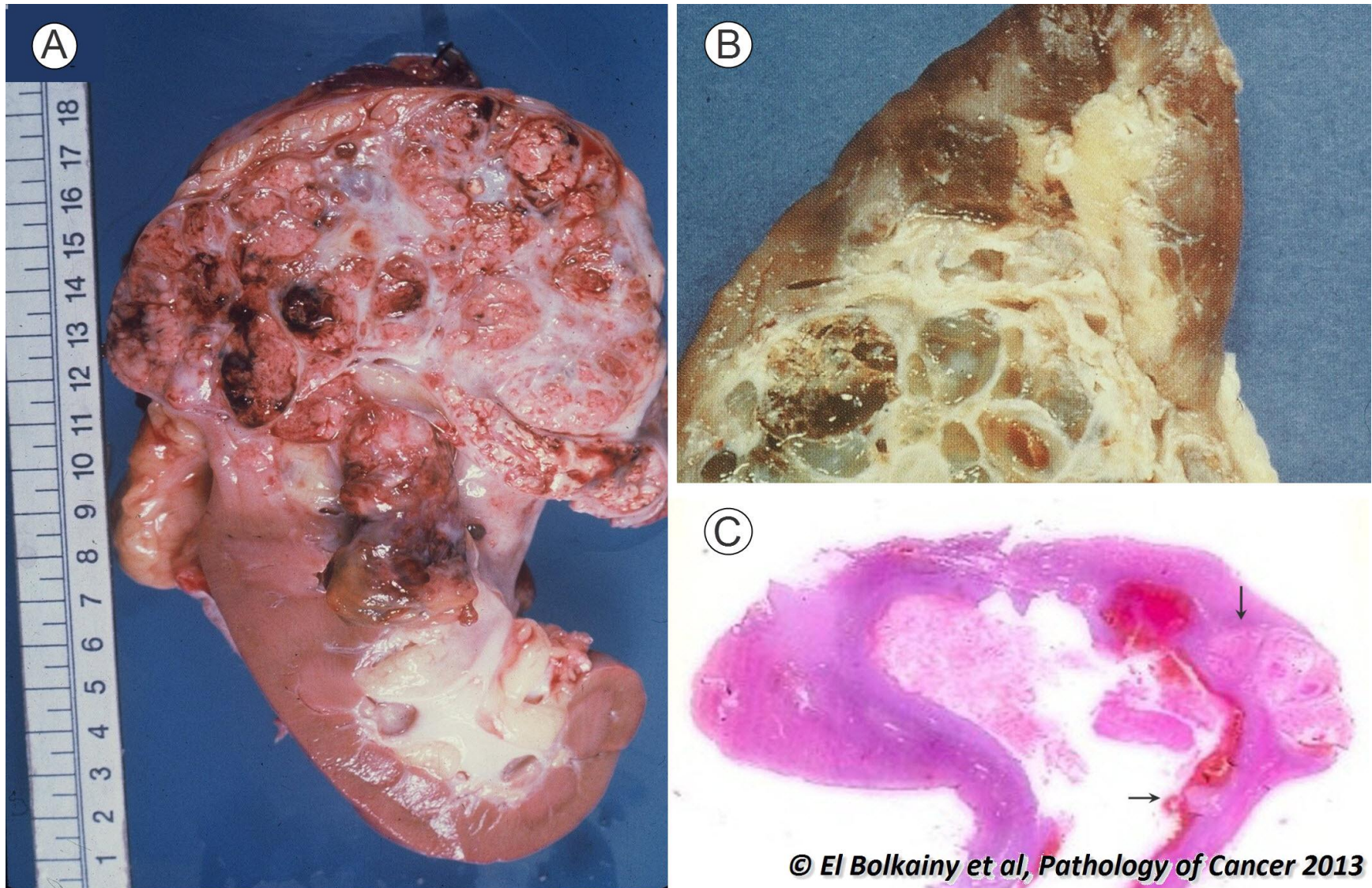


## Chapter 15

# Tumors of urinary system

15.1 Renal cell carcinoma, clear cell type.

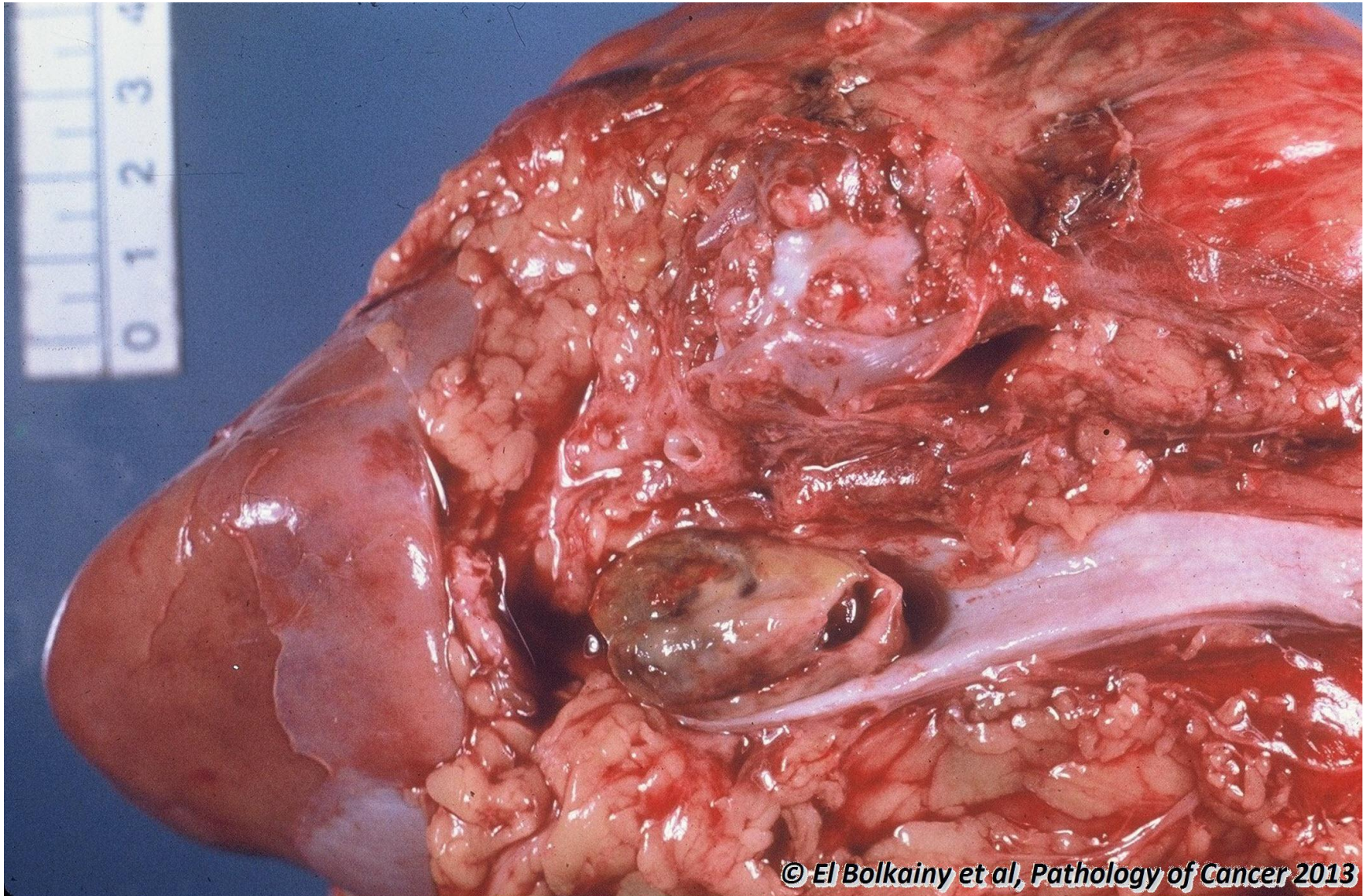


**Picture 15-1** Renal cell carcinoma, clear cell type. **A** Characteristic gross morphology is the circumscribed margin, golden yellow color with focal hemorrhage. **B** and **C** Gross cystic morphology with mural nodule in a solitary cyst or microtumors in multilocular cysts.

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15.2 Renal cell carcinoma, clear cell type.



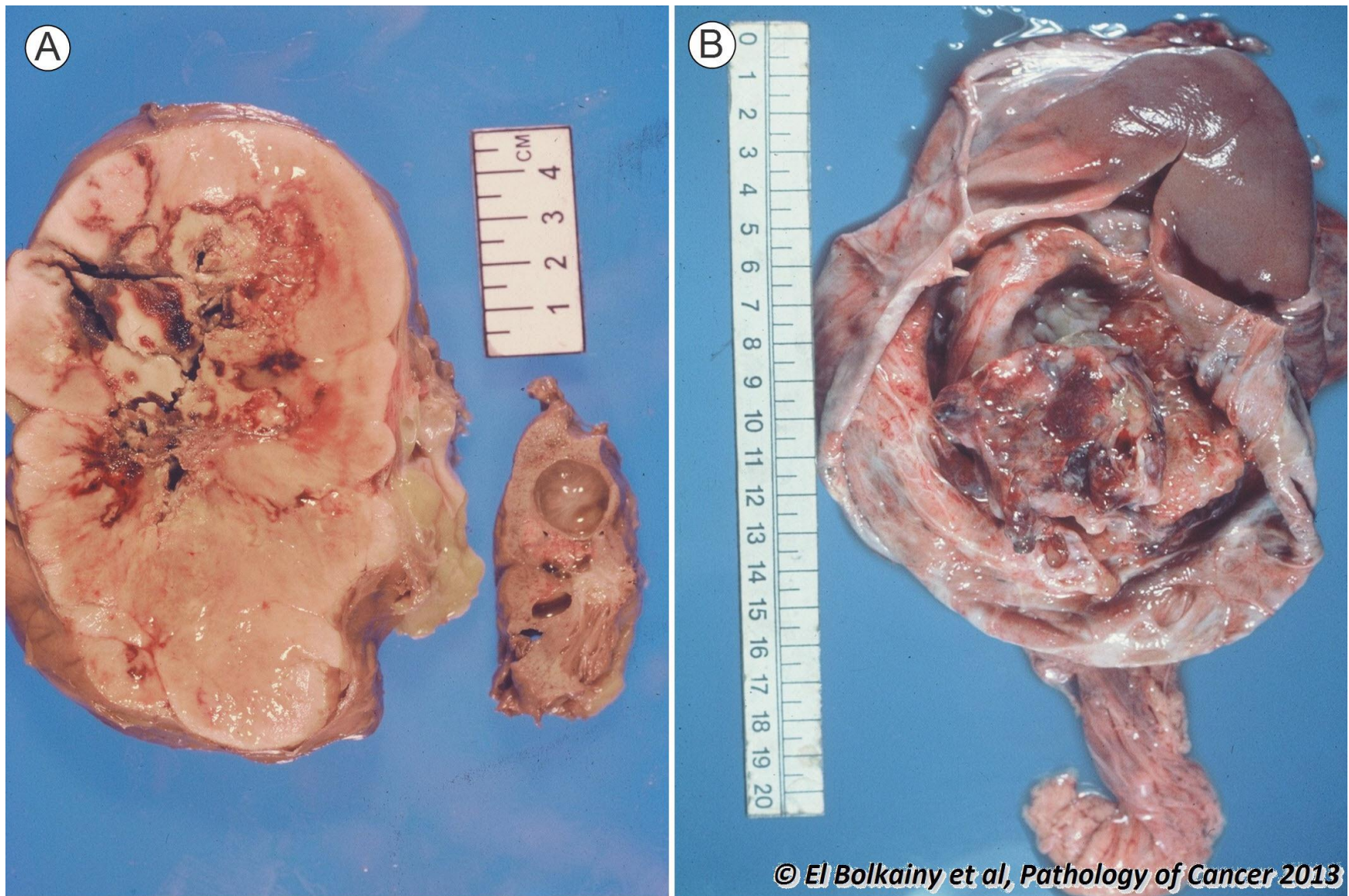
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Picture  
15-2

Renal cell carcinoma, clear cell type. Angioinvasion of renal vein.



### 15.3 Papillary carcinoma of kidney



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**Picture 15-3**

Papillary carcinoma of kidney may be **A** solid or **B** lining the inner wall of a cyst.



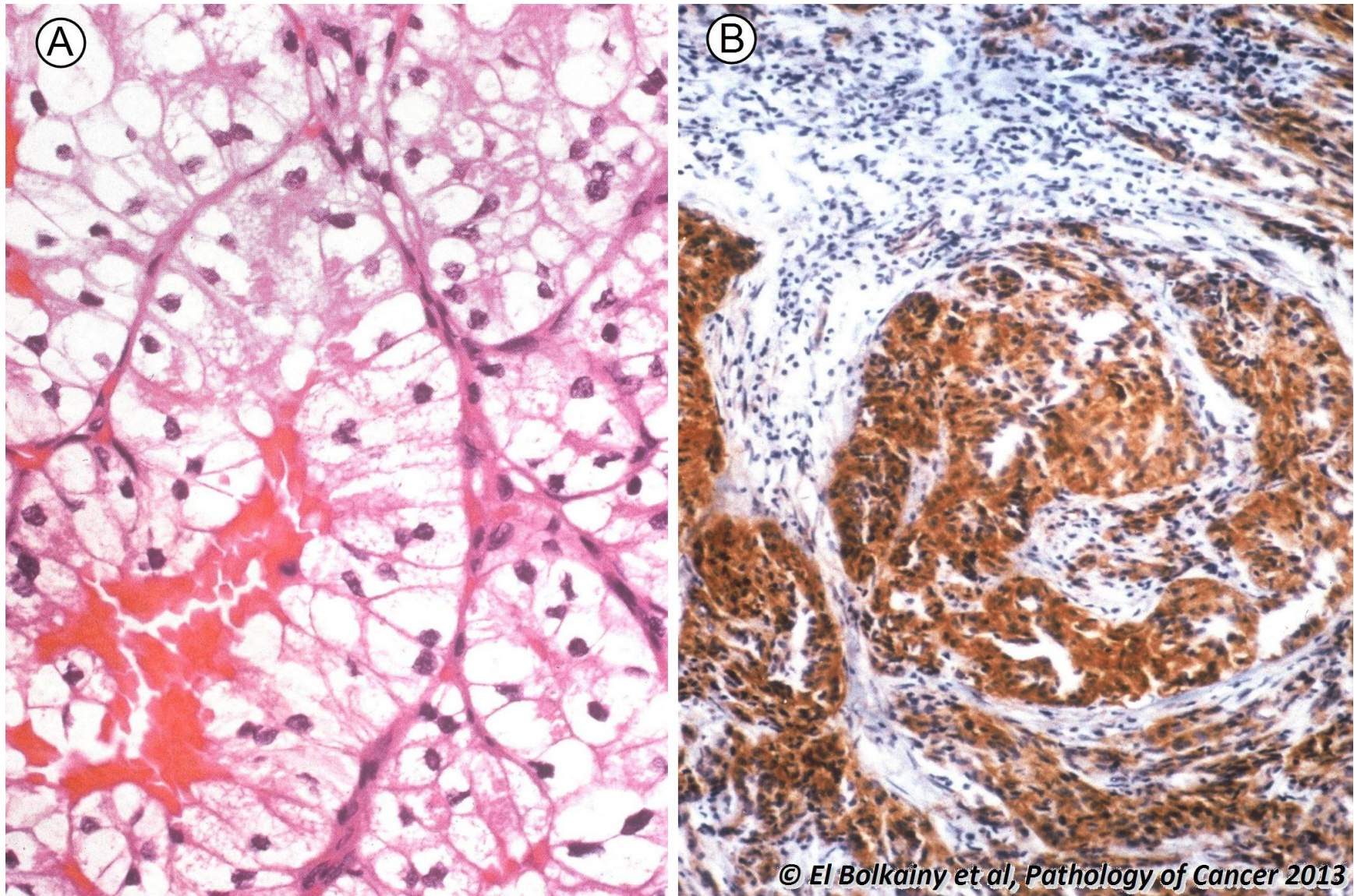
15.4 Gross features of oncocytoma and collecting duct carcinoma of Bellini.



**Picture 15-4** A Gross features of oncocytoma; mahogany brown color with central stellate scar is characteristic. B Collecting duct carcinoma of Bellini is typically medullary in location.



## 15.5 Histology of renal cell carcinoma, clear cell type.

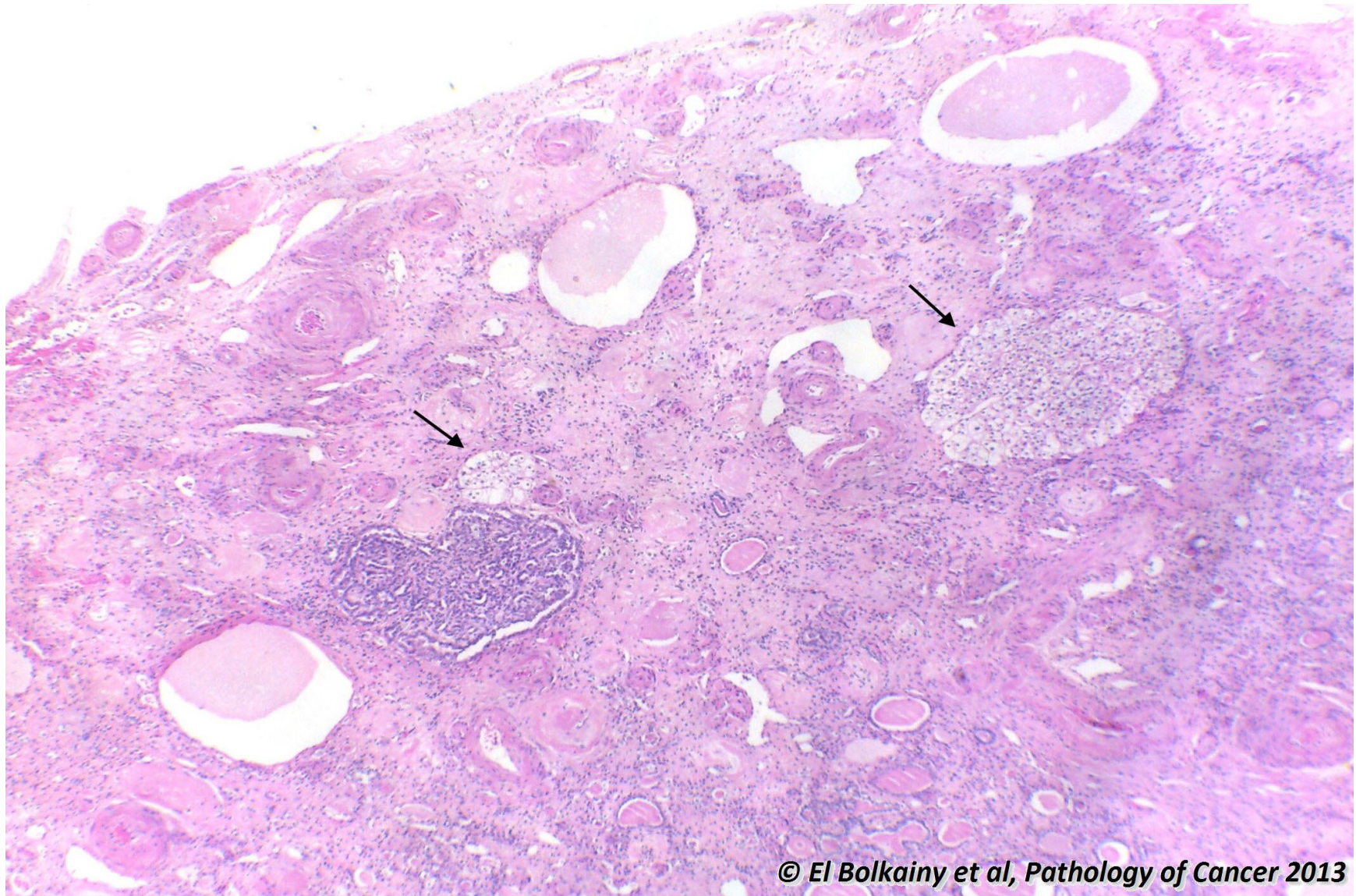


**Picture 15-5** Histology of renal cell carcinoma, clear cell type. **A** H&E, Clear cytoplasm, trabecular pattern with intervening sinusoids. **B** Vimentin positivity (in addition to cytokeratin) is characteristic.

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15.6 Variants of renal cell carcinoma.

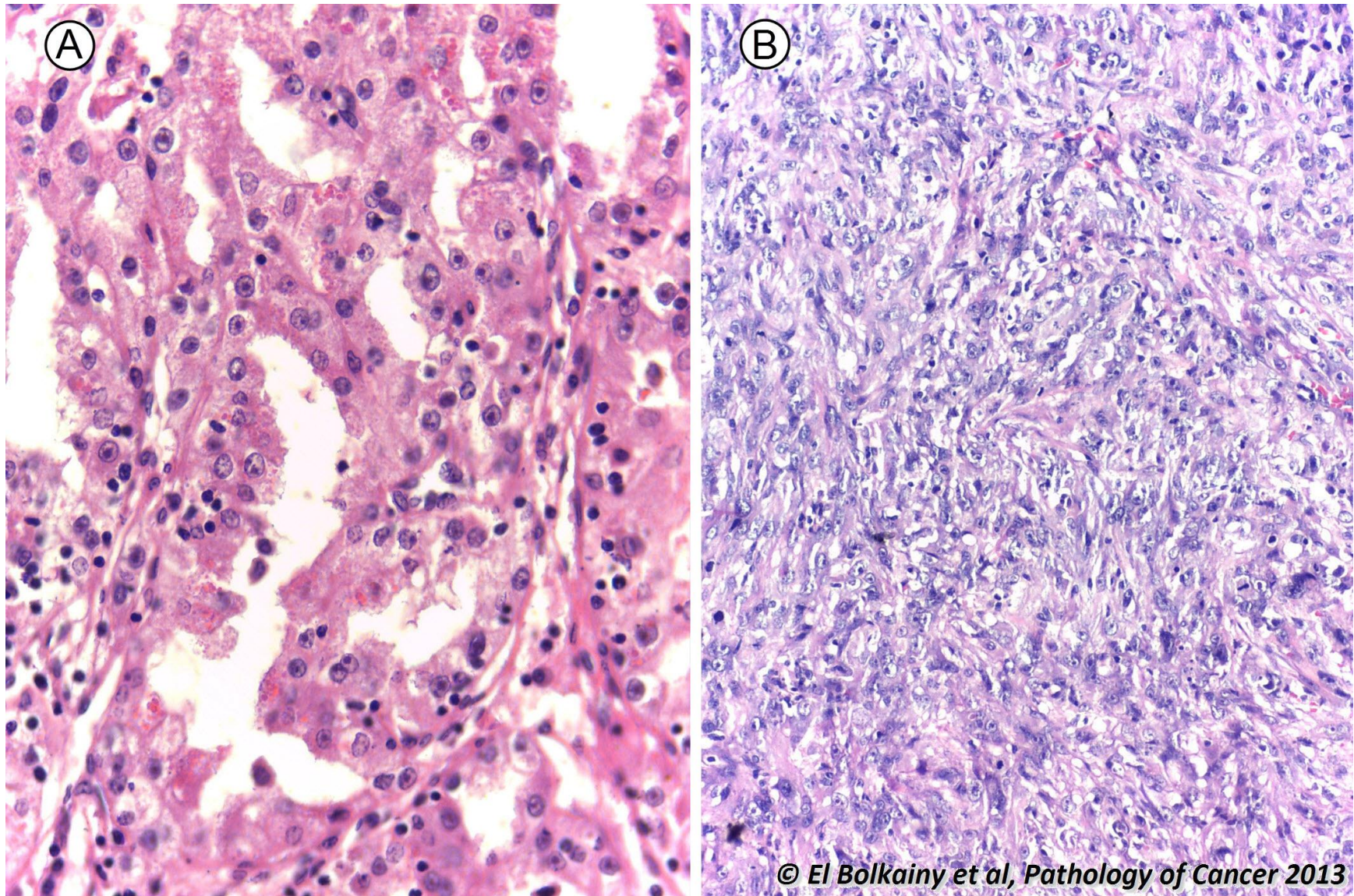


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**Picture 15-6** Renal cell carcinoma, clear cell type complicating renal dialysis characterized by multifocality (arrows) and associated cysts.



15.7 Renal cell carcinoma, clear cell type complicating renal dialysis



**Picture 15-7** Variants of renal cell carcinoma. A Granular cell type with granular eosinophilic cytoplasm. B Sarcomatoid spindle cell type.



15.8 Renal cell carcinoma, clear cell type, electron microscopy.



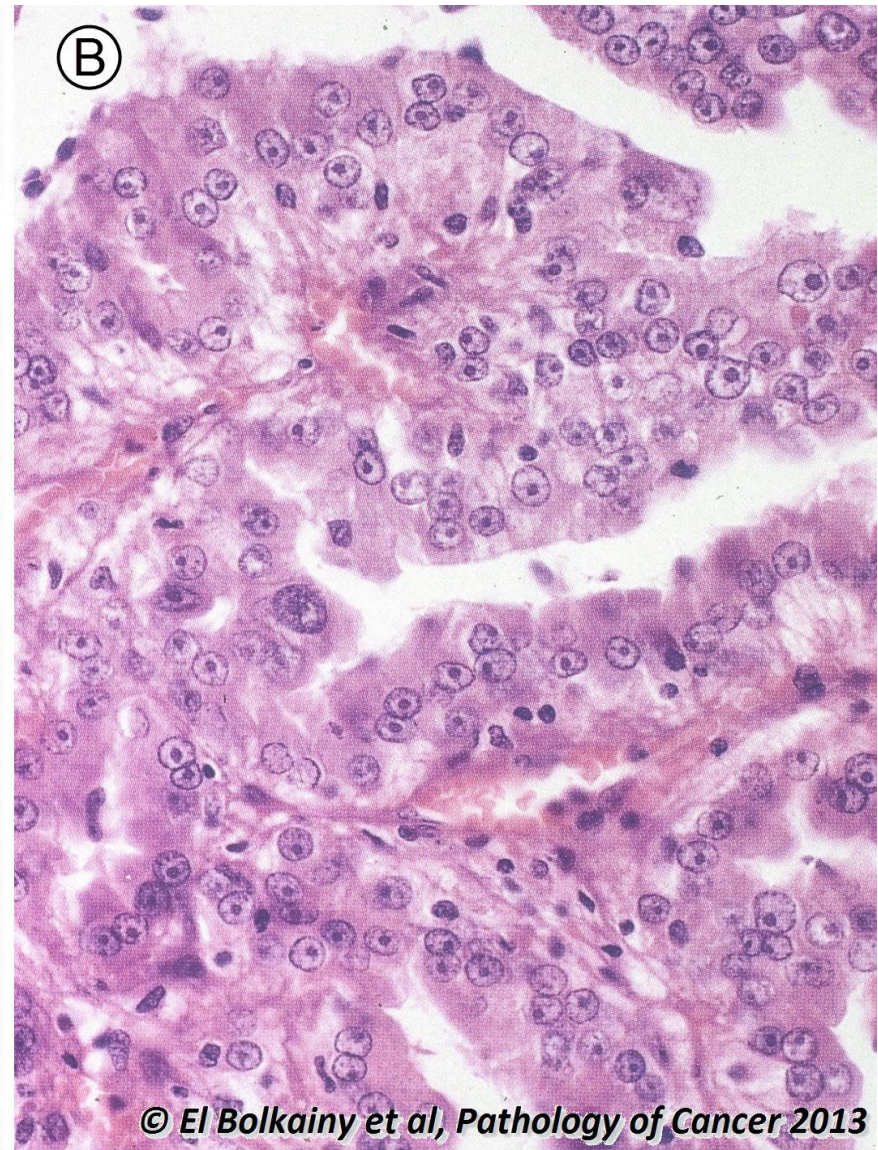
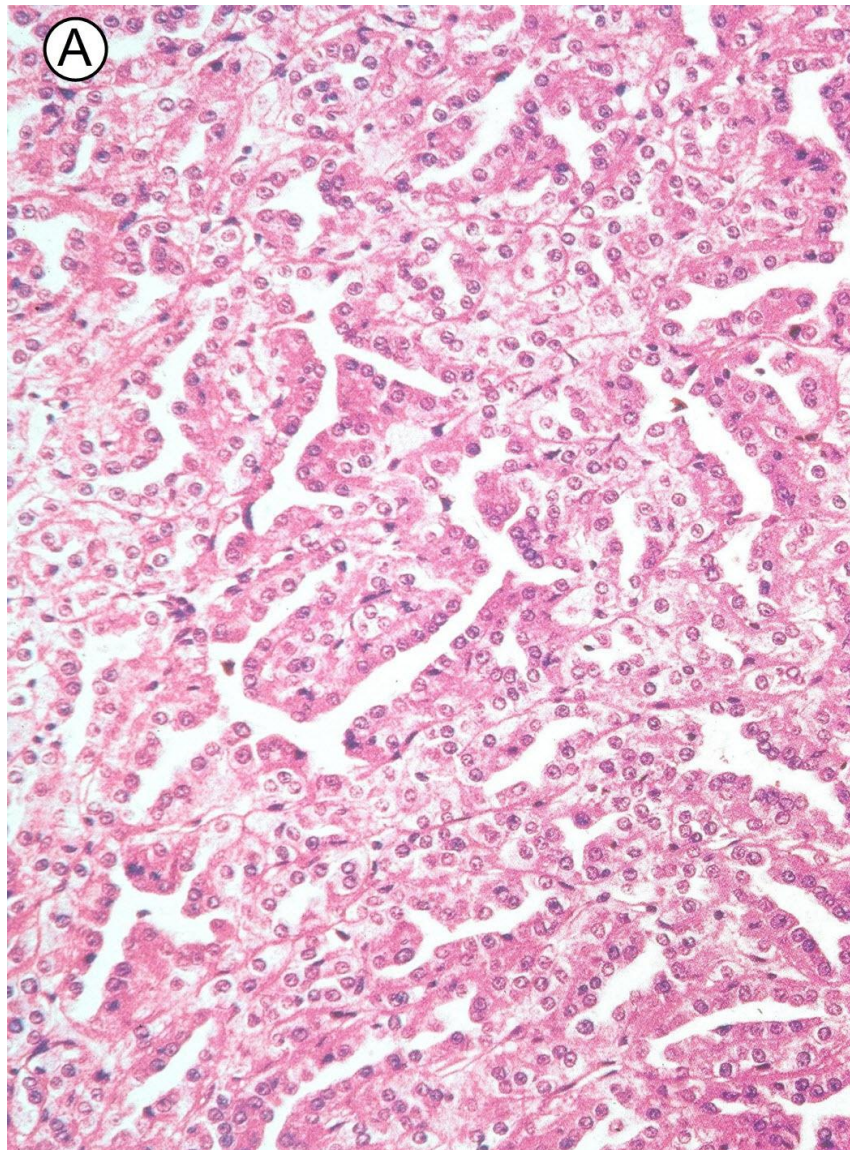
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**Picture  
15-8**

Renal cell carcinoma, clear cell type, electron microscopy. Abundant lipid and glycogen granules in cytoplasm.



## 15.9 Histology of papillary carcinoma.

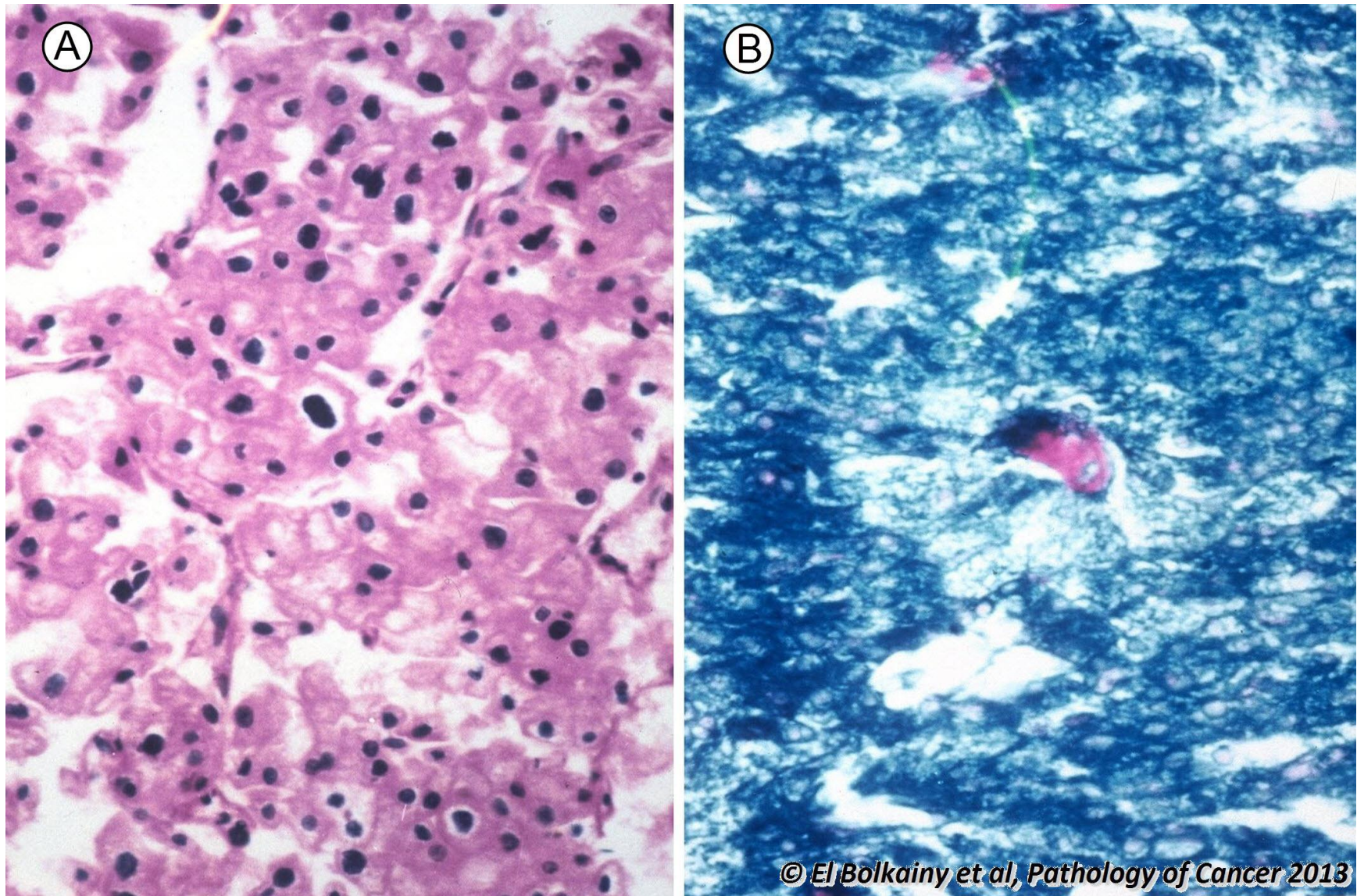


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**Picture 15-9** Histology of papillary carcinoma. **A** Type I: Single layer of Small cells with scanty cytoplasm and histiocytes in stroma. **B** Type II: large cells with abundant cytoplasm and stratified pattern.



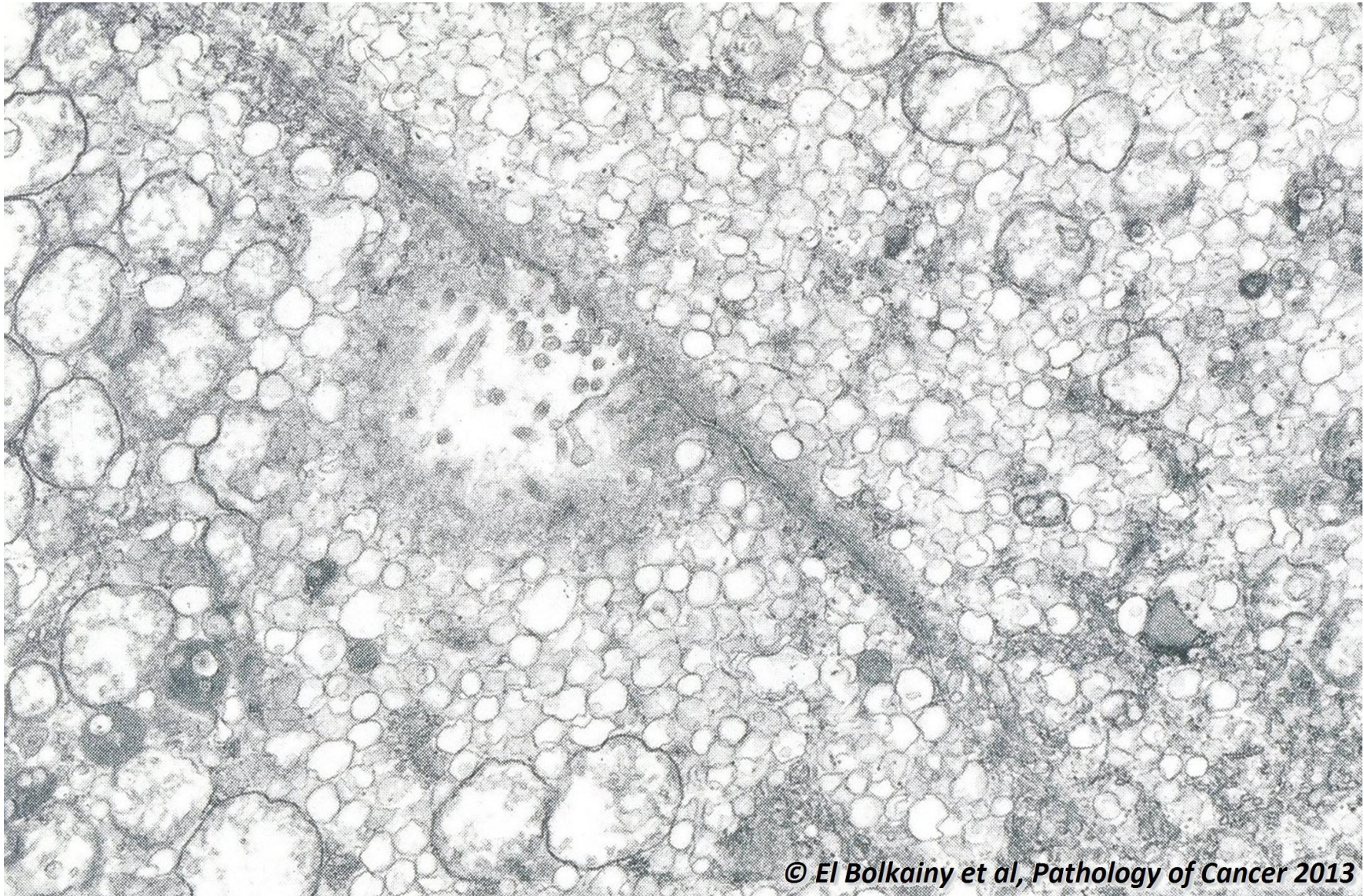
15.10 Chromophobe renal cell carcinoma.



**Picture 15-10** Chromophobe renal cell carcinoma. **A** Eosinophilic reticulated cytoplasm with perinuclear halo as well as binucleation. **B** The cytoplasm is positive for acid mucin (Hale's colloidal acid stain).



15.11 Chromophobe cell carcinoma, electron microscopy.

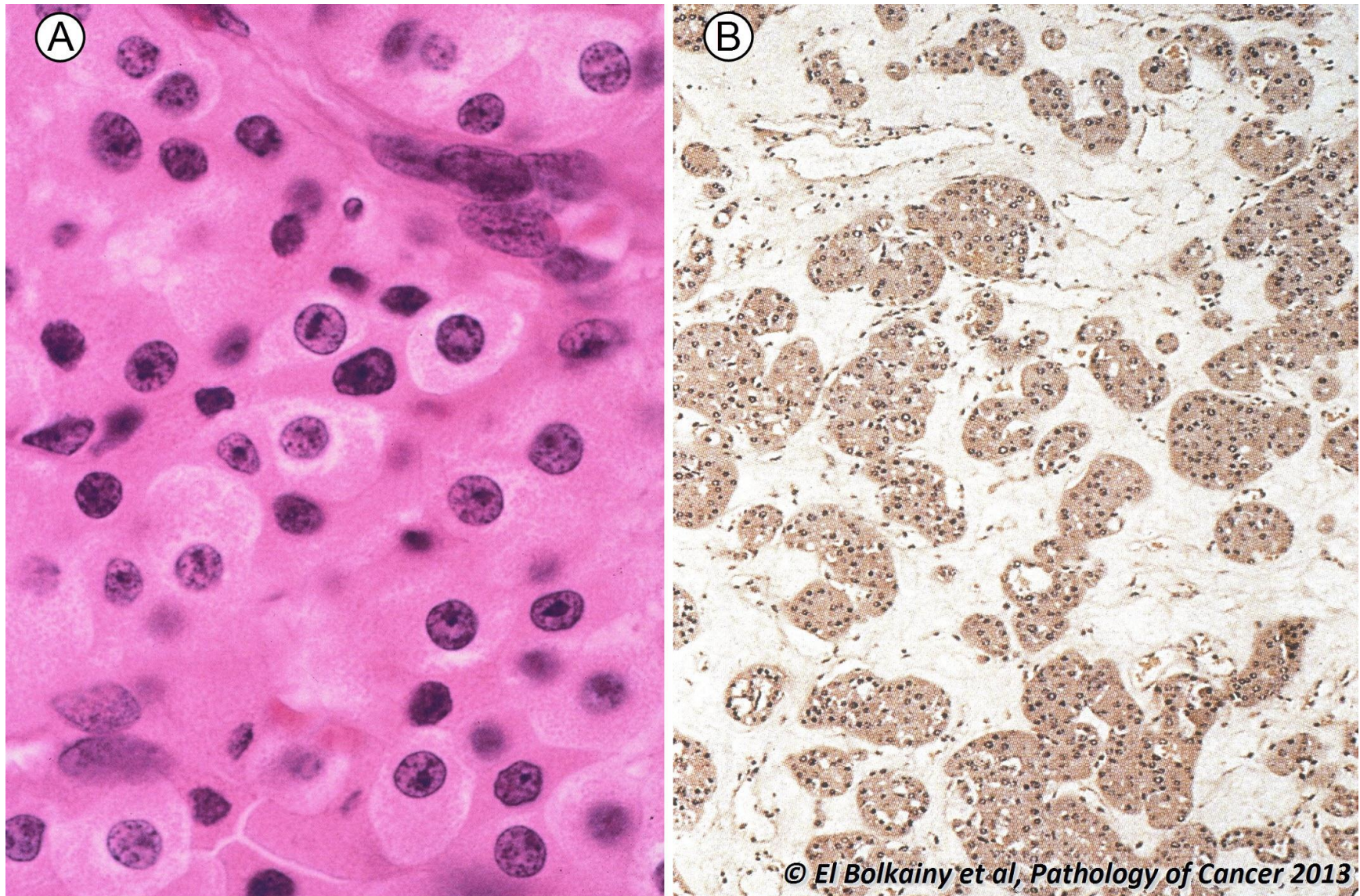


**Picture  
15-11**

Chromophobe cell carcinoma, electron microscopy. The cytoplasm is rich in microvesicles.



15.12 Histology of oncocytoma.

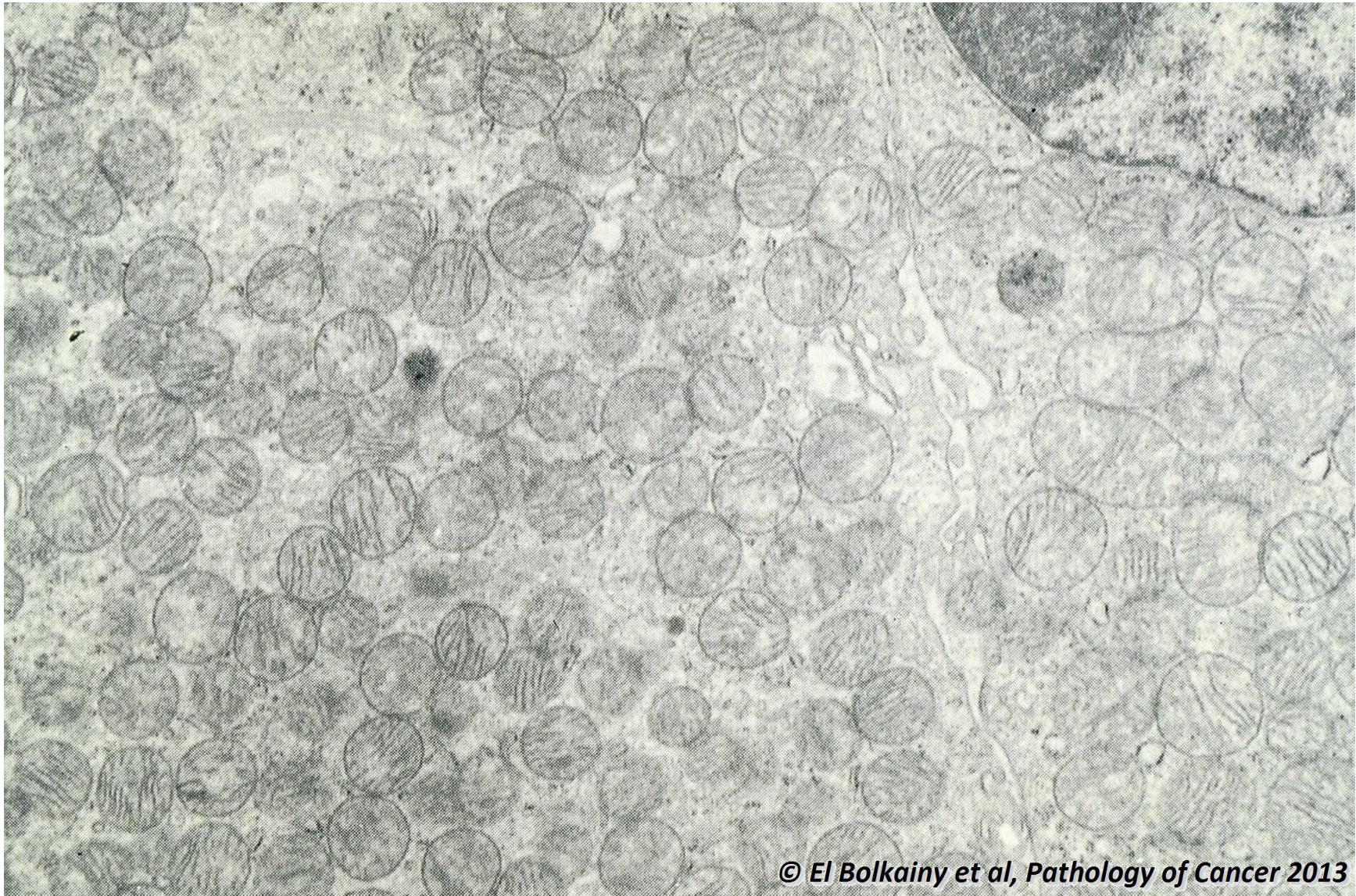


**Picture 15-12** Histology of oncocytoma. **A** Note abundant eosinophilic cytoplasm, solid and trabecular pattern, and lack of mitotic activity. **B** The center of the tumor shows marked stroma fibrosis.

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15.13 Oncocytoma, electron microscopy.



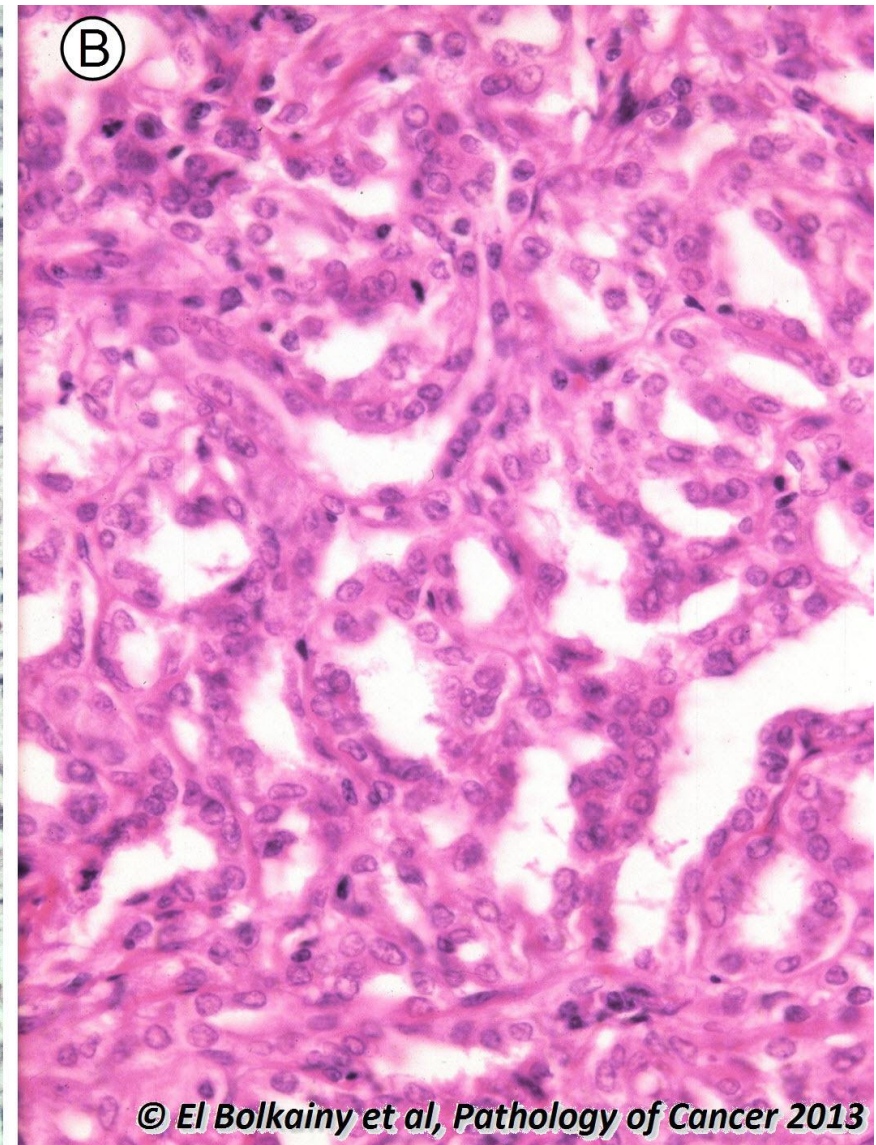
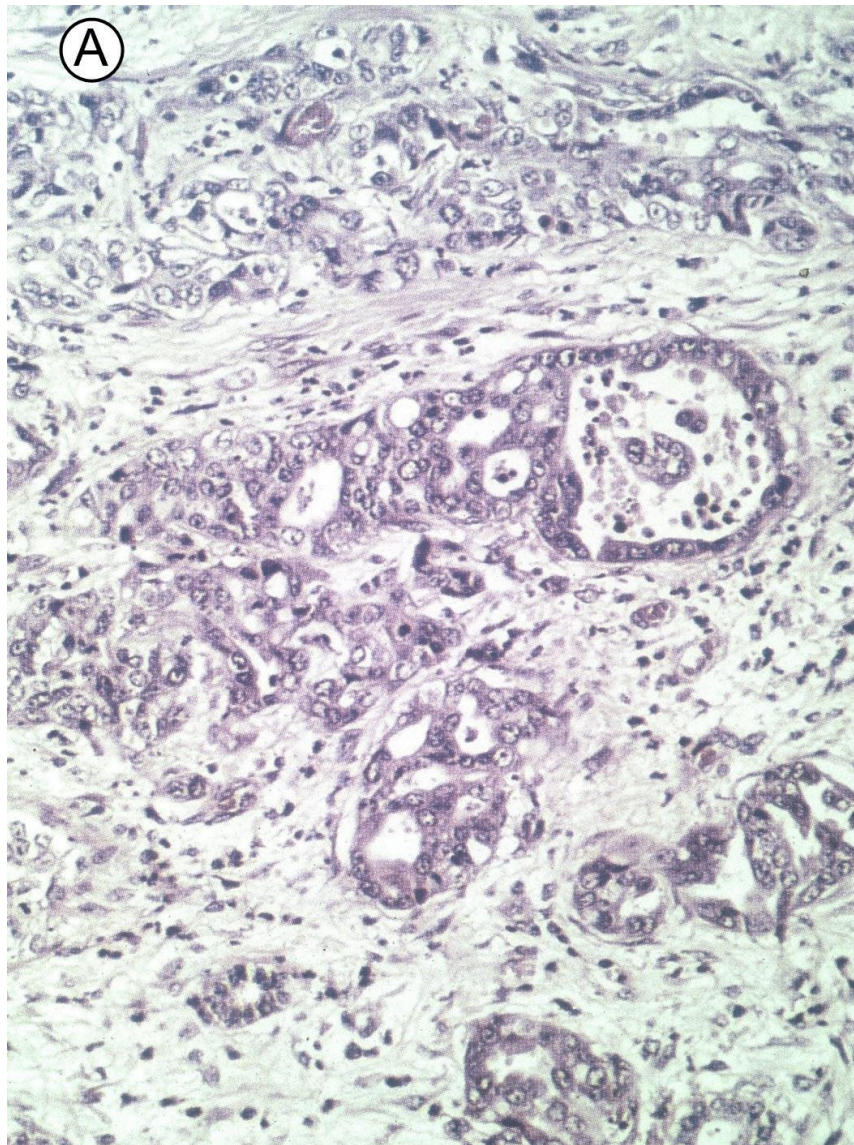
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**Picture  
15-13**

**Oncocytoma, electron microscopy.** The cytoplasm is rich in mitochondria replacing other organelles.



15.14 Histology of collecting duct carcinoma of Bellini.

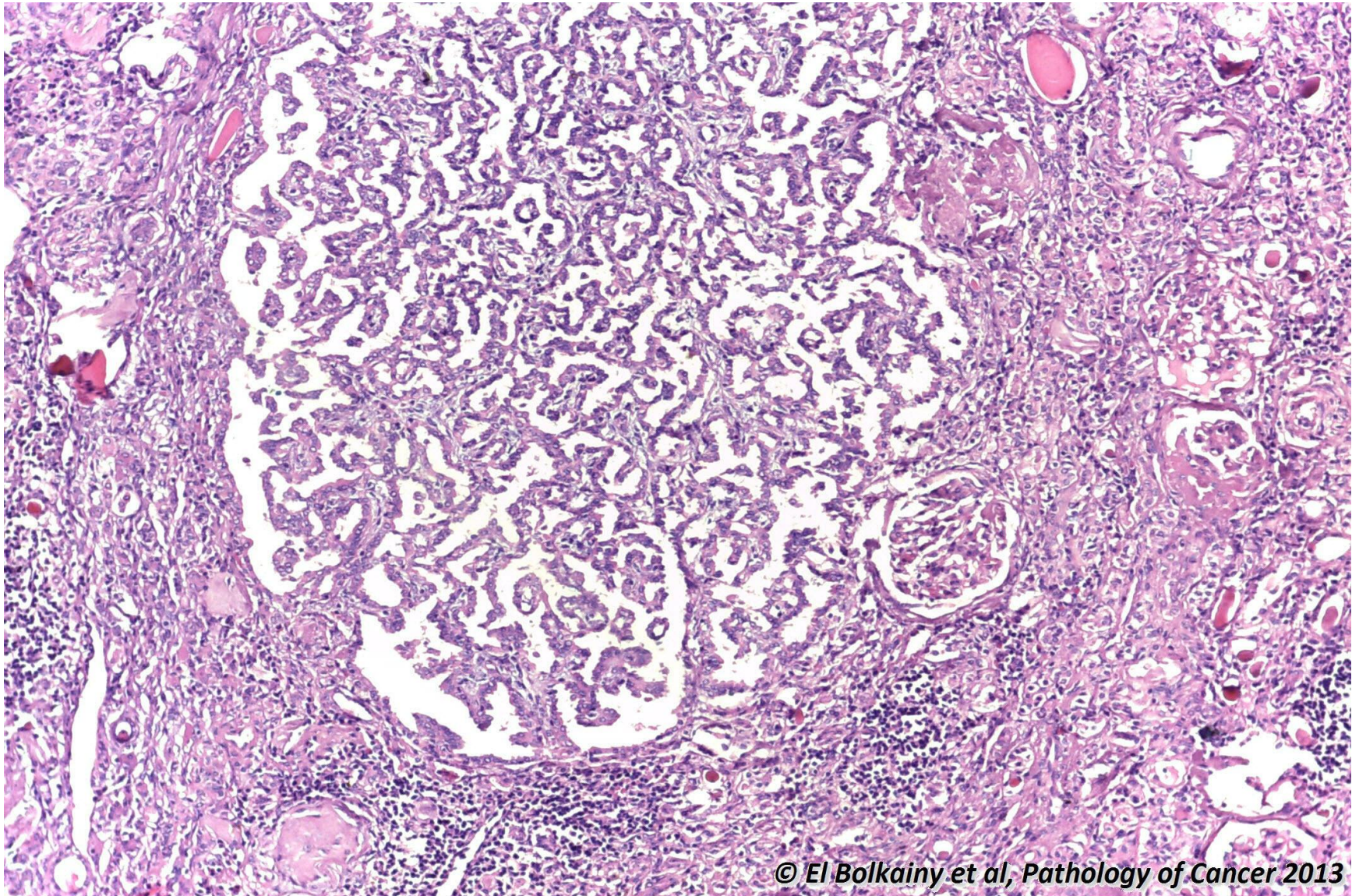


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**Picture 15-14** Histology of collecting duct carcinoma of Bellini. This high grade tumor is composed of irregular glands embedded in fibrotic stroma.



15.15 Histology of papillary adenoma.

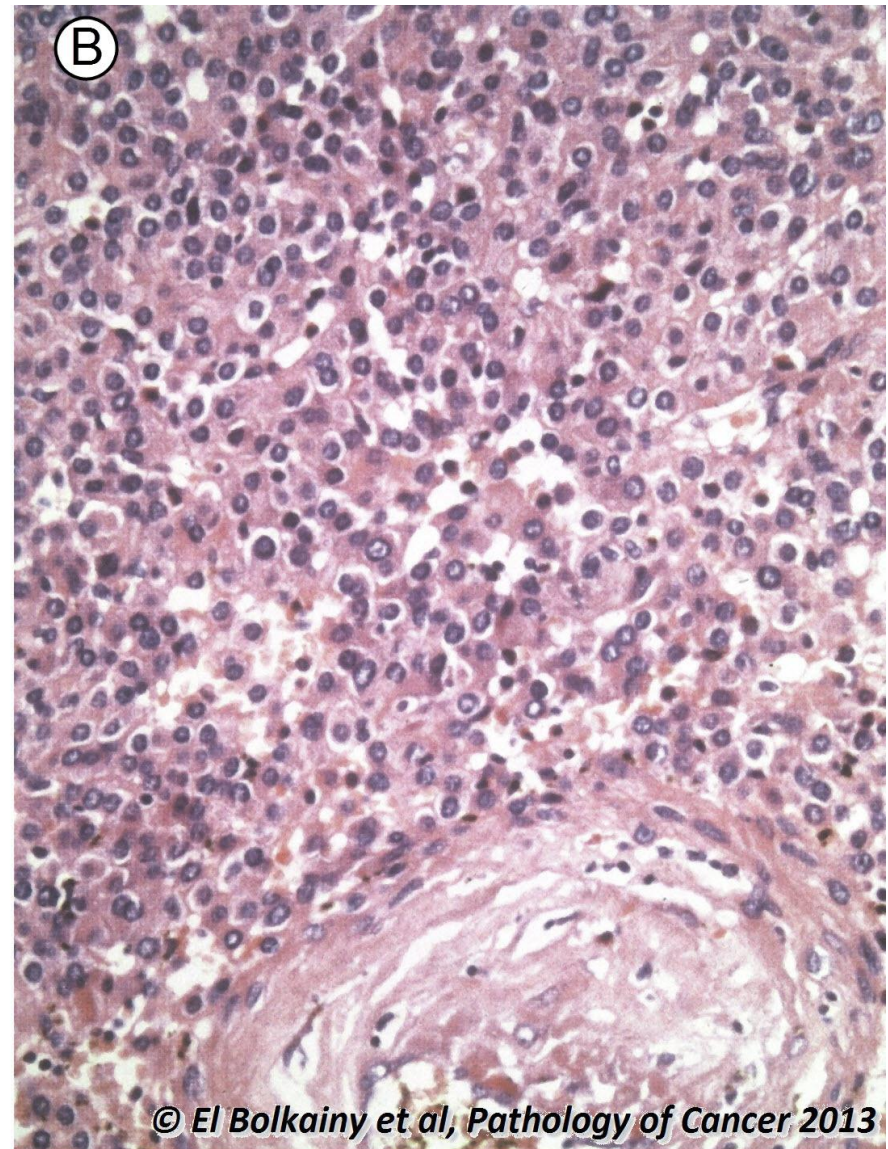
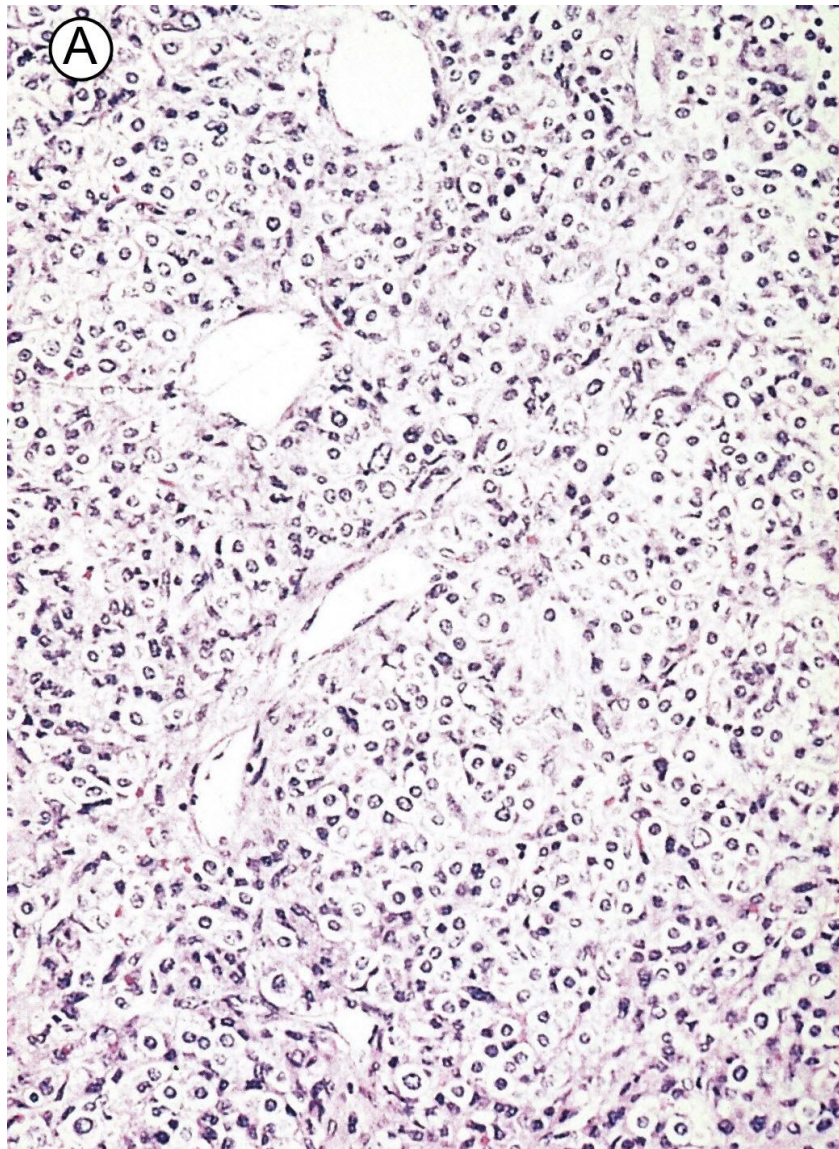


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**Picture 15-15** Histology of papillary adenoma. Note microscopic size of tumor (less than 5 mm), lack of capsule, non-clear cells, small uniform nuclei, papillary pattern, and no infiltration of surrounding tissue.



15.16 Histology of Juxtaglomerular cell tumor.



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**Picture 15-16** Histology of Juxtaglomerular cell tumor. **A** Low power, uniform cells in vascular stroma. **B** High power, showing polygonal cells with eosinophilic cytoplasm around a thick hyalinized vessel.



15.17 Juxtaglomerular cell tumor, electron microscopy.

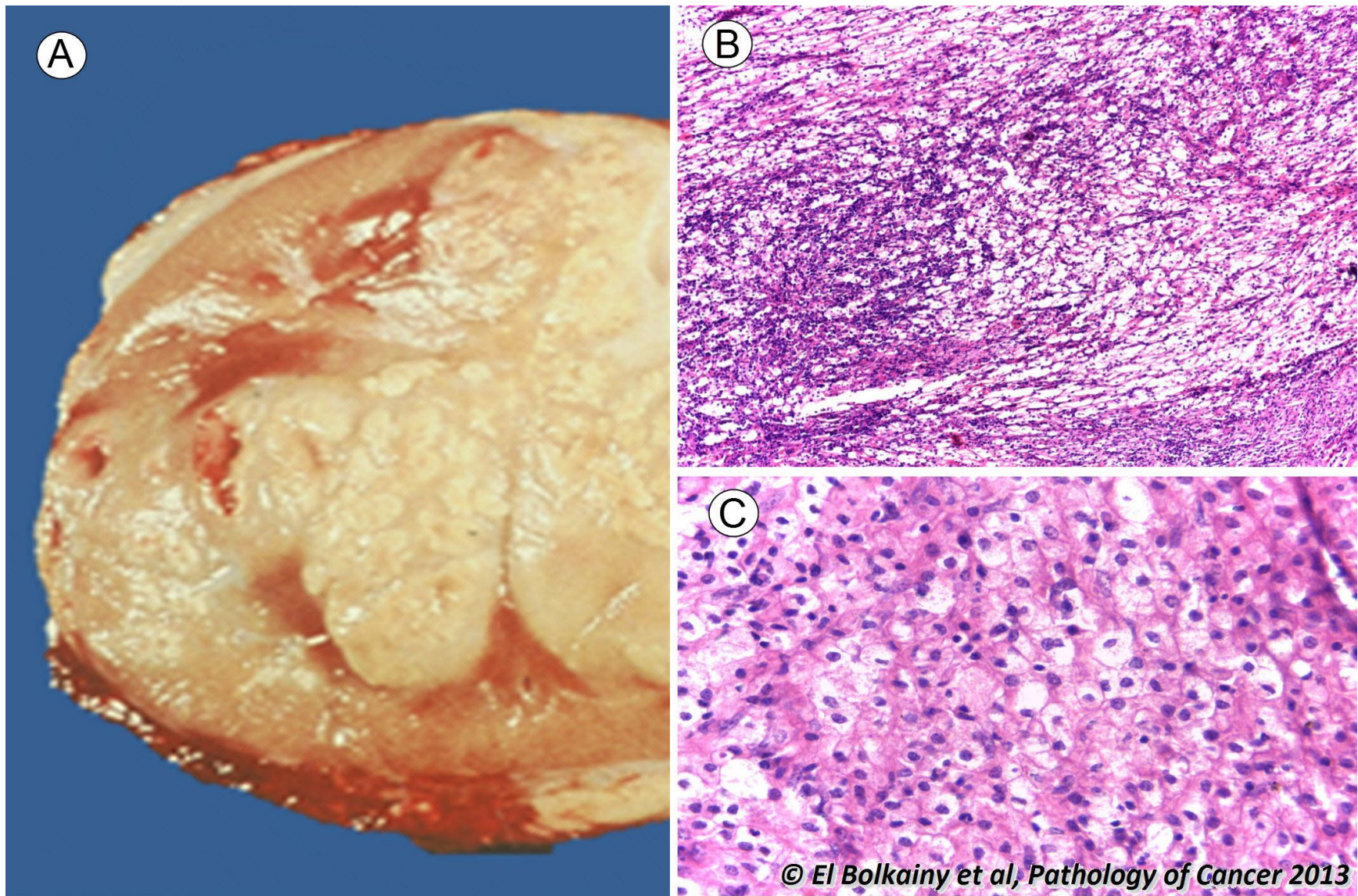


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**Picture 15-17** Juxtaglomerular cell tumor, electron microscopy. Note the rhomboid crystals of renin.



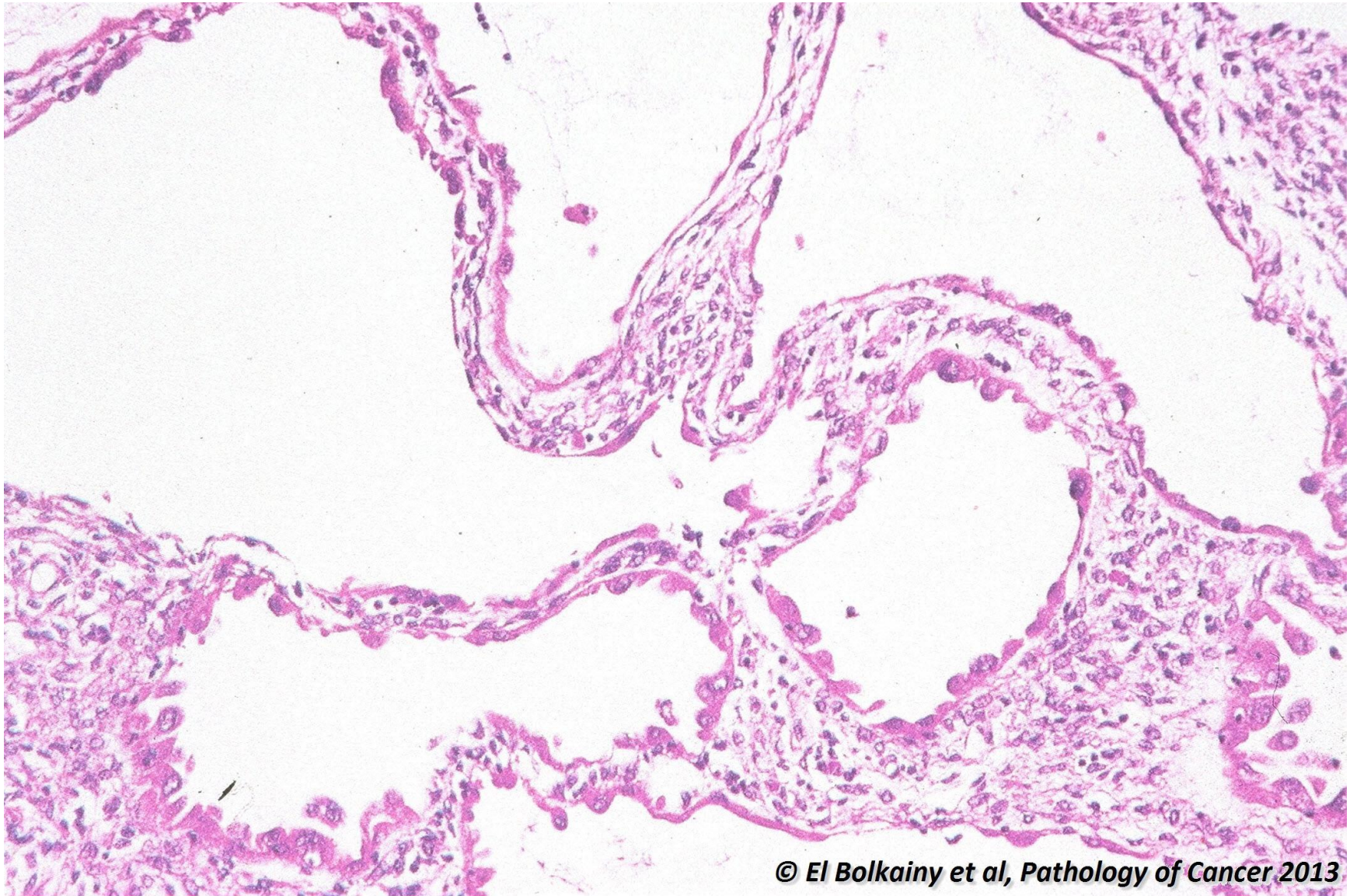
15.18 Xanthogranulomatous pyelonephritis.



**Picture 15-18** Xanthogranulomatous pyelonephritis. **A** Gross yellowish appearance. **B** The clear histiocytes are CD 68 positive. **C** The stroma lacks sinusoides and is rich in inflammatory cells.



15.19 Renal cystic nephroma.



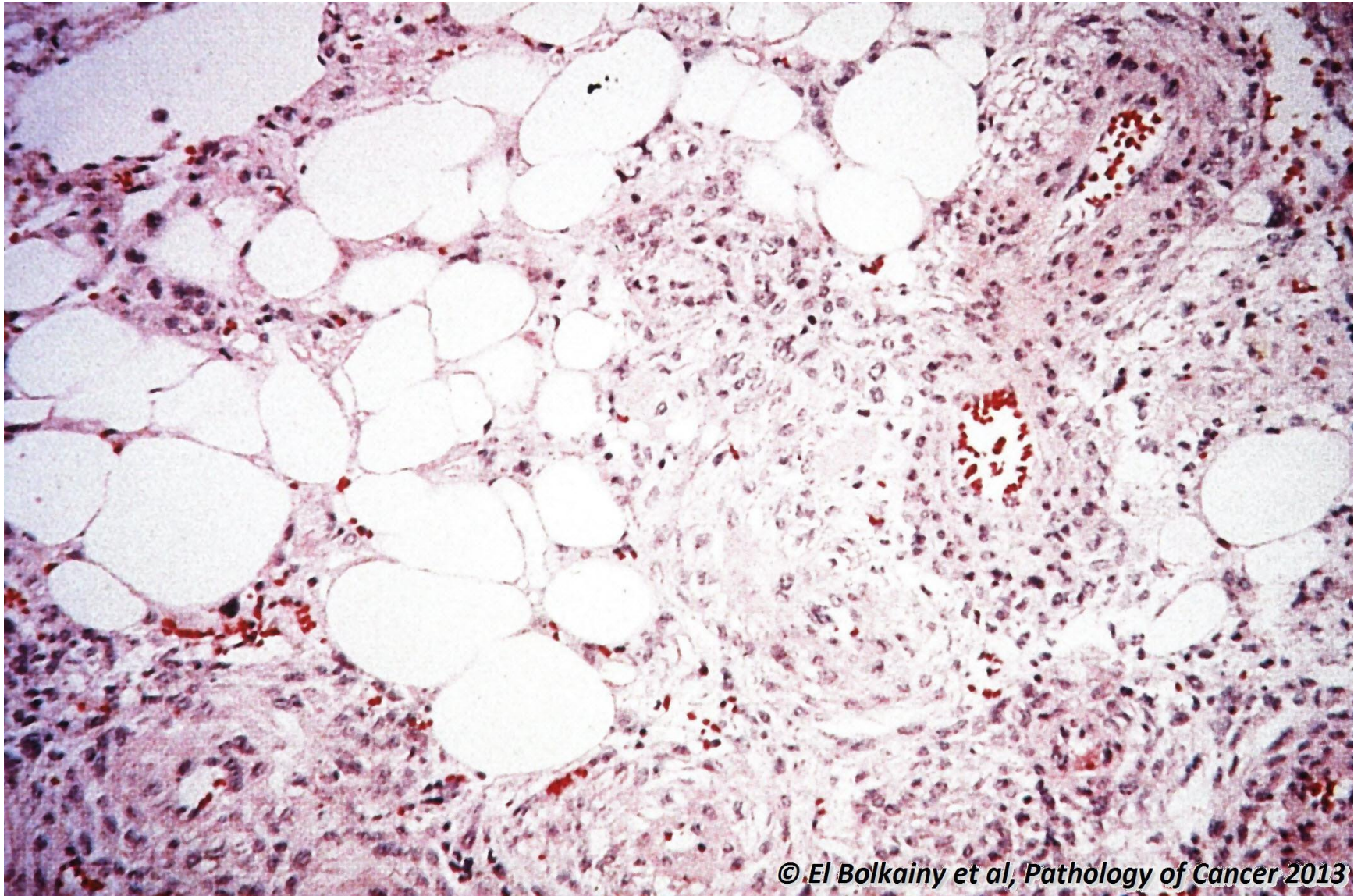
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**Picture  
15-19**

Renal cystic nephroma. Multiple cysts composed of fibrous tissue lined by cuboidal or flattened epithelium.



15.20 The histology of renal angiomyolipoma.

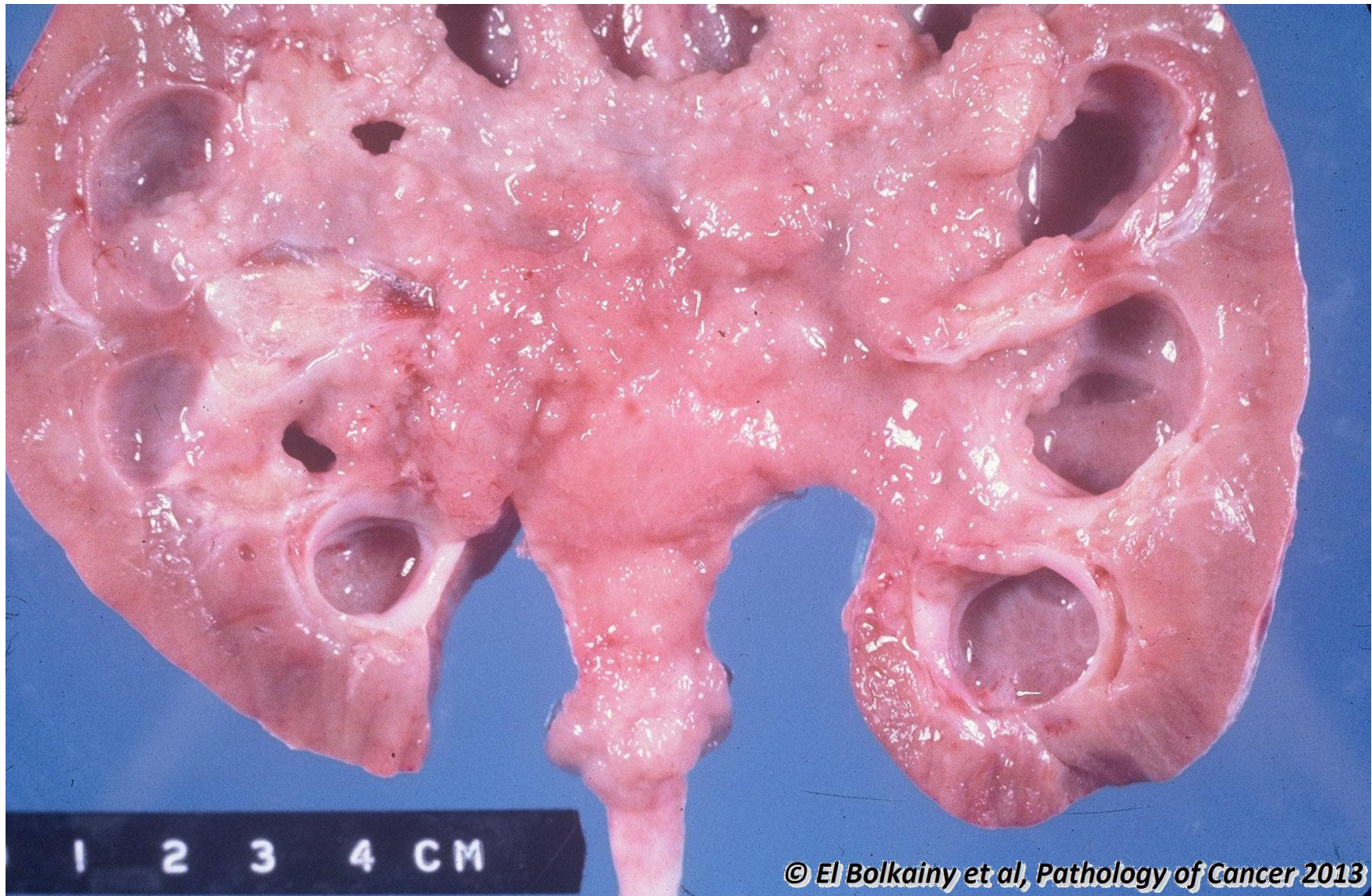


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**Picture 15-20** The histology of renal angiomyolipoma. This mass lesion is characterized by its triphasic structure namely blood vessels, smooth muscle and fat cells.



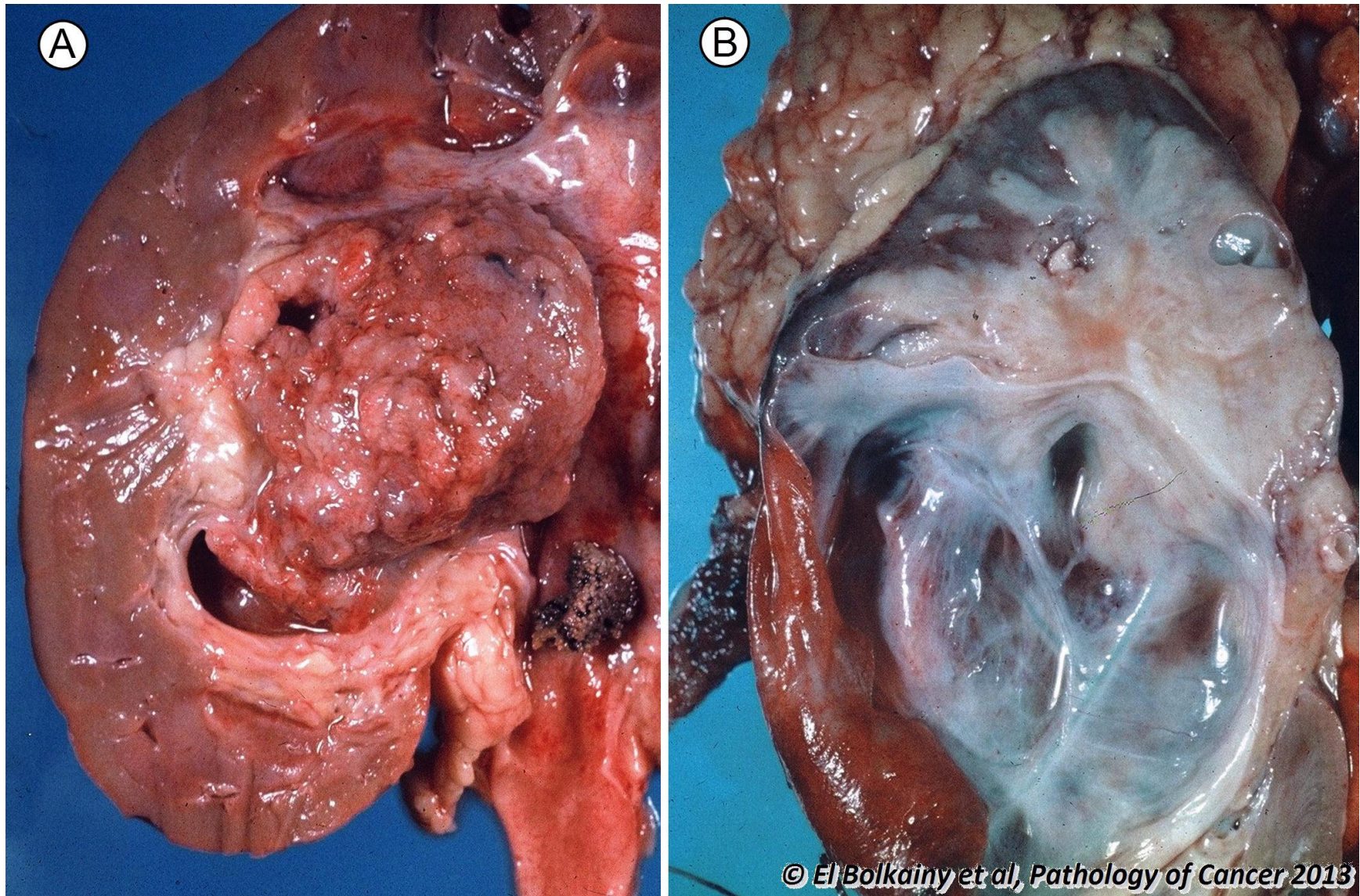
15.21 Gross features of multicentric urothelial carcinoma of renal pelvis and upper ureter,



**Picture** Gross features of multicentric urothelial carcinoma of renal pelvis and upper ureter, associated with dilated  
**15-21** calyces.



15.22 Gross features of urothelial carcinoma of renal pelvis.



**Picture 15-22** Gross features of urothelial carcinoma of renal pelvis. **A** Exophytic papillary urothelial carcinoma. **B** Diffusely infiltrative endophytic pattern related to cystically dilated renal pelvis.



15.23 Non-papillary diffusely infiltrating tumor, associated with calculi.

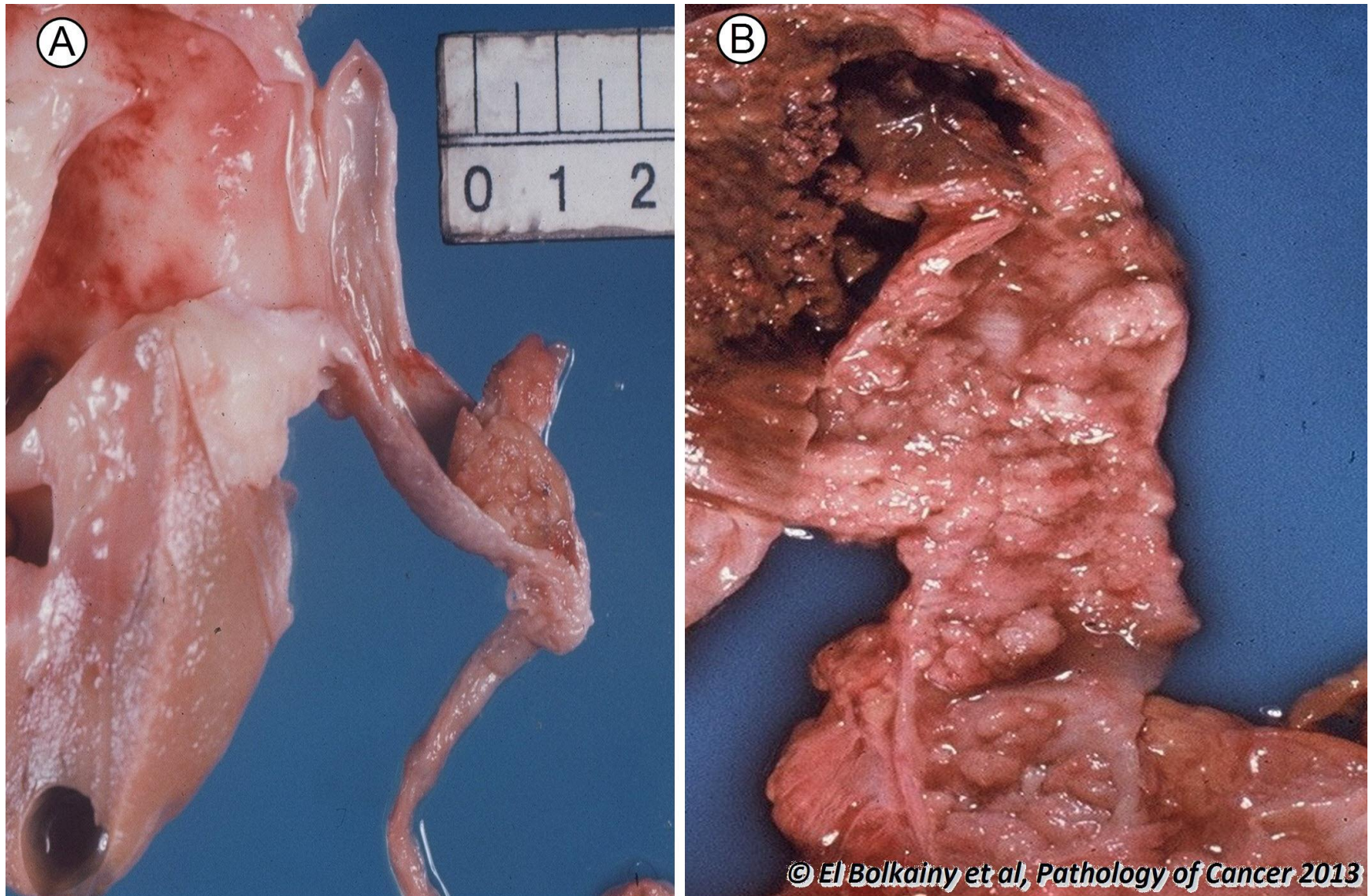


**Picture**  
**15-23**

**Non-papillary diffusely infiltrating tumor, associated with calculi.** Calculi-associated tumors are commonly squamous cell carcinoma.



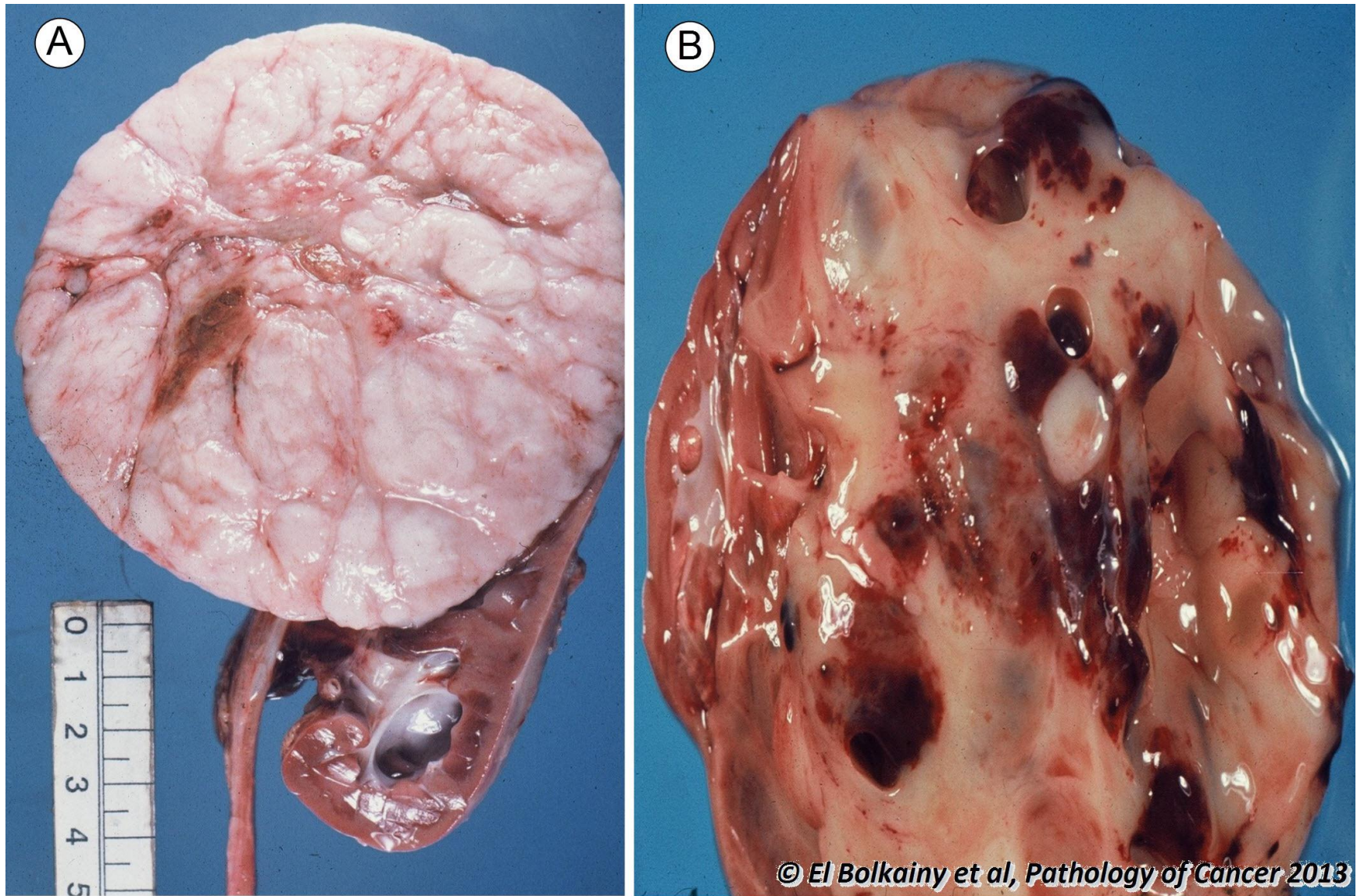
15.24 Transitional carcinoma of ureter.



**Picture 15-24** Transitional carcinoma of ureter. **A** Single papillary tumor. **B** Multiple papillary tumors involving the entire ureter.



15.25 Gross features of Wilms tumor.

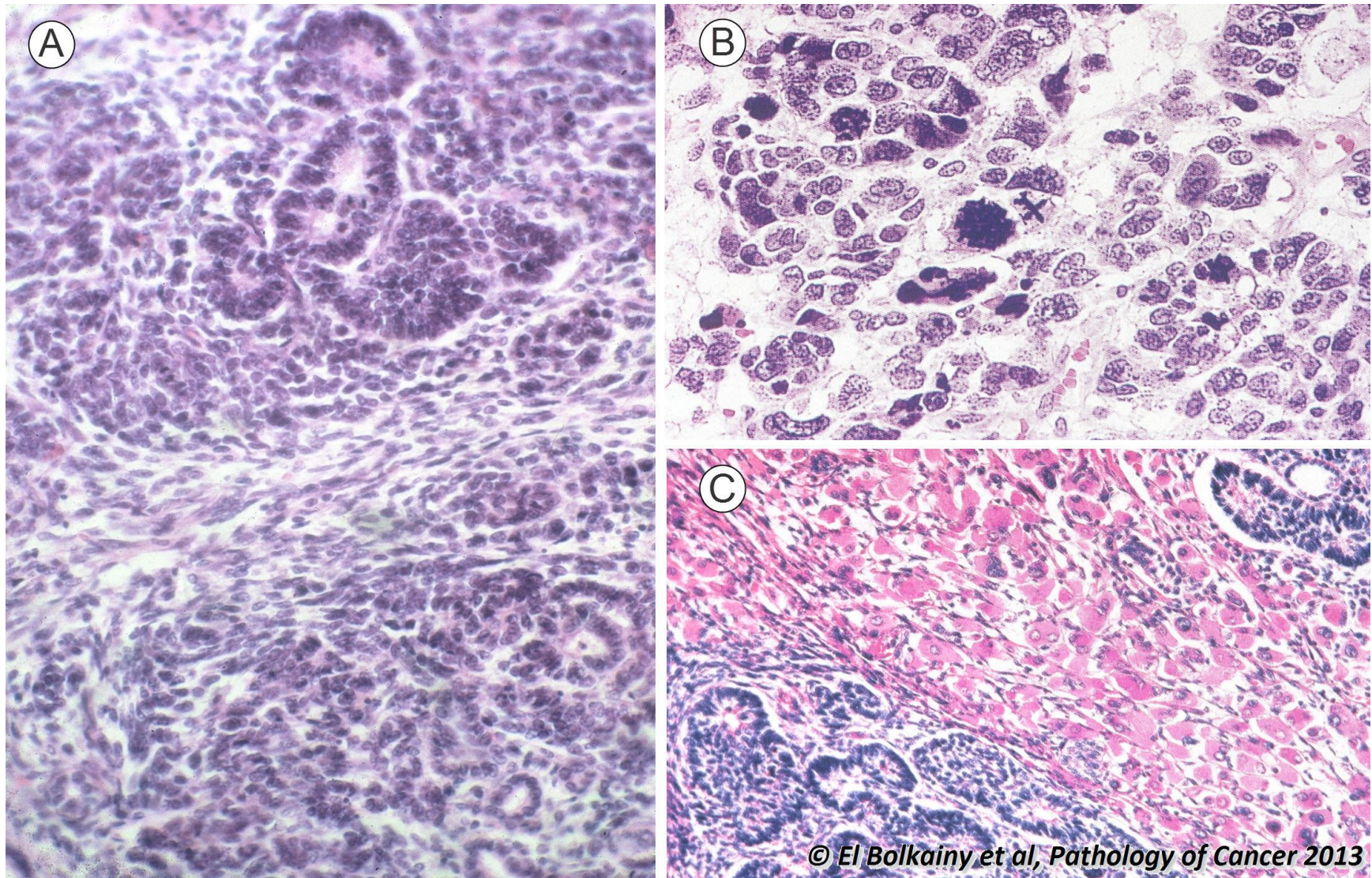


**Picture 15-25** Gross features of Wilms tumor. A Gray white color with central necrosis. B Variable colors due to focal hemorrhage and necrosis.

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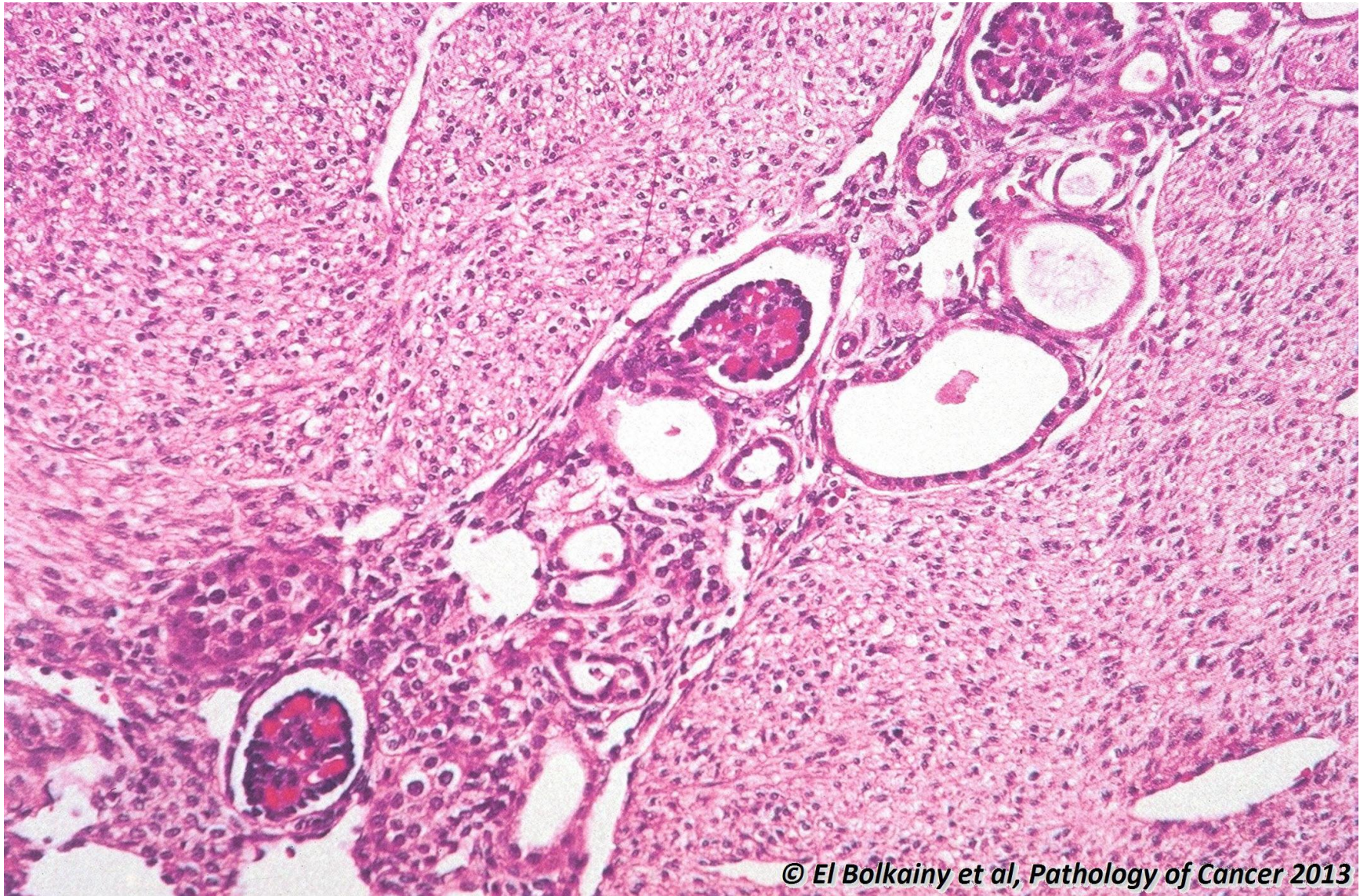
15.26 Histology of Wilms tumor.



**Picture 15-26** Histology of Wilms tumor. **A** Biphasic structure of blastemal, tubular, and stromal cells. **B** Anaplasia (large hyperchromatic nuclei) is an unfavorable feature. **C** Epithelial (tubules) and rhabdomyoblastic differentiation.



15.27 Histology of congenital mesoblastic nephroma.

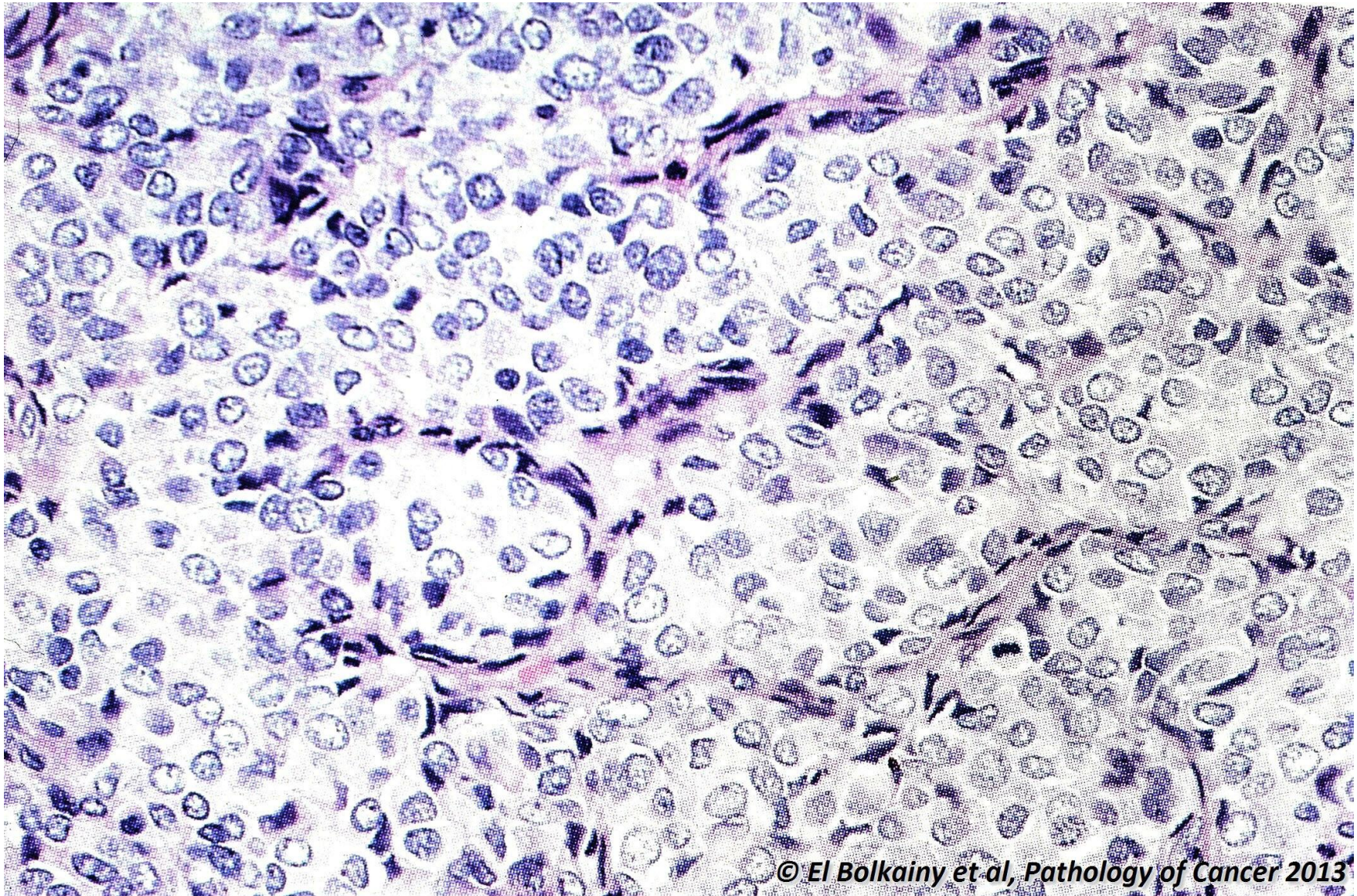


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**Picture 15-27** Histology of congenital mesoblastic nephroma. Spindle and rounded cells of the tumor infiltrates renal parenchyma. This pediatric tumor has a favorable prognosis.



15.28 Histology of renal clear cell sarcoma.

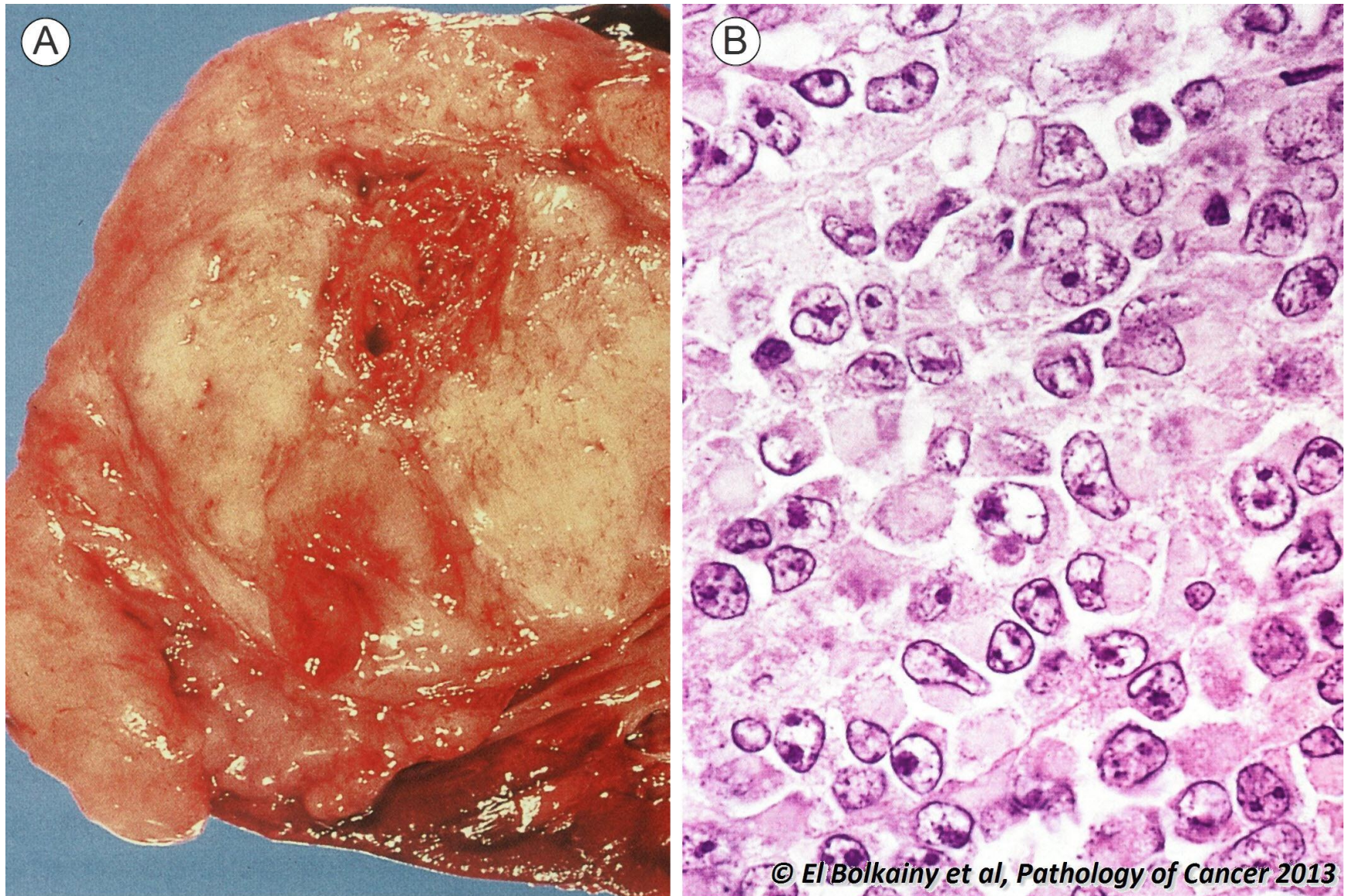


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**Picture 15-28** Histology of renal clear cell sarcoma. Tumor cells have a clear cytoplasm, fine chromatin pattern and indistinct nuclei.



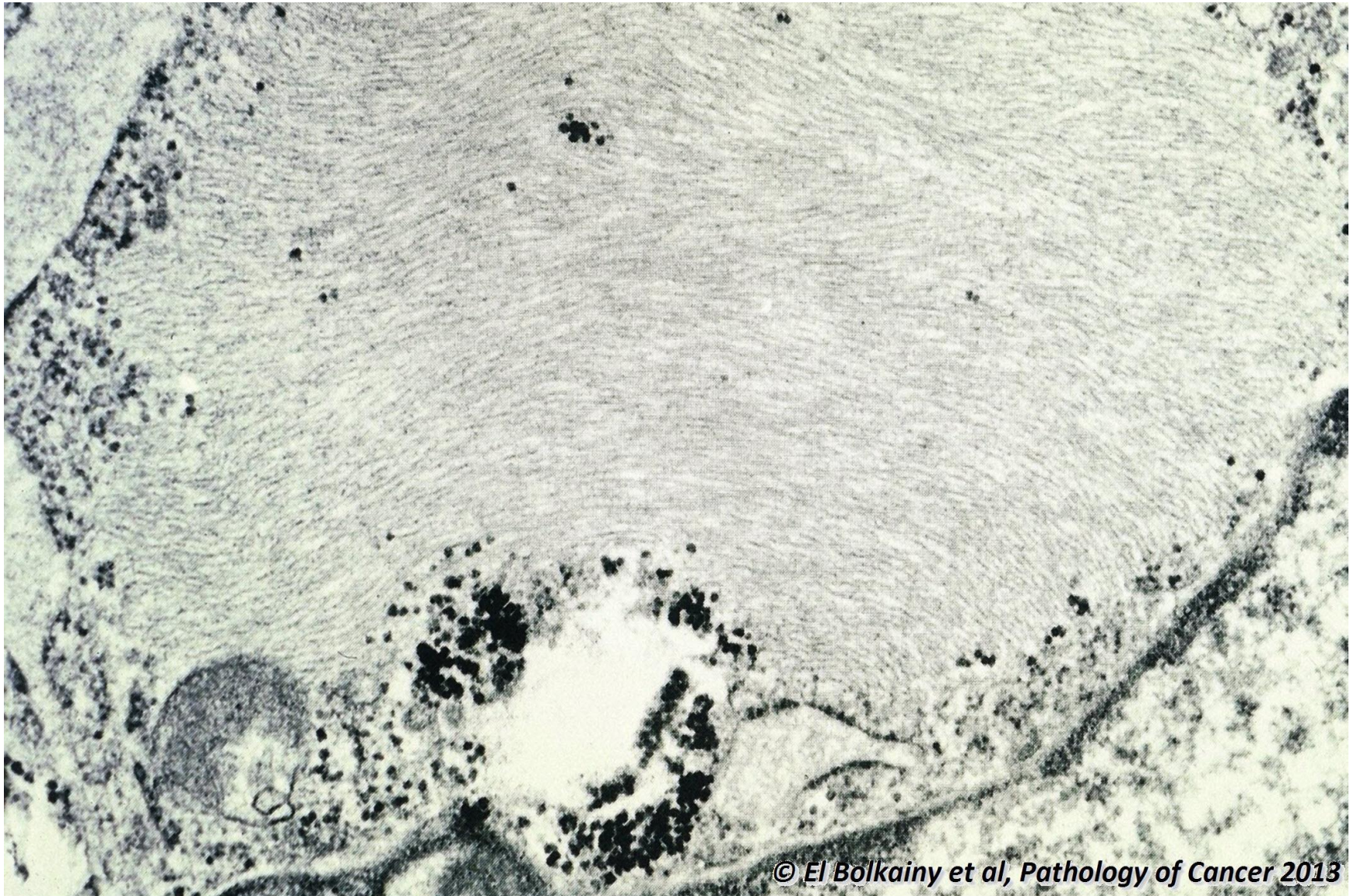
15.29 Rhabdoid tumor of kidney.



**Picture 15-29** Rhabdoid tumor of kidney. **A** Gross appearance with focal hemorrhage and necrosis. **B** Histology of rhabdoid tumor. The eosinophilic cytoplasm and prominent nucleoli are characteristic features.



15.30 Rhabdoid tumor, electron microscopy.



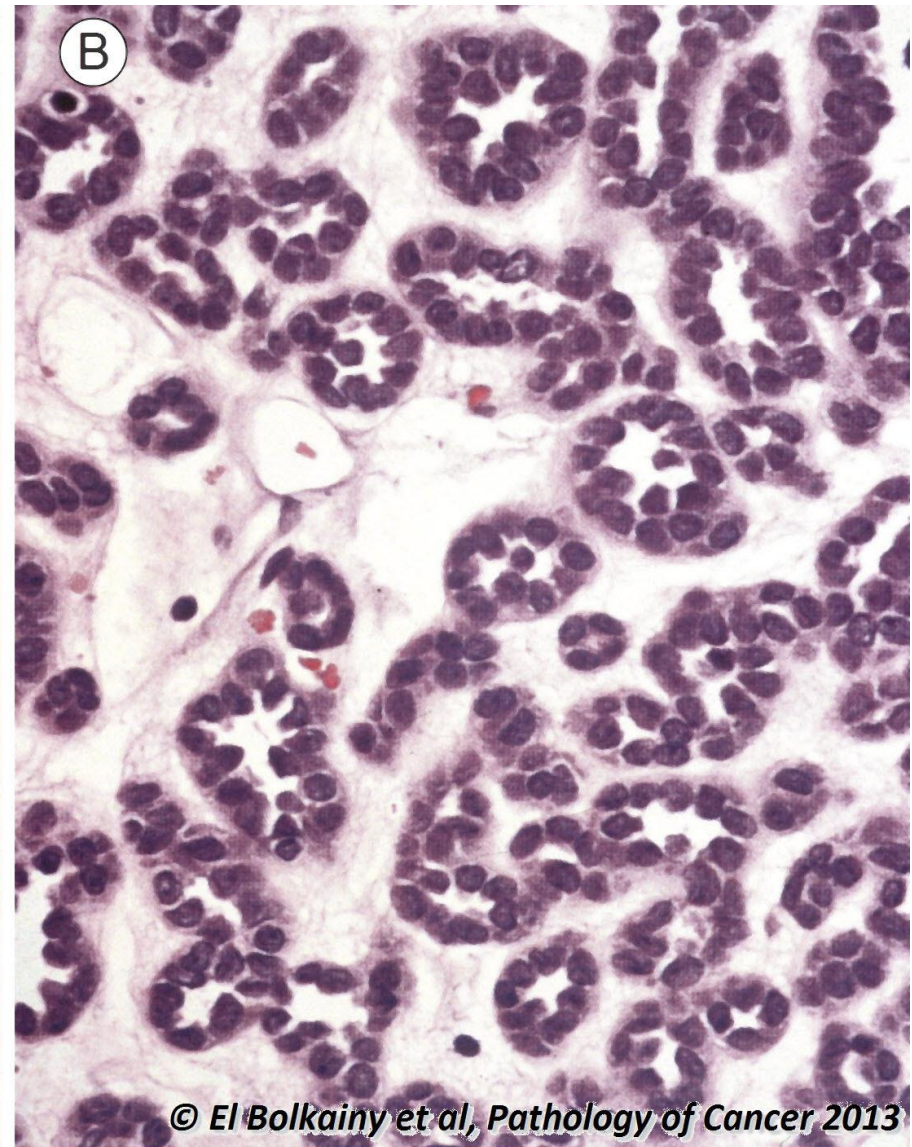
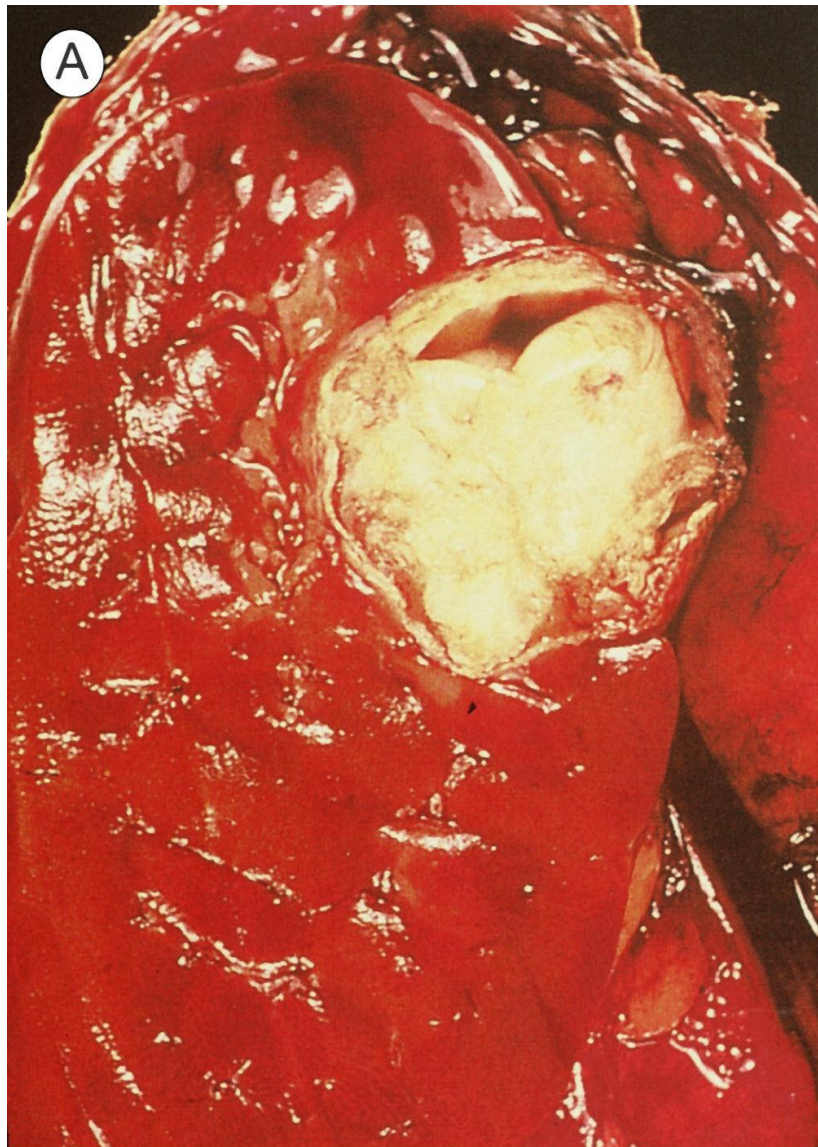
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**Picture  
15-30**

Rhabdoid tumor, electron microscopy. Microfilaments are abundant in cytoplasm.



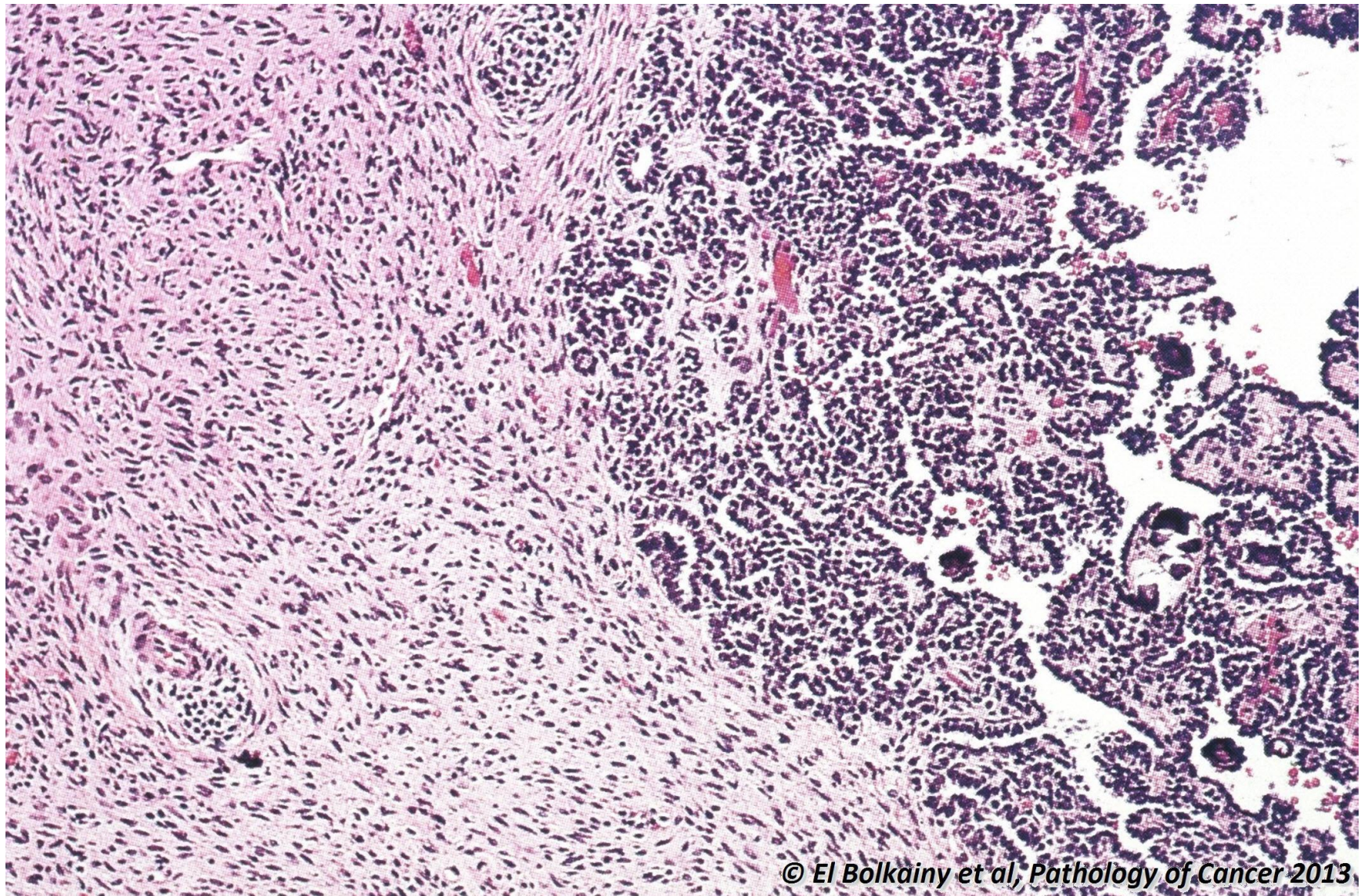
15.31 Metanephric adenoma.



**Picture 15-31** Metanephric adenoma. **A** Grossly, appears as a well defined gray white mass lesion. **B** Histology shows prominent tubulo-papillary pattern of small size, cuboidal epithelium with occasional hobnail features. Stroma is scanty.



15.32 Metanephric adenofibroma.



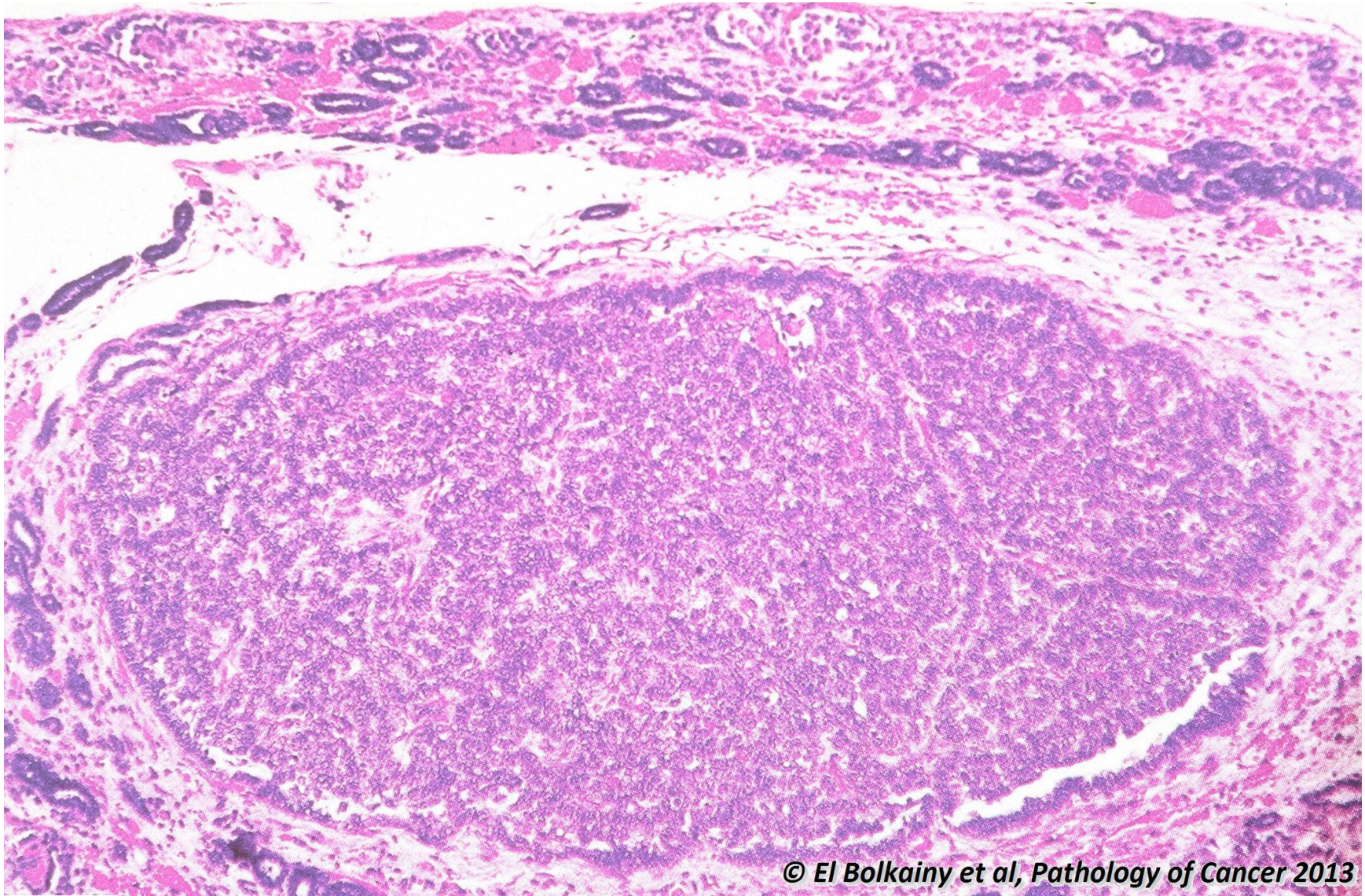
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**Picture  
15-32**

Metanephric adenofibroma. Histology shows a complex structure of stromal and epithelial elements.



15.33 Nephrogenic rests.



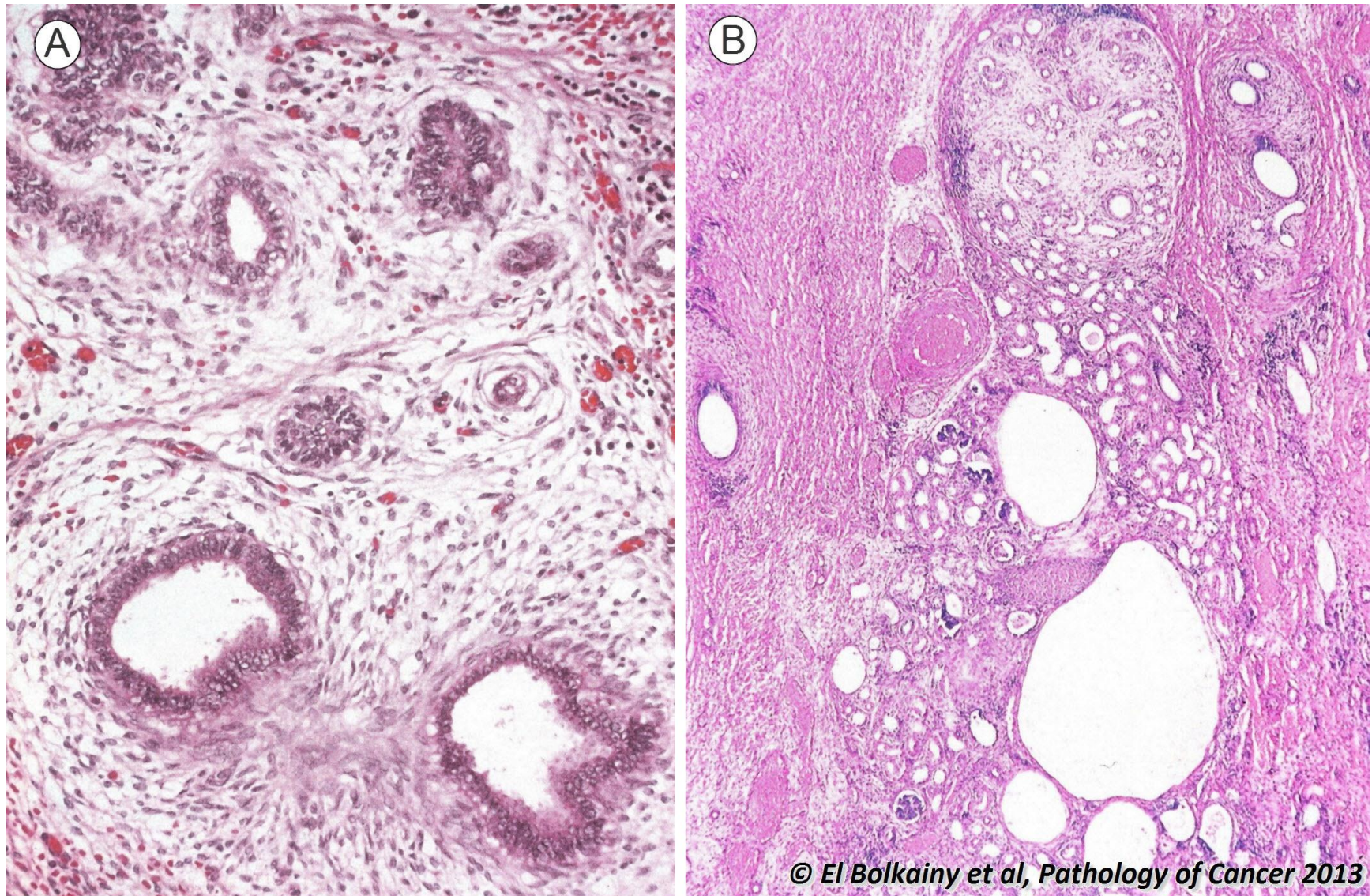
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**Picture  
15-33**

**Nephrogenic rests.** Microscopic focus of immature tubules.



15.34 Renal dysplasia, histology.



**Picture 15-34** Renal dysplasia, histology. **A** A diagnosed pattern of renal tubules and stroma. **B** Renal tubules show marked variation in size and shape.



15.35 Polycystic kidney (infantile type).

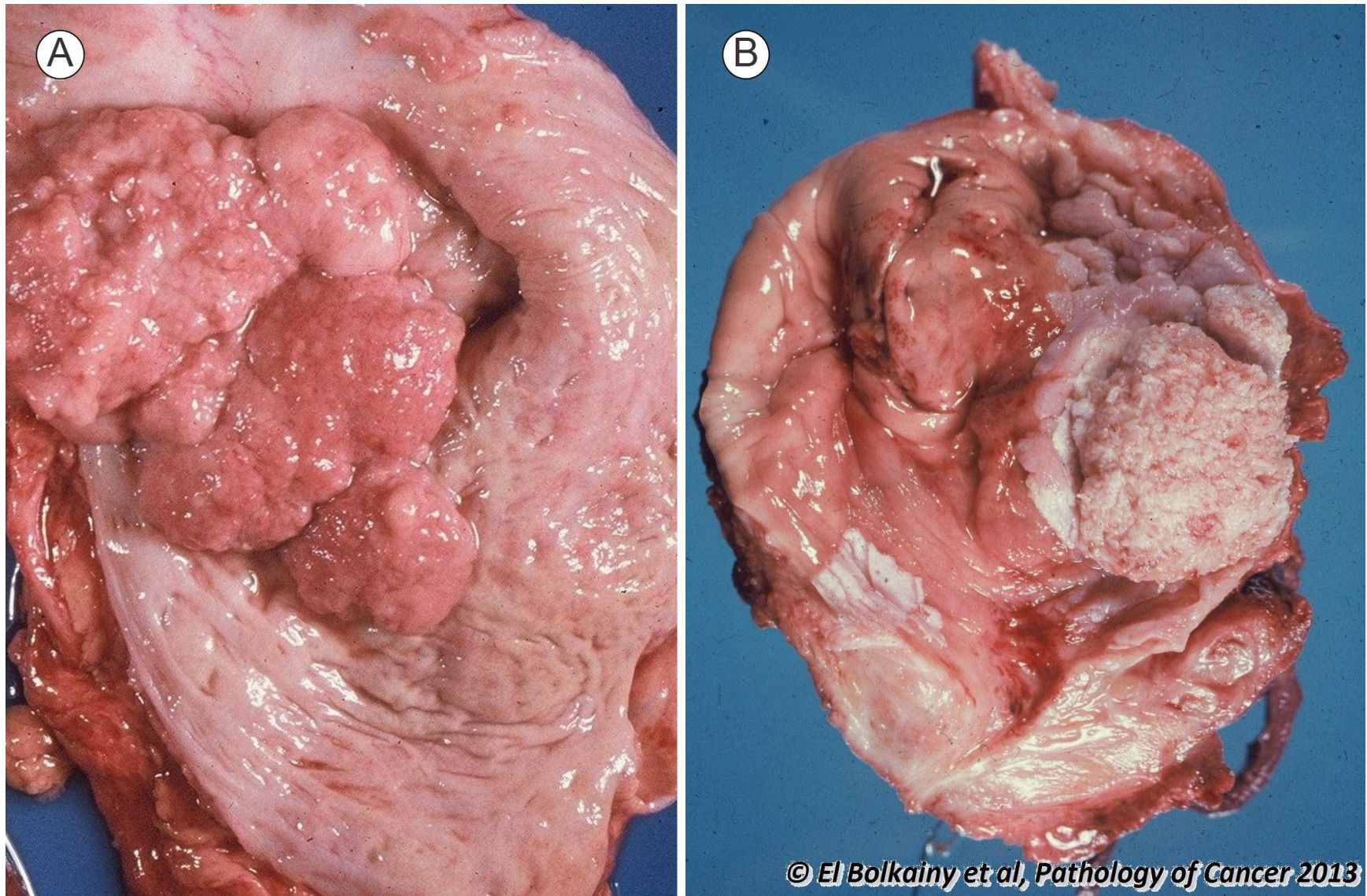


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**Picture 15-35** Polycystic kidney (infantile type). Grossly, there is diffuse affection of the entire kidney by multiple cysts of variable sizes which do not communicate with renal pelvis.



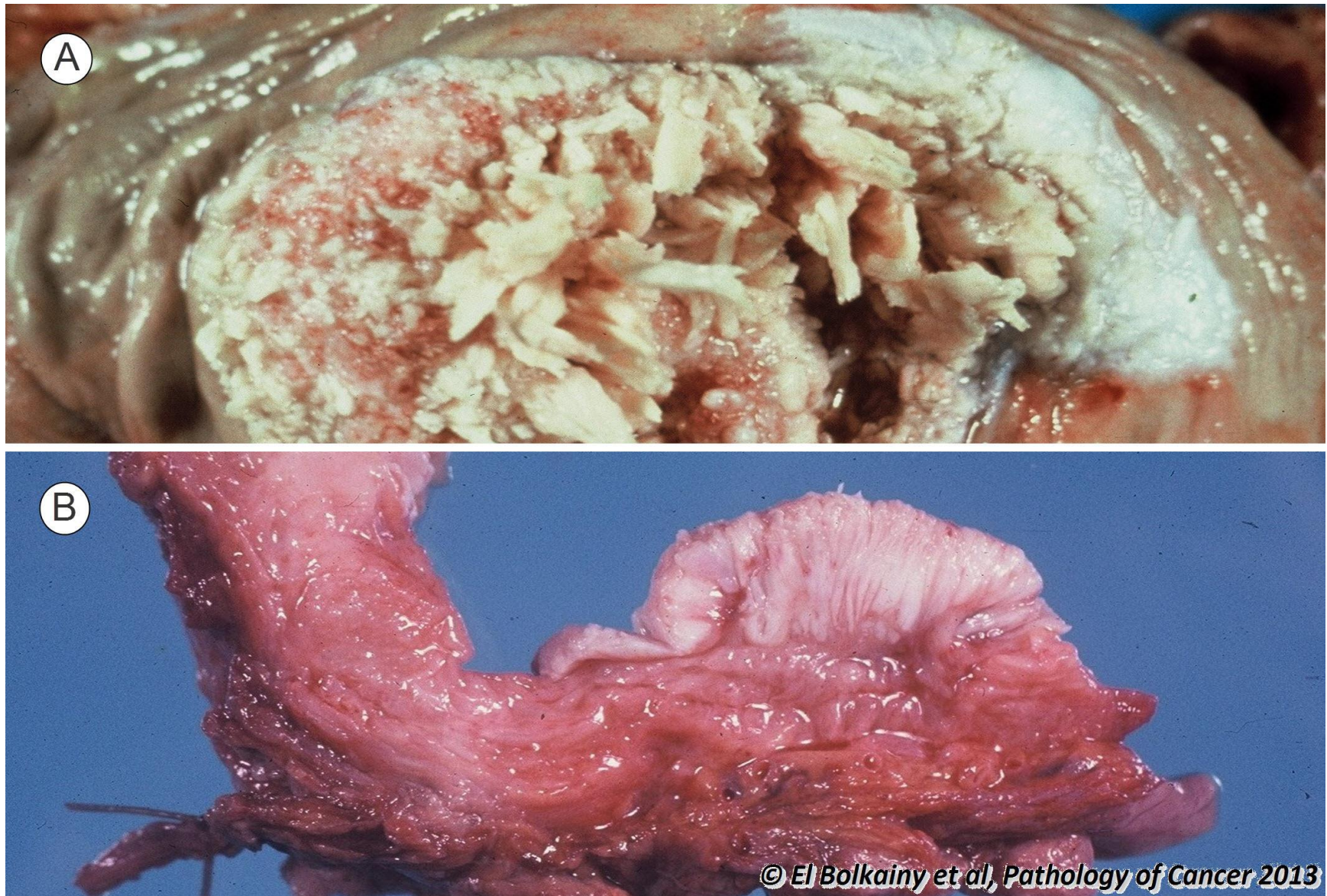
15.36 Gross feature of bladder cancer.



**Picture 15-36** Gross feature of bladder cancer. **A** Papillary pattern of transitional carcinoma. **B** Nodular type of squamous carcinoma associated with squamous metaplasia (leukoplakia) of urothelium.



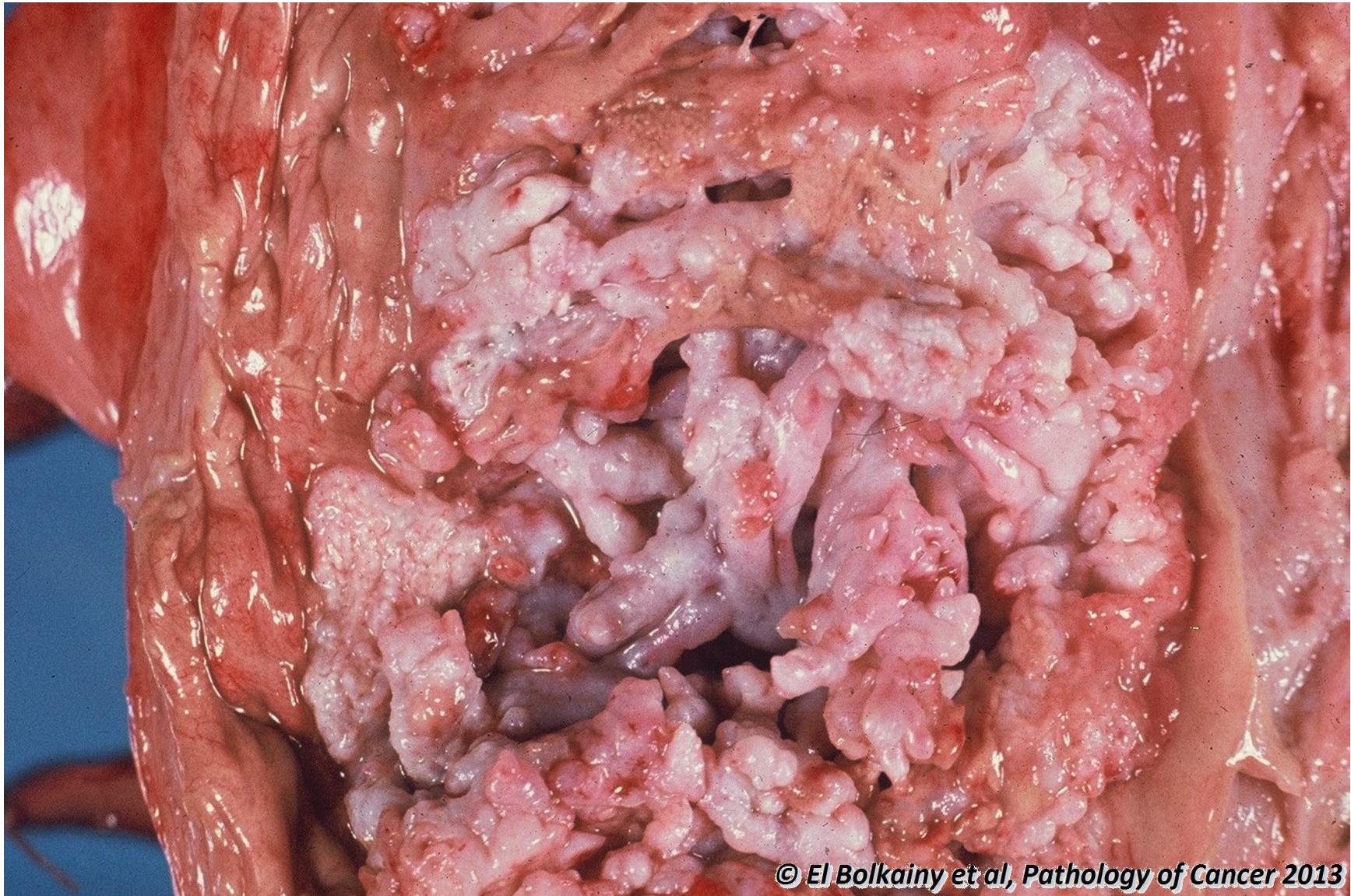
15.37 Gross appearance of verrucous carcinoma.



**Picture 15-37** Gross appearance of verrucous carcinoma. Note the whitish filamentous peg-shaped pattern. **A** Surface view. **B** Cut section.



15.38 Gross features of verrucoid carcinoma of bladder.

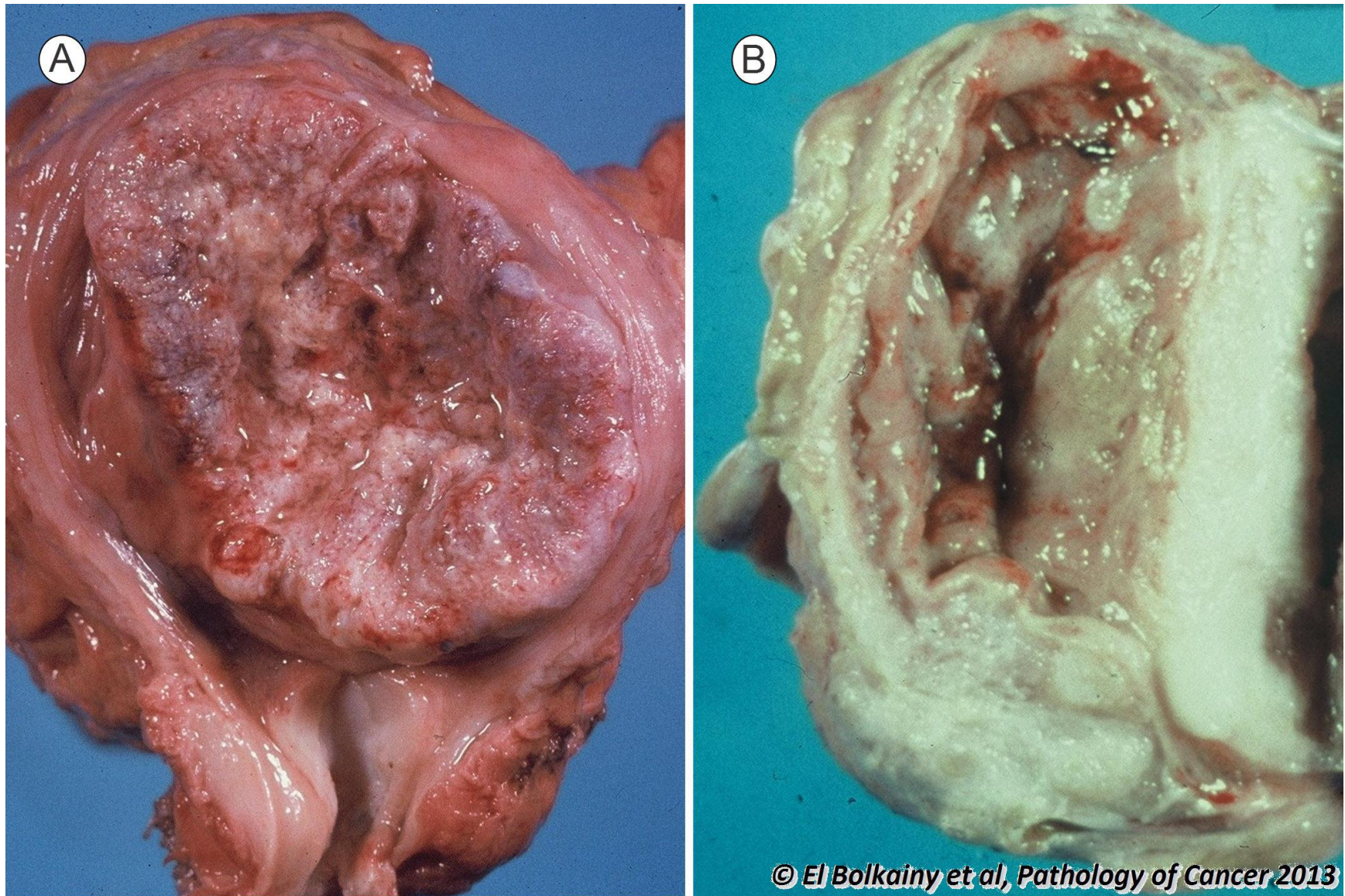


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**Picture 15-38** Gross features of verrucoid carcinoma of bladder. Note both exophytic filamentous pattern and invasive components.



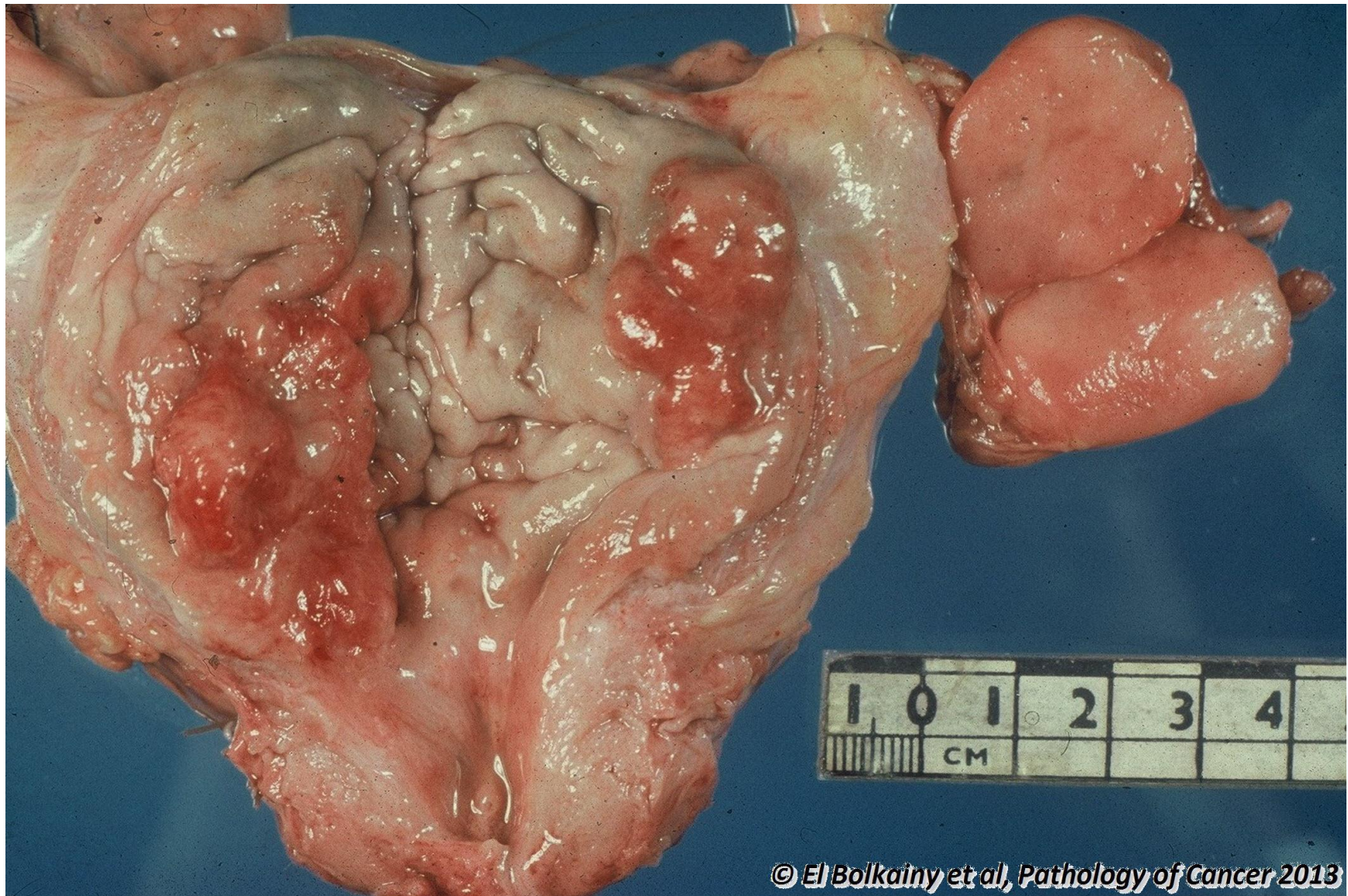
15.39 Gross features of bladder cancer.



**Picture 15-39** Gross features of bladder cancer. **A** Ulcerative type. **B** Diffusely infiltrative type characteristic of high grade and undifferentiated carcinomas.



15.40 Multiple bladder carcinomas.



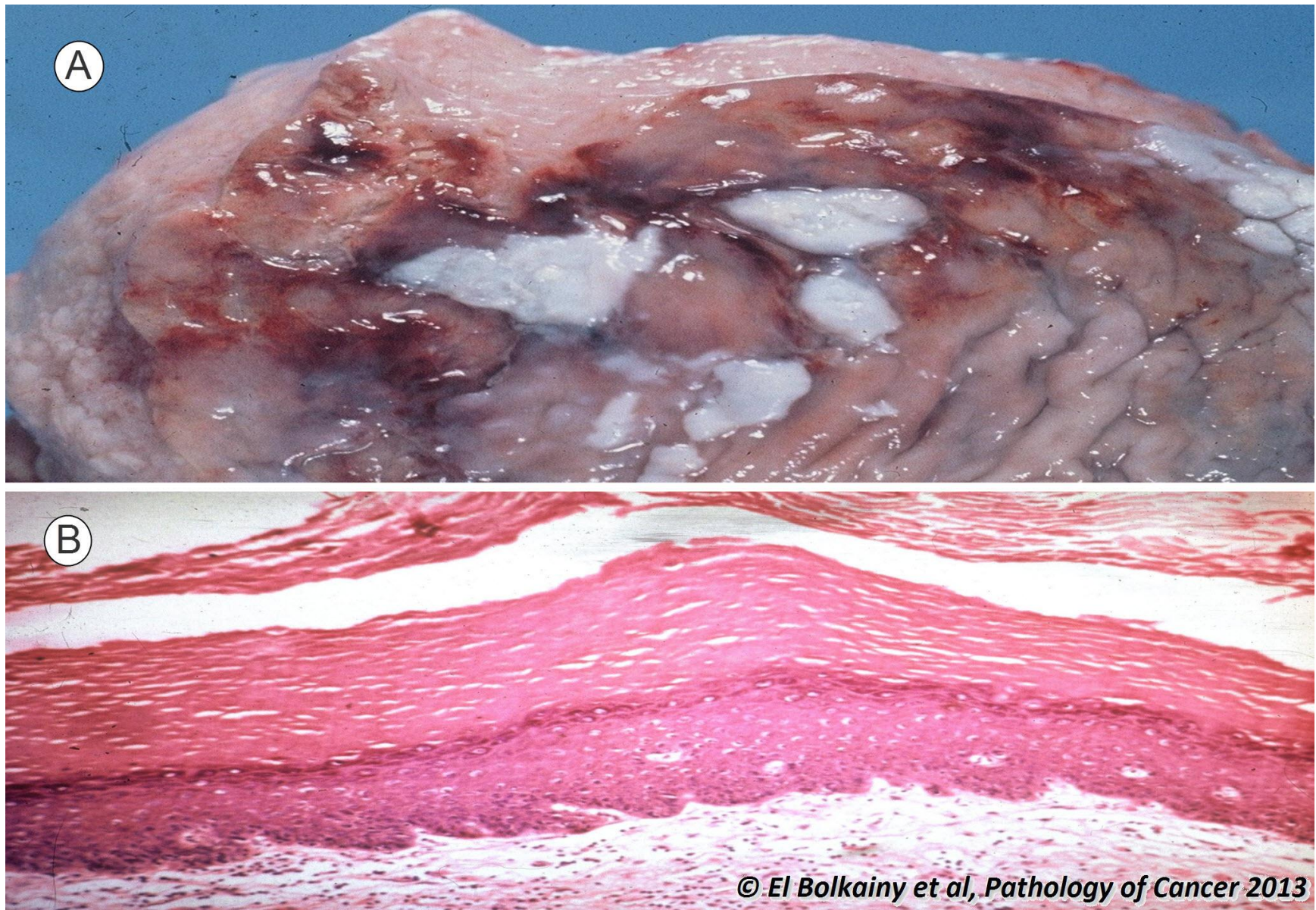
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Picture  
15-40

Multiple bladder carcinomas. Two tumors are present, associated with lymph node metastases (stage 4).



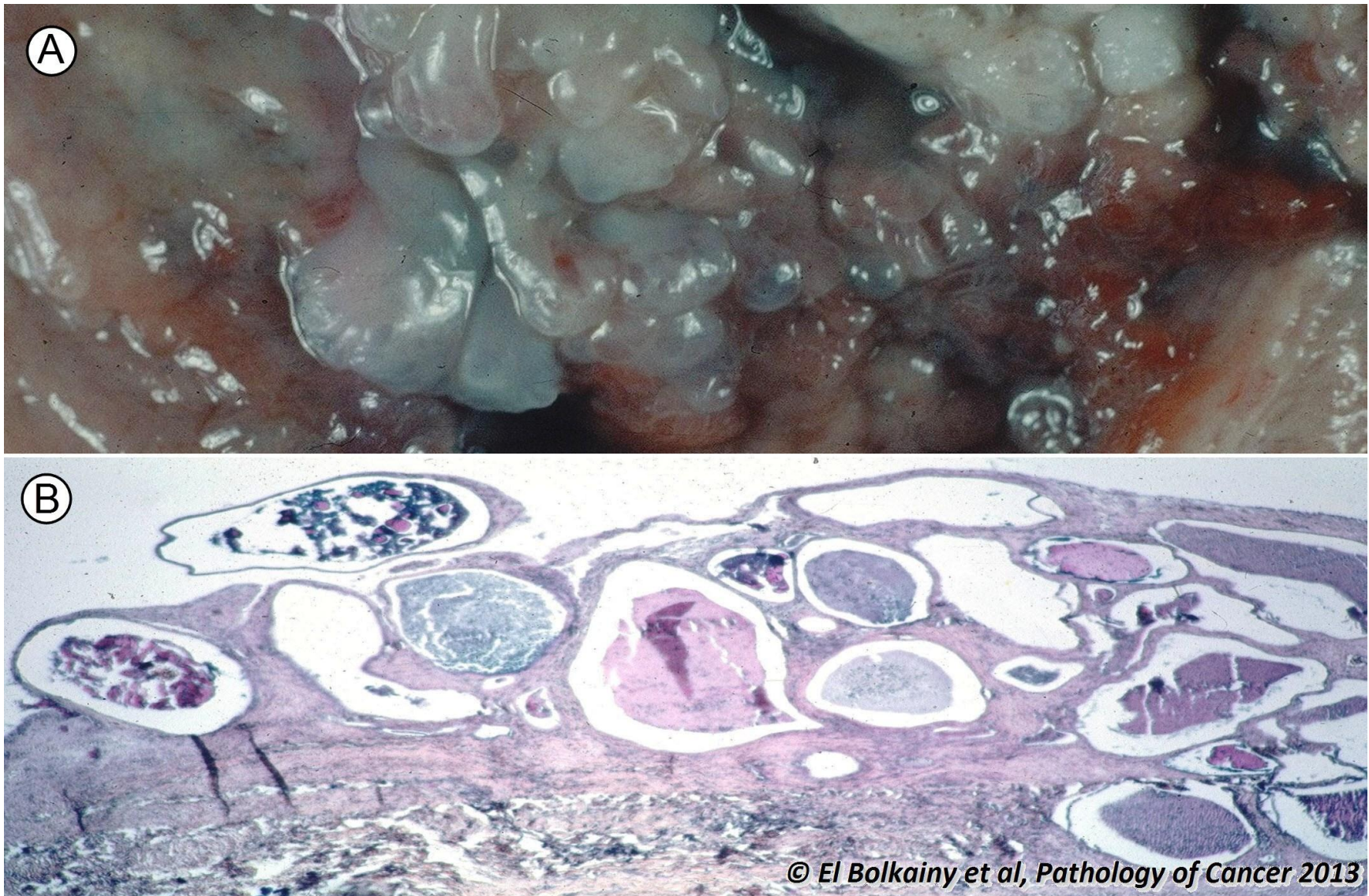
15.41 Squamous metaplasia (transdifferentiation) of urothelium.



**Picture 15-41** Squamous metaplasia (transdifferentiation) of urothelium. **A** Grossly, appears as white patches. **B** Histology, note eosinophilic cytoplasm and surface hyperkeratosis.



15.42 Cystitis cystica of urinary bladder.



**Picture 15-42** Cystitis cystica of urinary bladder. **A** Gross appearance of microcysts. **B** Histology, note cystic glands under surface urothelium.



15.43 Cystitis glandularis of surface urothelium.

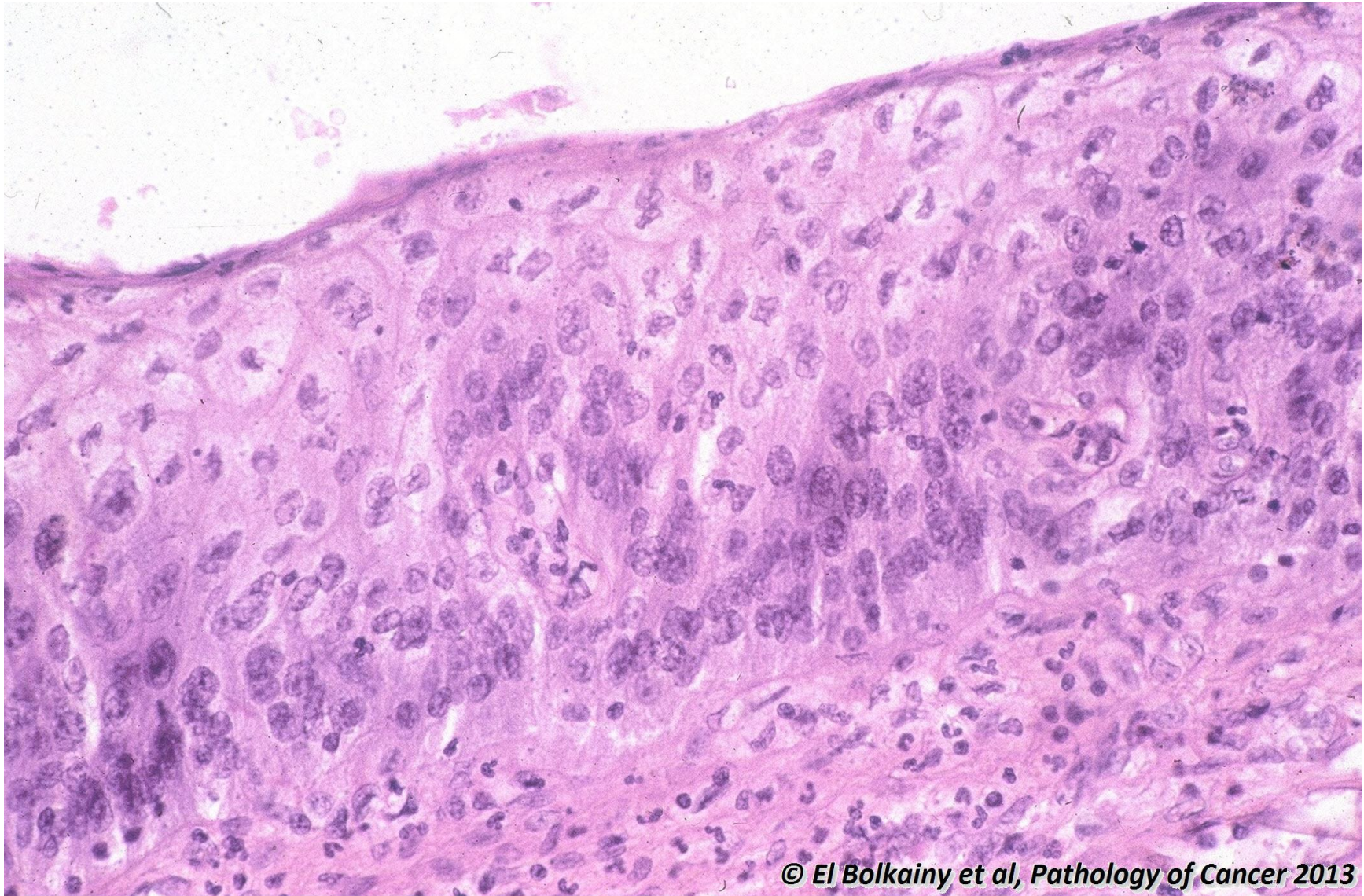


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**Picture 15-43** Cystitis glandularis of surface urothelium. There is a change of transitional epithelium to colonic type epithelium rich in goblet cells (glandular differentiation, intestinal type).



15.44 Histology of squamous dysplasia of urothelium.

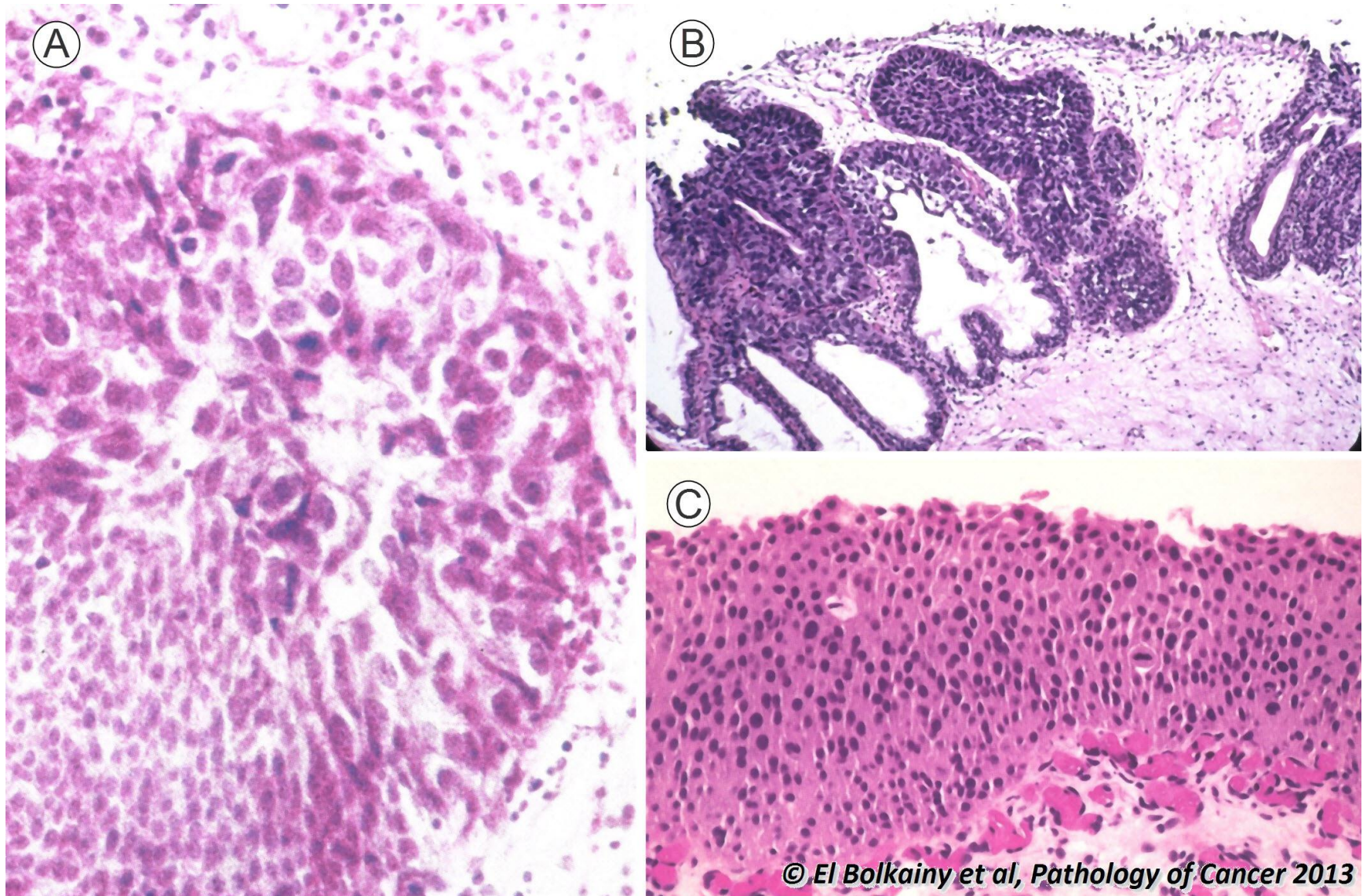


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**Picture 15-44** Histology of squamous dysplasia of urothelium. In addition to squamous metaplasia, there is moderate atypia affecting mainly basal layers of epithelium.



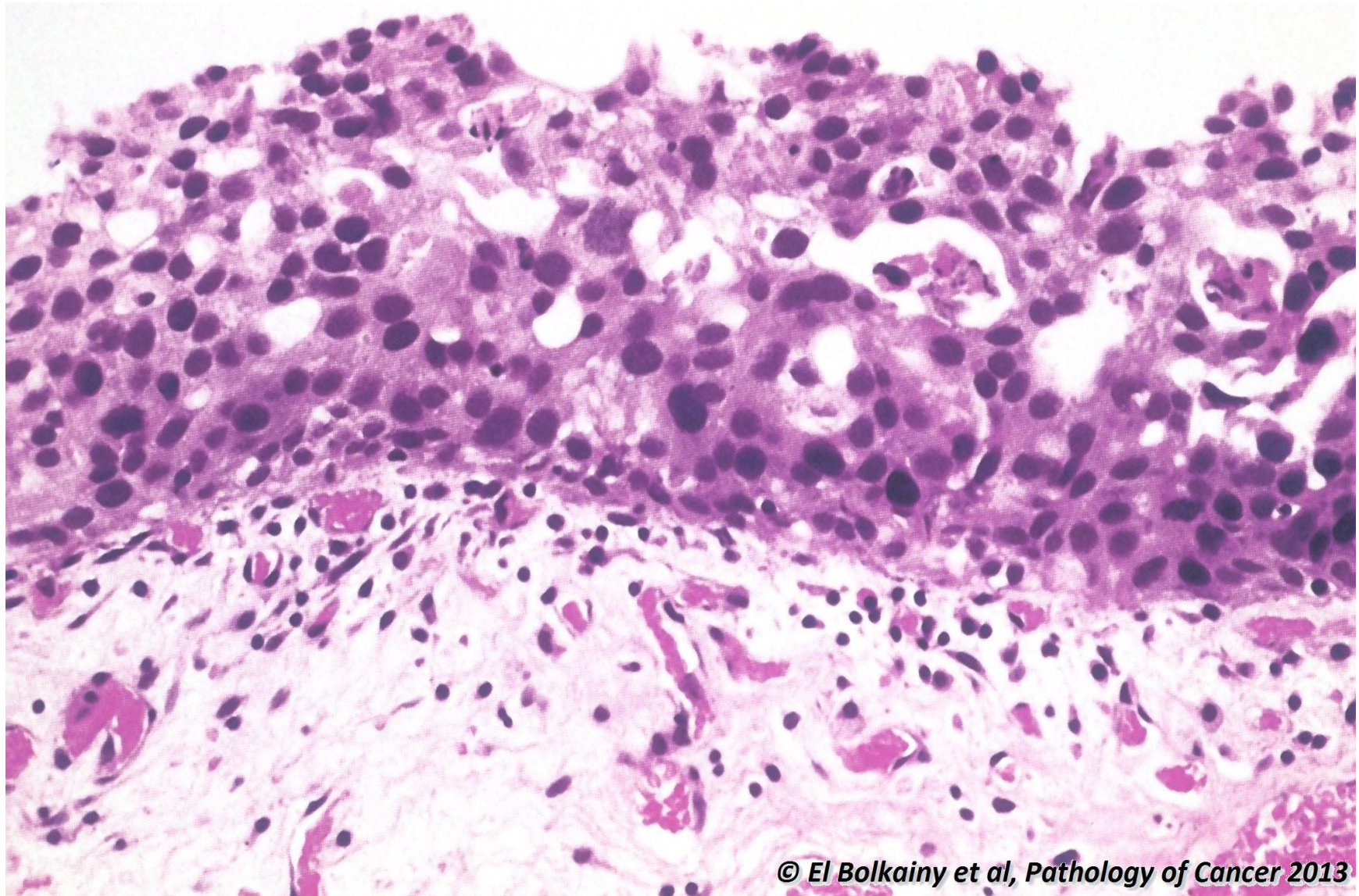
15.45 Histology of carcinoma in situ.



**Picture 15-45** Histology of carcinoma in situ. **A** Focal involvement of cell nest of Brunner. **B** Affecting glandular metaplasia. **C** Diffuse involvement of surface urothelium.



15.46 Histology of carcinoma in situ, pagetoid type.

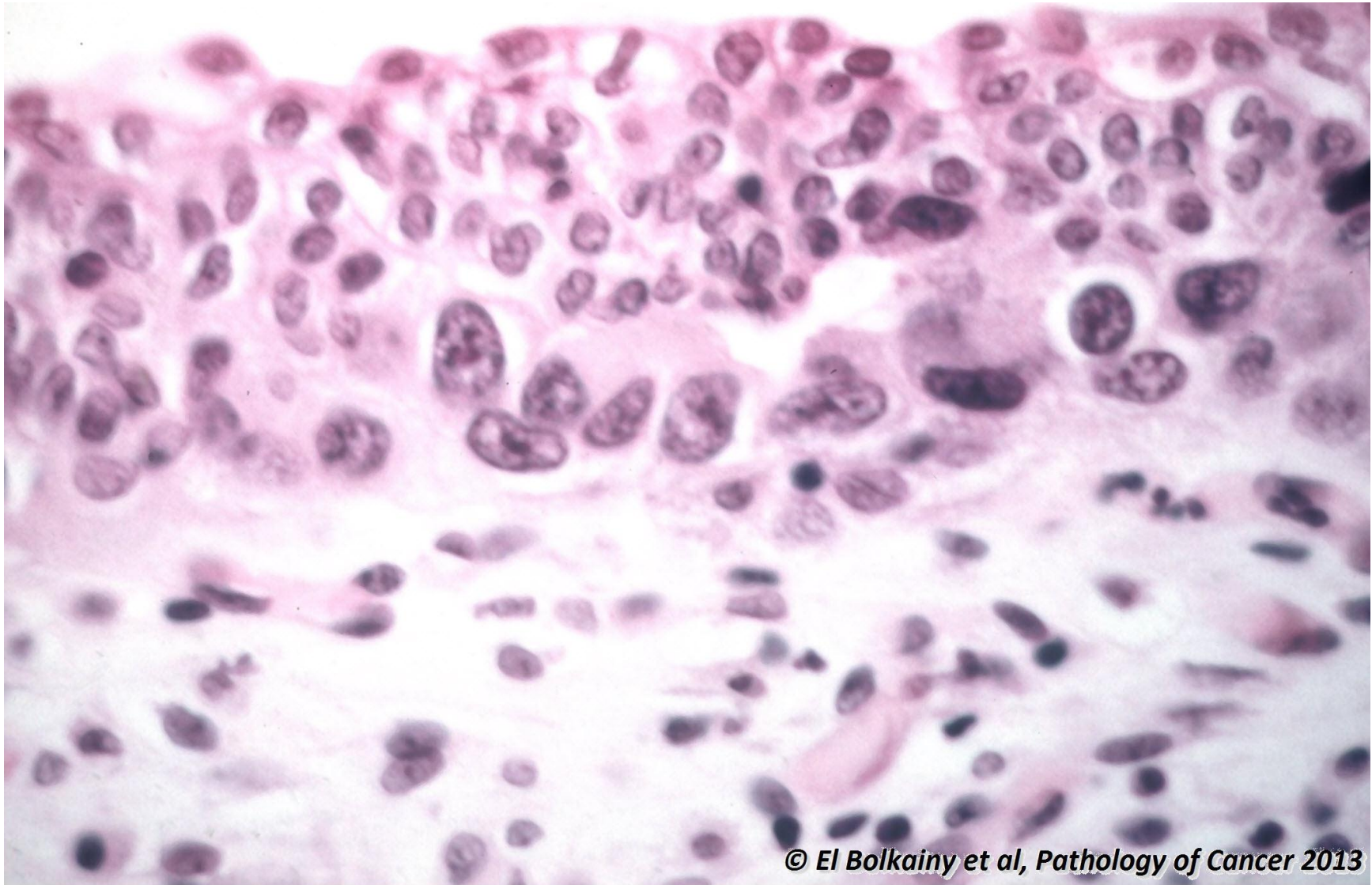


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**Picture 15-46** Histology of carcinoma in situ, pagetoid type. Note the scattered distribution of the large malignant cells among the small non-malignant epithelium.



15.47 Histology of carcinoma in situ, undermined type.



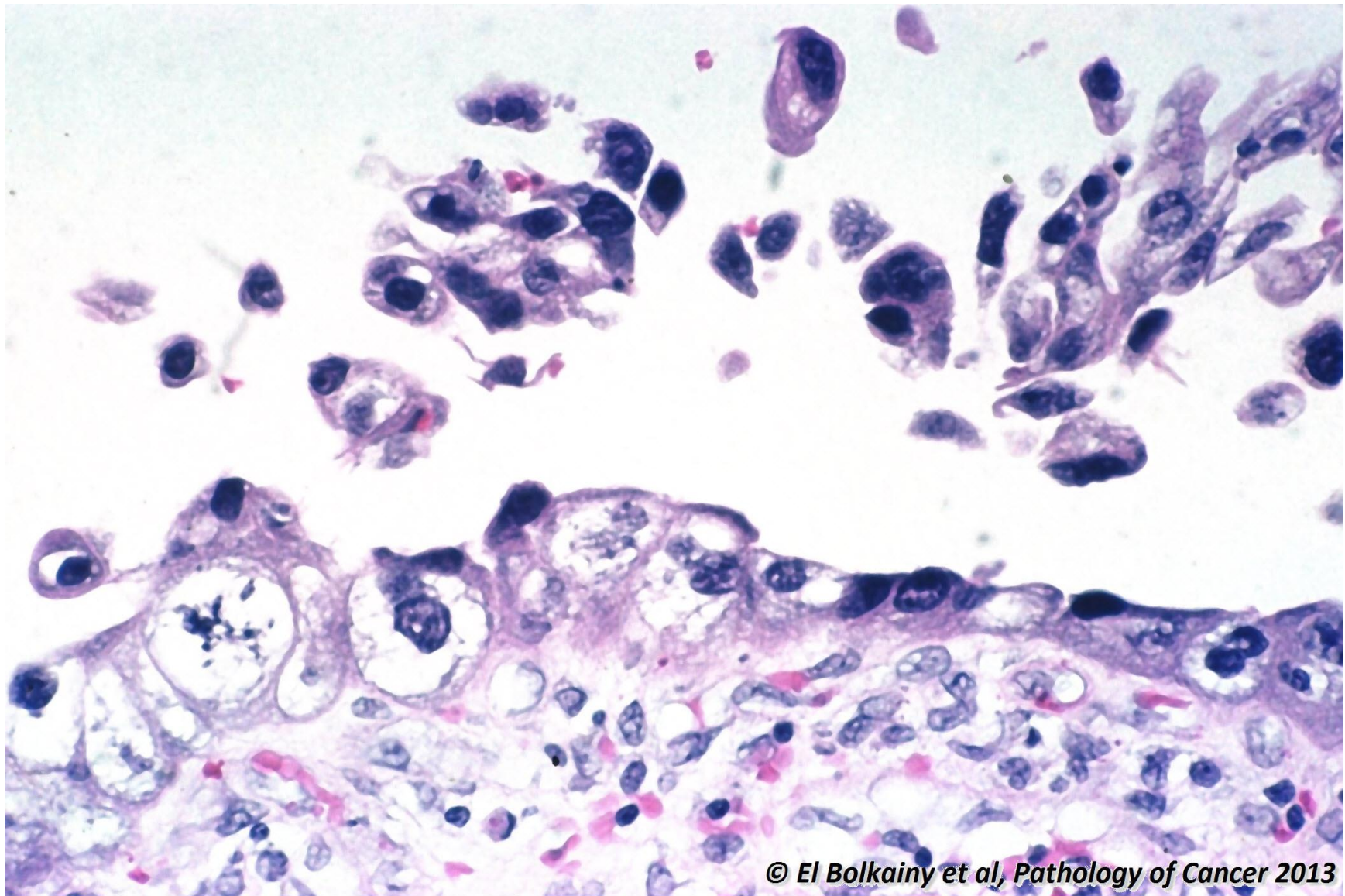
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Picture  
15-47

Histology of carcinoma in situ, undermined type. Note the basal distribution of malignant cells.



15.48 Histology of carcinoma in situ, clinging type.

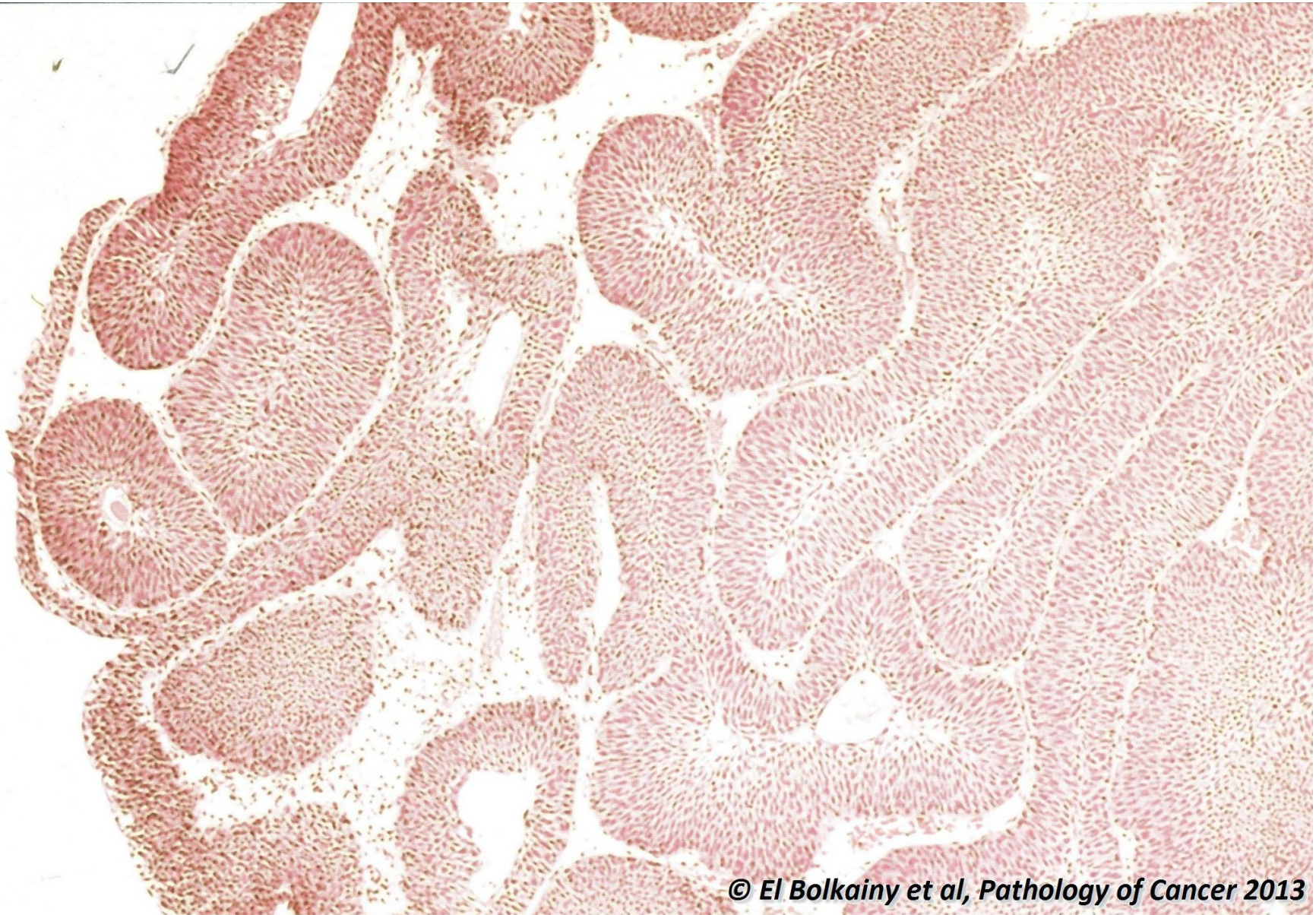


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**Picture 15-48** Histology of carcinoma in situ, clinging type. Most of urothelium is lost and only few malignant cells remain attached to an intact basement membrane.



15.49 Histology of inverted papilloma.



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Picture  
15-49

Histology of inverted papilloma. Note the endophytic anastomosing pattern of transitional epithelium.



15.50 Papillary urothelial neoplasm of low malignant potential.



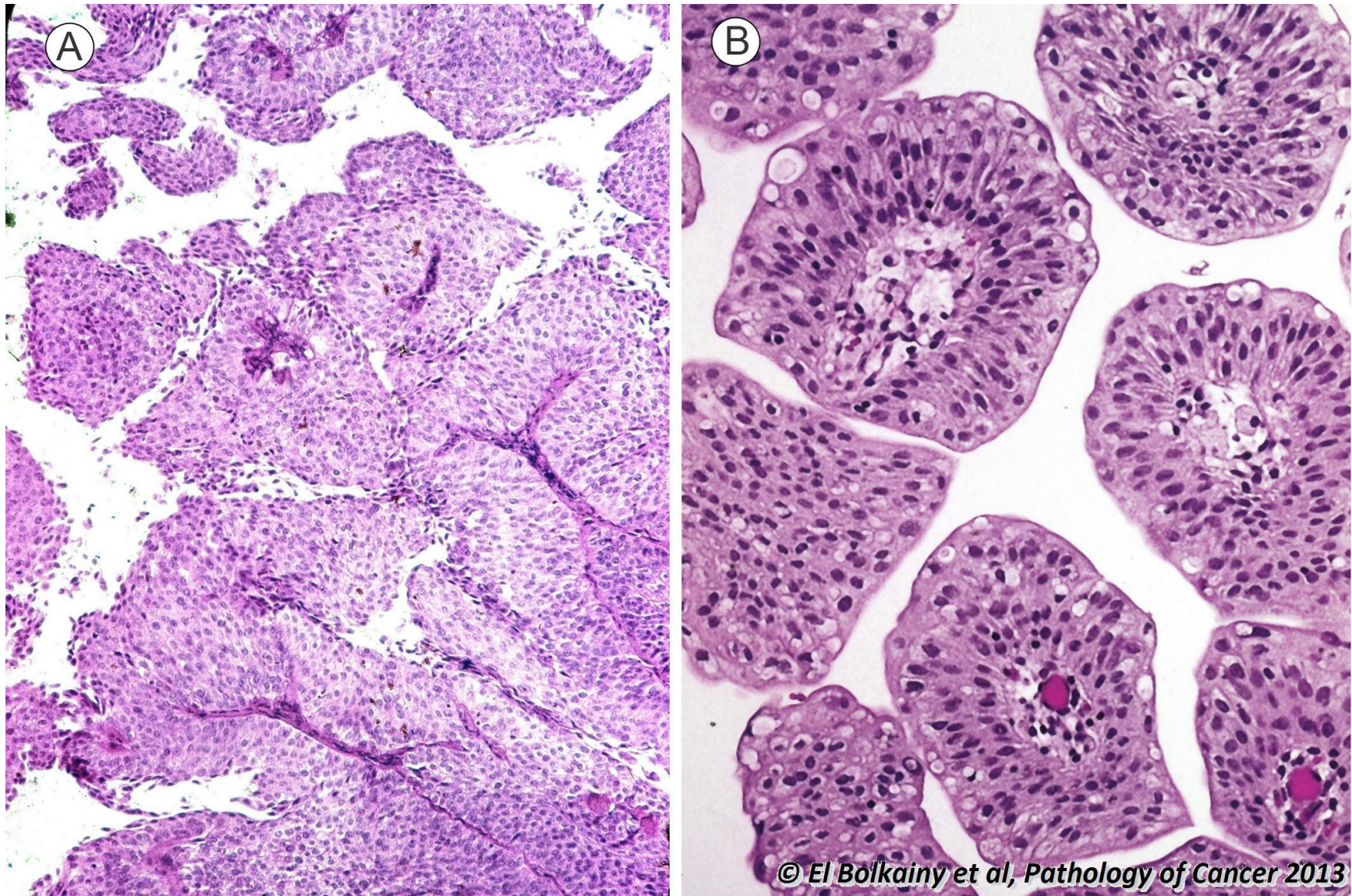
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Picture  
15-50

Papillary urothelial neoplasm of low malignant potential. This papillary well differentiated tumor is non-invasive.



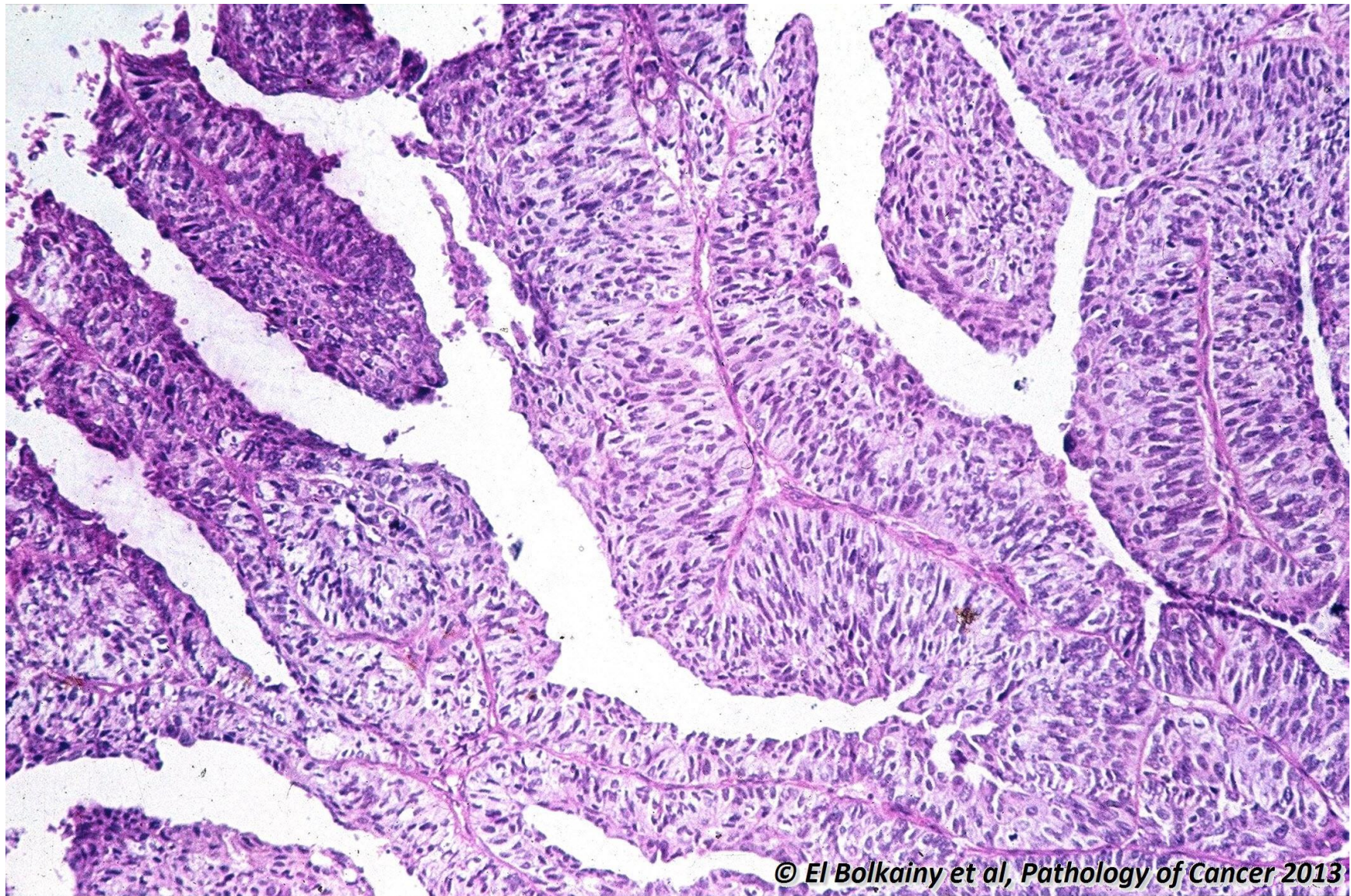
15.51 Histology of papillary transitional cell carcinoma, grade 1.



**Picture 15-51** Histology of papillary transitional cell carcinoma, grade 1. Note preserved vertically oriented cell pattern and mild cellular atypia. **A** Longitudinal section. **B** Transverse section.



15.52 Histology of papillary transitional cell carcinoma, grade 2.

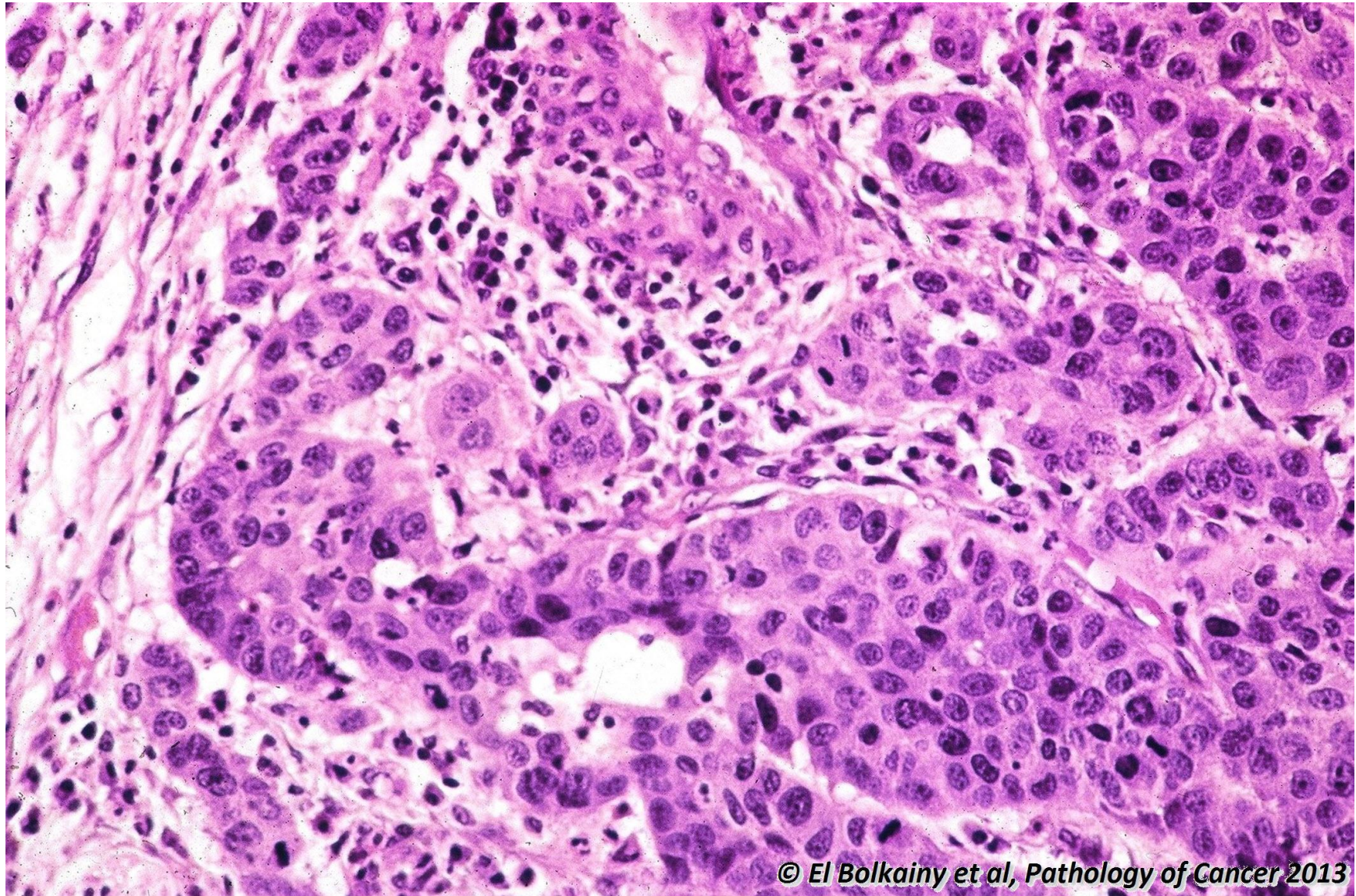


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**Picture 15-52** Histology of papillary transitional cell carcinoma, grade 2. Note preserved cell pattern and moderate cellular atypia.



15.53 Histology of transitional cell carcinoma, grade 3.

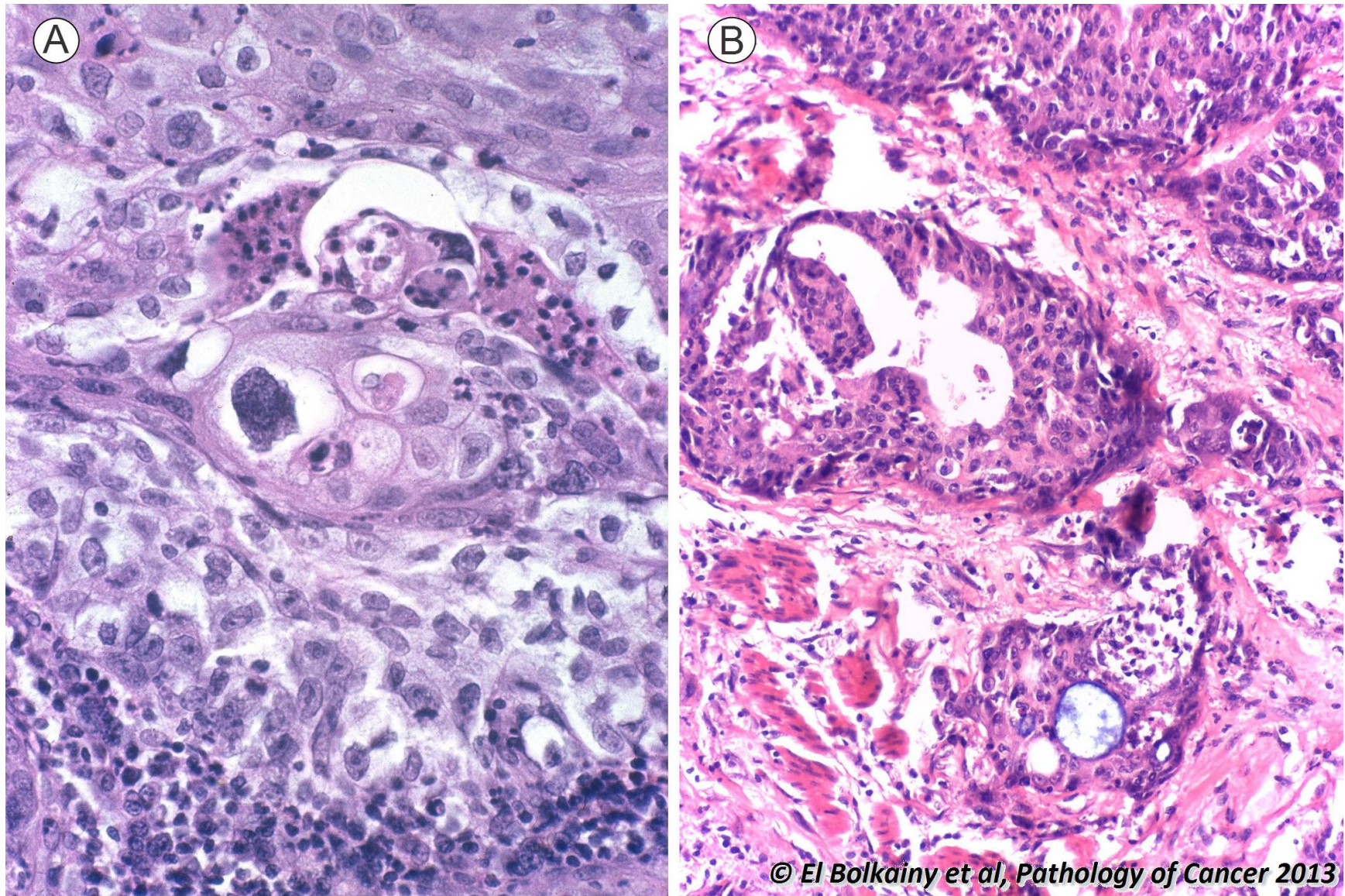


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**Picture 15-53** Histology of transitional cell carcinoma, grade 3. Note disorganized pattern, marked cellular pleomorphism, nuclear atypia, prominent nucleoli, and active mitosis.



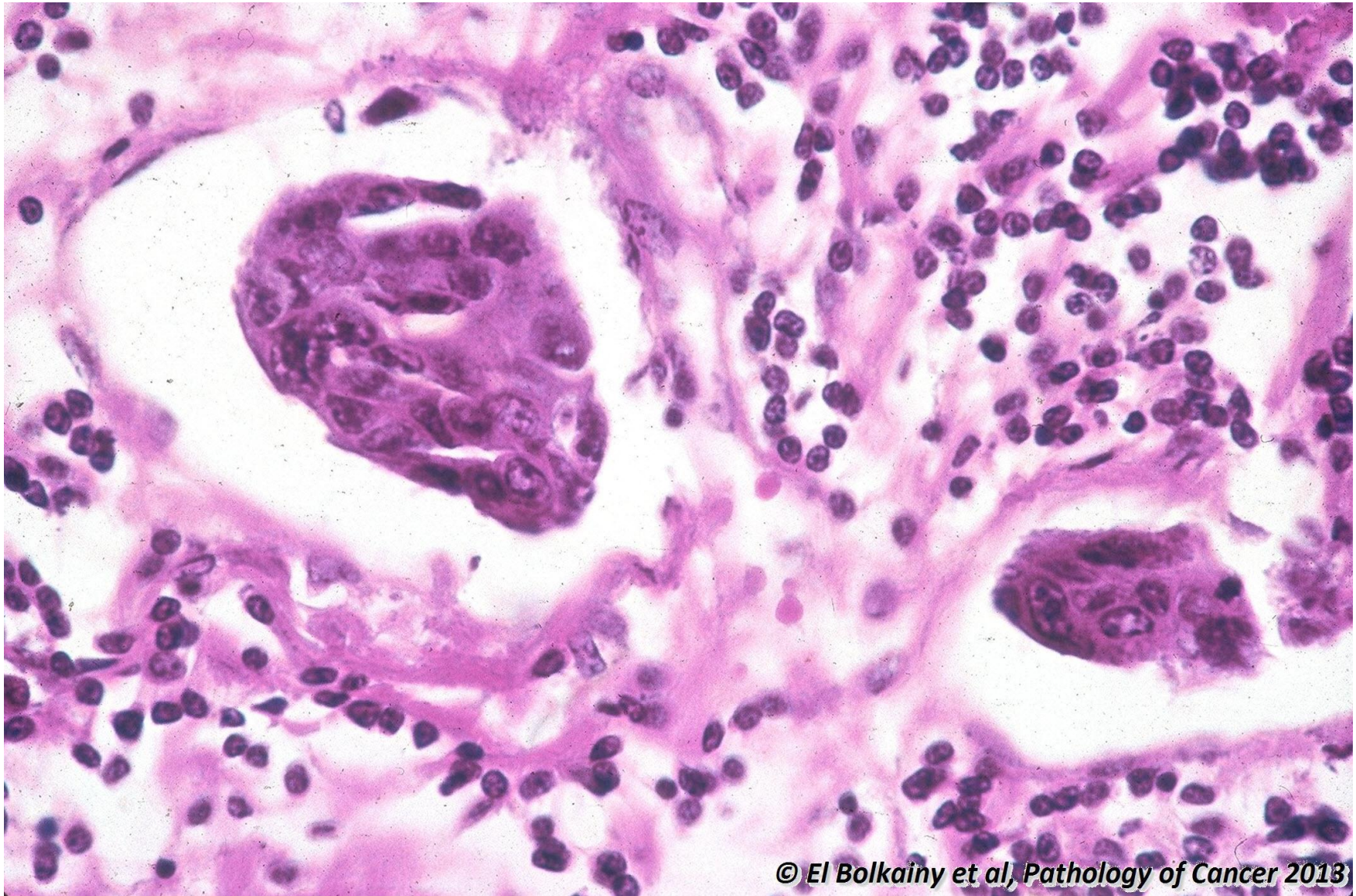
15.54 Histology of transitional cell carcinoma with metaplasia.



**Picture 15-54** Histology of transitional cell carcinoma with metaplasia. A Squamous metaplasia with cell nest formation. B Glandular metaplasia.



15.55 Angioinvasion.



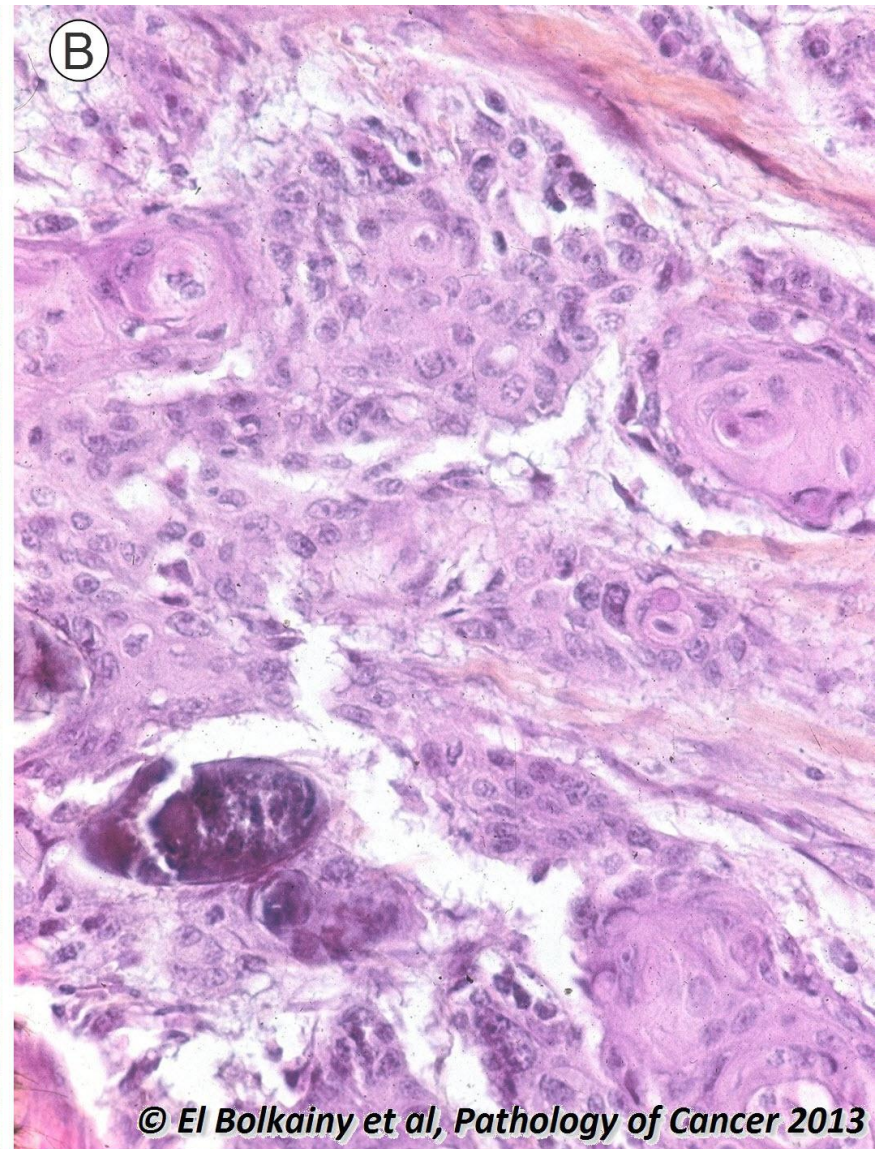
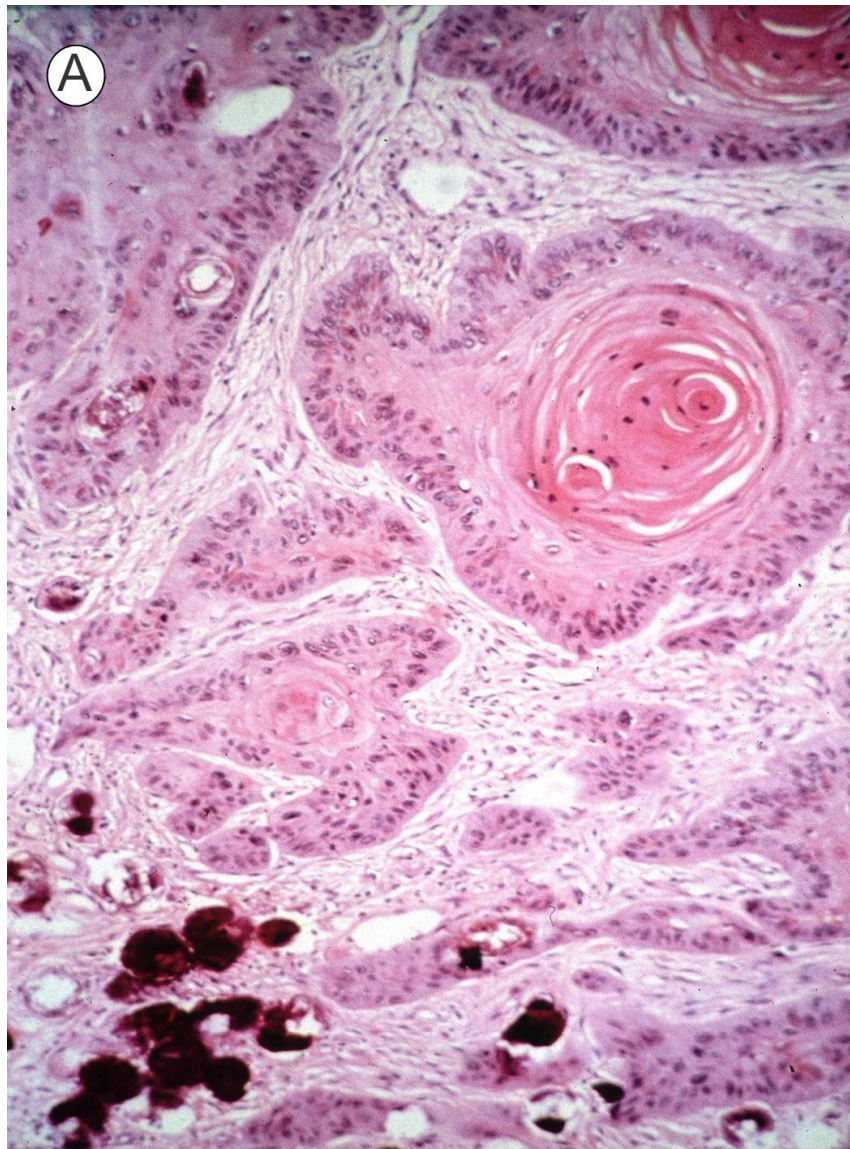
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Picture  
15-55

Angioinvasion. A high grade transitional carcinoma permeating a lymphatic vessel.



15.56 Histology of squamous cell carcinoma.

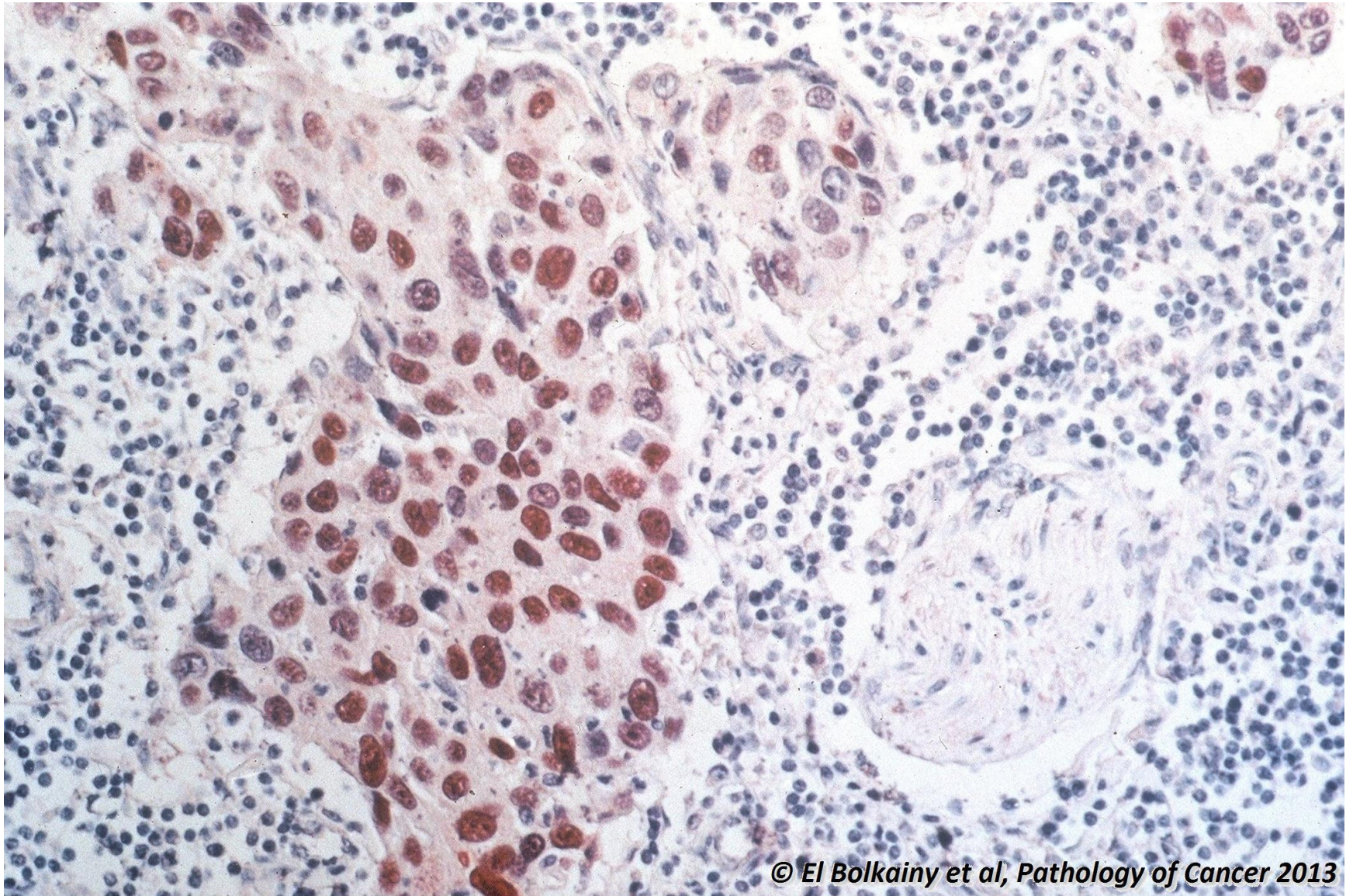


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**Picture 15-56** Histology of squamous cell carcinoma. A Grade 1, associated with bilharzial eggs. B Grade 2 carcinoma.



15.57 Squamous cell carcinoma positive for p53.



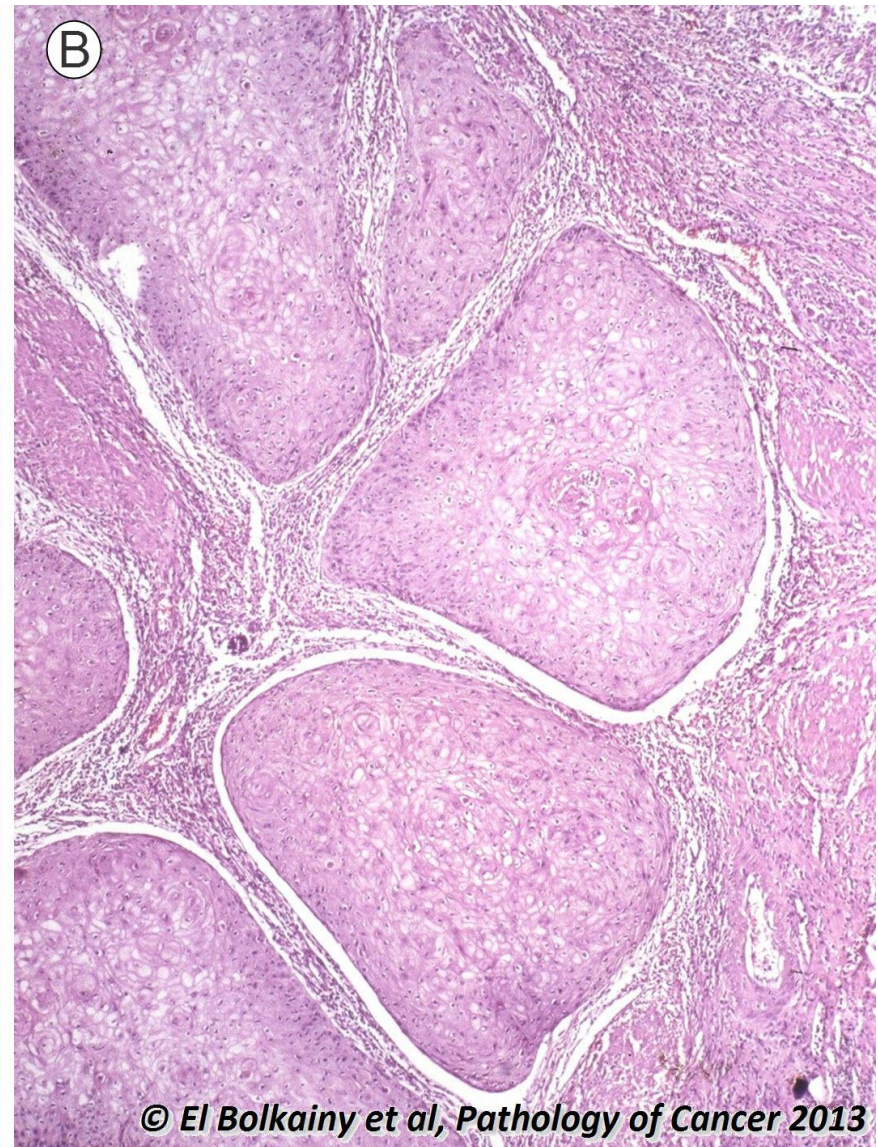
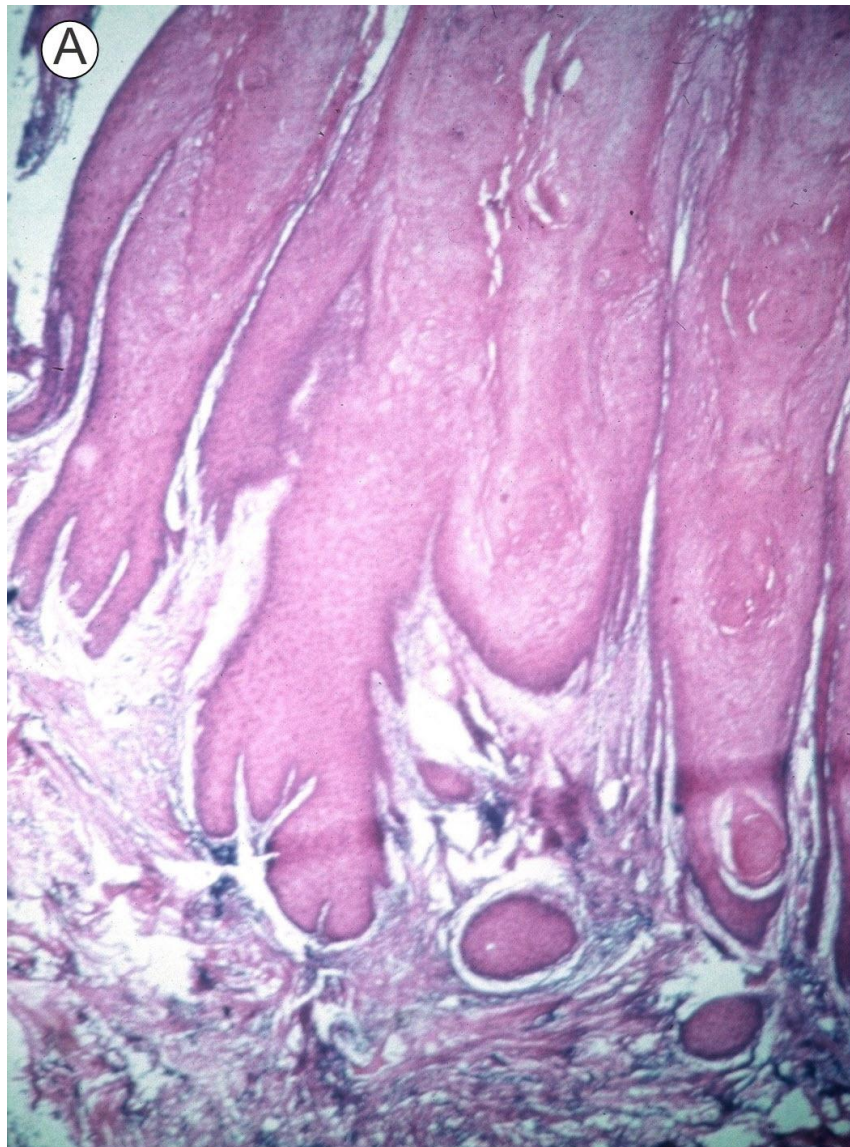
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Picture  
15-57

Squamous cell carcinoma positive for p53. Note the nuclear immunoreactivity.



15.58 Histology of verrucous carcinoma.

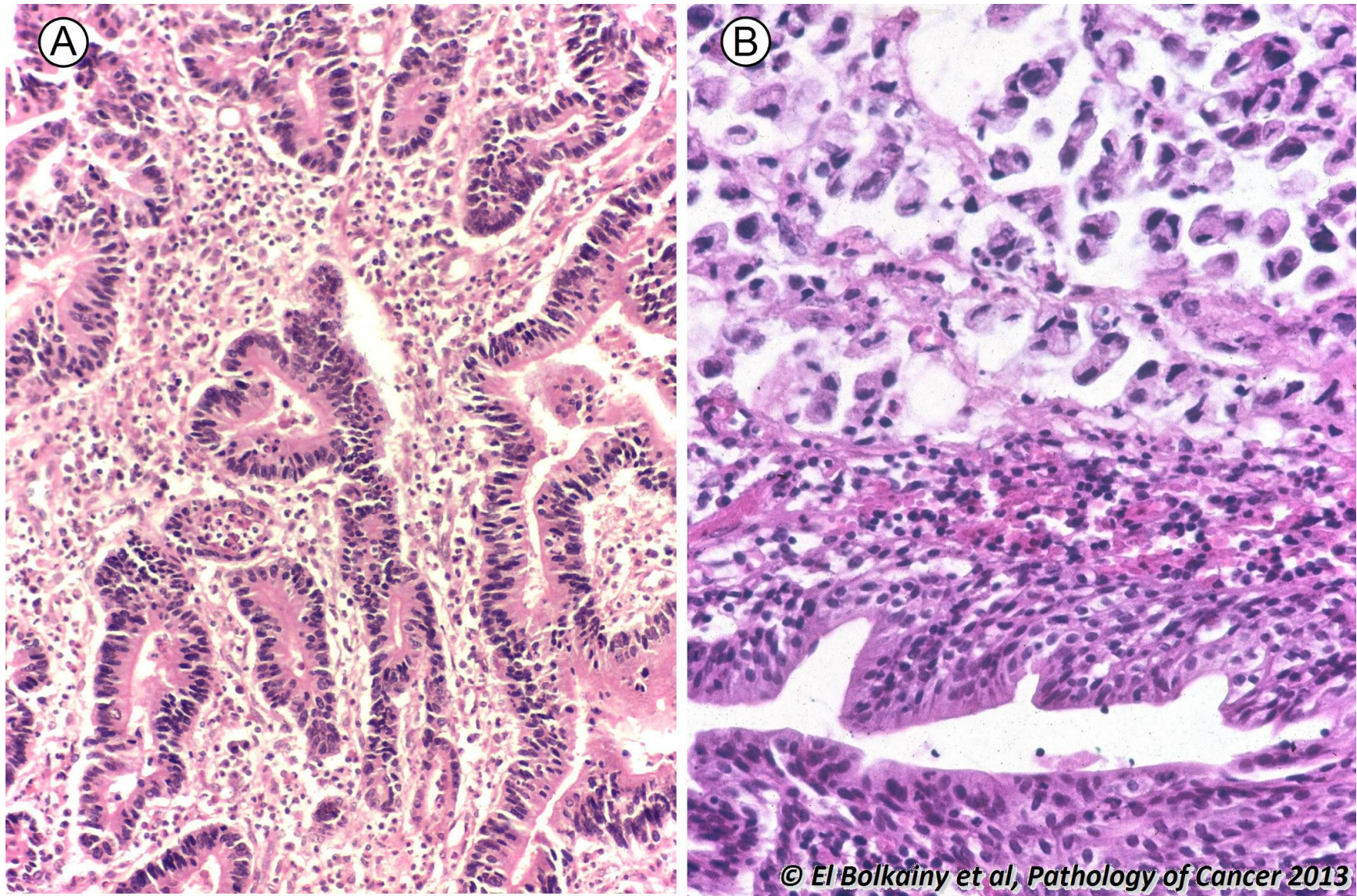


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**Picture 15-58** Histology of verrucous carcinoma. **A** Longitudinal section showing the characteristic filamentous pattern, marked keratinization and mild anaplasia. **B** Cross section showing the bulbous ends of tumor growing by expansion.



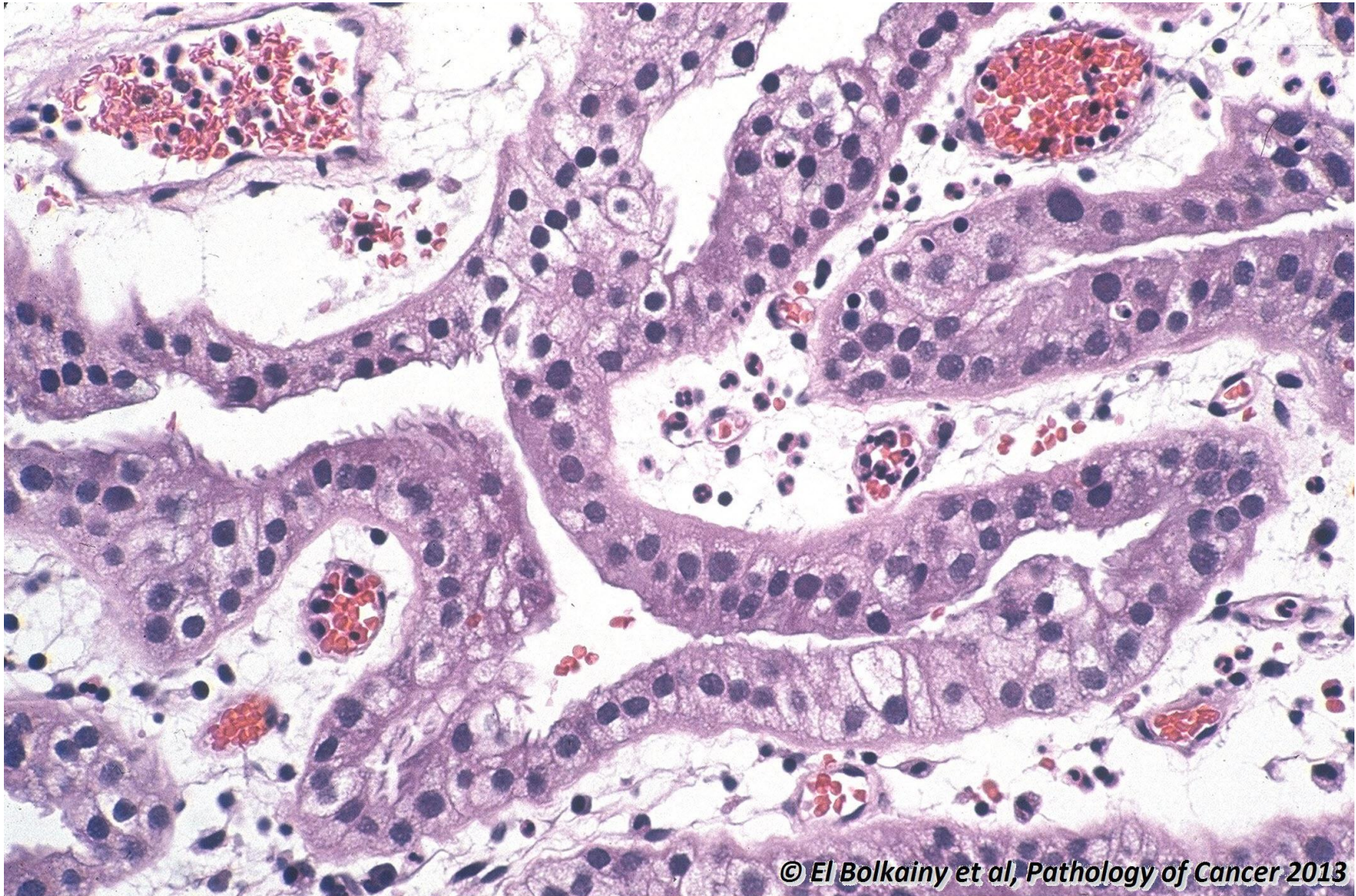
15.59 Adenocarcinoma, histologic subtypes.



**Picture 15-59** Adenocarcinoma, histologic subtypes. A Gland-forming subtype. B Signet-ring adenocarcinoma associated with cystitis glandularis (lower part of picture).  
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15.60 Mesonephric adenocarcinoma of bladder.

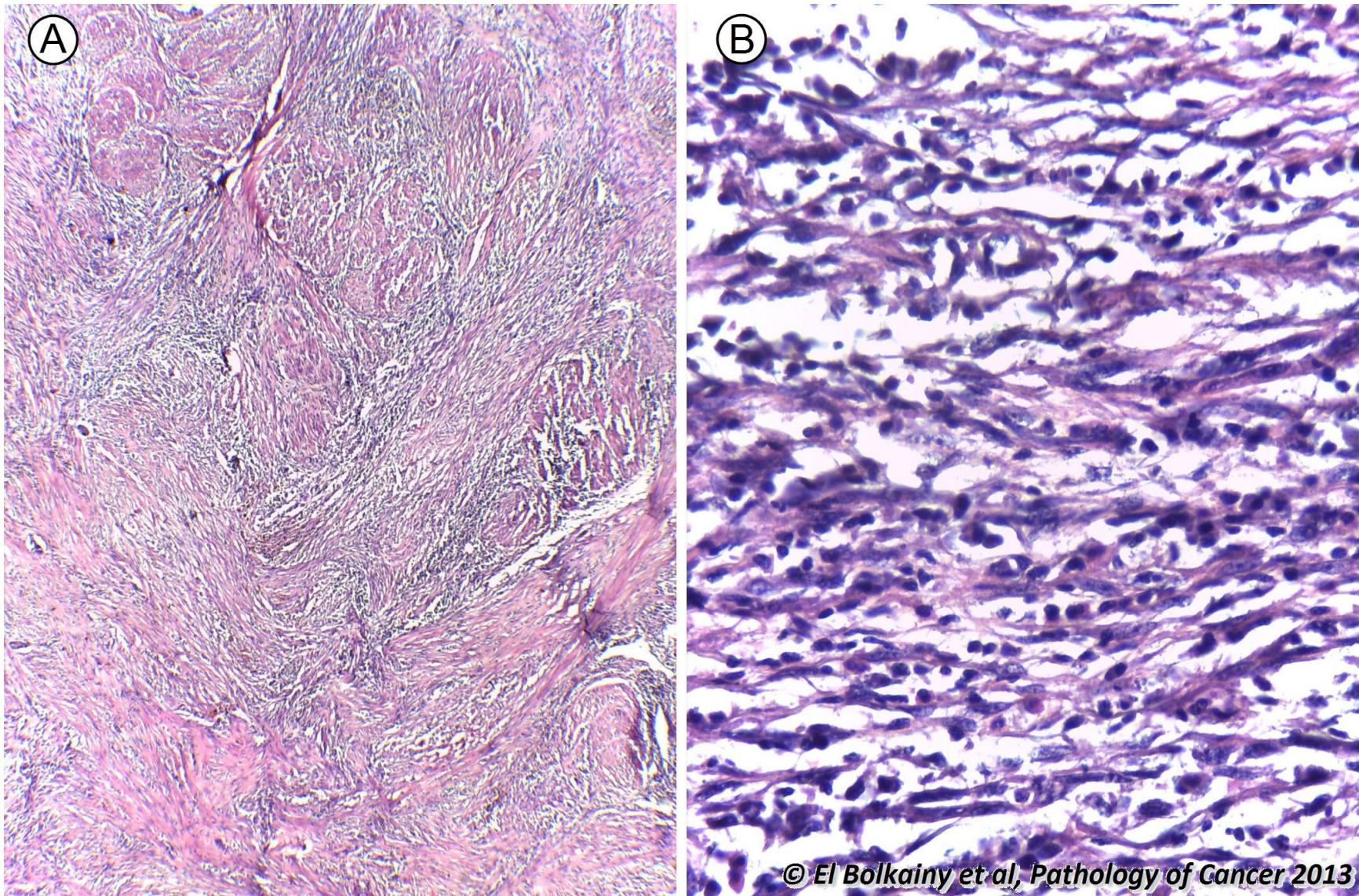


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**Picture 15-60** Mesonephric adenocarcinoma of bladder. Clear cytoplasm is a diagnostic feature.



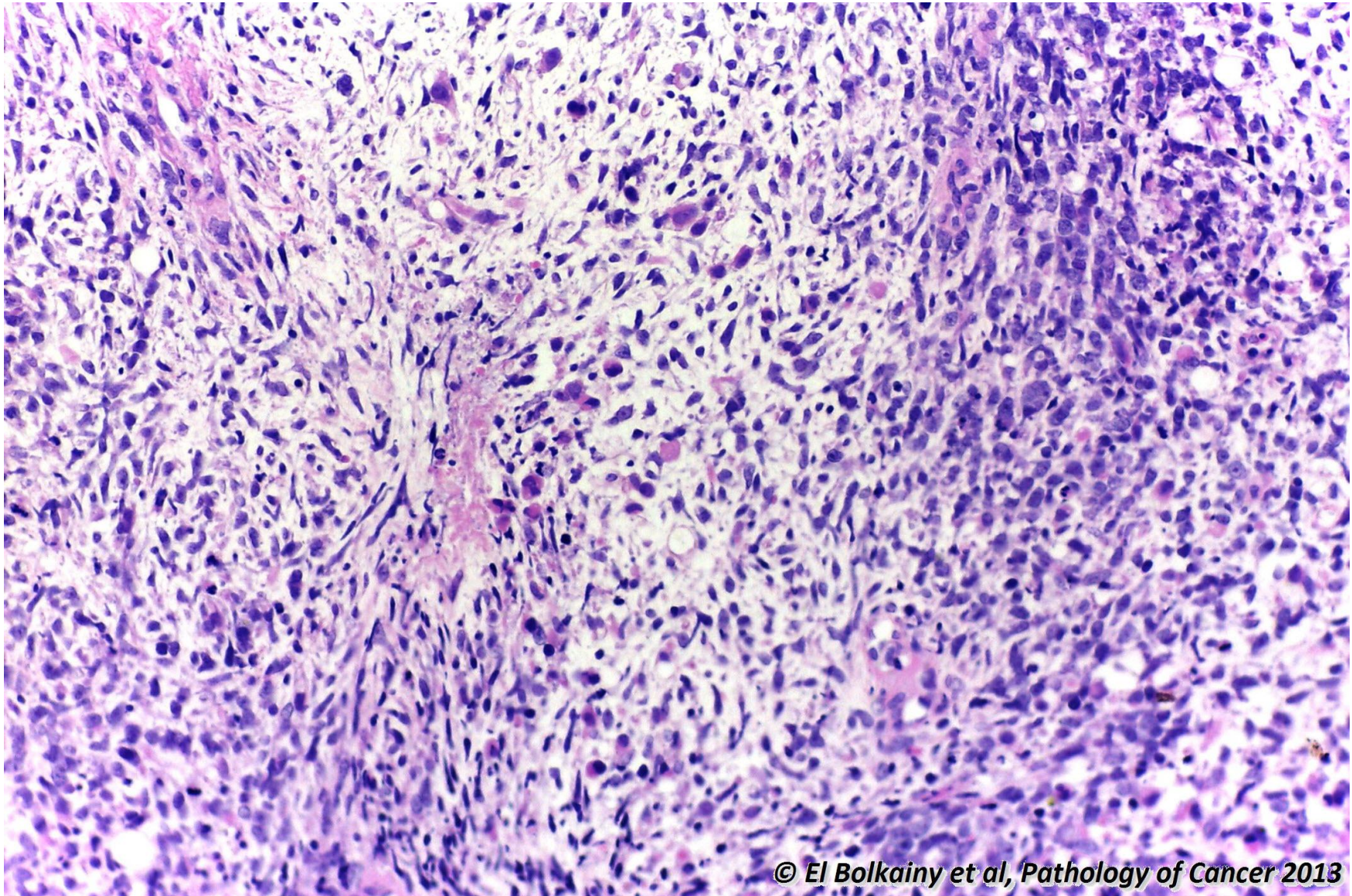
15.61 Undifferentiated spindle cell carcinoma of bladder.



**Picture 15-61** Undifferentiated spindle cell carcinoma of bladder. A Low power. B High power showing a sarcomatoid morphology, but such cells are positive for cytokeratin.



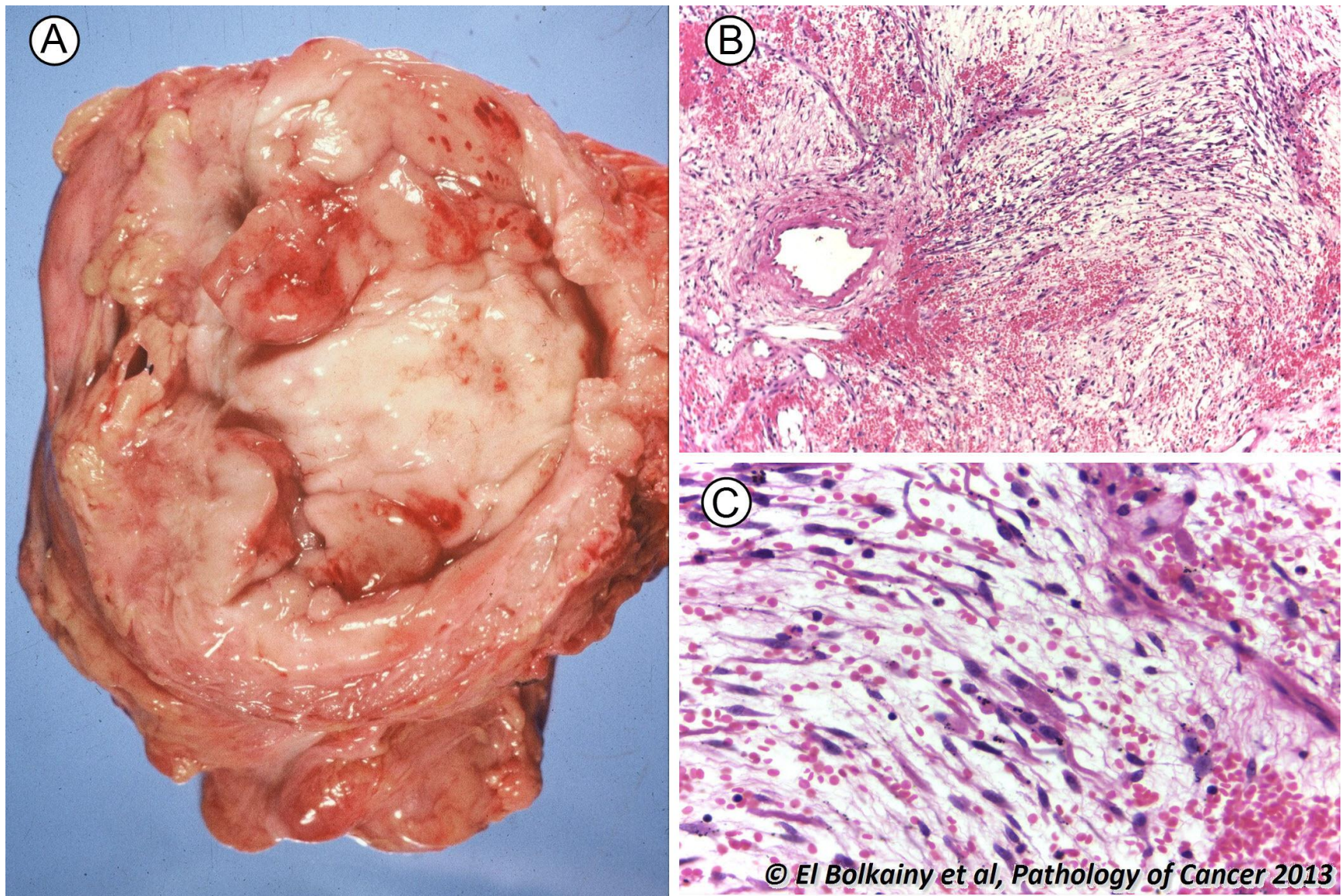
15.62 Carcinosarcoma of bladder.



**Picture 15-62** Carcinosarcoma of bladder. This adult mixed tumor shows both epithelial and rhabdomyoblastic differentiation. Co-expression of cytokeratin and desmin is diagnostic.



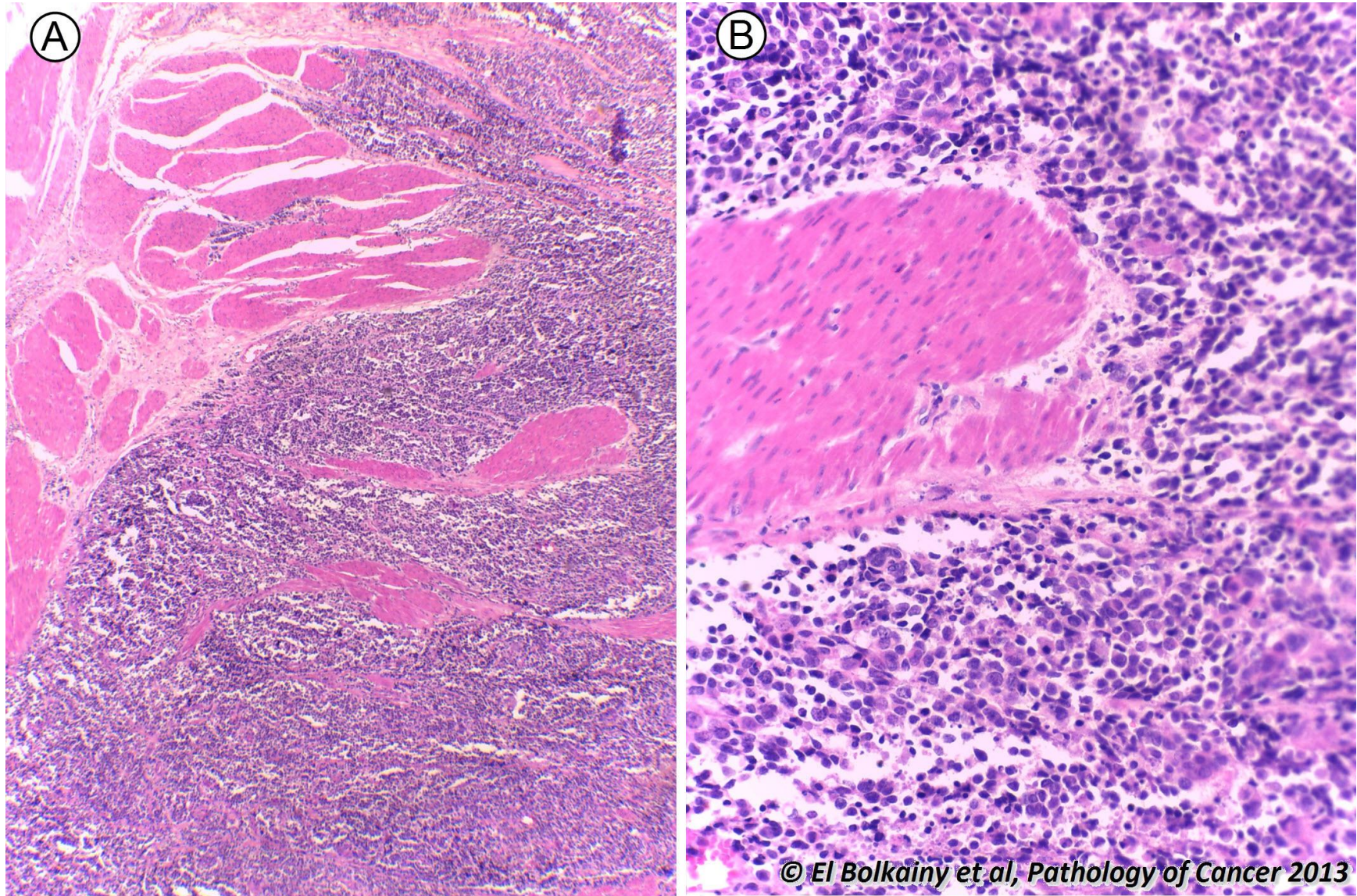
15.63 Embryonal rhabdomyosarcoma of infancy, botryoid type.



**Picture 15-63** Embryonal rhabdomyosarcoma of infancy, botryoid type. A Gross picture showing an exophytic tumor. B Low power. C High power. Note hypercellularity of spindle cells and myxoid stroma.



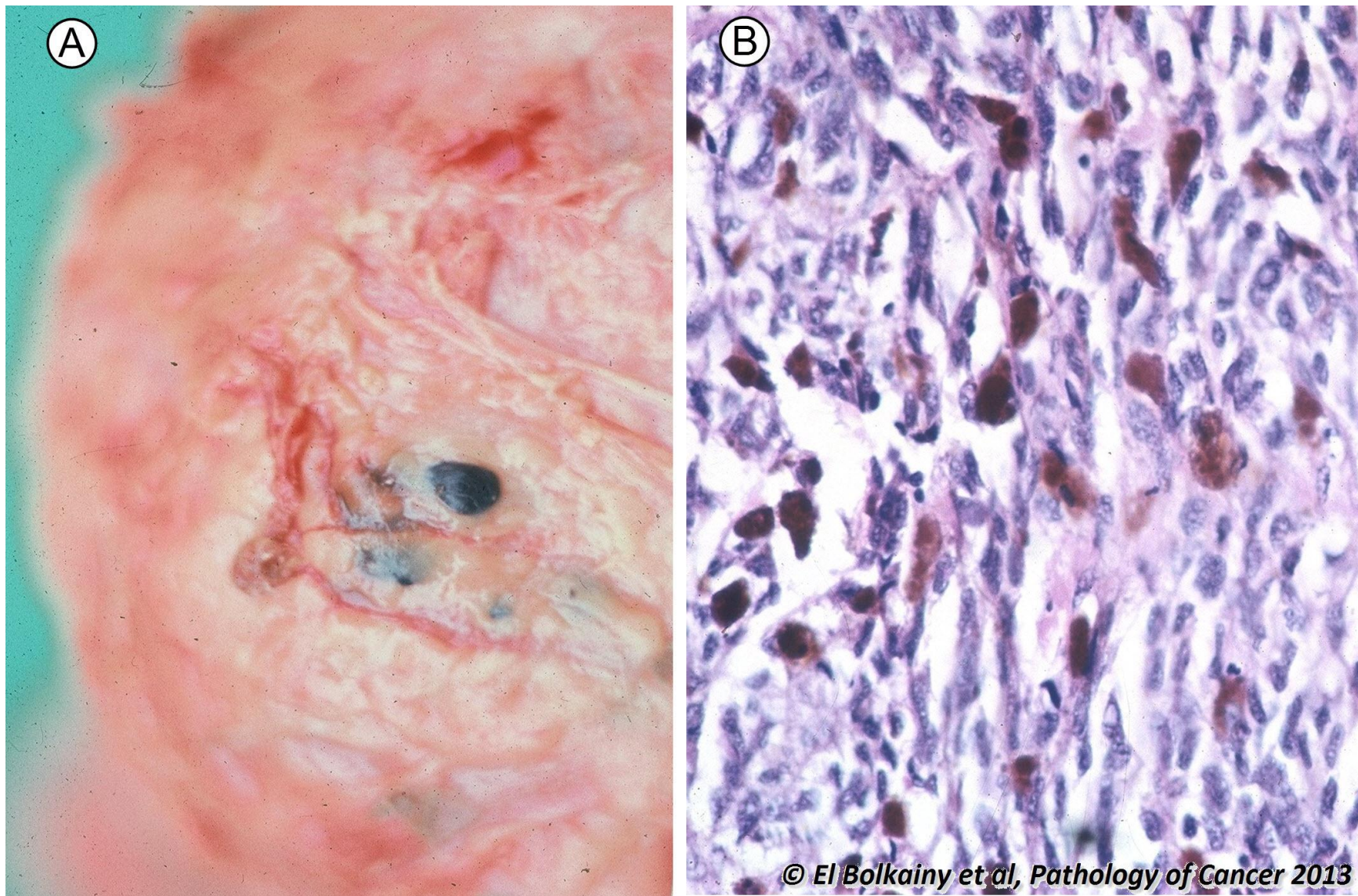
15.64 Undifferentiated small cell carcinoma.



**Picture 15-64** Undifferentiated small cell carcinoma. A Low power. B High power.



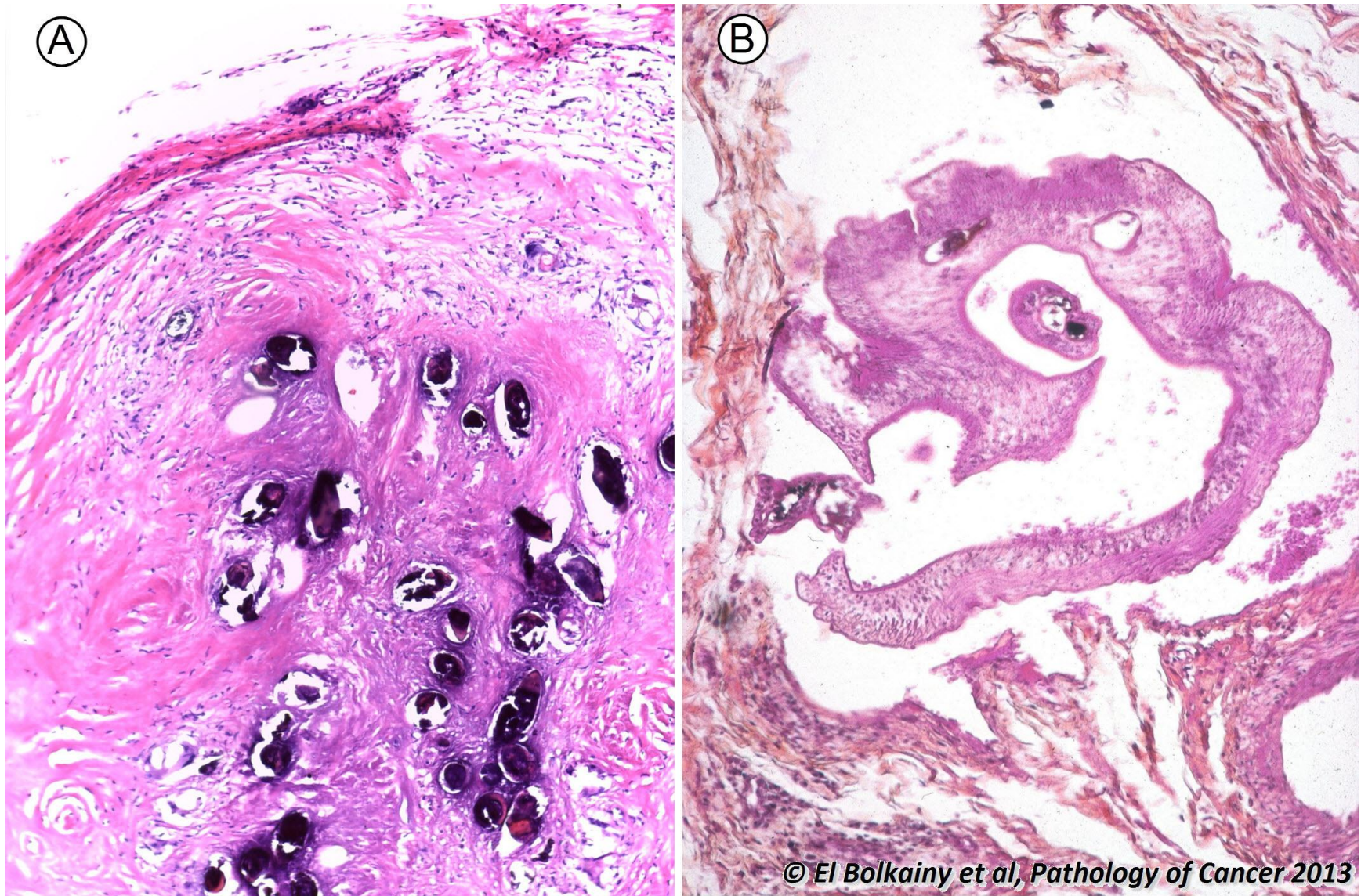
15.65 Malignant melanoma of bladder.



**Picture 15-65** Malignant melanoma of bladder. A Grossly, the melanoma permeates lymphatics in perivesical fatty tissue. B Histology showing malignant cells with brownish melanin pigment in cytoplasm.



15.66 Histology of bilharzial granuloma.



**Picture  
15-66**

Histology of bilharzial granuloma. A Calcified *S. hematobium* eggs. B Male and female worms in a vein.



15.67 Condyloma of the urinary bladder.



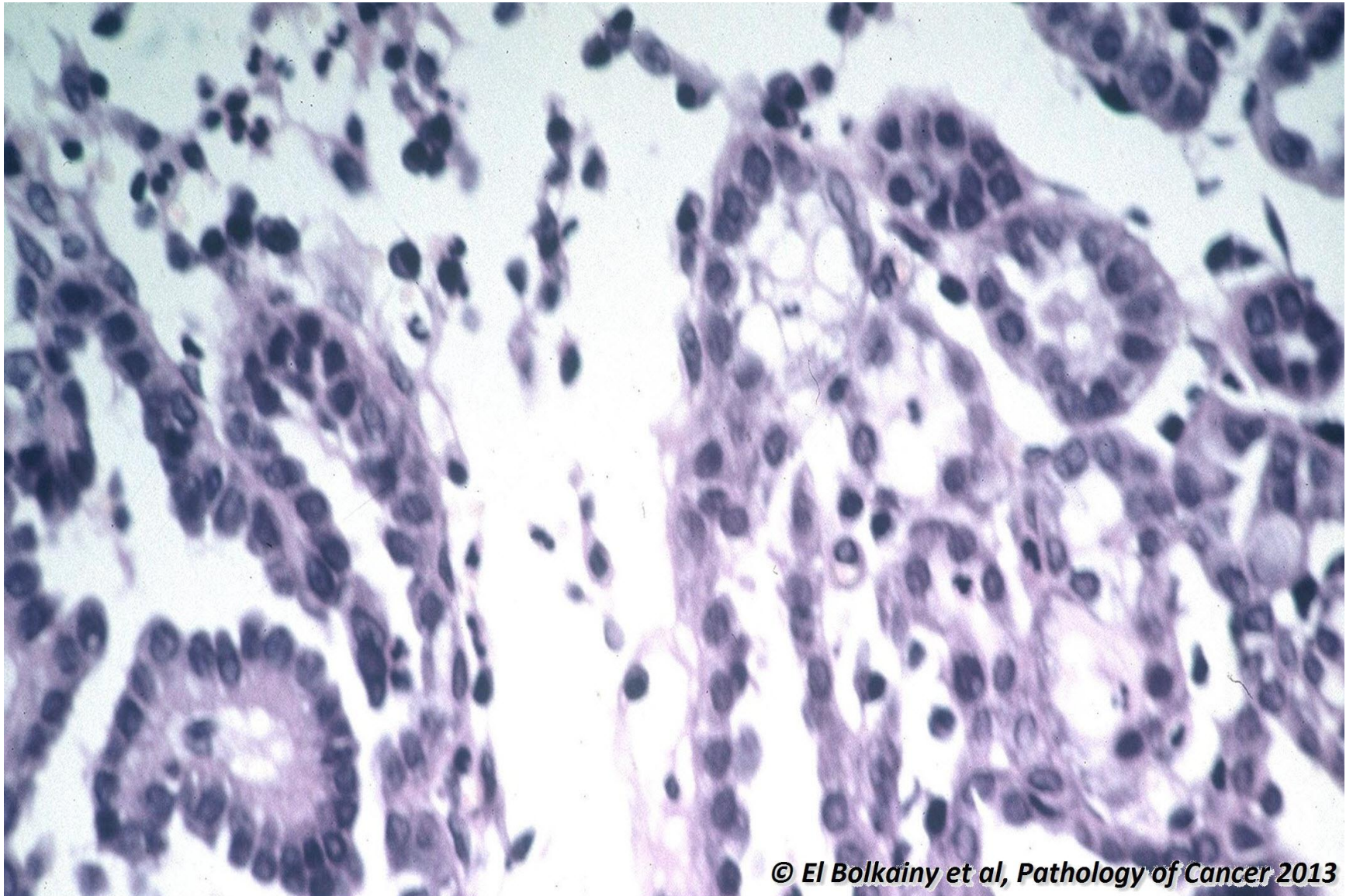
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**Picture  
15-67**

**Condyloma of the urinary bladder.** This HPV related papillary squamous lesion may be misdiagnosed as squamous carcinoma, but, perinuclear halos (koilocytosis) is a characteristic feature of condyloma.



15.68 Mesonephric remnants in bladder.

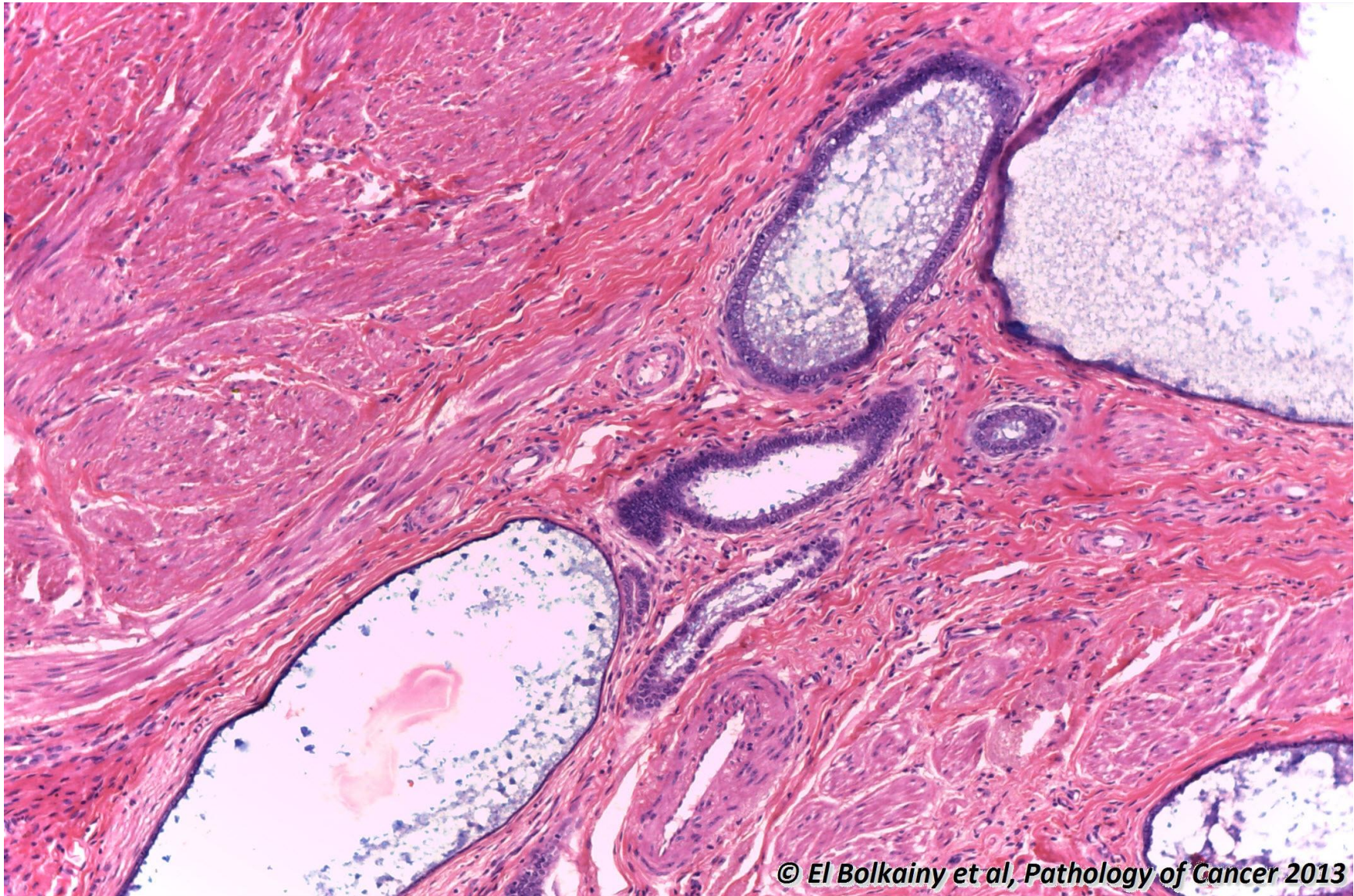


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**Picture 15-68** Mesonephric remnants in bladder. This may be misdiagnosed as adenocarcinoma, but, note the bland nuclei and their hobnail features (Lt. side of picture).



15.69 Urachal remnants in bladder.



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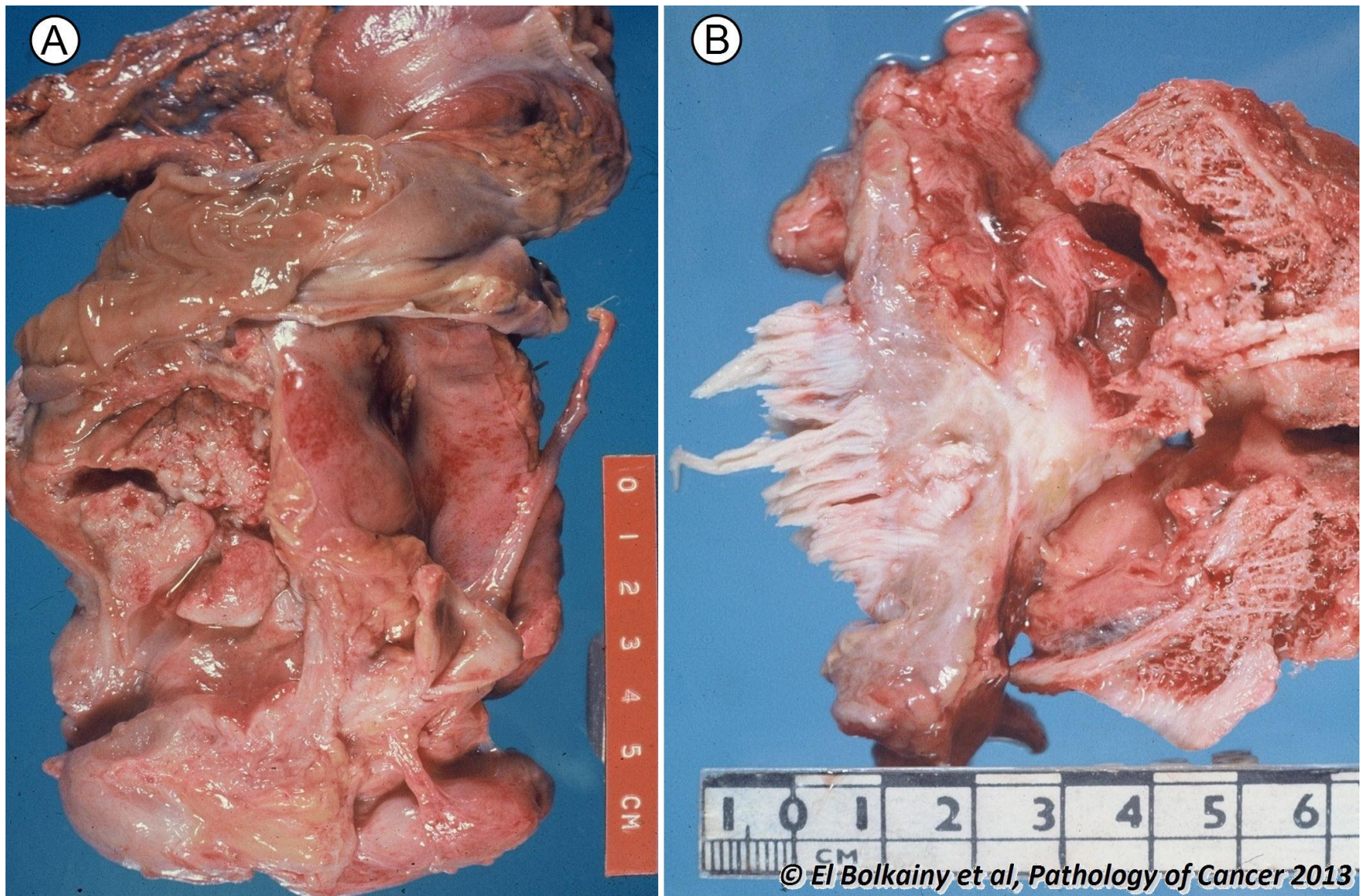
**Picture 15-69** Urachal remnants in bladder. Usually found in muscular wall near the vault. Their mature and regular cell structure distinguish it from carcinoma.







15.71 Bladder carcinoma invading non-contiguous structures.



**Picture 15-71** Bladder carcinoma invading non-contiguous structures. **A** Small intestine. **B** Anterior abdominal wall. This kind of spread is considered category T4b and classifies the case as stage IV.



15.72 Papillary transitional carcinoma cluster, cytology.

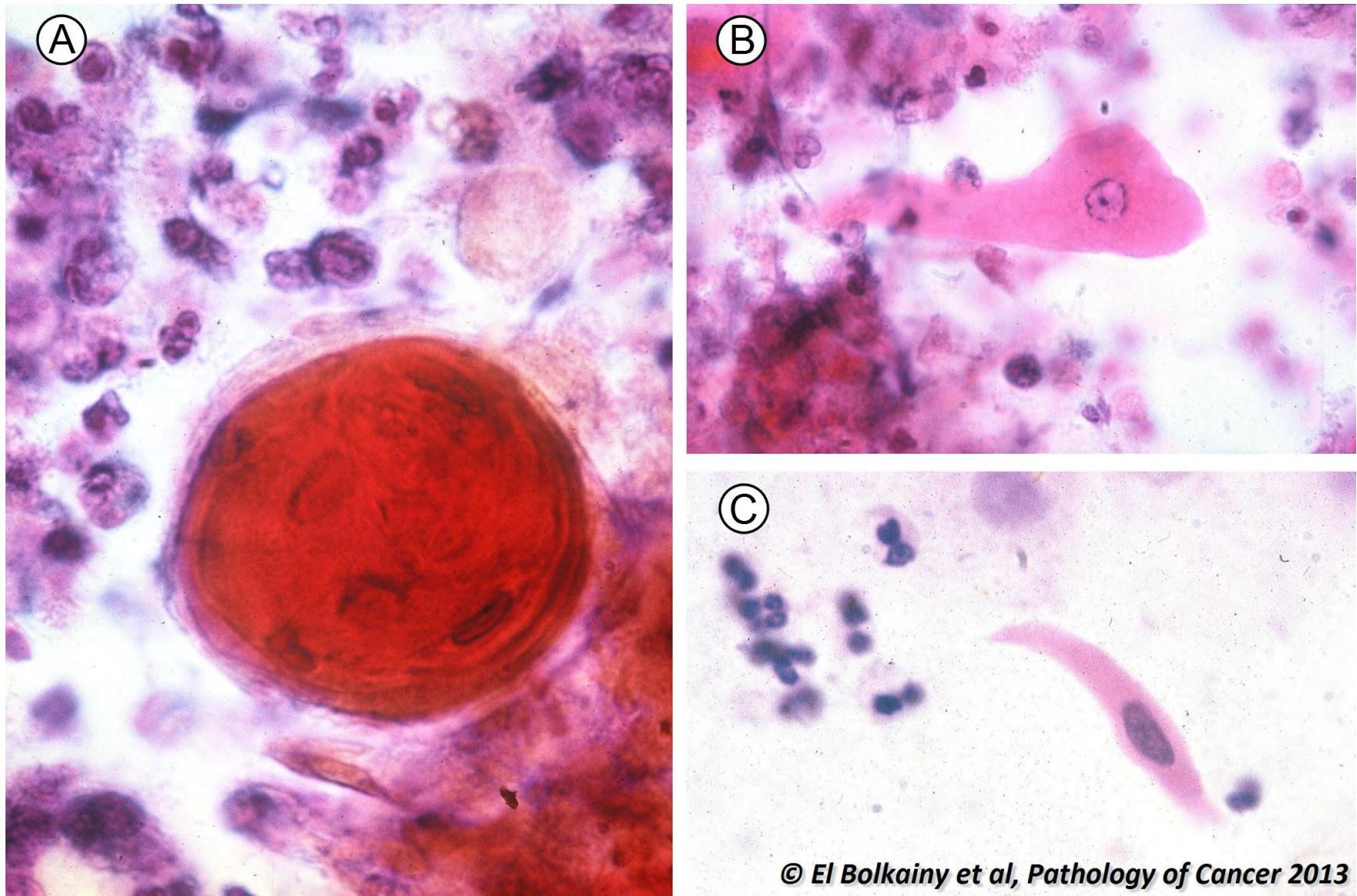


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**Picture 15-72** Papillary transitional carcinoma cluster, cytology. Note the crowded multilayered nuclei, ill-defined scanty cytoplasm and basophilic nucleoli.



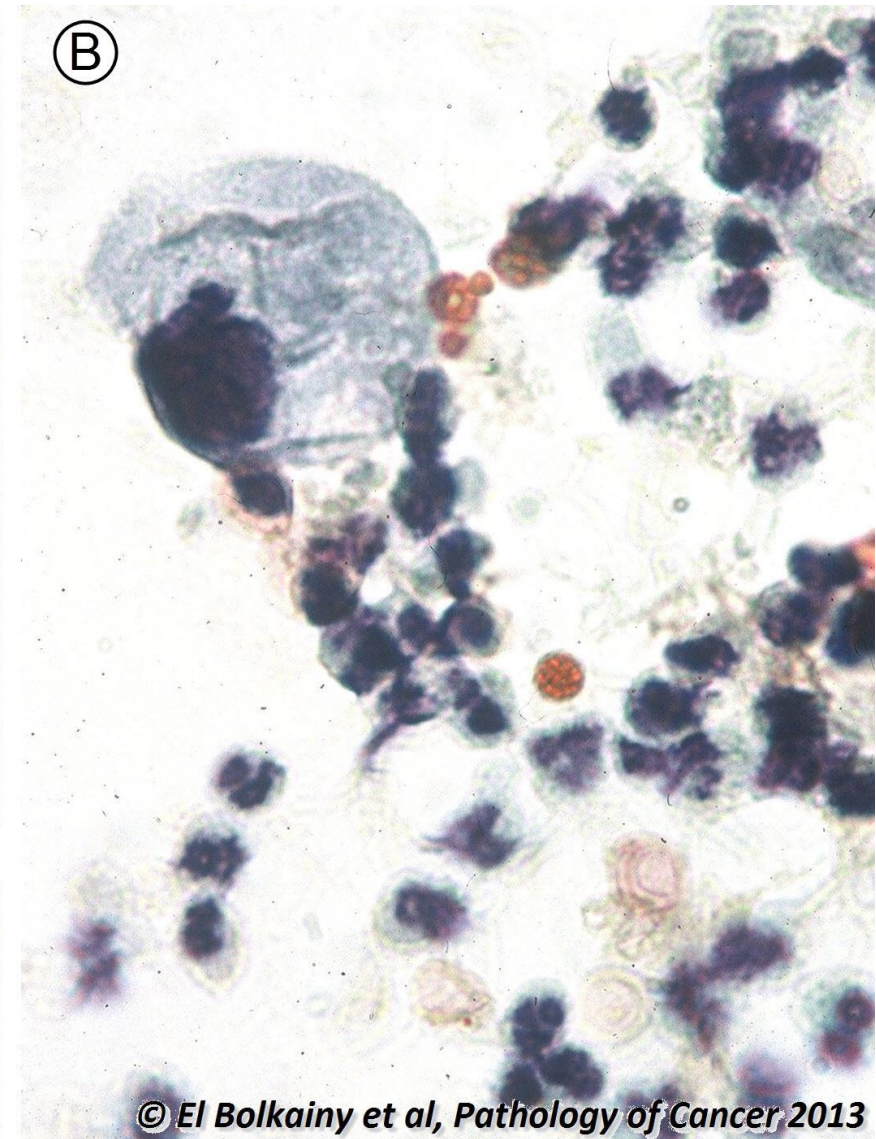
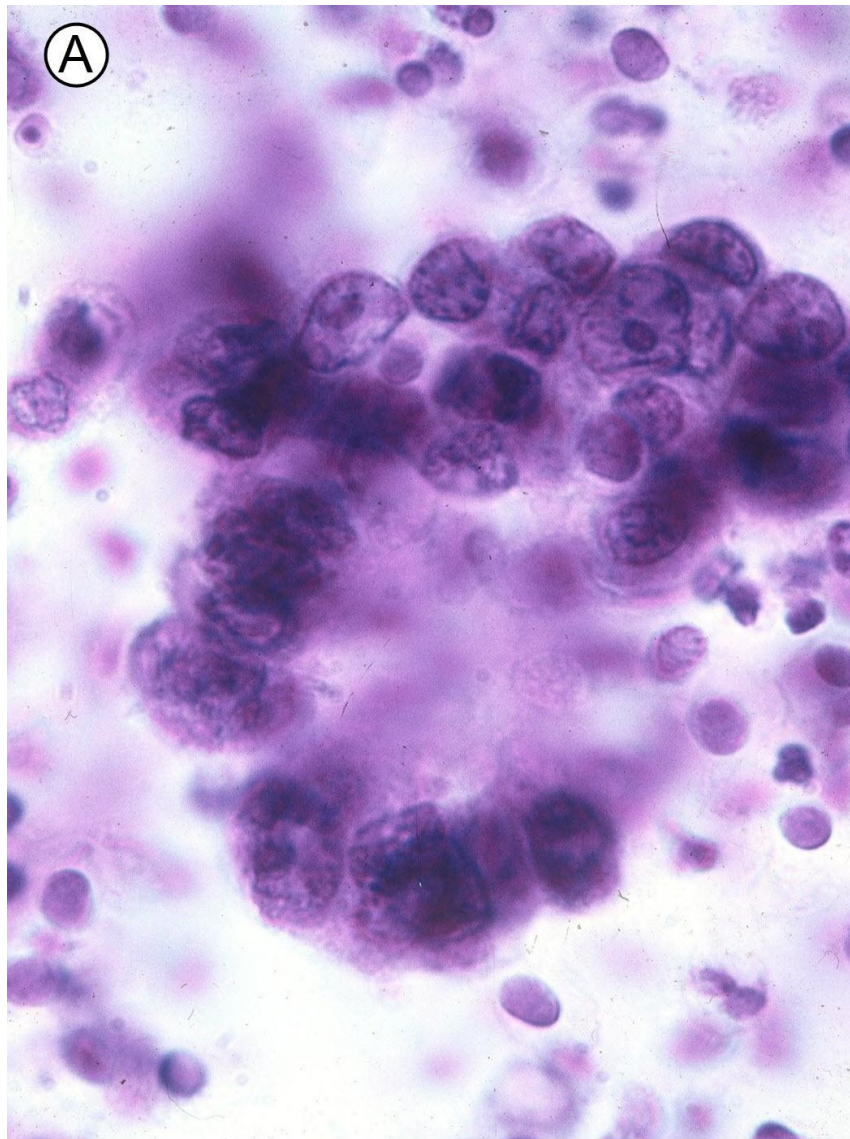
15.73 Urine cytology, squamous cell carcinoma.



**Picture 15-73** Urine cytology, squamous cell carcinoma. **A** Cell nest. **B** Tadpole cell. **C** Spindle cell. The cytoplasm of squamous carcinoma is eosinophilic or orangiphilic with sharp refractile margin.



15.74 Urine cytology, adenocarcinoma.

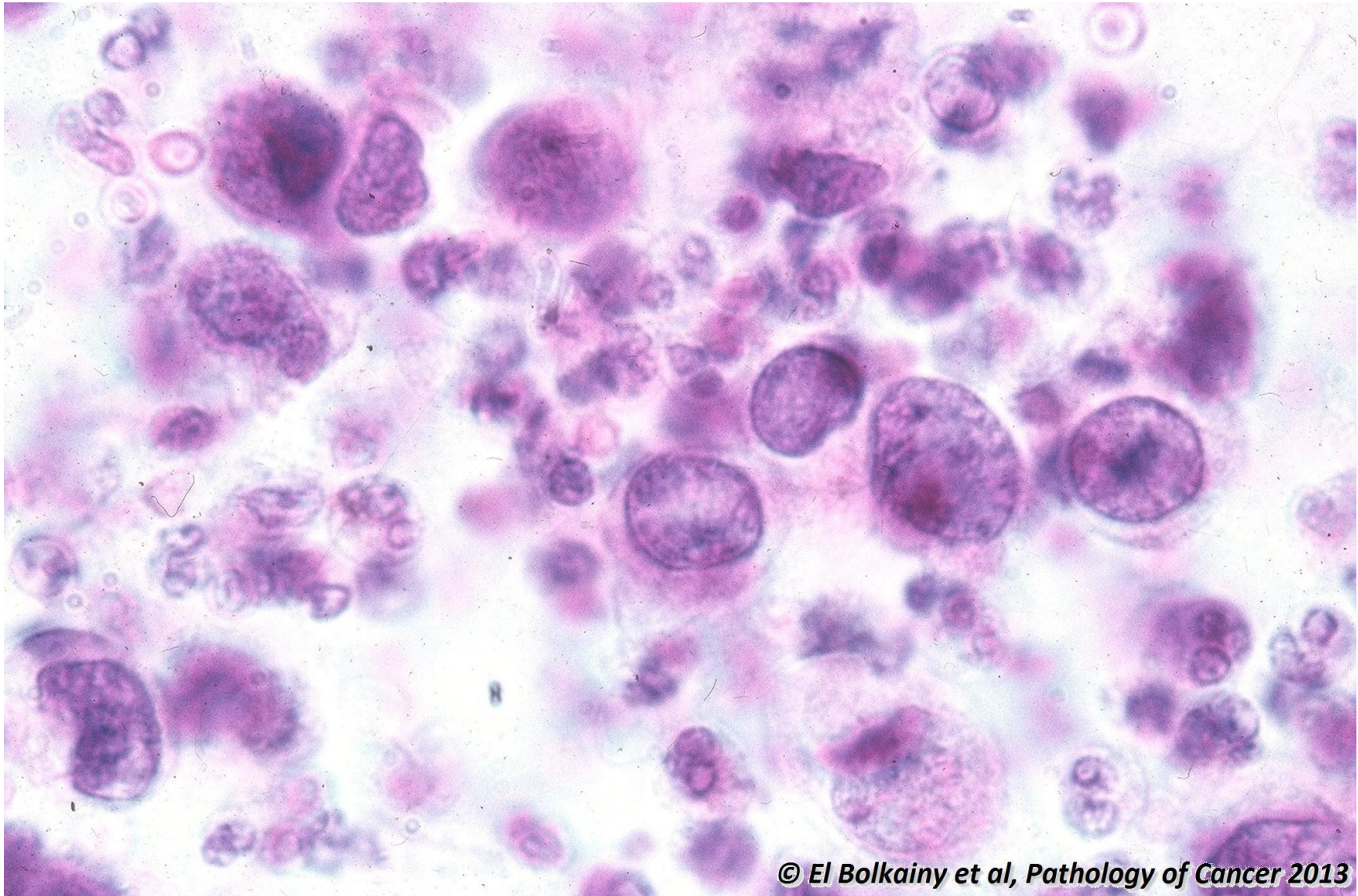


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**Picture 15-74** Urine cytology, adenocarcinoma. **A** Glandular pattern with tumor cells arranged around a central lumen. **B** Signet-ring type with clear cytoplasm and eccentric crescent-shaped nucleus.



15.75 Urine cytology, undifferentiated round cell carcinoma.

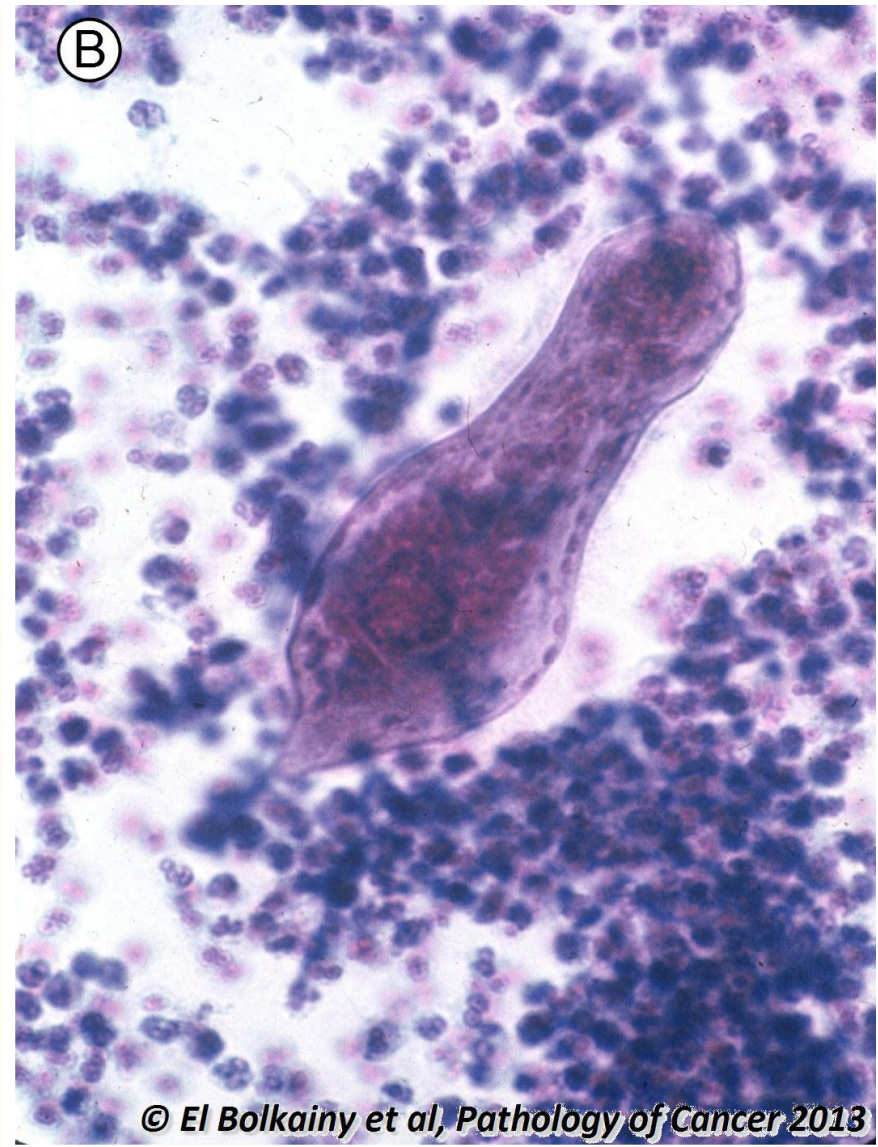
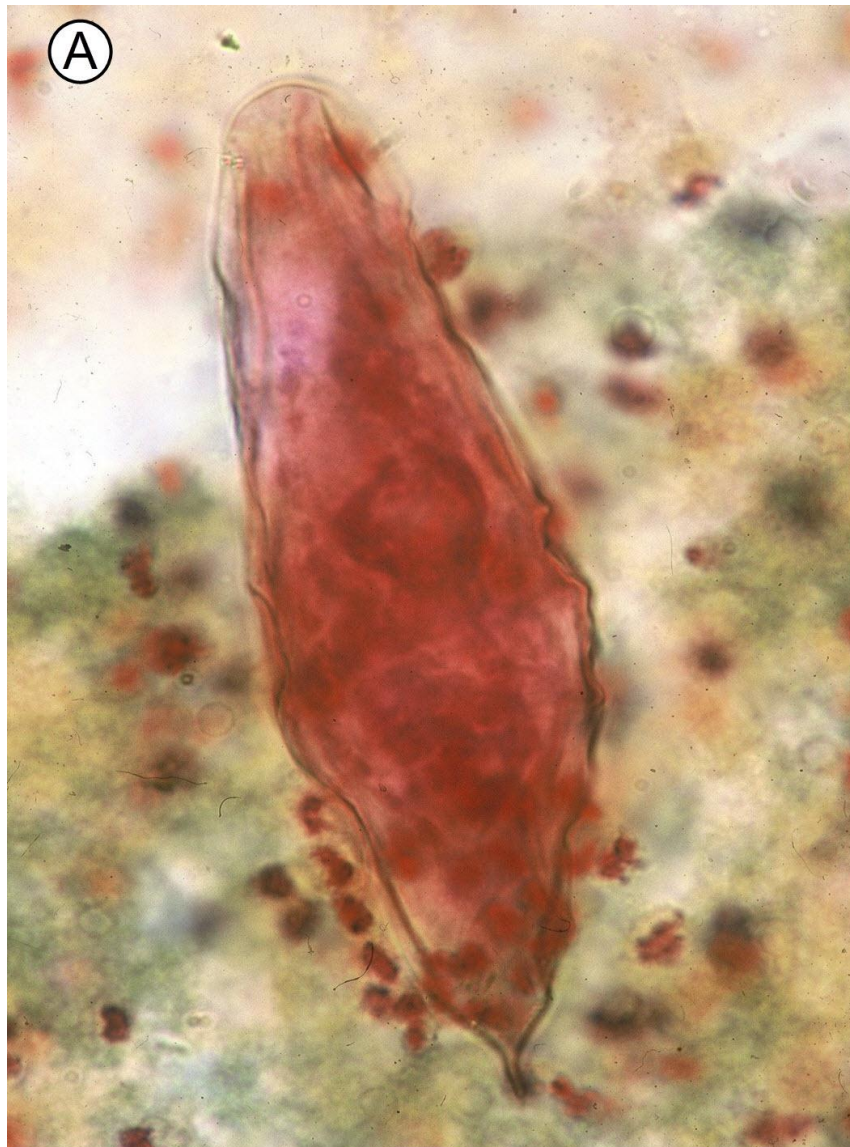


**Picture  
15-75**

**Urine cytology, undifferentiated round cell carcinoma.** The cells are dissociated from each other, with hyperchromatic nuclei and very scanty cytoplasm.



15.76 Urine cytology, *S. hematobium*.



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**Picture 15-76** Urine cytology, *S. hematobium*. **A** Eggs with terminal spine. **B** Free miracidium with ciliated surface and very small nuclei compared to those of humans.



