Cytology better than histology: upper urinary tract

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Urinary tract cytology

• Gold standard for diagnosis of urothelial carcinoma is a tissue diagnosis that provides grade and stage of the tumour

• Scenarios where histology is not performed because the lesion is occult (prostatic urethra, upper tract)

• Bladder washings and upper tract imaging and cytology provide the only tissue diagnosis
Patients with haematuria

- Cytology negative/positive: lesion seen at cystoscopy + biopsy = UC (grade and stage)
- Atypical or suspicious cytology on voided urine
- Atypia + UroVysion FISH negative + Normal cystoscopy = discharge patient
- Atypia + UroVysion FISH positive + Normal cystoscopy = follow up 3-6 mthly
- Suspicious cytology (no FISH) + Normal cystoscopy = upper tract imaging + ureteroscopy + washings
Haematuria

- Atypical cytology
  - FISH positive

Cystoscopy normal
- No biopsy

Upper tract imaging and ureteroscopy
- Washings if no lesion seen
Bladder washings

• Cellular
• Dispersed urothelial cells and umbrella cells
• Sheets and clusters of urothelial cells
• Variable shapes of cells from polygonal to columnar to spindled
• Nucleus may also follow the shape of the cell
• No features of high grade urothelial carcinoma
Upper tract (renal pelvis and ureters) washings

• Cellular

• Dispersed cells and papillaroid clusters to true papillae mimicking low grade papillary urothelial neoplasia

• Key issue is identification of high grade urothelial carcinoma
The Paris System: criteria for HGUC, Suspicious & Atypia*

<table>
<thead>
<tr>
<th>Category Criteria</th>
<th>HGUC</th>
<th>Suspicious for HGUC</th>
<th>Atypia</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of atypical cells</td>
<td>&gt;5 (voided)</td>
<td>&lt;5 (voided), 5-10</td>
<td>&lt;5</td>
</tr>
<tr>
<td></td>
<td>&gt;10 (instrumented)</td>
<td>(instrumented)</td>
<td></td>
</tr>
<tr>
<td>N:C ratio</td>
<td>&gt;0.7</td>
<td>&gt;0.7</td>
<td>0.5 – 0.7</td>
</tr>
<tr>
<td>Hyperchromasia</td>
<td>+</td>
<td>+</td>
<td></td>
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<tr>
<td>Clumped chromatin / Irregular nuclear borders</td>
<td>Either one of the two criteria</td>
<td>Either one of the two criteria</td>
<td>Any one of the three criteria</td>
</tr>
</tbody>
</table>

*In conjunction with explanatory notes for each category*
Summary

• In instrumented samples, cytology provides a reliable alternative to histology
• May be supported by ancillary tests such as FISH or newer PCR based tests
• Correlation with clinical and radiological findings essential particularly for low grade tumours
• Urine cytology is all about high grade urothelial carcinoma
• Recommend Paris system for reporting urinary tract cytopathology