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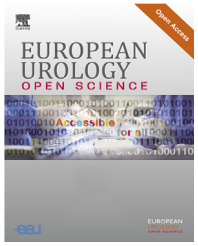

European Association of Urology

Letter to the Editor

Re: Kristina F. Galtung, Peter M. Lauritzen, Gunnar Sandbæk, et al. Is a Single Nephrographic Phase Computed Tomography Sufficient for Detecting Urothelial Carcinoma in Patients with Visible Haematuria? A Prospective Paired Noninferiority Comparison. Eur Urol Open Sci 2023;55:1–10

We read with interest the paper by Galtung and colleagues [1] on the efficacy of single nephrographic phase computed tomography (SNPCT) in detecting urothelial carcinoma (UC) in patients presenting with visible haematuria. We commend the authors for their work in conducting a single-centre prospective study over a period of <3 yr involving 308 patients with painless visible haematuria, all of whom were referred for CT before cystoscopy. The study revealed that SNPCT was noninferior to four-phase CT in detecting UC. Specifically, the difference in accuracy was within an acceptable margin, indicating that SNPCT is as effective as four-phase CT in diagnosing UC in patients with visible haematuria. However, we have some concerns regarding the conclusions drawn from this study.

Of the 308 patients enrolled, 45 (14.6%) were diagnosed with UC. It is important to note that only five of these patients had upper tract UC (UTUC). Consequently, data for true positives, true negatives, false positives, and false negatives are only conveyed in the form of ratios. The authors justify their findings and the limited number of patients with UTUC by citing the low incidence of this disease. In addition, their analysis was conducted on a per-patient rather than a per-lesion basis. Furthermore, the number of ureterorenoscopy procedures performed was not disclosed and no cases of carcinoma in situ in the upper tract were included or detected.

Although some authors support the idea that SNPCT may offer reassurance in cases with a normal-appearing ureter [2], it is important to acknowledge that most of the relevant studies were underpowered and retrospective, had heterogeneous risk stratification, and were susceptible to selection bias. An unopacified ureter, especially in a nondilated system, cannot definitively exclude the presence of a tumour or be used to assess the length of the defect or the presence of multifocality. Among imaging techniques, computed tomography urography (CTU) offers the highest accuracy for UTUC diagnosis, with pooled sensitivity of 92% and pooled specificity of 95% [3,4].

Therefore, judicious selection of patients for CTU is imperative. This selection should prioritise patients with a history of haematuria, either microscopic or visible, a history of UC, a family history of haematuria or UC, flank pain, a lumbar mass, or a history of exposure to smoking. Two primary approaches for contrast delivery and CT acquisitions are available: (1) single-bolus injection of contrast medium with CT acquisition during the unenhanced, nephrographic, and excretory phases (referred to as single-bolus CTU); and (2) split-bolus injection of contrast medium with CT acquisition during the unenhanced phase and the synchronous nephrographic and excretory phases (referred to as split-bolus CTU) [5]. The European Society of Urogenital Radiology recommends a split-bolus CTU protocol for patients at low to intermediate risk of UC, and a single-bolus CTU protocol for patients at high risk of UC [6]. While these recommendations are primarily based on expert opinion, it is essential to recognize that both the nephrographic and excretory phases are complementary for detection of UTUC [7,8].

The absence of multiple CT sequences, including a noncontrast phase, an arteriographic phase, and a urographic phase, has significant implications. Omission of a noncontrast phase may hinder accurate evaluation of stones and their Hounsfield unit status, which is vital for precise diagnosis and treatment planning in patients with hydronephrosis. Lack of an arteriographic phase may result in overlooking critical anatomic alterations, such as aberrant vessels, which are crucial for surgical planning, three-dimensional reconstruction, and distinguishing parenchymal tumours. Absence of a urographic phase might lead to a failure to diagnose abnormalities in the urinary system, including double urinary systems, among other conditions. This information is indispensable for effective surgical planning for nephroureterectomy and in guiding the surgeon during endourological treatment to prevent inconclusive histopathological confirmation of UTUC or, in more dire circumstances, missing the diagnosis and treatment, especially in cases involving multiple lesions. Finally, use of all CT phases improves the accuracy of lesion detection and ensures unequivocal findings and correct risk assessment of the tumour (multifocality, tumour length), affording patients the opportunity to proceed with nephroureterectomy without unwarranted delays associated with ureterorenoscopy.

It could be argued that use of SNPCT as a preliminary screening tool in patients with gross haematuria could be a practical approach to management of the increasing demands on imaging resources. However, careful UTUC risk

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assessment according to the specific clinical context and individual patient risk factors is very complex as there are no nomograms for predicting the likelihood of upper tract abnormalities in asymptomatic or monosymptomatic patients.

The decision to perform multiphase CT imaging is still guided by clinical judgment and the patient's medical history. In cases for which no alternative cause of recurrent gross haematuria is identified via SNPCT, positive cytology, or the presence of hydronephrosis, transition to multiphase CT for a more comprehensive evaluation is a crucial step. Thus, a tailored approach that balances resource optimisation with patient care should be considered. Strategies that postpone or avoid the CTU phase will need a cost-effectiveness assessment, as patients may require one or more SNPCT scans, multiple ultrasound imaging sessions, and several hospital visits to complete the recommended examinations, and patients' anxieties and uncertainties should also be taken into consideration.

Given the significance of haematuria as a key clinical symptom, we believe that compromising the quality of a CT scan is hard to justify, especially when aiming to minimize X-ray exposure and shorten the CT acquisition time. It should also be noted that a significant number of individuals presenting with haematuria are older, and concerns regarding X-ray exposure are less pertinent for this demographic.

In conclusion, while we commend the authors for their work, we urge caution in drawing definitive conclusions regarding the suitability of SNPCT for detecting not only bladder cancer but also UTUC in patients with visible haematuria. A more comprehensive imaging approach is necessary to ensure accurate diagnosis and optimal treatment planning for patients at risk of UC.

***Conflicts of interest*:** The authors have nothing to disclose.

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