Performance of computed tomographic urography in diagnosis of upper urinary tract urothelial carcinoma, in patients presenting with hematuria: systematic review and meta-analysis

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CRD summary
This review found that computed tomography urography was a highly specific and sensitive method for the evaluation of patients with haematuria. These conclusions were supported by the data, but should be interpreted with caution due to the possibility of missed studies and lack of details regarding study quality.

Authors' objectives
To calculate the diagnostic accuracy of computed tomographic urography (CTU) for the detection of upper urinary tract urothelial tumours.

Searching
MEDLINE, EMBASE, Web of Science and Cochrane Database of Systematic Reviews were searched from 2000 to June 2007 for studies published in English. Search terms were reported. Review articles were screened.

Study selection
Diagnostic cohort studies (prospective or retrospective) of patients with haematuria who were imaged with CTU performed with helical protocols using a multiphasic image acquisition techniques (index test) and had the presence of malignant urothelial pathology confirmed by surgery/histology (reference standard) were eligible for inclusion. Studies had to report sufficient data to construct a 2x2 table of test performance.

Patients in the included studies had haematuria, asymptomatic microhaematuria or recurrent microscopic haematuria. Studies used a three- or four-phase imaging acquisition scheme. Studies were conducted in USA, Greece and UK.

Two reviewers independently assessed studies for inclusion; disagreements were resolved through discussion.

Assessment of study quality
Two reviewers independently assessed study quality using STARD guidelines.

Data extraction
Two reviewers independently extracted data as 2x2 tables of test performance. These data were used to calculate sensitivity and specificity; in the case of 0 cells, 0.5 was added to each cell of the 2x2 table.

Methods of synthesis
Summary sensitivity and specificity were estimated using random effects models. Heterogeneity was assessed using the I² and X² statistics.

Results of the review
Five studies (n=1,155) were included: three prospective and two retrospective.

Sensitivity ranged from 88% to 100% and was greater than 97% in all studies except one. This study had a very small number of positive results, one of which was a false positive. Summary sensitivity was 96% (95% CI 88% to 100%). There was no evidence of heterogeneity (I²=0%).

Specificity ranged from 89% to 100% and was greater than 98% in all studies except one. Summary specificity was 99% (95% CI 98 to 99%). It appeared that there was evidence of heterogeneity in specificity which the authors stated was explained by the inclusion of high-risk patients and intense investigation algorithm by one study with the lower estimate of specificity.
Authors' conclusions
CTU is a highly specific and sensitive method for evaluation of patients with haematuria.

CRD commentary
The review addressed a focused question. Inclusion criteria were clearly defined. The literature search was adequate for published English-language studies, but restrictions on language and publication status raised the possibility of language and publication biases. Appropriate steps were taken to minimise bias and errors at all stages of the review process. The authors stated that study quality was assessed, but no further details were reported and so the reliability of the included studies was unclear. The methods of analysis were adequate. Results were clearly presented using forest plots, although an error in the paper meant that the forest plot for sensitivity was produced twice and the plot for specificity was missing.

The authors conclusions were supported by the data, but should be interpreted with caution due to the possibility of missed studies and lack of details regarding study quality.

Implications of the review for practice and research
Practice: The authors stated that CTU promised to be the method of choice for the investigation of the upper urinary tract in patients with haematuria at high-risk for urinary malignancy. In these patients, in whom an aggressive investigational policy is justified, radiation risk can be safely disregarded in favour of greater accuracy.

Research: The authors did not state any implications for research.

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