

Urethra

Tumors and Tumor-like Lesions

Dr Abu Suraih Sakhri

MBBS, MD (Pathology)

www.abusuraihsakhri.com

Learning objectives

- Recognize inflammatory urethral caruncle and its main mimic: A malignant meatal lesion.
- Name the benign epithelial tumor categories listed.
- Relate urethral carcinoma histotype to proximal versus distal location.
- Apply tissue diagnosis, anatomic mapping and structured reporting principles.

Three diagnostic categories of urethral masses

Inflammatory mimic

Urethral caruncle: Vascular, friable granulation-tissue lesion near the meatus.

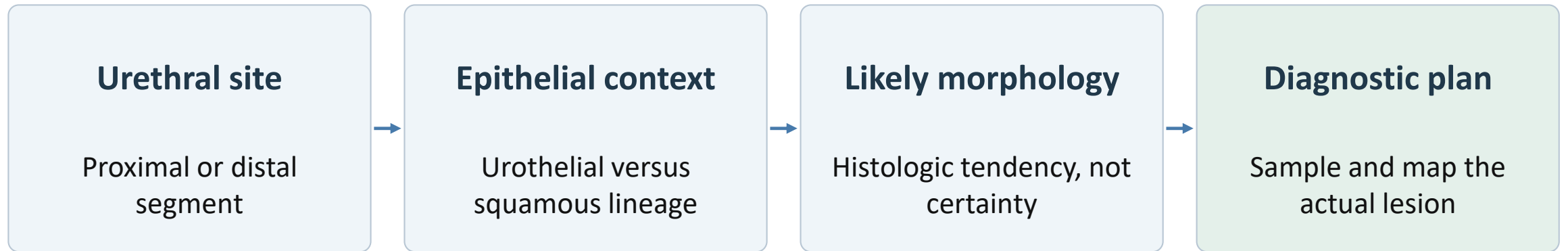
Benign epithelial lesions

Squamous papilloma;
Urothelial papilloma; Inverted urothelial papilloma;
Condyloma.

Malignant neoplasms

Rare primary carcinoma: Urothelial, squamous, or adenocarcinomatous differentiation.

Why the exact site matters



Location guides suspicion; Only histology establishes tumor identity.

The proximal-to-distal histologic tendency

Simplified anatomical axis (location concept only)

Proximal urethra

Distal urethra

Urothelial differentiation more typical

Squamous differentiation more typical

Anatomic tendency — not an absolute histologic rule.

A urethral mass is not automatically cancer

Non-neoplastic processes

Inflamed granulation tissue may form a conspicuous, bleeding polypoid mass.

Neoplastic processes

Papillomas and carcinomas are epithelial proliferations with different clinical implications.

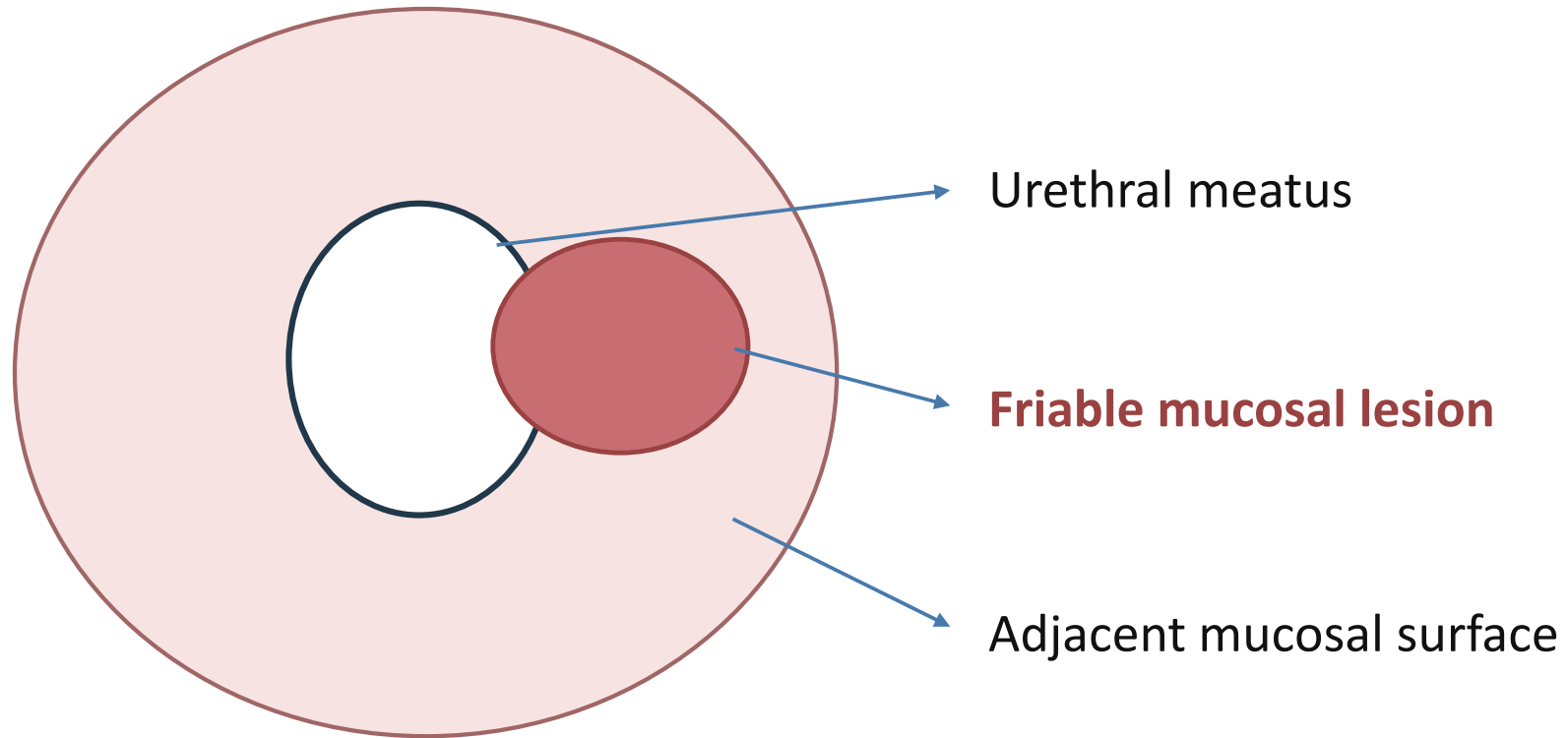
Classify the tissue process before interpreting its appearance.

Urethral caruncle: The defining lesion

- Inflammatory, tumor-like lesion at the external urethral meatus.
- Typically a small red, painful mass in an older female patient.
- Not equivalent to invasive carcinoma despite its tumorous appearance.

A visible mass can reflect inflammation rather than neoplasia.

Urethral caruncle: Meatal location

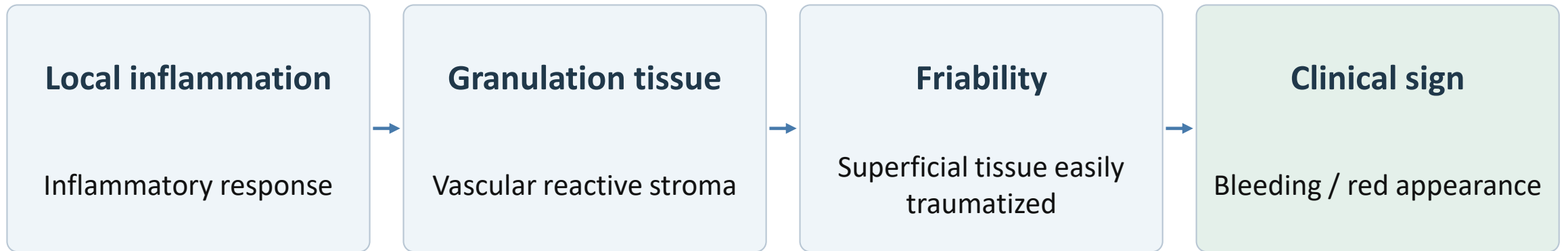


Schematic — not a clinical photograph

Patient context: Older females

- Older females as the typical clinical population.
- A lesion at the external meatus is readily accessible to direct inspection.
- Age and sex support a pattern; Neither can replace tissue assessment when findings are atypical.

Caruncle: The vascular granulation-tissue core



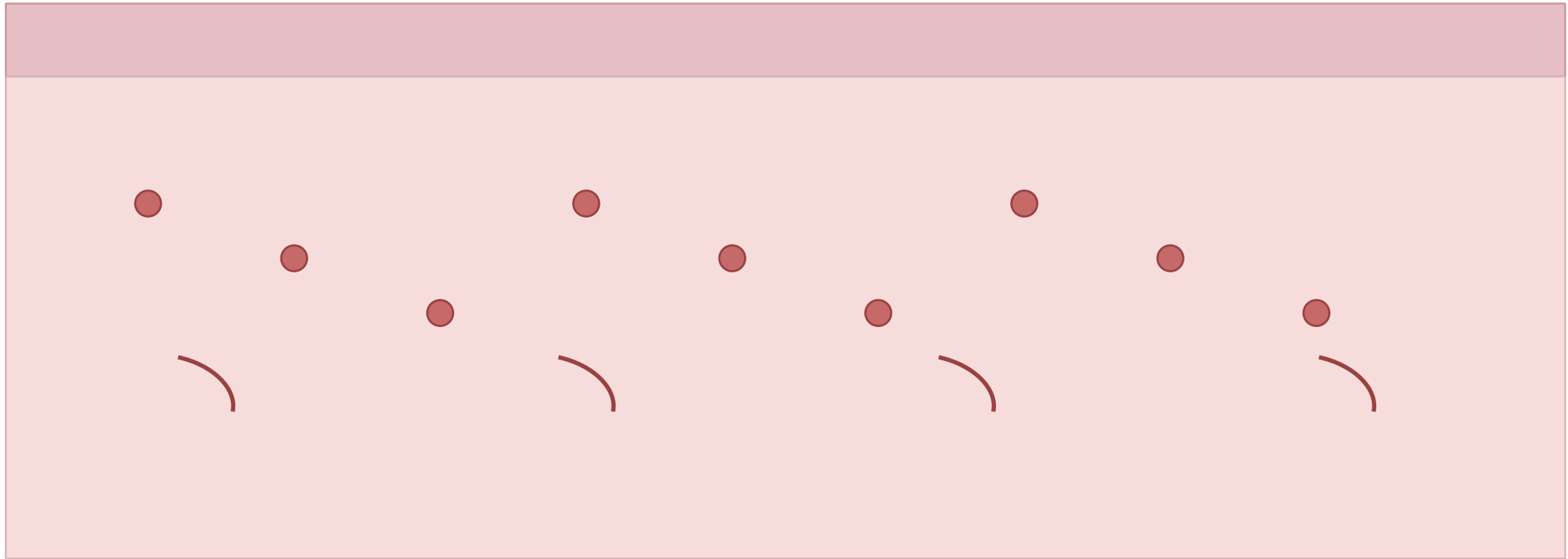
This is a pathophysiologic interpretation of the morphology reported by Robbins.

Caruncle: Intact but friable mucosa

- The lesion is covered by mucosa that may remain intact.
- Friability means the covering is easily injured.
- Minor trauma can expose vascular granulation tissue and provoke bleeding.

Caruncle: Conceptual tissue architecture

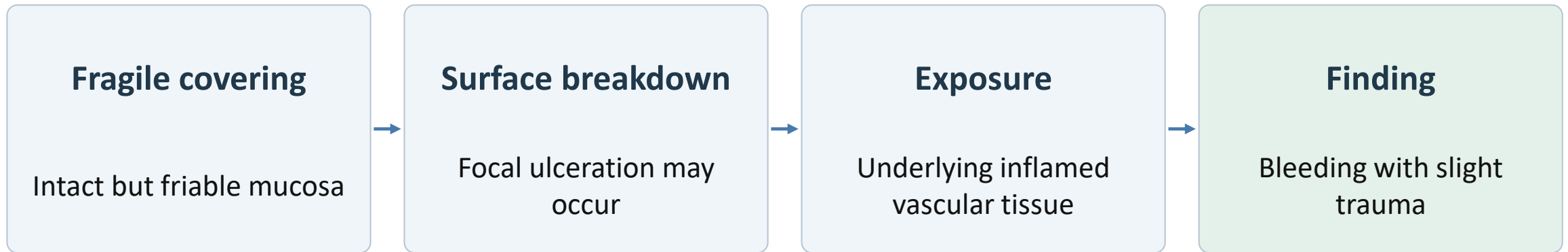
Surface: Thin, intact or ulcerated mucosa



Stroma: Inflamed granulation tissue + delicate vessels

Conceptual cross-section — not a histologic specimen

Caruncle: Ulceration and bleeding



Ulceration is possible, not obligatory.

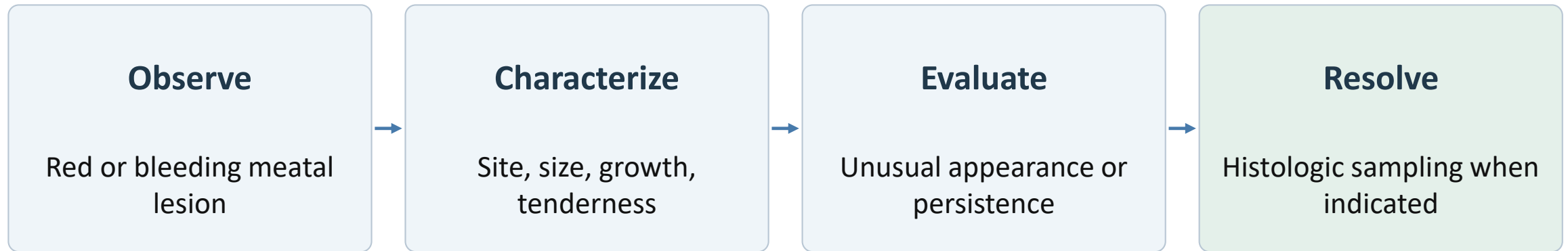
Caruncle: Pain is clinically relevant

- The typical lesion as painful.
- Inflammation and exposed or injured mucosa offer a plausible basis for discomfort.
- Pain is nonspecific: It does not reliably separate benign from malignant lesions.

Caruncle versus a suspicious meatal mass

Characteristic	Caruncle pattern	What still requires attention
Site	External urethral meatus	Confirm site of origin
Appearance	Small, red, friable	Document atypical or growing lesion
Microscopy	Inflamed granulation tissue	Exclude epithelial malignancy if sampled
Behavior	Benign inflammatory lesion	Persistent lesion merits reassessment

A red mass is a clinical description, not a diagnosis



The diagnostic pathway is an applied clinical principle, not a quoted Robbins algorithm.

When a caruncle is excised

- Surgical excision brings prompt relief and cure.
- If excised, preserve tissue architecture for histologic assessment.
- Clinical appearance and the final diagnosis must be reconciled.

Caruncle: Key pathology interpretation

Positive findings

Inflammation, granulation tissue and a superficial mucosal cover explain the lesion.

Critical exclusion

Atypical epithelial proliferation or destructive stromal invasion would require a different diagnosis.

Granulation tissue is the positive diagnosis—not merely “no cancer seen.”

Caruncle can rarely compromise voiding

- A published case documented acute urinary retention caused by a large meatal caruncle.
- A large lesion can mechanically interfere with urine outflow.
- The report is illustrative; It does not establish the frequency of obstruction.

Case 1: Friable meatal nodule

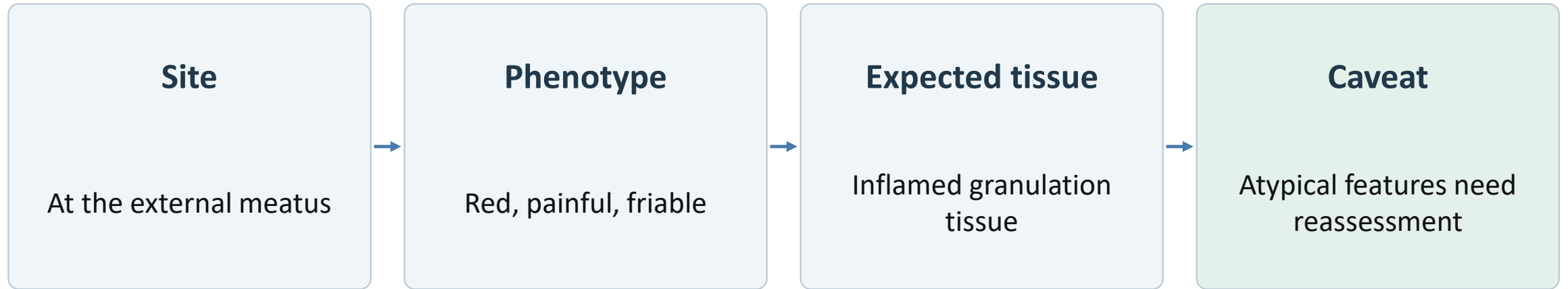
Clinical vignette

An older woman has a small red, tender lesion at the external urethral meatus. Light contact produces bleeding.

Question for the learner

Which tissue process most closely matches the Robbins description?

Case 1: Caruncle is favored



Benign epithelial tumors: Four named entities

Squamous papilloma

A benign squamous epithelial tumor included in the Robbins urethral list.

Urothelial papilloma

A benign urothelial epithelial tumor in the same source list.

Inverted and condylomatous

Inverted urothelial papilloma and condyloma complete the list.

Papillary versus inverted growth

Exophytic (papillary)

Proliferation projects toward the lumen; A general architectural descriptor.

Inverted

Predominantly downward growth into underlying tissue; Architecture is not synonymous with invasion.

Architecture alone must not be equated with malignancy.

Squamous papilloma: Category and lineage

- Named by Robbins as a benign epithelial urethral tumor.
- The designation indicates squamous epithelial differentiation.
- Reliable diagnosis requires examination of epithelial architecture and cytology.

Urothelial papilloma: Category and lineage

- Included among benign epithelial urethral neoplasms.
- The term denotes urothelial differentiation.
- At this site, biopsy must distinguish a benign papillary lesion from carcinoma.

Inverted urothelial papilloma: A pitfall in naming

- Explicitly listed as a benign urethral epithelial tumor.
- Inverted growth describes the direction of epithelial proliferation.
- Downward-growing epithelium is not, by itself, proof of destructive invasion.

Determine whether architecture is organized or truly infiltrative.

Condyloma and the HPV context

- Condyloma is listed among benign urethral epithelial lesions.
- Robbins separately associates distal urethral squamous carcinoma with HPV infection.
- Do not conflate a benign condyloma with an invasive squamous carcinoma.

HPV association does not determine behavior

Benign category

Condyloma is within the benign tumor list.

Malignant category

HPV-related squamous carcinoma is a distinct cancer diagnosis requiring malignant histology.

Viral association, lesion type, and invasive behavior are different questions.

What a papillary urethral biopsy must resolve

1 Confirm epithelial lineage and lesion site



2 Assess papillary versus inverted architecture



3 Examine cytologic atypia and epithelial maturation



4 Look specifically for destructive invasion



5 Integrate morphology with cystoscopic and clinical findings

Benign epithelial categories in one view

Entity	Epithelial designation	What the name alone does not establish
Squamous papilloma	Squamous	No guarantee about every visible mass
Urothelial papilloma	Urothelial	No staging information
Inverted urothelial papilloma	Urothelial; inverted growth	Does not equal invasive carcinoma
Condyloma	Condylomatous lesion	Does not equal squamous carcinoma

Case 2: Inverted epithelial growth

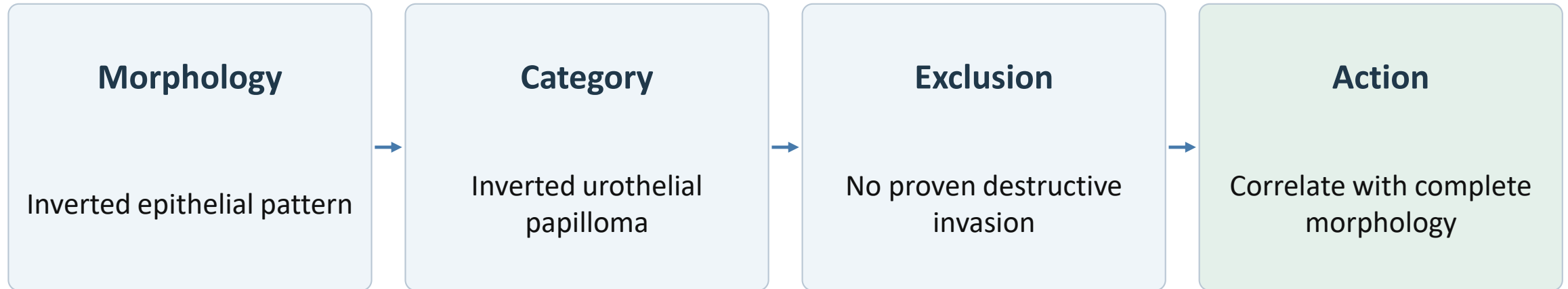
Clinical vignette

A small urethral lesion has predominantly inverted epithelial architecture. No destructive invasion is identified in an adequate specimen.

Question for the learner

Which Robbins benign category should be considered?

Case 2: Diagnose the architecture, not the direction



Primary urethral carcinoma is uncommon

Rare primary cancer

Robbins characterizes primary carcinoma of the urethra as an uncommon lesion.

Rarity must not be mistaken for zero clinical risk in a suspicious lesion.

Primary versus secondary urethral carcinoma

Primary carcinoma

First malignant neoplasm arises in the urethra.

Secondary urethral involvement

Cancer of another urinary site subsequently involves the urethra.

Establish the true primary site before applying site-specific classification.

Proximal-versus-distal pattern in carcinoma

Simplified anatomical axis (location concept only)

Proximal urethra

Distal urethra

Urothelial differentiation more typical

Squamous differentiation more typical

Anatomic tendency — not an absolute histologic rule.

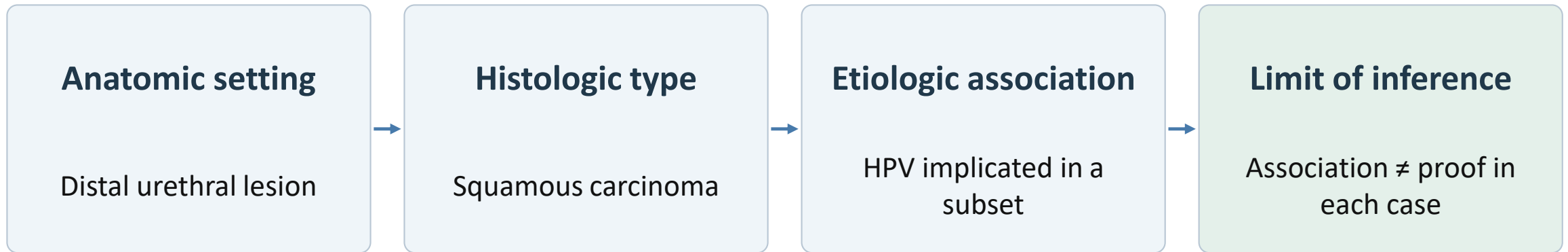
Proximal cancer: Urothelial differentiation

- Cancers originating proximally tend toward urothelial differentiation.
- These lesions tend to urothelial carcinomas of the bladder.
- Cystoscopic assessment should also examine the bladder for synchronous lesions.

Distal cancer: Squamous differentiation

- Distal urethral primary carcinomas more often show squamous morphology.
- An association with human papillomavirus.
- The site–histotype relationship is probabilistic, not absolute.

HPV and urethral squamous carcinoma



Adenocarcinoma: An uncommon urethral histotype

- Urethral adenocarcinomas are infrequent.
- They are reported especially in females.
- Histologic lineage and true site of origin require careful assessment.

Histologic subtype is not uniform by sex

Population / source	Most frequent pattern	Interpretation
Robbins 2026: anatomic sites	Proximal urothelial; distal squamous	Describes site-associated tendency
EAU 2026: males	Urothelial carcinoma predominant	Sex-specific case-mix varies
EAU 2026: females	Adenocarcinoma often most frequent	Do not assume male distribution applies

Urethral carcinoma can form a projecting mass

- Robbins Fig. 21.11 describes carcinoma with a fungating growth pattern.
- An exophytic mass can reflect malignant epithelial proliferation.
- Gross configuration cannot substitute for microscopic classification or invasion assessment.

Clinical red flags in suspected carcinoma

Bleeding

Visible hematuria or bloody urethral discharge

Obstruction

Weak stream, retention or other voiding difficulty

Mass

Urethral or periurethral lump / induration

Extension

Pelvic pain or locally invasive manifestations

Focused examination is anatomically directed

Male assessment

Inspect and palpate genital structures; Include rectal examination and nodal assessment.

Female assessment

Perform pelvic examination with urethral palpation; Assess regional nodes and local extension.

Document site, mass extent and bilateral inguinal findings.

Reported male predispositions are associations

Chronic injury

Urethral stricture, repeated instrumentation or prior urethral surgery.

Inflammation

Chronic urethritis, associated HPV infections, lichen sclerosus.

Prior therapy

Pelvic irradiation has been reported as a predisposing factor.

Reported female predispositions

Local structural factors

Urethral diverticulum is associated with primary urethral carcinoma.

Inflammatory history

Recurrent urinary tract infection has been reported in association.

Association is not diagnostic proof for an individual tumor.

Clinical work-up follows the diagnostic question

1 History and direct examination: Localize lesion



2 Urethrocystoscopy: Evaluate urethral extent and bladder



3 Targeted biopsy: Establish histologic type



4 Pelvic MRI: Evaluate local extent and regional nodes

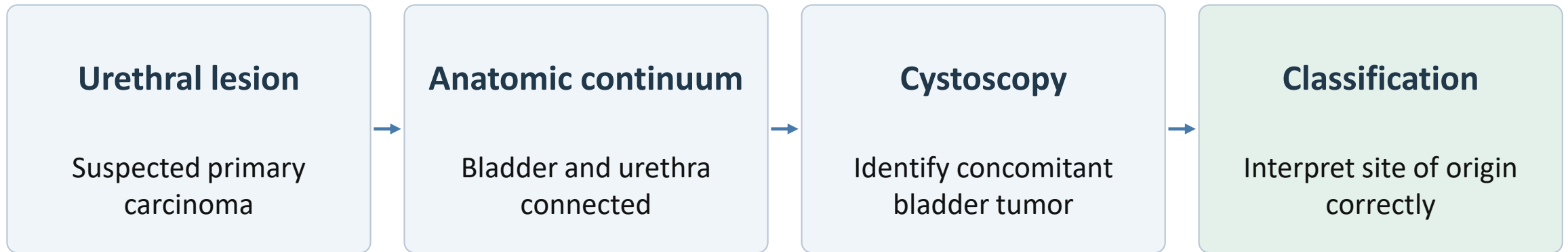


5 CT chest / abdomen / pelvis: Assess distant disease

Urethrocystoscopy plus biopsy establishes identity

- Endoscopy documents tumor location and intraluminal extent.
- A biopsy supplies tissue for histologic classification.
- Mark proximal/distal sampling sites whenever orientation matters.

Why the bladder must be inspected



Bladder inspection is explicitly recommended in EAU diagnostic evaluation.

Urinary cytology is supportive, not definitive

- EAU includes urinary cytology in the diagnostic evaluation.
- Detection performance is limited and depends on histologic type.
- A negative cytology result does not supersede a suspicious mass or tissue biopsy.

Imaging: Local extent versus systemic staging

Tool	Primary question	What it cannot replace
Pelvic MRI	Local tumor extent and regional nodes	Tissue-based histotype
CT thorax / abdomen / pelvis	Distant spread and staging	Direct urethral sampling
CT urography as indicated	Urothelial tract evaluation	Histologic assessment

Regional lymphatic drainage varies by site

Distal / anterior urethra

More often reaches inguinal nodes first, then pelvic stations.

Proximal / posterior urethra

More directly linked with pelvic nodal chains.

Site guides nodal examination and imaging interpretation.

Histologic type, grade and stage are distinct

Type

Urothelial, squamous or glandular differentiation.

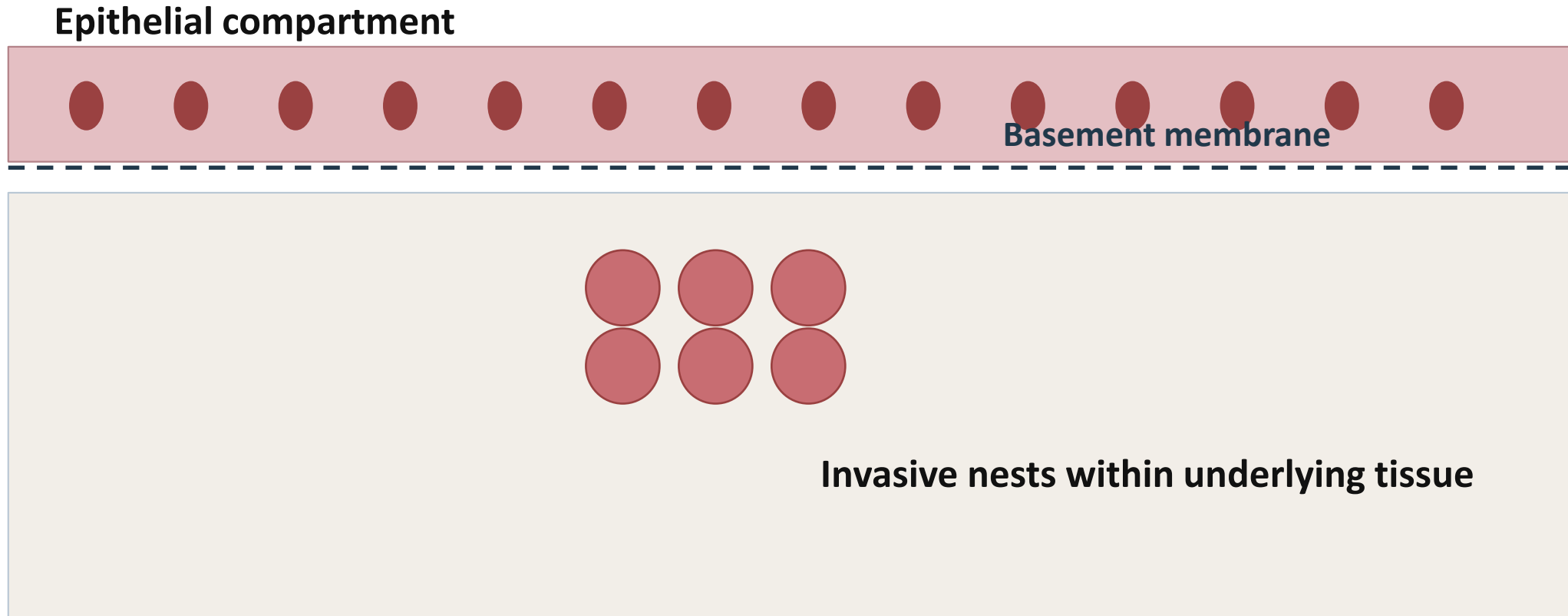
Grade

Degree of histologic aggressiveness within a classification system.

Stage

Anatomic extent of tumor invasion and spread.

Invasion must be demonstrated, not inferred



Schematic — epithelial invasion, not H&E

Margin orientation is a diagnostic asset

- Identify proximal, distal and other surgically relevant margins.
- Specimen orientation allows location-specific margin interpretation.
- EAU stresses marked biopsy sites and clear communication with pathology.

Urethral carcinoma: Core pathology report

Required element	Clinical value
Site and maximum dimension	Map primary focus and tumor burden
Histologic type and grade	Define epithelial phenotype and aggressiveness
Microscopic depth / extent of invasion	Inform pathologic classification
Margins and lymphovascular invasion	Identify additional risk factors
Regional lymph nodes (if submitted)	Determine nodal status

Anatomic context changes reporting

- The level of urethra and adjacent structures influence interpretation of extent.
- Urethral diverticular tumors have a different tissue context from non-diverticular tumors.
- A separate staging scheme is used for urothelial carcinoma involving the prostate.

Case 3: A proximal urethral mass

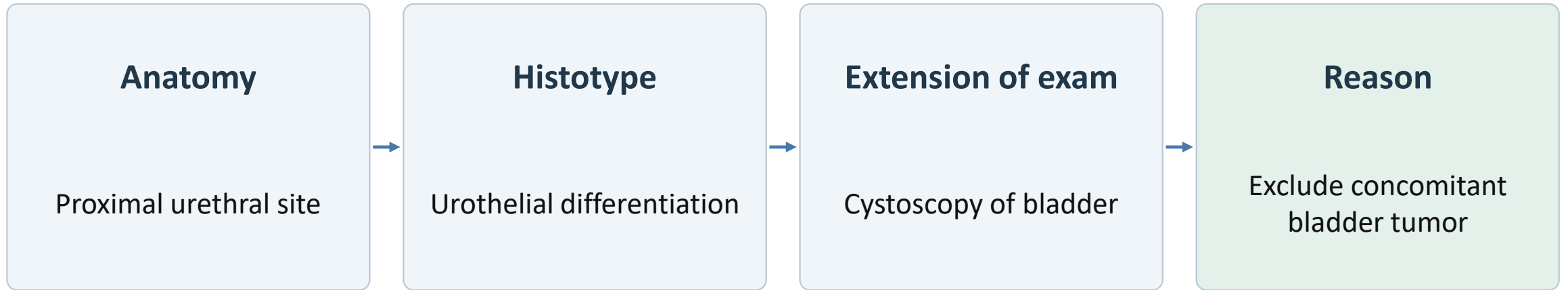
Clinical vignette

An older man presents with hematuria. Endoscopy reveals a proximal urethral mass; Tissue shows urothelial differentiation.

Question for the learner

What additional site must be examined, and why?

Case 3: Evaluate the bladder



Case 4: A female urethral glandular carcinoma

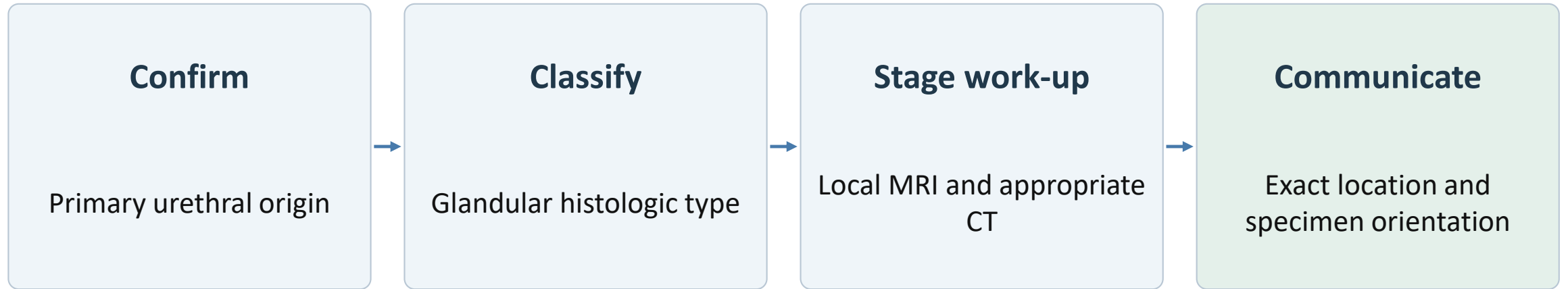
Clinical vignette

A woman has a urethral tumor with adenocarcinomatous differentiation on biopsy. Its extent and true origin are not fully established.

Question for the learner

Which uncertainty must be resolved before final site-specific classification?

Case 4: Establish origin and extent



Integrated differential for a urethral mass

Presentation	Important category	Decisive information
Red, friable meatal nodule	Inflammatory caruncle	Granulation tissue + mucosa
Papillary / inverted epithelial lesion	Benign epithelial tumor	Architecture, cytology, invasion
Suspicious growing/fungating mass	Primary carcinoma possible	Biopsy, type, invasion, mapping
Urethral tumor with bladder history	Secondary involvement possible	Prior disease and endoscopic mapping

Five diagnostic pitfalls to avoid

1 Equating every red meatal mass with carcinoma



2 Assuming inverted growth alone proves invasion



3 Assuming HPV exposure establishes invasive squamous carcinoma



4 Treating proximal or distal site as a definitive histotype



5 Skipping bladder evaluation in a suspicious urethral carcinoma

Core distinctions to retain

Caruncle

Inflammatory granulation-tissue mass at external meatus

Benign tumors

Squamous / urothelial papillomas, inverted papilloma, condyloma

Carcinoma

Uncommon; Differentiation varies with urethral location

Clinical action

Characterize, biopsy when suspicious, map extent

Key references

- Robbins, Cotran & Kumar. Pathologic Basis of Disease. 11th ed. Chapter 21: urethra, printed p. 876.
- EAU Guidelines on Primary Urethral Carcinoma. 2026 update: epidemiology, diagnosis and specimen reporting.
- Katsu A, Yanagi M, et al. Urethral caruncle causes acute urinary retention. IJU Case Rep. 2024;7:368–370.