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sensitivity and specificity of renal ultrasound (RUS) and CTU were included in the model. Finally the loss of life expectancy was used to assess how a potential radiation-induced malignancy might limit the life span of patients. The data were then analyzed by gender as well as age (younger than age 50 vs those older than 50). The authors conclude that RUS may be the best study for females under the age of 50 with gross hematuria.

The data are provocative and the methodology attempts to assess the risks and benefits of CTU in the evaluation of gross hematuria from multiple vantage points. The data reported are based on multiple different data sets and multiple assumptions. The models used in this study do not account for smoking history which is a known risk factor for UTUC. It is important to point out that the authors still advocate for the use of cystoscopy in patients with gross hematuria. With regard to imaging the upper urinary tracts, the use of RUS has been promoted in the evaluation of patients with asymptomatic microscopic hematuria.¹ However, the use of RUS in patients with gross hematuria is less studied. The authors do point out that the absolute risk of CTU-induced malignancy is quite low (0.09%-0.25%). Furthermore, the validity of using the linear no-threshold model for radiation-induced injury is debatable.² Yet, CTU has increased costs compared to RUS and a 0.3%-1.6% risk of contrast-induced reactions.³ Even with the use of CTU in the evaluation of gross hematuria, the rate of detection of UTUC is quite low. Commander et al found of the 652 patients who underwent CTU for gross hematuria, only 4 (0.006%) were diagnosed with UTUC, all of whom were current or former smokers.⁴

As we shift toward value-based care models, we should carefully consider how we evaluate patients with gross hematuria. This article focuses on the potential missed diagnosis of UTUC, yet many other disease states can also present with gross hematuria and therefore, providers should consider the patient's history, smoking history, and other symptomatology when deciding on the appropriate imaging test. For low-risk patients with gross hematuria, renal US may be a reasonable first imaging study, particularly those of younger age and of female gender.

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EDITORIAL COMMENT



The authors present data using a model to estimate the risk vs benefit of using computed tomography urography (CTU) in the evaluation of gross hematuria. Various models and data sources were used to construct the models used in this paper. The risk of radiation-induced malignancy was modeled using the Biological Effects of Ionizing Radiation VII Phase 2 report which assumes a linear, cumulative risk with no upper limit. The literature was then queried to assess the risk of an upper tract urothelial cell carcinoma (UTUC) in a patient with gross hematuria. The