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LithoVue™ Elite Single-Use Digital Flexible Ureteroscope

Selection criteria for intrarenal pressure sensing ureteroscopes

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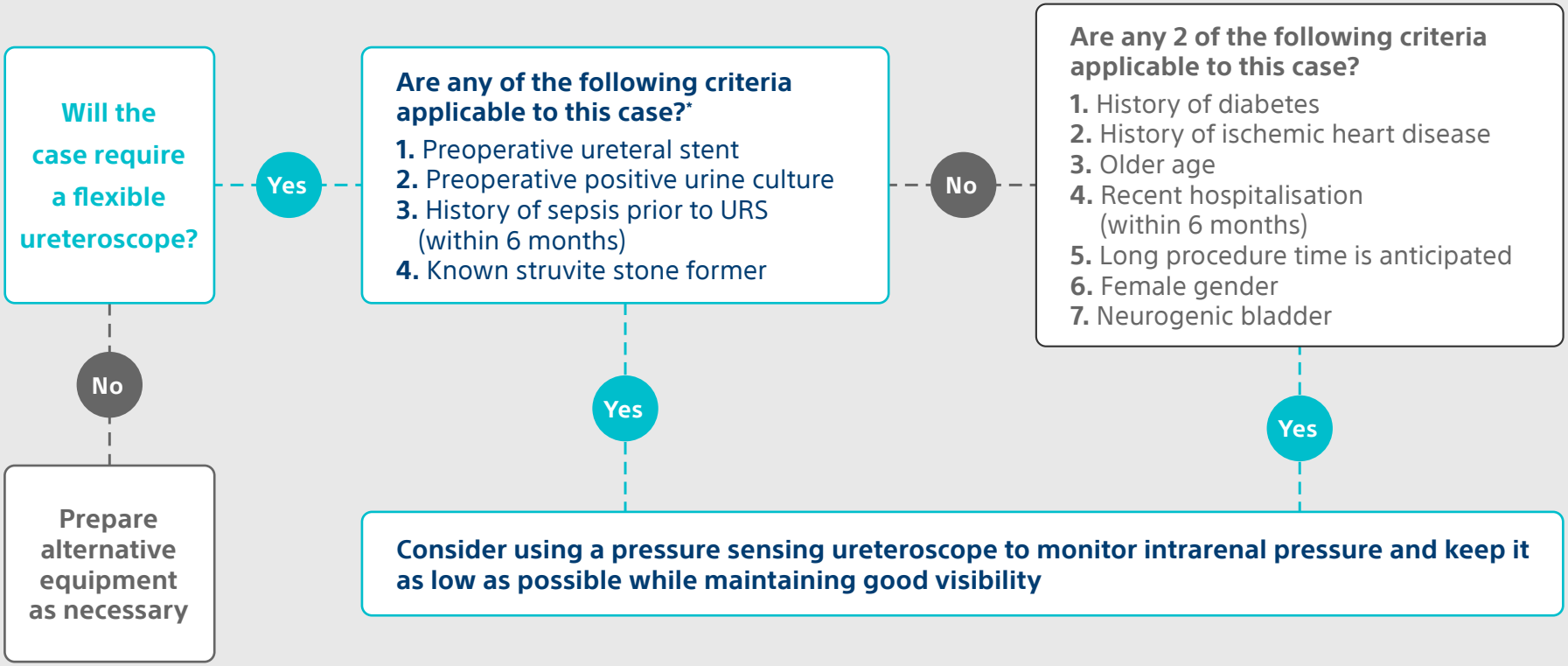
Selective approach

Similar to the criteria developed for single-use ureteroscopes in specific cases (i.e., large lower pole stone burden), facilities may benefit from using a clinical decision pathway tool to help decide when to use a pressure sensing ureteroscope.

Consider using the LithoVue Elite Ureteroscope in patients at risk of postoperative infectious complications, including sepsis, using the following selection pathway to potentially maximise the benefits at your institution:



*These factors have been associated with high risk (>3.0 odds ratio indicated in literature) of postoperative infectious complications following URS.

Selection criteria for intrarenal pressure sensing ureteroscopes

PERSPECTIVE BY

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Risk factors for postoperative infection after ureteroscopy

With new advancements in technology, ureteroscopy (URS) has become the primary surgical treatment modality for upper tract kidney stones.[1,2]

Contemporary studies have demonstrated that the risk of infection and even sepsis after URS may be significant.

Our recent meta-analysis and systematic review found a 5.0% pooled incidence of postoperative urosepsis (95% CI, 2.4-8.2)[3] and our recent large retrospective study (n=104,100) of commercially insured U.S. patients reported a 5.5% rate of sepsis post-URS.[4] This risk may seem low.

However, considering there is a 10.1% prevalence rate of kidney stone disease in the U.S. (based on 2013-2014 data)[5] and the impact on healthcare utilisation and cost,[4] it becomes a significant outcome that requires considerable consideration.

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To reduce the risk of post-URS infectious complications, including sepsis, there are a number of risk factors to consider:

Our systematic review and meta-analysis identified the following risk factors associated with increased postoperative urosepsis risk:[3]

- Preoperative ureteral stent (OR=3.94; 95% CI, 2.36-6.60)
- Preoperative positive urine culture (OR=3.56; 95% CI, 2.11-6.01)
- Comorbidities: ischemic heart disease (OR=2.49; 95% CI, 1.38-4.48), diabetes (OR=2.04; 95% CI, 1.04-4.03)
- Longer procedure time (mean difference=9 min; 95% CI, 2-16, *p*=0.02)
- Older age (mean difference=2.7 years; 95% CI, 1.0-4.4, *p*=0.002)

Additionally, in a 2020 systematic review, the following were associated with infectious complications after URS:[6]

- Neurogenic bladder
- Female gender

Our retrospective study identified the following risk factors for sepsis post-URS, in addition to many of those identified in our meta-analysis:[4]

- History of sepsis in 6 months prior to index URS (OR=3.51; 95% CI, 3.08-3.99)
- Hospitalisation in 6 months prior to index URS (OR=1.17; 95% CI, 1.06-1.29)

Finally, struvite stones are embedded with gram-negative bacteria, which can produce endotoxin.[7] A retrospective study showed an association between struvite stones and systemic inflammatory response syndrome (SIRS) (OR=3.331; 95% CI, 0.971-11.426).[8] SIRS is a serious condition closely associated with sepsis.[9]

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Risk factors for postoperative infection after URS (cont.)

A number of studies have demonstrated that irrigation-related factors are associated with postoperative infection and SIRS.[8,10,11] One of these studies was a randomised single-blind clinical trial comparing pressure irrigation at 80 mmHG (~109 cmH20) vs. 200 mmHG (~272 cmH20) during percutaneous nephrolithotomy (PCNL).[11] It was determined that the higher-pressure irrigation was an independent predictor of SIRS postoperatively. **Increased irrigation pressure has been shown to result in increased intrarenal pressure.**[12]

Other than the type of irrigation (pressure vs. non-pressurised) being used, additional factors can impact intrarenal pressure. Specifically for sepsis and intrarenal pressure, one factor to consider is the use of a ureteral access sheath (UAS).

While there are risks associated with using a UAS, research suggests that the use of a UAS can reduce the risk of postoperative sepsis[13] (although this hasn't been found in all studies).[14] It is theorised that this is most likely due to the reduction in intrarenal pressure associated with the use of a UAS.[15,16]

Significant evolution in flexible ureteroscope technology

Since the introduction of the flexible ureteroscope, advancements continue to make them smaller, more maneuverable, and with better image resolution. The flexible ureteroscope has revolutionised the way we treat kidney stones.[17] The launch of the first single-use ureteroscope in 2016 established a new paradigm in the surgical management of kidney stone disease in terms of access, indication, and financial costs for both the healthcare ecosystem and surgeons.[18] Boston Scientific pioneered this movement with the introduction of the LithoVue™ Single-Use Digital Flexible Ureteroscope. Since then, new innovations in chip technology, camera image quality, and maneuverability have brought about a new generation of single-use ureteroscopes across the globe.

The LithoVue™ Elite Single-Use Digital Flexible Ureteroscope, the latest innovation from Boston Scientific, builds on the LithoVue™ Single-Use Digital Flexible Ureteroscope and is the first ureteroscope with real-time pressure monitoring. Additionally, the LithoVue Elite Ureteroscope improves upon essential functionalities such as camera image quality.

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Bench Test or pre-clinical study results may not necessarily be indicative of clinical outcomes.
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