Trends in Circulating Tumor DNA in Rectal Cancer Patients: A Single Institution Experience

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Background
• Circulating tumor DNA (ctDNA) offers a longitudinal assessment of a tumor throughout disease management
• There is limited data evaluating the use of ctDNA in rectal cancer
• With a shift towards more individualized rectal cancer care there is potential for ctDNA to be used as an objective tool to monitor therapy and adjust the treatment plan

Methods
• Retrospective chart review of patients with a confirmed diagnosis of adenocarcinoma of the rectum across all stages with baseline ctDNA
• 16 patients were identified and a total of 57 plasma samples were analyzed
• A tumor-informed, personalized ctDNA assay (Signatera™, bespoke mPCR–NGS assay) was utilized to measure plasma ctDNA level expressed as mean tumor molecules (MTM)/mL

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Figure 2. Patient overview plot

- In our cohort, all 16 (100%) patients had a positive ctDNA at baseline.
- 11 patients cleared ctDNA after some form of treatment
- There were 4 patients who had upfront surgical resection, 3 of the 4 patients cleared ctDNA after surgery. One patient (patient 5) had stage IIIb disease and did not clear ctDNA until after starting adjuvant treatment. Since completing adjuvant treatment patient 5 has had 2 positive ctDNA results without radiologic evidence of disease recurrence.
- Of the 12 patients that received neoadjuvant treatment 1 patient had complete pathologic response (patient 13), 2 patients had near complete pathologic response (patient 1 and 11), and 3 had partial pathologic response (patient 2, 9, 12).
- There were 2 patients who had progression of disease which correlated with rising ctDNA levels (patient 4 and 8).
- Excluded from the figure are patient 14 and 16 whom had baseline ctDNA levels and are currently receiving neoadjuvant treatment. Patient 7 was lost to follow-up after completing induction chemotherapy.

Table 1. Patient Characteristics and Demographics (n=16)

| Patient characteristic | # of patients (%)
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<td>Median age at diagnosis (range)</td>
<td>67.5 years (44–86)</td>
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<td>Sex</td>
<td>Male 7 (44%)  Female 9 (56%)</td>
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<tr>
<td>Stage at diagnosis</td>
<td>I 2 (12.5%)     II 2 (12.5%)     III 10 (62.5%)     IV 2 (12.5%)</td>
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<td>Initial treatment</td>
<td>Surgery 4 (28%)  TNT 9 (56%)  Neoadj CRXT 3 (19%)</td>
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<td>Baseline CEA expressed</td>
<td>Yes 7 (44%)  No 9 (56%)</td>
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Conclusions
• This exploratory study demonstrates the feasibility of ctDNA–based molecular residual disease monitoring in patients with rectal cancer
• Our data suggests a correlation between ctDNA clearance and response to treatment, potentially offering an opportunity to monitor therapeutic efficacy and tailor therapy
• Larger prospective studies are needed to explore the potential role of ctDNA in the management of rectal cancer patients.