Impact of lymphovascular invasion on overall survival in patients with prostate cancer following radical prostatectomy according to pathological tumor stage

Marcus L. Jamil MD, Nikola Rakic, Jacob Keeley MS, Akshay Sood MD, Deepanish Dalela MD, Sohrab Arons MD, Natalija Kovacevic, Alyesa Danno, James G. Peabody MD, Mani Menon MD, Craig G. Rogers MD, Firas Abdallah MD

BACKGROUND

• Histopathological assessment and subsequent pathological staging following radical prostatectomy (RP) remains pivotal in allowing providers to determine the next appropriate step in care.1

• Lymphovascular invasion (LVI) has been recognized as an adverse pathological feature in prostate cancer (PCa).2,3

• Estimated prevalence of LVI: 5.1% to 52.9%5

• LVI has been associated with higher Gleason grade, pathological T & N stage, risk of seminal vesical invasion and biochemical recurrence (BCR).6

• The effect of LVI on overall survival (OS) has not been well established.

OBJECTIVE

• To assess the impact of LVI on overall survival (OS) in patients following RP.

MATERIALS AND METHODS

• All patients were identified within the National Cancer Database (NCDB)

• Patients with histologically confirmed non-metastatic PCs with positive or negative LVI status between 2010 to 2015 were included in analysis

• Patients prior to 2010 were excluded due to lack of LVI recording

• Primary Outcome:

  • 5-year OS in patients with and without LVI on final pathology stratified by pathological T stage

  • Kaplan-Meier analysis used to assess overall survival of patients with and without LVI stratified by pathological tumor stage

RESULTS

• 232,704 patients with histologically confirmed non-metastatic PCs with positive or negative LVI status

  • Median age (IQ): for all patients was 62 (56 – 67) years

  • Median PSA 5.6 (4.3 - 8.2) ng/mL

  • Median follow-up was 42.7 months (27.1 – 58.7)

• Higher proportion of patients with LVI was noted in patients with Gleason grade (B-D), pathological tumor stage (pT3a and pT3b) and LNI (Table 1).

• On multivariable analysis, LVI status was not an independent predictor of OS in pT2 disease (hazard ratio [HR]: 1.11, 95% confidence interval [CI] 0.92 - 1.35, p = 0.2). However in pT3a and pT3b disease, presence of LVI had 1.2-fold (95%CI: 1.03-1.44, p=0.02) and 1.4-fold (95%CI: 1.22-1.61, p<0.001) higher overall mortality than their counterparts without LVI (Table 2).

• 5-year OS in LVI vs. non-LVI patients is depicted in figure 1.

CONCLUSIONS

• Our report demonstrates the impact of LVI on OS in locally advanced PCs (pT3a and higher).

• This information may prove valuable when risk-stratifying based on final pathology and counseling patients regarding outcomes and determining the necessity of further adjuvant treatment.

REFERENCES


Table 1: Descriptive characteristics of all patients stratified by the presence or absence of lymphovascular invasion on final pathological specimen within the National Cancer Database between 2010 to 2015

<table>
<thead>
<tr>
<th>LVI</th>
<th>Entire Cohort</th>
<th>- LVI</th>
<th>+ LVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVI</td>
<td>214,946 (92.4)</td>
<td>17,758 (7.6%)</td>
<td></td>
</tr>
<tr>
<td>Gleason &lt;6</td>
<td>63,631 (27.3%)</td>
<td>62,799 (29.2%)</td>
<td>832 (4.7%)</td>
</tr>
<tr>
<td>Gleason 3 + 4</td>
<td>103,030 (44.3%)</td>
<td>98,872 (46%)</td>
<td>4,158 (23.4%)</td>
</tr>
<tr>
<td>Gleason 4 + 5</td>
<td>37,052 (15.9%)</td>
<td>32,250 (15%)</td>
<td>4,802 (27%)</td>
</tr>
<tr>
<td>Gleason 8 - 10</td>
<td>24,859 (10.7%)</td>
<td>17,187 (8%)</td>
<td>7,672 (43.2%)</td>
</tr>
</tbody>
</table>

Table 2: Multivariable competing risks analysis and hazard ratios of all patients with histologically confirmed non-metastatic PCs with positive or negative LVI status between 2010 to 2015 within the National Cancer Database, stratified based on pathological tumor stage

<table>
<thead>
<tr>
<th>LVI Hazard Ratio</th>
<th>pT2</th>
<th>pT3a</th>
<th>pT3b</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVI</td>
<td>1.11</td>
<td>1.22</td>
<td>1.41</td>
</tr>
<tr>
<td>p</td>
<td>0.23</td>
<td>0.02</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

Figure 1. Kaplan-Meier overall survival estimates of all histologically confirmed non-metastatic PCs with positive or negative LVI status between 2010 to 2015, within the National Cancer Database, stratified based on pathological tumor stage.