

Image quality assessment in patient-assisted versus standard compression: A population-based randomized trial in a Breast Cancer Screening Program in Spain

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Purpose

To evaluate the quality of mammography images obtained by patient-assisted (PAC) and standard compression (SC) modes, using the PGMI classification.

Methods

This prospective randomized controlled study was conducted between September 2017 and December 2019. Participants were asymptomatic women aged from 50 to 69 years attending a subsequent screening mammography. We randomized the breast laterality and the compression mode to start the mammography. Three radiologists evaluated the image independently by identifying errors per each PGMI criteria. Based on this evaluation, we classified each image according to the view as "perfect", "good", "moderately good", or "inadequate" (Figure 1). Pearson's chi square test, with Yates correction if pertinent, were performed to compare the image quality between compression modes.

Results

A total of 295 participants were included (mean age, 60 years \pm 4.9 [standard deviation]; range, 51 –70 years). There were no differences in the percentages of the PGMI between the patient-assisted and the standard compression mode for the craniocaudal (CC) view and the mediolateral oblique (MLO) view (Table 1). No differences were found when we stratified by laterality (Table 2).

The visible external glandular tissue-CC was the only criterion with significantly more errors in the standard compression (PAC, 2.7% vs SC, 6.1% P=.04). Other three criteria had higher error percentage in the standard compression but were not statistically significant.

Table 1. Distribution of the PGMI classification in the craniocaudal and mediolateral oblique views by patient-assisted and standard compression modes

Craniocaudal view		Type of Compression			
PGMI	Patient-assisted	%	Standard	%	P value*
Perfect	100	33.9	104	35.3	0.91
Good	4	1.4	7	2.4	
Moderate	191	64.7	183	62.0	
Inadequate	0	0.0	1	0.3	
Total	295	100.0	295	100.0	
Mediolateral oblique view					
PGMI	Patient-assisted	%	Standard	%	P value*
Perfect	166	56.3	170	57.6	0.73
Good	61	20.7	65	22.0	
Moderate	62	21.0	58	19.7	
Inadequate	6	2.0	2	0.7	
Total	295	100.0	295	100.0	

*p-value for the Chi Square test with Yates's correction for continuity
Abbreviations: PGMI= perfect, good, moderately good, and inadequate.

Figure 1. Mammograms classified using the PGMI system. (a) Right MLO view classified as "inadequate" obtained with the patient-assisted compression mode (b) Left MLO view classified as "inadequate" obtained with the standard compression mode.

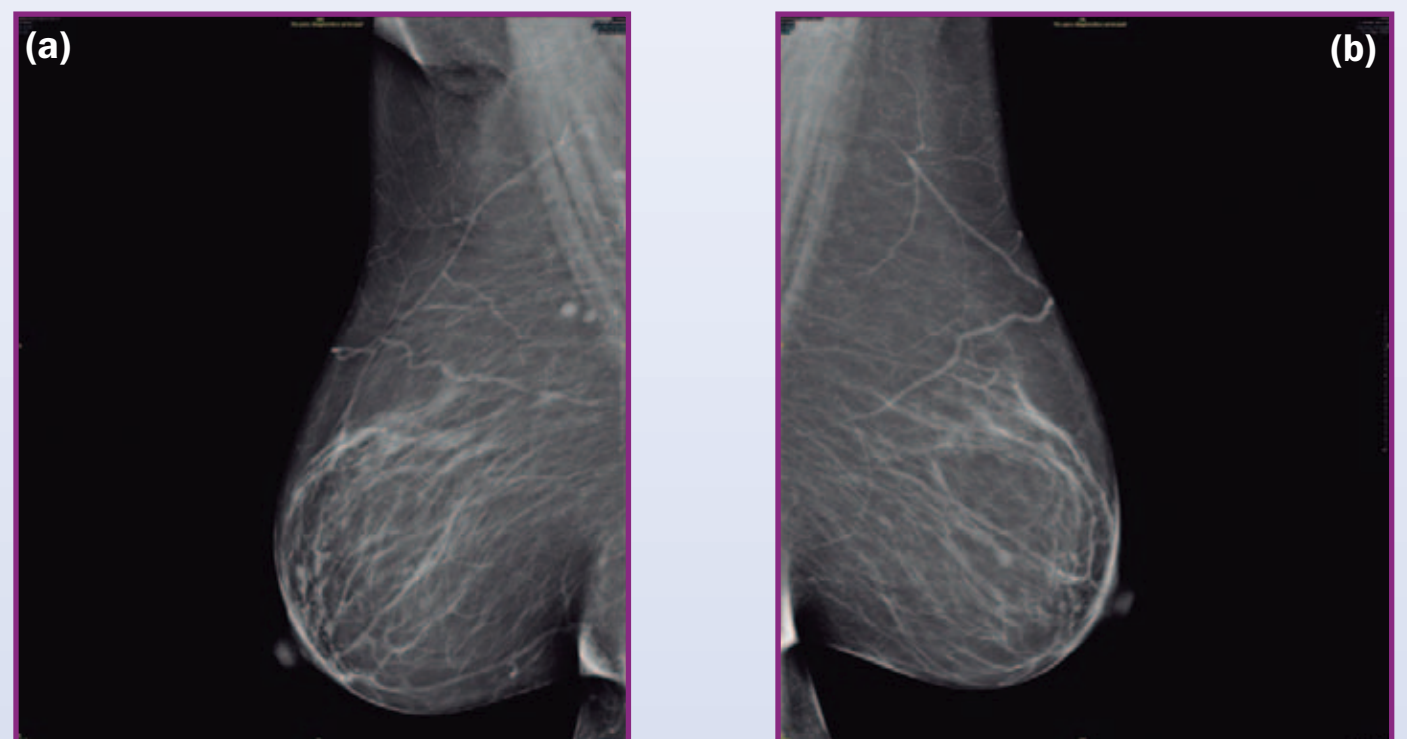


Table 2. Distribution of the PGMI classification in the craniocaudal and mediolateral oblique views stratified by breast laterality, by patient-assisted and standard compression modes

PGMI	Patient-assisted (n=295)	%	Standard (n=295)	%	P Value*
Right CC					
Perfect	45	31.7	52	33.9	0.98
Good	3	2.1	3	1.9	
Moderate	94	66.2	98	64.1	
Inadequate	0	0.0	0	0.0	
Left CC					
Perfect	55	35.9	52	36.6	0.79
Good	1	0.7	4	2.8	
Moderate	97	63.4	85	59.9	
Inadequate	0	0.0	1	0.7	
Right MLO					
Perfect	87	61.3	85	55.6	0.09
Good	20	14.1	39	25.5	
Moderate	32	22.5	29	18.9	
Inadequate	3	2.1	0	0.0	
Left MLO					
Perfect	79	51.6	85	59.9	0.43
Good	41	26.8	26	18.3	
Moderate	30	19.6	29	20.4	
Inadequate	3	1.9	2	1.4	

*p-value for the Chi Square test with Yates's correction for continuity
Abbreviations: CC =craniocaudal; MLO=mediolateral oblique; PGMI=perfect, good, moderately good, inadequate.

Conclusion

Patient-assisted compression does not seem to have a negative impact on the image quality of mammography. Future research should focus on evaluating it in a daily practice setting.

Summary Statement: The image quality of screening mammography, using the PGMI classification, was similar between the patient-assisted compression and the standard compression modes.

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