RESULTS

Purpose / Objective(s)

• Local failure represents a source of morbidity and mortality for patients with locally advanced unresectable or medically inoperable pancreatic cancer (LAPC).

• We hypothesize that proton therapy (PBT) can achieve durable local control with a reduced risk of side effects as compared to photon therapy.

Material & Methods

We analyzed the multicenter prospective registry of the Proton Collaborative Group (PCG) for patients with LAPC (unresectable or medically inoperable) who received definitive PBT.

- 90% of patients had adenocarcinoma histology (n=17), while two patients had either a neuroendocrine tumor or cystadenoma.

- Overall survival (OS), freedom from local-regional recurrence (FFLR), and freedom from distant metastases (FFDM) was calculated for the adenocarcinoma cohort.

- Toxicity, as per the Common Terminology Criteria for Adverse Events version 4.0, was calculated for the entire cohort.

- Descriptive statistics were used to report patient, tumor, and treatment characteristics. The Kaplan-Meier method was used to calculate OS, FFLR and FFDM.

Table 1: Patients (N=19) No. (%)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>11 (57.9%)</td>
</tr>
<tr>
<td>Male</td>
<td>8 (42.1%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Median Range</td>
<td></td>
</tr>
<tr>
<td>70 years</td>
<td>37 – 88 years</td>
</tr>
<tr>
<td>Primary Location</td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>3 (15.8%)</td>
</tr>
<tr>
<td>Head</td>
<td>12 (63.2%)</td>
</tr>
<tr>
<td>Tail</td>
<td>2 (10.5%)</td>
</tr>
<tr>
<td>Head &amp; Body NOS</td>
<td>1 (5.3%)</td>
</tr>
<tr>
<td>Tumor Size</td>
<td></td>
</tr>
<tr>
<td>Median Range</td>
<td></td>
</tr>
<tr>
<td>3.90 cm</td>
<td>2.30 – 5.50 cm</td>
</tr>
<tr>
<td>Clinical T Stage</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>1 (5.3%)</td>
</tr>
<tr>
<td>T3</td>
<td>3 (15.8%)</td>
</tr>
<tr>
<td>T4</td>
<td>10 (52.6%)</td>
</tr>
<tr>
<td>Not Reported</td>
<td>5 (26.3%)</td>
</tr>
<tr>
<td>Clinical N Stage</td>
<td></td>
</tr>
<tr>
<td>N0</td>
<td>8 (42.1%)</td>
</tr>
<tr>
<td>N1</td>
<td>5 (26.3%)</td>
</tr>
<tr>
<td>NX</td>
<td>6 (31.6%)</td>
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<td>Prior Chemotherapy</td>
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</tr>
<tr>
<td>Yes</td>
<td>13 (68.4%)</td>
</tr>
<tr>
<td>No</td>
<td>1 (5.3%)</td>
</tr>
<tr>
<td>Not Reported</td>
<td>5 (26.3%)</td>
</tr>
<tr>
<td>Concurrent Chemotherapy</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15 (78.9%)</td>
</tr>
<tr>
<td>No</td>
<td>4 (21.1%)</td>
</tr>
<tr>
<td>Total Radiation Dose</td>
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</tr>
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<td>Median Range</td>
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</tr>
<tr>
<td>54 Gy</td>
<td>50.4 – 60 Gy</td>
</tr>
</tbody>
</table>

Table 1: Outcomes (w/ a median follow up of 10.0 months):

- Freedom from Loco-Regional Recurrence:
  - 1 yr FFLR: 81.3%

- Freedom from Distant Metastases:
  - 1 yr FFDM: 58%

- Overall Survival:
  - 1 yr OS: 50.8%
  - Median OS: 13 months

Toxicity:

• 21% Acute Grade 2 Anorexia
• 21% Acute Grade 2 Fatigue
• 0% Grade ≥3 acute or late toxicity

Conclusions

This study shows excellent local control following PBT in LAPC, with a lower side effect profile than in modern IMRT photon series. Additional studies are needed to determine if PBT can further improve outcomes without adding toxicity using dose escalated strategies for LAPC.