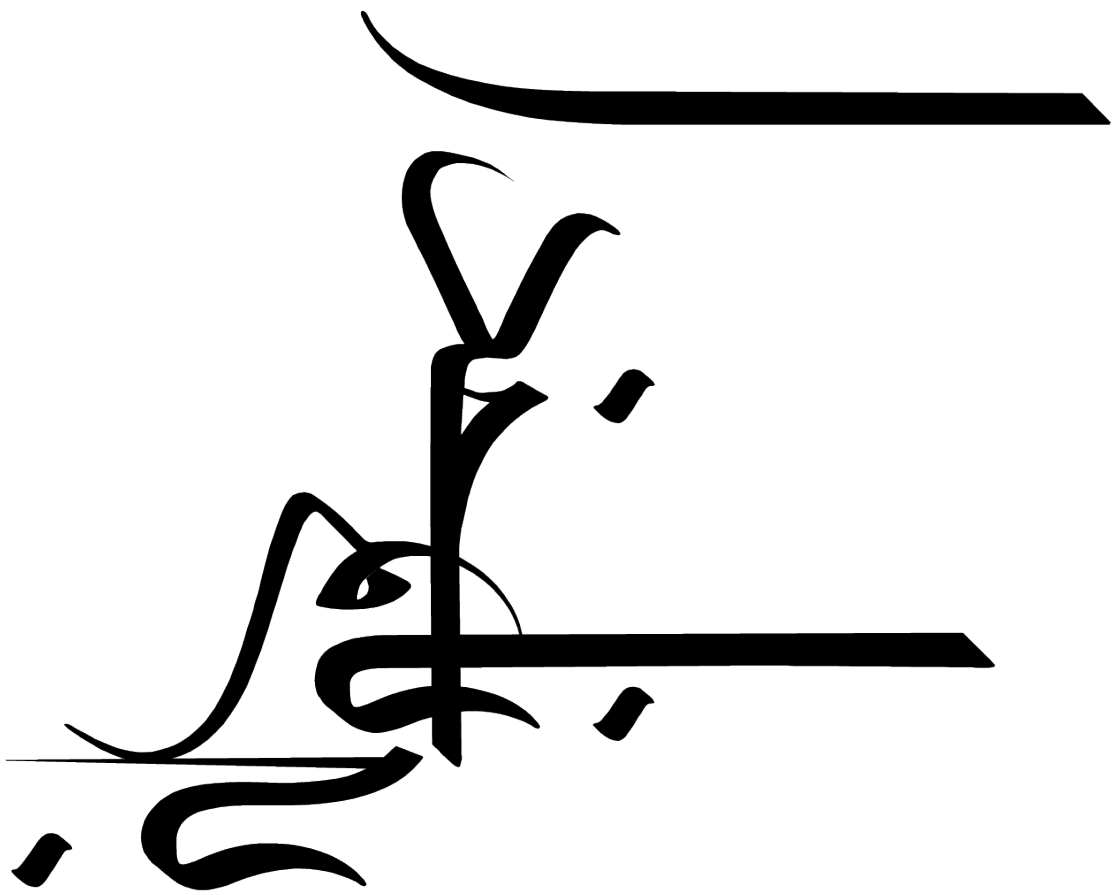


- Up to 65% of patients with hematuria may be diagnosed with a urologic or renal condition, many of which require treatment.

- Hematuria may be classified according to its visibility and timing during the urinary stream as well as the presence or absence of associated symptoms.

- gross hematuria (GH), sometimes referred to as *frank hematuria, macrohematuria,* or *visible hematuria,* is hematuria that can be seen with the naked eye.

- initial hematuria most commonly emanates from a urethral source; terminal hematuria from the bladder trigone, bladder neck, or prostate; and total hematuria from the bladder or upper urinary tract

- **GH must be distinguished from pigmenturia,** which may be due to endogenous sources (e.g., bilirubin, myoglobin, porphyrins), foods ingested (e.g., beets, rhubarb), drugs (e.g., phenazopyridine), or simple dehydration.

- MH is a sign rather than a symptom. **The prevalence of MH among healthy participants in screening studies is approximately 6.5%**with higher rates noted in studies with a predominance of males, older patients, and smokers

- Many studies and guideline panels have used a threshold of ≥3 RBCs/HPF to trigger evaluation.

- AUA/SUFU guideline panel determined that **a single positive UA is sufficient to prompt evaluation**

- **the evaluation of patients with MH has been found to yield a diagnosis of malignancy in 0.3-6.25% of cases.**

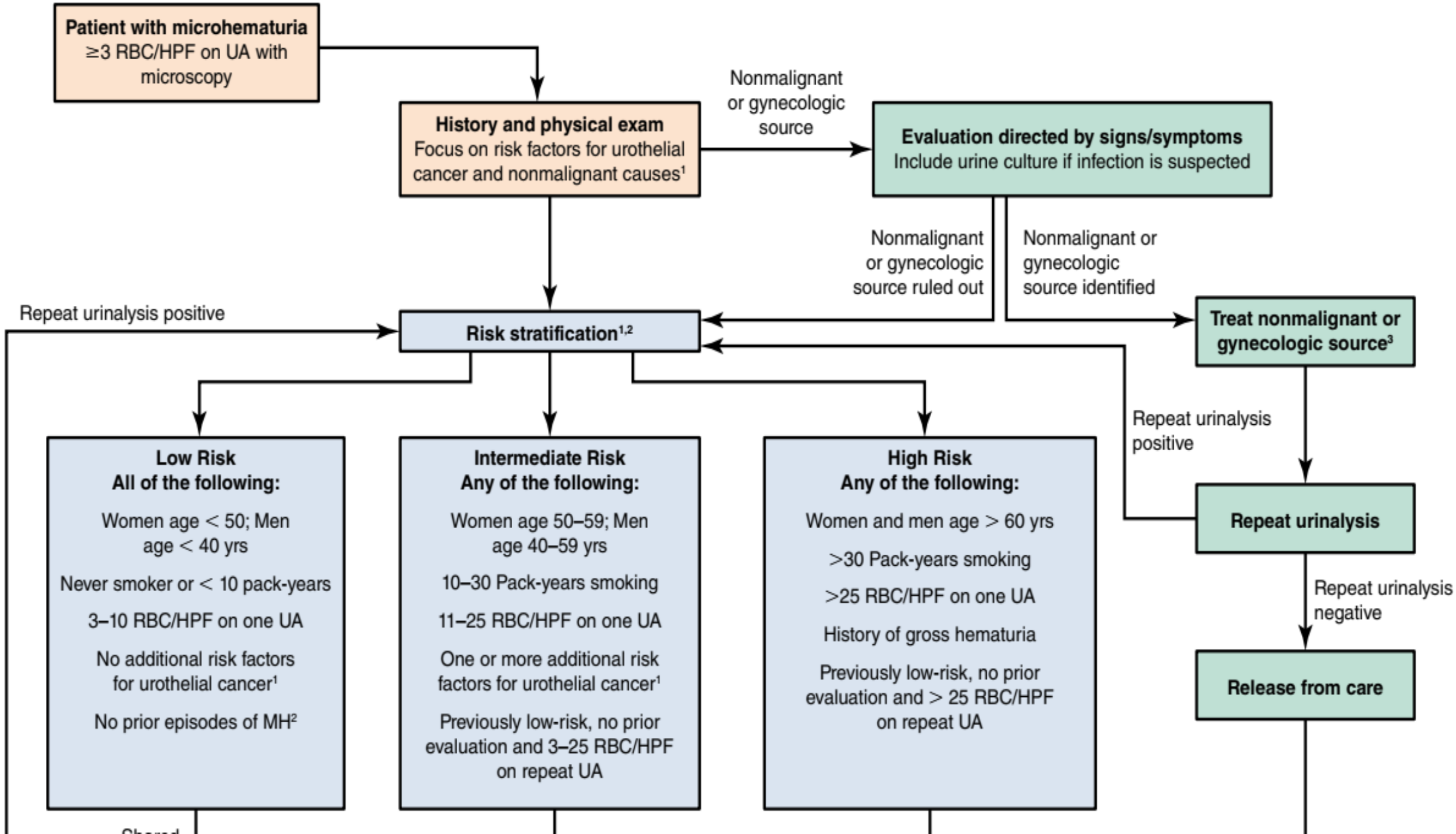
- **The likelihood of identifying a malignancy has been found to be greater among patients with a greater degree of microscopic hematuria (≥25 RBCs/HPH), GH, or risk factors for malignancy**

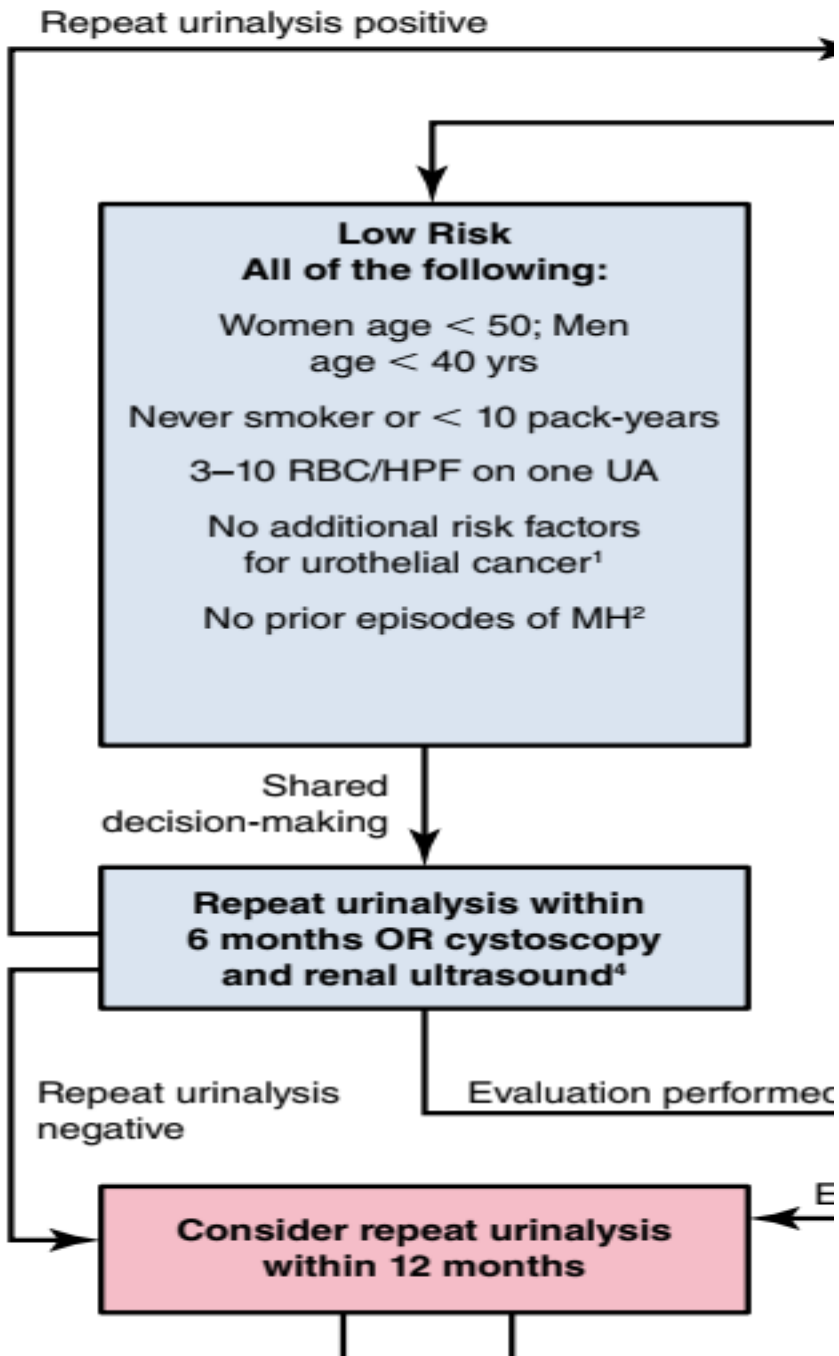
BOX 8.1 Urothelial Cancer Risk Factors

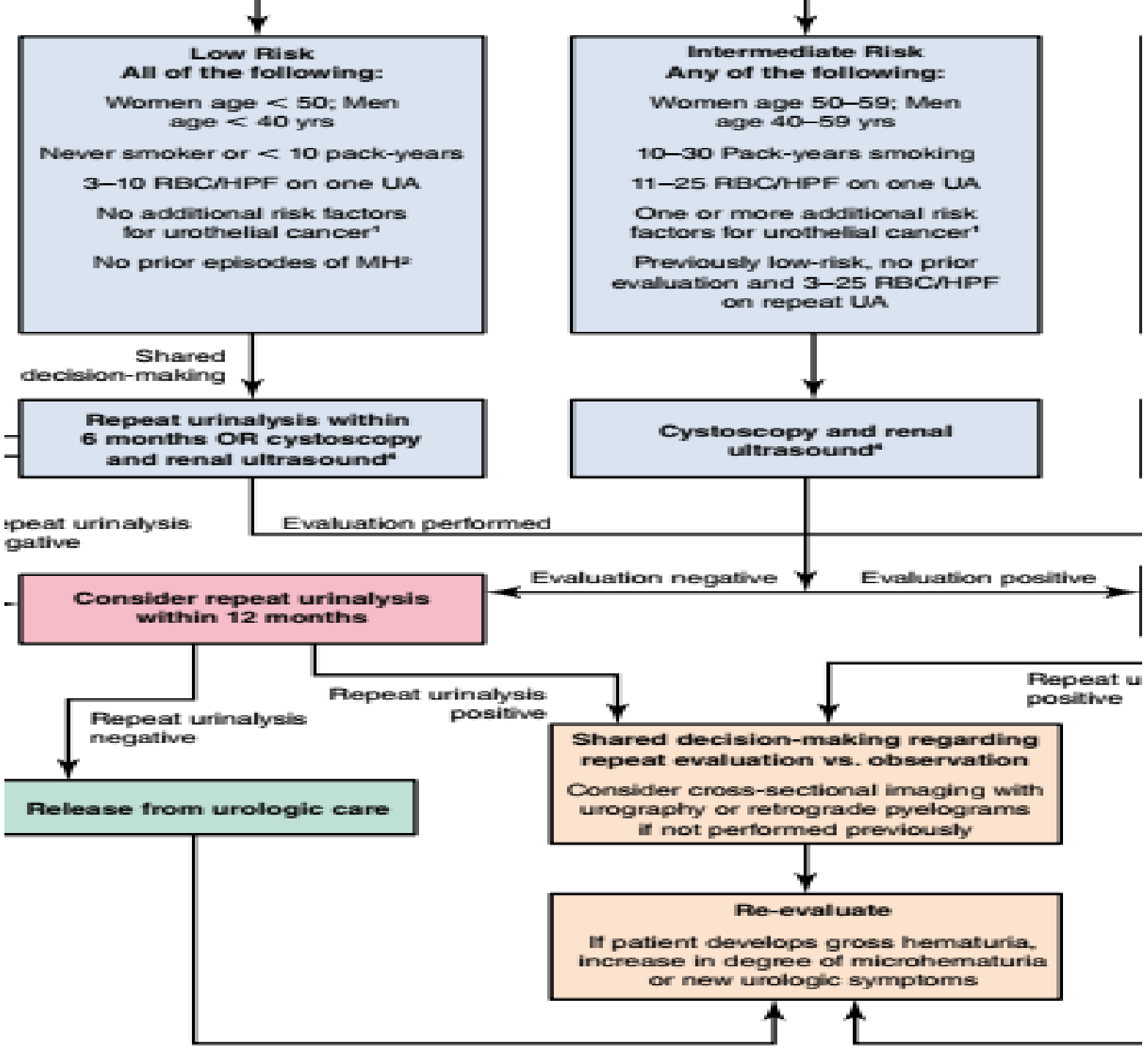
Risk Factors Included in AUA Microhematuria Risk Stratification System	Additional Urothelial Cancer Risk Factors*
Age	Irritative lower urinary tract sympt
Male sex	Prior pelvic radiation therapy
Smoking use	Prior cyclophosphamide/ifosfamide chemotherapy
Degree of microhematuria	Family history of urothelial cancer or Lynch syndrome
Persistence of microhematuria	Occupational exposures to benzene chemicals or aromatic amines (e.g., rubber, petrochemicals, dyes)
History of microhematuria	Chronic indwelling foreign body in the urinary tract

- **MH in women is more often misattributed to urinary tract infection (UTI) or gynecologic causes, leading to delays in MH evaluation and diagnosis of bladder cancer.**

- Use of anticoagulation or antiplatelet also poses a risk of delayed evaluation for hematuria if the patient and/or clinician dismiss this potentially important sign.


Patient with microhematuria
≥3 RBC/HPF on UA with microscopy
History and physical exam
Focus on risk factors for urothelial cancer and nonmalignant causes[1]
Nonmalignant or gynecologic source
Evaluation directed by signs/symptoms
Include urine culture if infection is suspected
Nonmalignant or gynecologic source ruled out
Nonmalignant or gynecologic source identified
Repeat urinalysis positive
Risk stratification[1,2]
Treat nonmalignant or gynecologic source[3]
Repeat urinalysis positive
Repeat urinalysis
Repeat urinalysis negative
Release from care
Low Risk
All of the following:
Women age < 50; Men age < 40 yrs
Never smoker or < 10 pack-years
3–10 RBC/HPF on one UA
No additional risk factors for urothelial cancer[1]
No prior episodes of MH[2]
Intermediate Risk
Any of the following:
Women age 50–59; Men age 40–59 yrs
10–30 Pack-years smoking
11–25 RBC/HPF on one UA
One or more additional risk factors for urothelial cancer[1]
Previously low-risk, no prior evaluation and 3–25 RBC/HPF on repeat UA
High Risk
Any of the following:
Women and men age > 60 yrs
>30 Pack-years smoking
>25 RBC/HPF on one UA
History of gross hematuria
Previously low-risk, no prior evaluation and > 25 RBC/HPF on repeat UA


Repeat urinalysis positive
Low Risk
All of the following:
Women age < 50; Men age < 40 yrs
Never smoker or < 10 pack-years
3–10 RBC/HPF on one UA
No additional risk factors for urothelial cancer[1]
No prior episodes of MH[2]
Shared decision-making
Repeat urinalysis within 6 months OR cystoscopy and renal ultrasound[4]
Repeat urinalysis negative
Evaluation performed
Consider repeat urinalysis within 12 months


Low Risk
All of the following:
Women age < 50; Men age < 40 yrs
Never smoker or < 10 pack-years
3–10 RBC/HPF on one UA
No additional risk factors for urothelial cancer[1]
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Intermediate Risk
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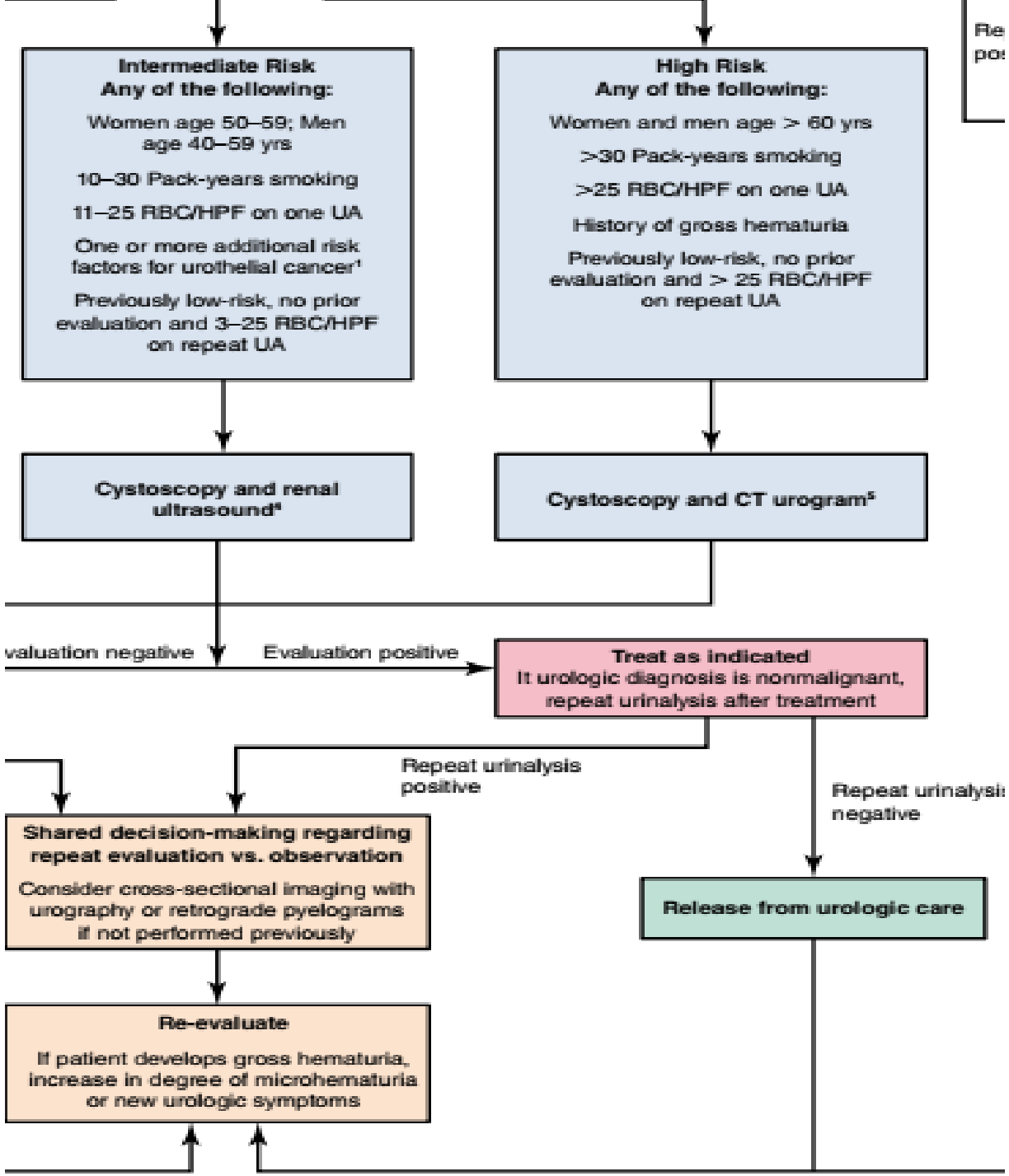
Evaluation performed
Evaluation negative
Evaluation positive
Consider repeat urinalysis within 12 months
Repeat urinalysis negative
Repeat urinalysis positive
Repeat u
positive
Release from urologic care
Shared decision-making regarding repeat evaluation vs. observation
Consider cross-sectional imaging with urography or retrograde pyelograms if not performed previously
Re-evaluate
If patient develops gross hematuria, increase in degree of microhematuria or new urologic symptoms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Previously low-risk, no prior evaluation and 3–25 RBC/HPF on repeat UA
High Risk
Any of the following:
Women and men age > 60 yrs
>30 Pack-years smoking
>25 RBC/HPF on one UA
History of gross hematuria
Previously low-risk, no prior evaluation and > 25 RBC/HPF on repeat UA
Cystoscopy and renal ultrasound[4]
Cystoscopy and CT urogram[5]
valuation negative
Evaluation positive
Treat as indicated
If urologic diagnosis is nonmalignant, repeat urinalysis after treatment
Repeat urinalysis positive
Repeat urinalysis negative
Shared decision-making regarding repeat evaluation vs. observation
Consider cross-sectional imaging with urography or retrograde pyelograms if not performed previously
Release from urologic care
Re-evaluate
If patient develops gross hematuria, increase in degree of microhematuria or new urologic symptoms

- **Urinary cytology and other urine biomarkers are not recommended as part of the initial evaluation of MH**

- **cytologic examination may be considered in patients with a negative initial workup in whom urothelial carcinoma is still suspected, particularly in those with irritative voiding symptoms.**

- **clinicians may repeat the UA within 12 months of the initial negative evaluation and may discontinue further evaluation if the follow-up UA is negative.**

- **patients presenting with GH in the absence of antecedent trauma or culture-documented UTI should be evaluated with a urine cytologic examination, cystoscopy, and upper tract imaging, preferably CT urography.**