Association of hematuria on microscopic urinalysis and risk of urinary tract cancer development

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Background

• The incidence of urinary tract cancer in patients with hematuria is unclear
• Current recommendations for the evaluation of hematuria are not well-validated
Purpose

• To determine the incidence of urinary tract cancer in patients with hematuria
• Stratify the risk of urinary tract cancer
  – Age
  – Sex
  – Degree of hematuria
  – Current Best Policy Recommendations

Materials and Methods

• A large retrospective population-based cohort study
  – Subjects with a microscopic urinalysis between 2004 and 2005
• Main Outcome – Three-year incidence of urologic cancer
  – Kaiser Permanente Cancer Registry 2008
Results

- Three-year incidence
  - Overall – 0.43%
  - With hematuria – 0.68%
  - Without hematuria – 0.18%

- Risk stratification
  - Older age – OR 17.0, 95% CI = 11.2-25.7
  - Male sex – OR 4.8, 95% CI = 4.2-5.6
  - Degree – OR 4.0, 95% CI = 3.5-4.5
Cancer Rates by Age and First Urinalysis Result

Overall:

FEMALE

MALE

Kaiser Permanente®
Performance of Guidelines

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Number of patients identified</th>
<th>Number of cancers found</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>Odds Ratio</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUA definition</td>
<td>50,960</td>
<td>578</td>
<td>59.2</td>
<td>83.8</td>
<td>1.34</td>
<td>5.21 (4.68-5.80)</td>
<td>0.672</td>
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<tr>
<td>CUA definition</td>
<td>36,227</td>
<td>596</td>
<td>49.3</td>
<td>58.5</td>
<td>1.83</td>
<td>7.45 (5.88-9.29)</td>
<td>0.680</td>
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<tr>
<td>Alternative definition</td>
<td>54,845</td>
<td>682</td>
<td>54.5</td>
<td>92.2</td>
<td>2.77</td>
<td>12.0 (10.3-13.6)</td>
<td>0.713</td>
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</tbody>
</table>

**Alternative Definition**  
- Any patient > 40 years old  
- At least 1 urinalysis with >25 RBC/HPF

Conclusions

- The incidence of urinary tract cancer is low, even in patients with hematuria  
- Older age, male sex, and higher degrees of hematuria are associated with a higher risk of urinary tract cancer  
- Current best policy recommendations do not perform well in the detection of urinary tract cancer