### Exploring the potential of Fluorine-18 fluorodeoxyglucose positron emission tomography (18F-FDG PET) to improve clinical decision making in patients with Retroperitoneal Fibrosis (RPF)?

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### Introduction

- Clinical decision-making in RPF can be challenging
- Is the RPF malignant?
- Does everyone need a biopsy?
- Is the RPF active or inactive?
- When to start/stop steroids?
- Is ESR/CRP sufficient for monitoring?
- CT PET may be able to help in answering these questions

### Methods

- Prospective study of 122 RPF patients assessed by multi-disciplinary team
- 78 patients underwent 101 PETs in addition to blood tests and CT/MRI

### Is biopsy required?

<table>
<thead>
<tr>
<th>PET status</th>
<th>Biopsy required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>No malignant cases diagnosed on pre-biopsy PET</td>
</tr>
<tr>
<td>Positive</td>
<td>Biopsy could be avoided in this group</td>
</tr>
</tbody>
</table>

### Is RPF active or inactive?

<table>
<thead>
<tr>
<th>ESR/CRP</th>
<th>PET status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Negative PET 20/38 (53%)</td>
</tr>
<tr>
<td>Raised</td>
<td>Positive PET 18/38 (47%)</td>
</tr>
</tbody>
</table>

### What's new?

- Degree of uptake on PET
- Response to steroids (mass size/decreased activity)

### Recommendations

- FDG-PET should be performed at time of diagnosis
- Biopsy only if PET positive or atypical features
- Steroids not prescribed if PET negative
- If PET negative + obstruction – consider ureterolysis if fit as poor response to steroids
- PET in addition to inflammatory markers when assessing response to treatment

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### Protocol and images

- 6h pre-scan fasting
- Integrated CT/PET scanner
- FDG dose of 5.5MBq/kg IV
- Images taken @ 90 mins
- Quantitative measure (mSUV)
- Visual scale – 0 to 4
- Cost £800-900

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### Findings and inflammatory markers

<table>
<thead>
<tr>
<th>PET status</th>
<th>Normal markers</th>
<th>Raised markers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>Positive PET 53/63 (84%)</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative PET 10/63 (16%)</td>
<td></td>
</tr>
</tbody>
</table>

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### Pain

- Pain can be multi-factorial
- 23/58 (40%) positive PET had pain
- 4/24 (17%) negative PET had pain
- If PET positive, pain more likely to be due to RPF and respond to steroids
- If PET negative, look for alternative cause

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### Steroids – when / how long?

- Pain can be multifactorial
- 23/58 (40%) positive PET had pain
- 4/24 (17%) negative PET had pain
- If PET positive, pain more likely to be due to RPF and respond to steroids
- If PET negative, look for alternative cause

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### Degree of uptake on PET

<table>
<thead>
<tr>
<th>Steroid Response</th>
<th>PET status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>0/14 (0%)</td>
</tr>
<tr>
<td>Low grade</td>
<td>3/24 (12%)</td>
</tr>
<tr>
<td>High grade</td>
<td>9/11 (82%)</td>
</tr>
</tbody>
</table>

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### Is the RPF malignant?

- PET of benign RPF different from malignant RPF (b)
- 5/5 (100%) malignant cases diagnosed on pre-biopsy PET
- PET can point to diagnoses outside retroperitoneum
- E.g. Metastatic axillary melanoma (E) with paraneoplastic RPF
- PET can help with subtype classification
- 14/19 (74%) cases of IgG4 had mSUV>4 (median 7.1 vs 3.2 for non-IgG4 group)