

Combination 2D/3D Mammography versus 2D Mammography: A Comparison Study on Clinical Metrics in Women with Normal and Dense Breast Tissue.

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Combination 2D/3D Mammography versus 2D Mammography: A Comparison Study on Clinical Metrics in Women with Normal and Dense Breast Tissue

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Introduction

In November 2014, the American College of Radiology released a statement saying combination 2D/3D tomosynthesis was no longer investigational, and that it has shown to improve key screening parameters when compared to 2D digital mammography. Of these key screening methods are things such as overall cancer detection, reduction in false positive recalls, and invasive cancer detection. While numerous studies have corroborated this information, insurance companies are lagging behind in terms of providing coverage, claiming there is not enough evidence yet to support its use. This doubt has crept into the public persona, with many women either unaware of the new technology or unwilling to pay out of pocket for it.

Problem Statement

In women receiving screening mammograms at LVHN, is combination 2D/3D tomosynthesis better than 2D mammography in terms of recall rate, proportion of false positive recalls, ultrasound only recalls, and overall cancer detection in women with either fatty or dense breast tissue?

Methods

We performed a retrospective institutional review of all women who received an initial BIRADS 0 screening mammogram at LVHN between May 2014 - May 2016. This study compared the performance of 2D mammography versus combination 2D/3D tomosynthesis in women with both normal and dense breast tissue. The analysis included the following performance metrics that were further stratified based on breast density: Recall rate, false positive recall rate, ultrasound only recall rate, and overall cancer detection.



Results

A total of 52,524 women were evaluated who received a screening mammogram at LVHN between May 2014 – May 2016. Of those, 30,616 received a 2D digital mammogram, while 2,530 required a call back for additional imaging. This resulted in an overall recall rate for 2D mammography of 8.26%. 21,908 women received combination 2D/3D tomosynthesis, of which 1,522 required a call back for additional imaging. This resulted in an overall recall rate for combination 2D/3D mammography of 6.9%. Of the women called back using 2D digital mammography, a total of 95 invasive cancers were detected. This amounted to 3.75% of the women called back. Of the women called back using combination 2D/3D tomosynthesis, a total of 89 invasive cancers were detected. This amounted to 5.8% of the women called back. Additionally, in women with dense breast tissue, we found a statistically significant reduction in the amount of false positive recalls when utilizing combination 2D/3D tomosynthesis (p-value 0.03).

Table 1. Sample Data Collection Spreadsheet																		
									BIRADS 4&5					BIRADS 4*5 OUTCOMES				
	Total Screening	Total Birads 1&2	Total Birad 0	Recall Rate	Recall US Only	%US only recall	Total Birads 1&2 After Addl Eval	Birads 3 After Recall	Birads 4&5 After Recall	4A	4B	4C	5	Benign	DCIS	IDC	ILC	Unresolved Other
May 2014 2D Total	4658	1089	68	5.88%	1	1%	43	15	10	8	1	0	1	7	2	1	0	
May 2014 2D Fatty			38		1		24	9	5	5	0	0	0	5	0	0	0	
May 2014 2D Dense			30		0		19	6	5	3	1	0	1	2	2	1	0	
May 2014 3D Total	926	864	62	6.70%	8	13%	33	16	12	7	2	3	0	8	0	3	0	*1 cyst asp
May 2014 3D Fatty			27		3		13	7	5	4	0	1	0	4	0	1	0	*1 cyst asp
May 2014 3D Dense			35				20	8	7	3	2	2	0	5	0	2	0	*1 cyst asp

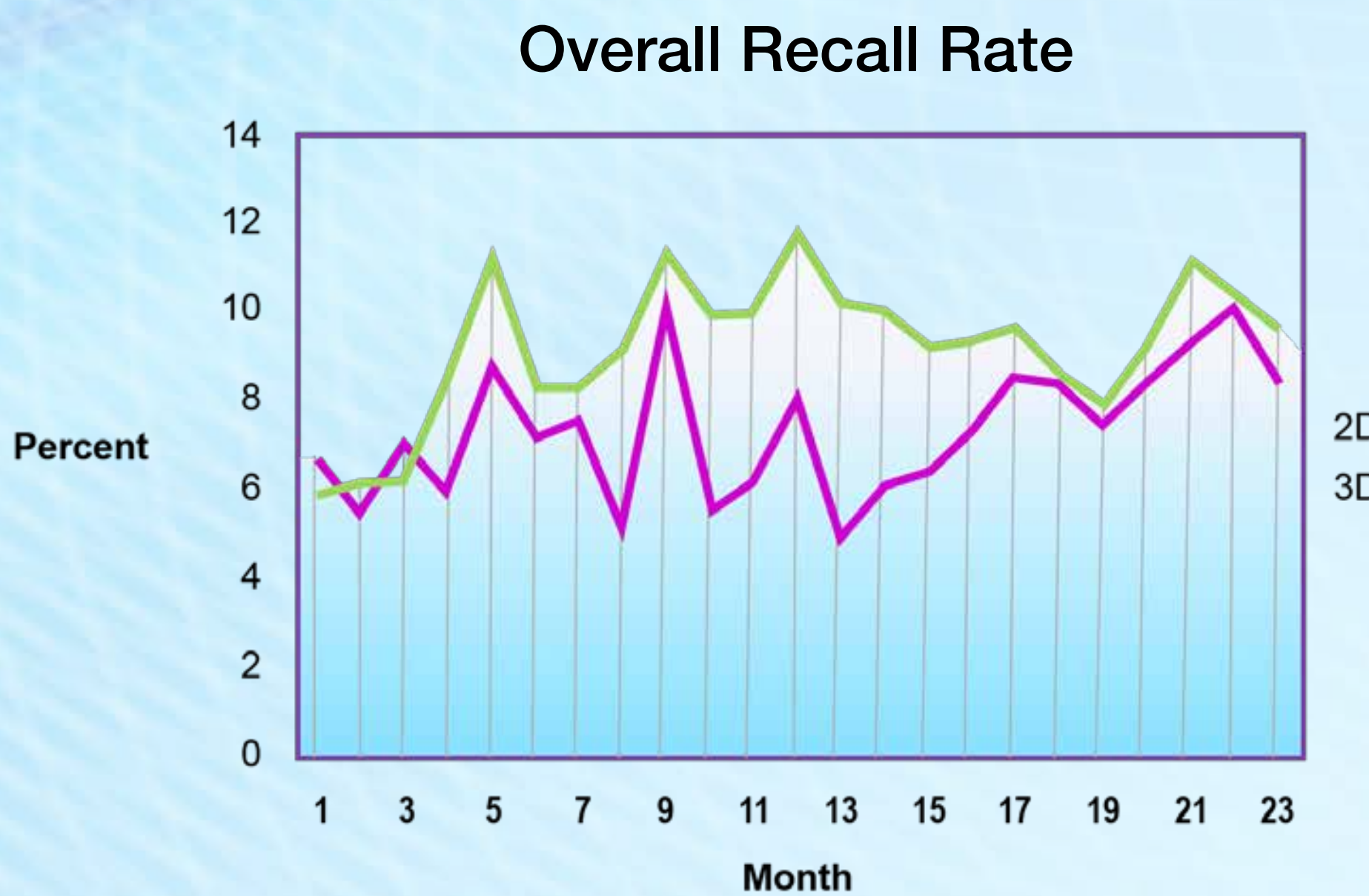


Figure 1. Overall recall rate in women with both fatty and dense breast tissue when comparing 2D to combination 2D/3D tomosynthesis.

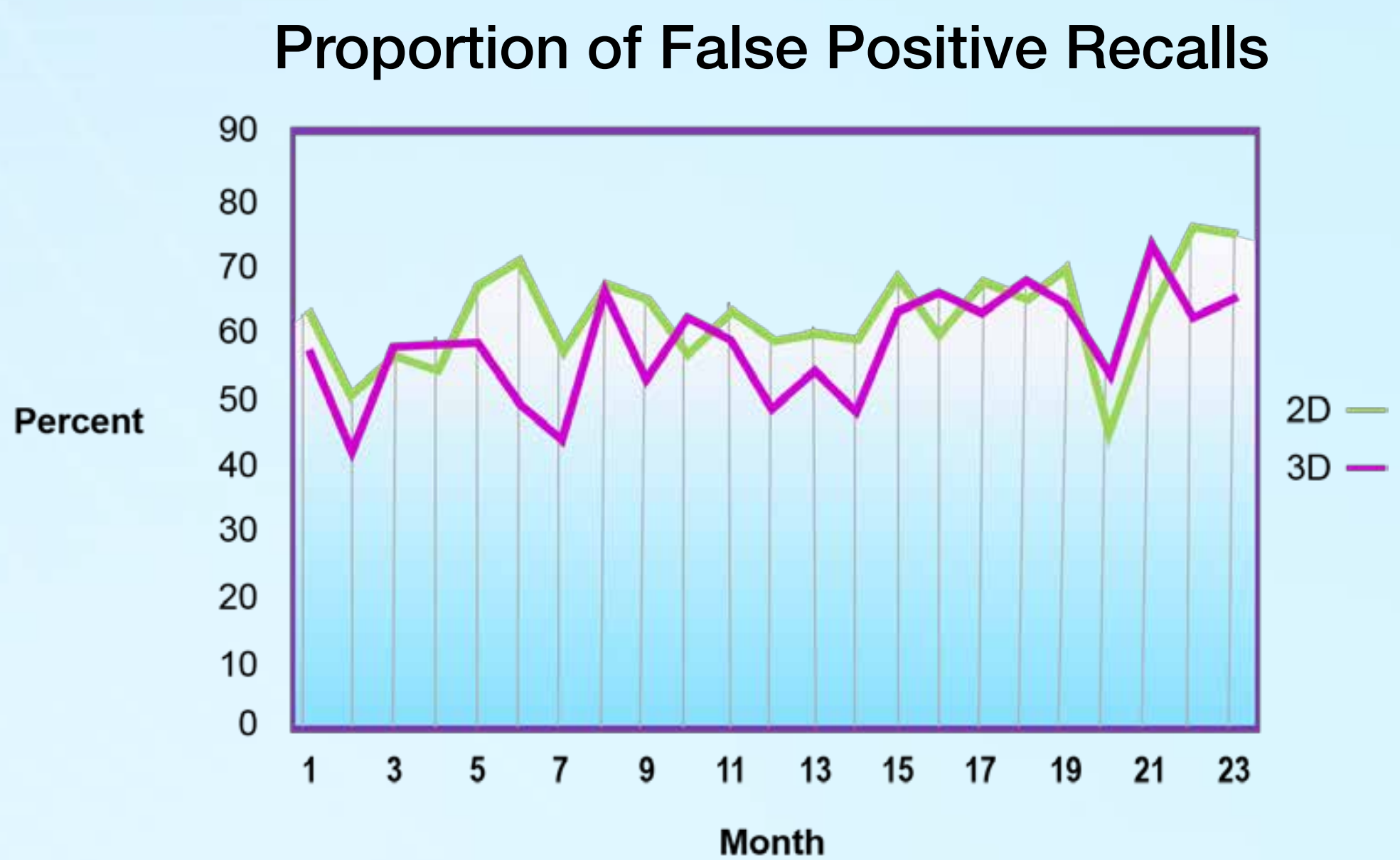


Figure 2. Comparison of the proportion of false positive recalls in women with dense breast tissue.

Conclusion

Combination 2D/3D mammography has been shown in numerous studies to improve overall cancer detection as well as reduce the number of false positive recalls. In our study, we found that using 2D/3D tomosynthesis as a screening tool resulted in less women being called back unnecessarily. Of those women who were called back, however, tomosynthesis was able to pick up on a higher percentage of invasive cancers. When viewing the technology from a breast density standpoint, women with denser breast tissue benefited from a decrease in false positive recalls when using tomosynthesis. These results corroborate current literature as well as provide evidence for the benefits of combination 2D/3D tomosynthesis specifically in women with dense breast tissue.

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