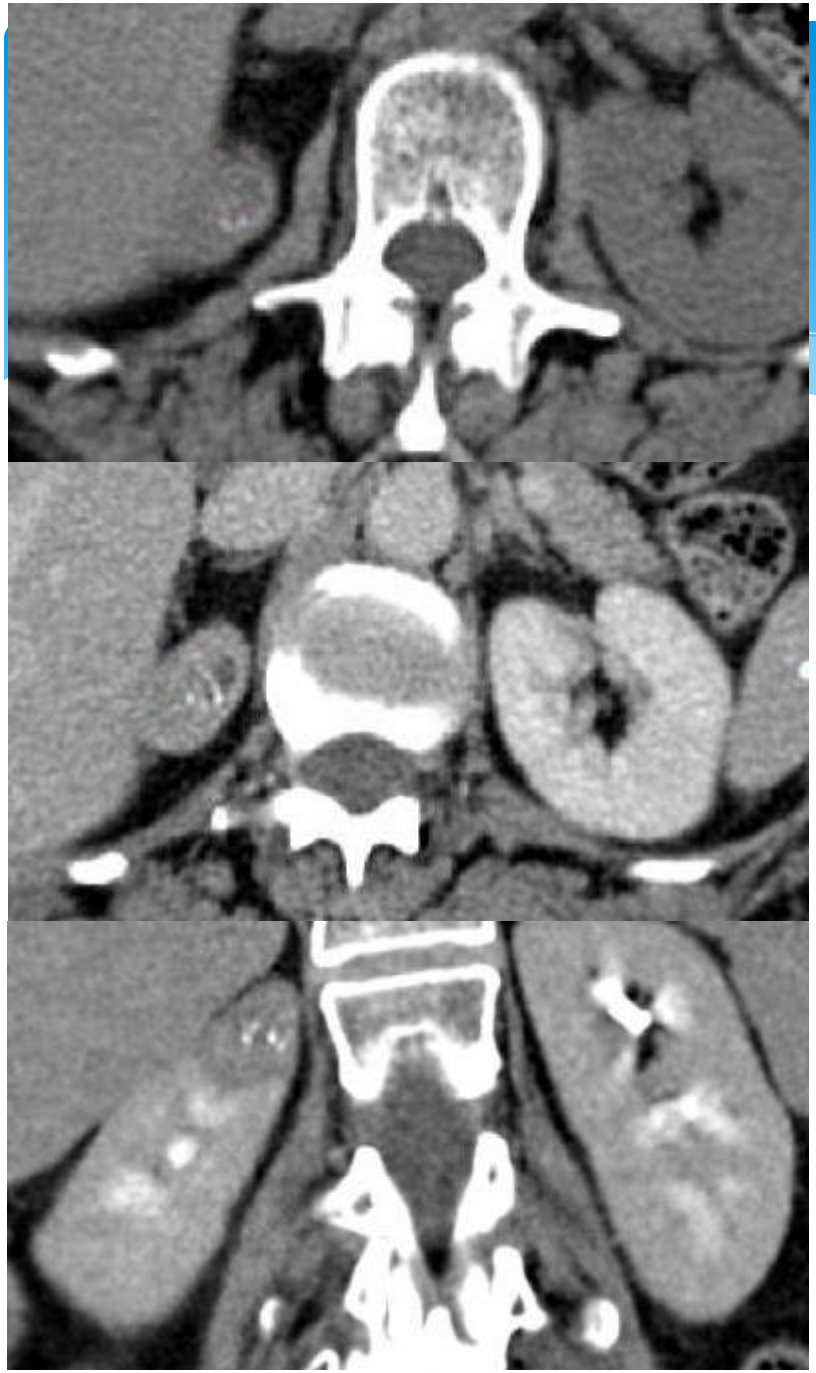
T or -6 s

08, J Am Coll Radiol; 7:754-773

General Approach to Cystic Renal Masses



Berland et al., 2008, J Am Coll Radiol; 7:754-773



Which features of this right renal mass are concerning?

A. Size > 1 cm
B. Heterogeneous appearance
C. Enhancement ≥ 20 HU
✓ D. All of the above

References

1. L. L. Berland, S. G. Silverman, R. M. Gore, W. W. Mayo-Smith, A. J. Megibow, J. Yee, J. A. Brink, M. E. Baker, M. P. Federle, W. D. Foley, I. R. Francis, B. R. Herts, G. M. Israel, G. Krinsky, J. F. Platt, W. P. Shuman, and A. J. Taylor, "Managing incidental findings on abdominal CT: white paper of the ACR incidental findings committee," *J. Am. Coll. Radiol. JACR*, vol. 7, no. 10, pp. 754–773, Oct. 2010.
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Thank You!