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LETTER TO EDITOR

# National consensus survey on management approaches for upper urinary tract obstruction: A comparative analysis of retrograde ureteric stent and percutaneous nephrostomy

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To the Editor,

*Upper urinary tract obstruction* (UUTO) is a common scenario in clinical practice, and it is caused by a variety of diseases. Lithiasis, tumours and strictures are some of the principal aetiologies (1). Multiple factors may influence both the need for decompression of the obstructed collecting system and the urgency of procedure. To our knowledge, there is limited agreement among clinicians about the optimal method, timing of intervention and even some indications for decompression.
Both *percutaneous nephrostomy* (PCN) and *retrograde ureteral catheterization* (RUC) have established efficacy for decompression of upper urinary tract (2). Furthermore, the high success and low complication rates of these drainage procedures make both alternatives attractive (3-5). However, there is great disagreement on which of the two methods is better for the patient and for a specific clinical setting (3-5).
There are currently insufficient studies that directly compare both methods, and most works have retrospective and heterogenous design (3-5). There are two randomized studies addressing efficacy of RUC vs PCN in patients with obstructive ureteral calculi and infection (2, 6). One randomized controlled trial with 42 patients, demonstrated no significant difference in time to definitive drainage, clinical normalization of index parameters (white blood count and temperature), or length of hospital stay (2). Another randomized prospective trial with 40 patients, concluded that percutaneous nephrostomy was superior to retrograde ureteric stent, with shorter period of iv antibiotics, superior quality of life, less use of analgesia and no access failures on PCN arm (3).
Previous studies also addressed which method was superior according to clinical indication. Double J stent was the first choice of Urologists when facing patients with uncomplicated benign disease and patients with coagulopathy (7).
Availability, logistics, and experience with PCN or ureteric stent techniques vary internationally, nationally, and even locally (4). Desobstruction method selection is made by local practice, patient characteristics, expertise, and facilities (4).
Acute upper urinary tract obstruction is most commonly due to calculus. The existing guidelines by European Association of Urology only recommend definitive treatment of the cause of obstruction after infection has been resolved (8). However, further to the emerging role for the use of primary *ureteroscopy* (URS) in the management of non-infective ureteric stones (9), recent data showed that URS can effectively and safely manage febrile hydronephrosis due to ureteric stone disease, when combined with strong antibiotics in select clinical situations (10, 11).
Based on the above findings, the decision to choose the best method for decompression of the renal collecting system depends on the clinical scenario, the physician's expertise, hospital environment and costs. That decision is made without guidelines about the best method for decompression and the perfect timing.
This work aims to build a consensus survey among Urologists in Portugal, that may be the basis for subsequent development of guidelines to support the decision on the best method of upper urinary tract clearance, according to the clinical situation and intrinsic factors of the patient.

## PATIENTS AND METHODS

The study was approved by institutional ethical committee (CE-099/2022). Opinion based questionnaire was available via Google Forms and sent to all Portuguese urologists using the *Portuguese Urological Association* (APU) associates database. All gathered data was anonymised. Written inform consent to participate in the study was collected. Survey was designed by Urologists with experience in UUTO and pretested with 10 urologists.

All respondents were invited to answer questions about their urological experience, their working place and resources of urology unit. Three sets of questions were provided on questionary to survey urologists opinion on the indication, timing, and the preferred method. First, clinicians were invited to decide when to drain the urinary tract, given different clinical scenarios. Answers were given in the form of a Likert scale with 5 levels (Totally agree to decompress to Totally disagree to decompress) and were followed by an assessment of the priority of each decompression (<1h; 1-3h; 3-12h; >12h). Urologists were also invited to choose the preferable method (PCN or RUC) for the previously designed clinical scenarios. Lastly, five questions directed to primary URS role were incorporated, to define the possibility of choosing this option over PCN or RUC.
Residents with less than 3 years of clinical practice were excluded from the final analysis. Data analysis regarding agreement was categorised into three degrees of agreement: "*clear agreement*" (> 75% agreement), "*broad agreement*" (50-75%) and "*no broad consensus*" (less than 50%).
Descriptive analyses were performed using standard summary statistics - median, mode and frequency distribution. Mann-Whitney U Test was used to analyze differences between groups of experts. Specialist questionaries were evaluated using standard summary statistics according to previously defined degrees of agreement. SPSS version 25 was used.

## Results

### *Survey population and group differences analysis*

We obtained a total of 104 answers, covering more than 35% of national urology specialists. In the study population, 76% of participants were currently working in a central or metropolitan emergency department and carried out assistance activity in the emergency department. A total of 70% of the answers were given by specialists and the remaining 30% by residents with more than 3 years of experience. Most answers (57%) were given by clinicians with more than 10 years of expertise in urology and 97% of the answers were given by physicians who perform PCN and RUC in their daily clinical practice. Most urologists (57%) reported a minimum of 2 patients per day requiring UUT decompression in their hospital.
There were no significant differences between residents and specialists' answers ($p > 0.05$), groups of years of experience ($p > 0.05$) and activity in emergency department ($p > 0.05$). When analyzing the answers by the number of patients per day requiring UUT decompression, answers of experts significantly differed in the indications for decompression in case of MET refractory colic ($p < 0.05$) and AKI without complications ($p < 0.05$). Questions with significantly different responses in the four previous groups were excluded from the following global analysis.

### *Indications for upper urinary tract decompression*

The complete results of survey regarding the indication and timing for upper urinary tract decompression are summarized on Table 1. Urologists had clear agreement that decompression of the upper urinary tract is mandatory with fever (99% agreement) and clinical signs of sepsis (100% agreement). In case of fever, there was a broad agreement it should be performed in less than 3 hours (64%) and a clear agreement it should be performed in a time interval of less than 12 hours (99%). When clinical signs of sepsis are present, there was a clear agreement that it should be performed in less than 3 hours (85%). Most urologist answered it should be done in less than 1 hour (66%).
Regarding the need to decompress the UUT when the patient presents with AKI (increase of serum Cr > 50% in 48h or diuresis < 0.5ml/kg/h for > 6h), there was a clear agreement that UUT decompression should be performed (75%). When complications are present, such as fluid overload or altered state of consciousness, 96% urologist agree with decompression. Regarding time to decompression, AKI without complications can be delayed more than 3 hours (broad agreement), with 18% of the clinicians stating that it could even be deferred to the next day. When complications are present, 83% said it should be done in less than 3 hours, reaching a clear agreement.
There was also clear agreement (81%) that decompression should take place in presence of leukocytosis and increased CRP, with 93% (clear agreement) stating that it should be performed within the first 12 hours. When questioned about the CRP values that should motivate UUT decompression, there was a clear agreement that UUT decompression should not be performed with CRP values lower than 5 mg/dl (89%), when no other symptoms or

***Table 1.***
*Opinions regarding the adequacy of UUT decompression according to clinical scenarios.*

| Indications for UUT decompression | | | | |
|---|---|---|---|---|
| | No | No opinion | Yes | Time until decompression |
| Fever (>38º) | 0% | 1% | 99% | 64% at <3h |
| Signs of sepsis | 0% | 0% | 100% | 85% at <3h |
| AKI | 5% | 20% | 75% | 54% at 3-12h |
| AKI and complication | 2% | 2% | 96% | 83% at <3h |
| Leucocytosis and high CRP | 2% | 17% | 81% | N/Ag |
| Refractory to MET | 11% | 23% | 66% | 64% at >12h |
| Single functioning kidney | 0% | 0% | 100% | 63% at <3h |

*C/Ag – Clear Agreement; B/Ag – Broad agreement; N/Ag – No Agreement*
*Colour legend:*
*Clear Agreement; Broad Agreement; No Agreement*

laboratory parameters are present. Only 9% of the surveyed urologists would decompress the UUT with CRP values of 3-5 mg/dL.
If the patient presents with obstruction caused by lithiasis, refractory to *medical expulsive therapy* (MET), 66% would clear the UUT and 64% agreed to postpone the procedure to the following day, thus reaching a broad agreement for both questions. If the patient is on medical expulsive therapy, 74% think it is appropriate for the patient to wait 3 or more weeks until desobstruction (broad agreement).
Regarding UUT decompression when the patient has a single functioning kidney, there was a clear agreement (100%) that desobstruction should be performed, with 98% of the clinicians agreeing that it should be done within the first 12 hours (clear agreement).

### *PCN vs RUC according to clinical setting*

The complete results of survey regarding the best method for decompression of UUT are summarized on Table 2.
There was broad agreement that both methods were equally adequate in case of fever and sepsis. Among the few clinicians who chose one of the procedures over the other in case of fever, 79% chose to submit the patient to RUC. In case of sepsis, the majority (54%) considered both methods equally effective. Septic shock, on other hand, didn't meet agreement, with 44% preferring PCN and 38% showing no preference.
There was a clear agreement that RUC is superior in patients with coagulation alterations (98%), undergoing antiaggregant medication (84%), taking oral anticoagulants (NOAC/Warfarin) (97%).
When UUT is present associated with slight hydronephrosis, there is clear agreement thar RUC is superior to PCN (94%).
Regarding UUT unblocking during pregnancy, although most stated that it is better to perform PCN (49%), no broad agreement was achieved. It was broadly agreed that PCN is preferred in cases of obstruction with blood clots (67%), renal abscess (60%), and pyonephrosis (67%).
In cases of UUTO caused by calculi, if the size of the stone is < 5 mm, there is a clear agreement that RUC is superior (76%). With calculus of 5-10 mm, RUC is also the preferable method (70%, broad agreement). In case of calculus with > 10 mm or Steinstrasse, no agreement was reached.
There was a clear agreement on performing PCN (80%) in the presence of a locally advanced tumor, and a broad agreement on performing PCN (61%) in the context of adenopathic conglomerates.
When asked about the method that most preserves patient's quality of life, 85% of the clinicians stated that RUC is the superior method (clear agreement).
We reached broad agreement that, for both male and female patients, both methods are equally adequate. For young adult population and for a professionally active patient, 74% (broad agreement) and 82% (clear agreement) of the clinicians considered RUC more suitable than PCN, respectively. In obese patients, 88% agreed that RUC is the superior method (clear agreement). On the other hand, for elderly patients, or palliative care and dependent patients, no agreement was reached.

**Table 2.**
*Opinions regarding the adequacy of primary URS to unblock UUTO giving different clinical scenarios.*

| Best method for decompression of UUT | | | | |
|---|---|---|---|---|
| | PCN | RUC | Equally adequate | Indication |
| Fever (>38°) | 7% | 27% | **66%** | Equally Adequate |
| Signs of sepsis | 27% | 19% | **54%** | Equally Adequate |
| Septic shock | 44% | 18% | 38% | N/Ag |
| Coagulation alterations | 1% | **98%** | 1% | RUC |
| Antiaggregant therapy | 1% | **84%** | 15% | RUC |
| Anticoagulant therapy | 1% | **97%** | 2% | RUC |
| Slight Hydronephrosis | 4% | **94%** | 2% | RUC |
| Pregnancy | 49% | 35% | 16% | N/Ag |
| Obstruction by blood clots | **67%** | 11% | 22% | PCN |
| Obstruction and renal abscess | **60%** | 20% | 20% | PCN |
| Pyonephrosis | **67%** | 12% | 21% | PCN |
| | | | | |
| Ureteric Calculus <5mm | 2% | **76%** | 22% | RUC |
| Ureteric Calculus 5-10mm | 3% | **70%** | 27% | RUC |
| Ureteric Calculus >10 mm | 18% | 48% | 34% | N/Ag |
| *Steinstrasse* | 34% | 33% | 33% | N/Ag |
| | | | | |
| Locally advanced pelvic cancer | **80%** | 8% | 12% | PCN |
| Adenopathic conglomerates | **61%** | 20% | 19% | PCN |
| | | | | |
| Preserve quality of life | 12% | **85%** | 3% | RUC |
| Males | 3% | 32% | **65%** | Equally Adequate |
| Females | 2% | 38% | **60%** | Equally Adequate |
| Young | 2% | **74%** | 24% | RUC |
| Elderly | 13% | 38% | 49% | N/Ag |
| Professionally active | 3% | **82%** | 15% | RUC |
| Palliative care | 43% | 29% | 28% | N/Ag |
| Dependent in daily activities | 35% | 38% | 27% | N/Ag |
| Obese | 3% | **88%** | 9% | RUC |

*C/Ag – Clear Agreement; B/Ag – Broad agreement; N/Ag – No Agreement*
*Colour legend:*
*Clear Agreement; Broad Agreement; No Agreement*

### *Primary URS in patients with lithiasis*

Regarding UUT decompression in case of ureteric lithiasis, when asked about the role of primary URS, there was clear agreement that it should not be performed with fever, signs of sepsis and increased inflammatory parameters in blood analysis. We reached a broad agreement that, in the case of lithiasis and AKI, it may be appropriate to use primary URS.
There was also clear agreement regarding

decompression in case of lithiasis refractory to MET. The results are summarized on Table 3.

***Table 3.***
*Opinions regarding the adequacy of primary URS to unblock UUTO giving different clinical scenarios.*

| Primary URS in patients presenting with lithiasis and: | No | No opinion | Yes |
|---|---|---|---|
| Fever | 95% | 3% | 2% |
| Sepsis with urinary starting point | 96% | 1% | 3% |
| AKI | 34% | 15% | 51% |
| Refractory to MET | 2% | 14% | 84% |
| Increase of inflammatory parameters | 79% | 12% | 9% |

*Colour legend:*
*Clear Agreement; Broad Agreement; No Agreement*

## Discussion

The ideal method for decompression should be easily applicable, have complete success rate, few complications, and be well tolerated. Most decisions on upper urinary tract decompression in the daily practice are based on specialists' opinions, therefore we consider the expert-based survey a suitable method to address this issue.

It is well accepted that drainage is mandatory when obstruction of the upper urinary tract occurs in the setting of urinary infection or loss of renal function. Untreated obstruction in patients with infection may lead to serious consequences such as pyonephrosis, sepsis, and death (12).

Our results confirmed these indications, with more than 95% of Urologists agreeing on the need of upper urinary tract decompression when facing fever, signs of sepsis, AKI with complications and unilateral functioning kidney. When considering infection, prompt decompression is indicated, with 99% of Urologists considering it should be performed in less than 12 hours in case of fever, and in less than 3h or even 1h hour when clinical signs of sepsis are present. In a previous British study addressing urologists and radiologists, fever and elevated inflammatory parameters were considered non-urgent indications for RUC or PCN, with timing not precisely defined. In case of sepsis, *Lynch and colleagues* agreed with urgent decompression with PCN (7). In our study, both methods were considered equally effective facing fever and sepsis. In case of septic shock, no agreement was found, but when deciding for one method, most urologists would perform urgent PCN. The surveyed specialists considered that infection complicated with renal abscess or pyonephrosis should likewise be decompressed with PCN.

Solitary kidney is an indication for urgent decompression of upper urinary, with most urologist agreeing it should be performed in less than 3 hours. On the other hand, AKI with no complication can safely be addressed within 3 to 12h. These results are consistent with previous studies, that stated it can even be delayed until the next day (7).

We also addressed some of the main laboratory findings that may influence clinical decisions. When facing elevated CRP levels and leukocytosis, 81% of urologists would perform decompression of collecting system. No agreement was met in the timing of decompression. When facing leukocytosis with no CRP elevation, no agreement was also assembled. Previous studies demonstrated that both physical and emotional stress increase WBC count on emergency department patients and that this marker can only be transiently elevated with no association with infection (13).

Regarding the CRP values that should motivate UUT clearance in the absence of other clinical or laboratory signs, there was clear agreement between Portuguese urologists that a CRP value under 5 mg/dl without other clinical findings is not an indication for decompression. CRP and *procalcitonin* (PCT) are by far the most widely used and studied biomarkers and both increase transiently during infection and sepsis, but these markers may also be elevated in other conditions (14). In some studies, PCT was considered superior to CRP to diagnose and exclude sepsis. Combination of these two biomarkers may improve their ability to identify or exclude sepsis (14).

Ureteric stone disease is the most common cause of UUTO. If uncomplicated, most urologists agree that decompression may be deferred to the following days and that primary URS is an appropriate treatment. We found broad agreement (74%) that patients could wait 3 or more weeks on MET until decompression. There are insufficient studies addressing the function deterioration of the obstructed kidney.

We also evaluated the impact of stone dimension on the selection of the best method of decompression. RUC was the method of choice for stones < 10 mm. No agreement was found for stones > 10 mm or steinstrasse. Stent failure occurred more frequently in patients with large ureteral stones (4). According to previous studies, double J stent is the first choice of Urologists when facing patients with uncomplicated benign disease (7).

In our study, primary URS was an option for clearance of stones refractory to MET and when AKI is present. When facing fever, signs of sepsis or elevated inflammatory parameters, there was clear consensus not to perform primary URS. These results are at odds with recent studies suggesting that URS can safely manage febrile hydronephrosis when combined with strong antibiotics (10, 11).

Our study didn't reach consensus in UUT decompression during pregnancy. Previous studies have shown that pregnant women with stone disease may undergo definitive treatment with ureteroscopy in specialized referral centers.7 Retrospective studies also concluded that PCN seemed more effective than double J insertion. When choosing double-J placement in this group of patients, rapid encrustation needs to be considered, because during pregnancy, hyperuricosuria, hypercalciuria, and asymptomatic bacteriuria are common (4).

PCN was the preferred method in case of locally advanced neoplasia. In previous studies, no significant difference has been reported between the two diverting modalities (5).

Double J stent was the method of choice in case of coagulopathy and patients on antiaggregant or anticoagulant therapy. These findings confirmed previous studies that similarly recommended stent as first line of treatment (7).
Conclusions on pain and QoL are contradictory. Portuguese specialists considered RUC as the method that better preserves quality of life, preferring this option for young patients and professionally active population. Patient sex did not influence the choice, both methods were considered equally appropriate. Patient and disease characteristics like obesity and slight hydronephrosis influenced the choice of method, probably due to technical difficulties. Urologists opted for RUC in these patients.
Our results need confirmation from other studies and have several limitations. National representativity was limited to 35% of urologists and possible bias are present when addressing patient characteristics independently. We aim to amplify our survey respondents by expanding to other countries. Our future aim is to assemble Portuguese experts in the next Portuguese Urology Association meeting to define the expert-based consensus national guidelines for UUT decompression using Delphi method consensus.

## Conclusions

We successfully identified consensus among expert Portuguese urologists regarding upper urinary tract decompression. These conclusions serve as a solid foundation for the subsequent formulation of specific guidelines.

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