Statins (HMG-CoA reductase inhibitors) are lipid-lowering medications that block the conversion of HMG-CoA to mevalonic acid, and subsequently to estradiol. Statins have also been shown to possess anti-inflammatory properties. Studies have shown a correlation between obesity, cholesterol, estrogen and breast cancer. We hypothesized that because of its anti-estrogen and anti-inflammatory properties, statin use may be associated with a lower incidence of invasive breast cancer.

We performed a Level III retrospective cohort study to compare the incidence of invasive breast cancer in statin users, statin (+) vs nonusers, statin (-). We also examined age, number of pregnancies and completed births, age of statin use, tumor characteristics and treatment modalities.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Statin User (%)</th>
<th>Non Statin User (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>125</td>
<td>1278</td>
<td>0.114</td>
</tr>
<tr>
<td>Age (yr)</td>
<td>66.15</td>
<td>56.31</td>
<td>0.000</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>29.17</td>
<td>27.17</td>
<td>0.001</td>
</tr>
<tr>
<td>No of Pregnancies</td>
<td>2.44</td>
<td>2.15</td>
<td>0.108</td>
</tr>
<tr>
<td>No of Births</td>
<td>1.83</td>
<td>1.59</td>
<td>0.097</td>
</tr>
<tr>
<td>Age at First Birth</td>
<td>24.47</td>
<td>26.78</td>
<td>0.117</td>
</tr>
</tbody>
</table>

Mammography: 60 (44) vs 458 (33), P = 0.049
Calcifications: 18 (13) vs 168 (12)
Palpation: 46 (34) vs 610 (43)
Other (eg MRI): 13 (0) vs 155 (11), P = 0.027
Diagnostic Method: 13 (9) vs 93 (7)

US Core needle biopsy: 77 (56) vs 642 (46)
FNA: 21 (15) vs 242 (25)
Excisional Biopsy: 24 (18) vs 256 (18)
Other: 2 (1) vs 58 (4), P = 0.000

We compared the incidence of invasive breast cancer in statin (+) vs statin (-) patients. There was a higher incidence of invasive ductal carcinoma (IDC) in the statin (+) group than the statin (-) group (29.17 vs 27.03, 65.15 vs 56.31, respectively, P < 0.001). There was no difference between groups in terms of postoperative chemotherapy and radiation therapy and a lesser incidence of invasive ductal carcinoma in the statin (+) group than the statin (-) group (IDC, 80.3% vs 89.2%, respectively, P = 0.003). There was no difference between tumor size and node positivity between groups. There was a lower proportion of moderate- and poorly-differentiated invasive cancer in the statin (+) group than the statin (-) group (p = 0.003). There was no difference in tumor ER, HER2 status and surgical management between groups. Local recurrence rates were also lower among statin (+) patients than statin (-) patients (p = 0.003). Statin (+) patients demonstrated less usage of postoperative chemotherapy (28% vs 46%, p < 0.001). There was no significant difference between groups with regards to postoperative radiation therapy and tamoxifen use (p = 0.145 and p = 0.053, respectively).

We performed chi-square analysis for comparison of discrete variables between groups, and unpaired Student’s T-test for comparison of continuous variables. Significance was set at p < 0.05. IRB approval was obtained for this study.

Discussion

From our database, we found 125 statin (+) and 1278 statin (-) patients who had invasive breast cancer. BMI and age were greater in the statin (+) group than the statin (-) group (29.17 vs 27.03, 65.15 vs 56.31, respectively, p < 0.001). There was no difference between number of pregnancies, number of births, and age of first birth between groups. There was a higher incidence of invasive lobular carcinoma (ILC) in the statin (+) group than the statin (-) group (19.7% vs 10.8%, respectively) and a lesser incidence of invasive ductal carcinoma in the statin (+) group than the statin (-) group (IDC, 80.3% vs 89.2%, respectively, p = 0.003). There was no difference between tumor size and node positivity between groups. There was a lower proportion of moderate- and poorly-differentiated invasive cancer in the statin (+) group than the statin (-) group (p = 0.003). There was no difference in tumor ER, HER2 status and surgical management between groups. Local recurrence rates were also lower among statin (+) patients than statin (-) patients (p = 0.003). Statin (+) patients demonstrated less usage of postoperative chemotherapy (28% vs 46%, p < 0.001). There was no significant difference between groups with regards to postoperative radiation therapy and tamoxifen use (p = 0.145 and p = 0.053, respectively).

Conclusion

Statin (-) patients have a higher proportion of recurrent invasive cancer than statin (+) patients even though they tend to have a higher BMI. This may be associated with a lower risk of recurrence in patients with invasive breast cancers.

References