Impact of Comorbidities on Treatment Choice for Colon Cancer Patients
Louisiana-CDC CER Project

Mei-Chin Hsieh, MSPH, CTR; Lisa A. Pareti, BS, RHIA, CTR; Mary O’Flarity, MN; Quoc Manh Nguyen, MD; Vivien W. Chen, PhD

Introduction

Treatment plan for cancer patients depends on tumor stage and grade, patient’s age, life expectancy, health condition, and preference. The surgical resection of the primary site and regional lymph nodes is the primary treatment for locoregional colon cancers with metastatic disease. Studies have demonstrated that stage III colon cancer patients benefited from adjuvant chemotherapy after surgical resection by reducing the risk of tumor recurrence and improving survival; however, stage III colon cancer patients with comorbidities were less likely to receive adjuvant chemotherapy than those without comorbidity. Radiation therapy is not a common treatment option for colon cancer and it is often used to shrink tumor before surgery. For stage IV patients, chemotherapy and radiation were used mainly as palliative therapy.

Objectives

We examined the association between treatment choice and comorbidities for stage I-IV colon cancer patients. Specifically we assessed comorbidity(s) and adjuvant chemotherapy for stage III patients.

Data and Methods

Data sources
Stage I-IV colon cancer cases, diagnosed in 2011, were obtained from the Louisiana Tumor Registry, one of ten CDC Comparative Effectiveness Research (CER) Project participating registries. CER registries were required to collect detailed and timely treatment for breast, colorectal and CML cases diagnosed in 2011 as well as complete comorbidities for all cancer sites.

Comorbid Condition

The comorbidities selected in this study were used in the Charlson comorbidity index (CCI) as indicated in Table 2, in which the higher the score the more severe the disease. The group comorbidities were the sum of comorbid conditions colon cancer patient had: none, one comorbidity, and two or more comorbidities. We also categorized type of comorbidities based on the disease severity into: mild (CCI = 1) and moderate (CCI=2, 3) to severe (CCI≥4).

Treatment and Demographic variables
Treatment includes surgery, adjuvant chemotherapy (yes, no), and adjuvant radiation (yes, no). The age at diagnosis and demographic variables included: race (white, black), sex (male, female), and age group (≤64, 65–79, ≥80).

Statistical Analysis
The logistic regression was used to examine the association between comorbidity and treatment and to identify factors associated with treatment decision making. Statistical analyses were carried out using SAS 9.0.3.

Results

A total of 1,514 eligible stage I-IV colon cancer patients were included in this model, among these patients, 45% had at least one stage III colon cancer and others had non-Charlson comorbidities. Diabetes is the most common Charlson comorbidity (18.8%) followed by chronic obstructive pulmonary disease (17.1%) and congestive heart failure (10.8%) (Table 1).

Figure 1 shows the distribution of comorbid grouping based on Charlson list. Out of 1,514 colon cancer patients, 486 patients had no comorbidity conditions, About 23% of colon cancer patients diagnosed in 2011 had one comorbidity, 27.9% of patients had mild comorbidity disease, and less than 5% of patients had moderate to severe disease.

Figure 2 shows the distribution of treatment combination by AJCC stage. The majority of stage I and II patients received surgery only, 92.7% and 78.7%, respectively. Stage III patients receiving adjuvant chemotherapy were three-fold higher than stage II patients (67.8% vs. 19.1%), and only 1.8% of stage III patients received adjuvant radiation. Less than 1% of stage I-III colon cancer patients and 14.2% of stage IV patients received non-surgical therapy (Table 2).

Table 2 shows the distribution of treatment combination by AJCC stage. The majority of stage I and II patients received surgery only, 92.7% and 78.7%, respectively. Stage III patients receiving adjuvant chemotherapy were three-fold higher than stage II patients (67.8% vs. 19.1%), and only 1.8% of stage III patients received adjuvant radiation. Less than 1% of stage I-III colon cancer patients and 14.2% of stage IV patients received non-surgical treatment (Table 2).

Table 2. Frequency distribution of treatment type by AJCC stage

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>Stage I (%)</th>
<th>Stage II (%)</th>
<th>Stage III (%)</th>
<th>Stage IV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>94.6</td>
<td>0.8</td>
<td>0.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Surgery only</td>
<td>345 (21.7)</td>
<td>129 (78.3)</td>
<td>218 (29.5)</td>
<td>76 (23.9)</td>
</tr>
<tr>
<td>Surgery and chemotherapy</td>
<td>0.0</td>
<td>80 (15.9)</td>
<td>67.8 (7.7)</td>
<td>494 (12.6)</td>
</tr>
<tr>
<td>Surgery and radiation</td>
<td>0.0</td>
<td>1 (0.2)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Surgery with adjuvant chemotherapy &amp; radiation</td>
<td>0.0</td>
<td>6 (1.4)</td>
<td>8.1 (1.2)</td>
<td>27 (1.8)</td>
</tr>
<tr>
<td>Total</td>
<td>370 (100)</td>
<td>418 (100)</td>
<td>394 (100)</td>
<td>322 (100)</td>
</tr>
</tbody>
</table>

Total 1,083 (71.5%) had comorbidity information. Among these patients, 45% had at least one stage III colon cancer and others had non-Charlson comorbidities. The majority of them (84.9%) received adjuvant chemotherapy. Only 39% of colon cancer patients received radiation, 35.9% of them received neoadjuvant (pre-operative) radiation (Figure 2).

About 92% (1,388) of all colon cancer patients received surgery, almost exclusively had surgical resection. For colon cancer patients who exclusively had surgical treatment (Table 2).

Conclusions

Surgery remains the primary treatment choice for colon cancer patients and is not affected by the patient’s comorbid conditions. Adjuvant chemotherapy is used to destroy remaining cancer cells and to prevent the cancer recurrence; and adjuvant radiation is used mainly when the cancer has attached to an internal organ, the lining of abdomen wall or has metastasized to other organs. In our study shows comorbidity impacts the decision of additional adjuvant chemotherapy for stage III colon cancer patients. However, we did not observe a significant relationship between comorbidities and received adjuvant radiation for stage IV patients.

Table 3. Odds Ratios of Adjuvant Treatment for Stage III and IV Colon Cancer Patients, Louisiana, 2011

<table>
<thead>
<tr>
<th>Stage</th>
<th>No comorbidity</th>
<th>Comorbidity</th>
<th>CCI score</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>0.08 (0.03-0.21)</td>
<td>1.00 (Referent)</td>
<td>0.08 (0.03-0.21)</td>
<td>1.00 (Referent)</td>
</tr>
<tr>
<td>IV</td>
<td>0.08 (0.03-0.21)</td>
<td>1.00 (Referent)</td>
<td>0.08 (0.03-0.21)</td>
<td>1.00 (Referent)</td>
</tr>
</tbody>
</table>

References