Statin Use At Time of Breast Cancer Diagnosis Is Associated With Better Outcomes

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Introduction

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

Variable	Statin User (%)	Non Statin User (%)	P
Number	125	1278	0.114
Age (yr)	**66.15**	**56.31**	**P<0.001**
BMI (kg/m2)	**29.17**	**27.17**	**P<0.001**
No of Pregnancies	2.44	2.15	0.108
No of Births	1.83	1.59	0.097
Age at First Birth	24.47	26.78	0.117
Presentation			**0.049**
Mammography	**60 (44)**	**458 (33)**	
Calcifications	**18 (13)**	**168 (12)**	
Palpation	**46 (34)**	**610 (43)**	
Other (eg MRI)	**13 (0)**	**155 (11)**	
Diagnostic Method			**0.027**
Stereo biopsy	**13 (9)**	**93 (7)**	
US Core needle biopsy	**77 (56)**	**642 (46)**	
FNA	**21 (15)**	**242 (25)**	
Excisional Biopsy	**24 (18)**	**256 (18)**	
Other	**2 (1)**	**58 (4)**	

Methods

Using our prospective breast cancer database, 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.

Variable	Statin User (%)	Non Statin User (%)	P
Age	**66.15**	**56.31**	**0.000**
Size * (mm)	16.77	19.31	0.294
Positive Nodes	0.75	0.99	0.317
Histopathology			**0.003**
IDC	**110 (80)**	**1241 (89)**	
ILC	**27 (20)**	**150 (11)**	
Tumor differentiation			**0.003**
Well	**28 (21)**	**255 (18)**	
Moderate	**73 (54)**	**630 (46)**	
Poor	**35 (26)**	**489 (36)**	
Estrogen Receptor	125 (100)	1099 (86)	0.309
H2N IHC	112 (90)	1065 (83)	0.078
Oncotype	18.67	22.09	0.392
Surgery			0.348
Breast Conservation	113 (84)	1113 (80)	
Mastectomy	22 (16)	272 (20)	
Local Recurrence			**0.003**
	0 (0)	**67 (5)**	
	137 (100)	**1324 (95)**	
Radiation			0.145
Yes	96 (71)	1003 (76)	
No	40 (29)	313 (24)	
Tamoxifen			0.053
Yes	112 (84)	965 (76)	
No	22 (16)	302 (24)	
Chemotherapy			**P<0.001**
Yes	**37 (28)**	**584 (45)**	
No	**97 (72)**	**702 (54)**	

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

Dulak J, Jozkowicz A. Anti-Angiogenic and Anti-Inflammatory Effects of Statins: Relevance to Anti-Cancer Therapy. Curr Cancer Drug Targets. 2005 Dec: 5(8): 579-594.