Pulmonary Venous Blood Sampling Significantly Increases the Yield of Circulating Tumor Cells in Early Stage Lung Cancer

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Background

• Majority of Lung Cancer discovered at Stage IV
• Early detection improves survival
• Circulating Tumor Cells (CTC) are detectable in the blood, but clinical utility only seen in Stage IV disease
• Identifying CTCs in early stage cancers limited by rare cells (≤1 CTC per 7.5ml blood) and unreliable analysis of these rare cells
Diagram showing the flow of blood through the heart and lungs. The blood from the aorta flows through the capillary beds and then into the pulmonary vein. Tumor cells circulate through the bloodstream, causing issues in the lungs.
Methods

• Microfluidic technology allows for higher throughput analysis of blood and higher yield with increased sensitivity and specificity compared to other CTC detection platforms.

• EpCAM based chips (along with EGFR and CD133) used to evaluate whole blood samples.

• 40 patients enrolled
Results

- 20/32 patients had detectable CTCs (62.5%)

<table>
<thead>
<tr>
<th>Raw Data</th>
<th>Average</th>
<th>Stdev</th>
</tr>
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<tbody>
<tr>
<td>Preop Peripheral</td>
<td>3.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Intraop Peripheral</td>
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<tr>
<td>Intraop PulmVein</td>
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<tr>
<td>Postop Peripheral</td>
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</tbody>
</table>
Conclusions

- Pulmonary Vein sampling increases the yield significantly
- EpCAM antibody based systems may miss many CTCs
- Bronchoscopic biopsies may lead to higher CTCs being shed from early lung cancers
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