Does digital mammography increase DCIS detection rate? Trends after 7 years of digitalization in Barcelona, Catalonia, Spain

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Background

The aim of this study was to explore trends of ductal carcinoma *in situ* (DCIS) and invasive breast cancer detection rates in initial and successive screenings in a cohort of women screened from 1996 to 2011, before and after the transition from screen-film mammography (SFM) to digital mammography (DM).

Material and methods

We analyzed a retrospective cohort of screened women from a population-based screening program in Barcelona (Catalonia, Spain) screened from 1996 to 2011 (n=61,859). A total of 182,002 screening mammograms were included in the analysis, 102,970 SFM and 79032 DM. We divided the study period in 8 periods of 2 years, from 1996 to 2003 with SFM and form 2004 to 2011 with DM. Invasive and DCIS cancer detection rates per 1,000 mammograms were computed and compared among periods, using Chi-squared tests.

Results

An overall number of 812 breast tumors were detected in the study period. No statistically significant differences were observed in cancer detection rate (table 1) comparing SFM and DM periods neither in initial (5.10‰ and 5.50‰ respectively, p=0.60) nor in successive screenings (4.26‰ and 4.02‰ respectively, p=0.53). However, rates of DCIS were higher in DM than in SFM period (0.89‰ and 0.56‰ respectively, p=0.013) while invasive cancer rates were lower (3.34‰ and 3.95‰ in DM and SFM respectively, p=0.035). The highest rate of DCIS (figure 1) was observed in initial screenings in the first DM period, followed by a decrease in the subsequent DM periods, from 1.51‰ to 1.16‰. In successive screenings (figure 2), rates of DCIS increased from the second to fourth DM periods (0.93‰ to 0.99‰).

Table 1. Cancer detection rates (overall, invasive and in situ) and interval cancer rates according to screen-film mammography and digital mammography

	Screen-film mammography n	‰	Digital mammography n	‰	p value*
Screened women**	41939		43406		
Screening mammograms	102970		79032		
First screening	41196		14533		
Successive screening	61774		64499		
Cancer detection rate	473	4,59	339	4,29	0,353
First screening	210	5,10	80	5,50	0,603
Successive screening	263	4,26	259	4,02	0,531
Invasive carcinomas detection rate	407	3,95	264	3,34	0,036
First screening	178	4,32	61	4,20	0,903
Successive screening	229	3,71	203	3,15	0,098
In situ carcinomas detection rate	58	0,56	70	0,89	0,013
First screening	25	0,61	18	1,24	0,029
Successive screening	33	0,53	52	0,81	0,079
Interval cancer rate***	139	1,36	112	1,42	0,751
First screening	64	1,56	32	2,21	0,132
Successive screening	75	1,22	80	1,25	0,959

*Chi-square
**The total number of screened women is not the sum of women screened with screen-film and digital mammography, since some women were screened during both periods (n=23,486)
***Interval cancer rate was calculated as number of screened women, minus women with screen-detected cancer in the same period

Figure 1. Total, invasive and DCIS breast cancer rates in initial screening according SFM and DM periods

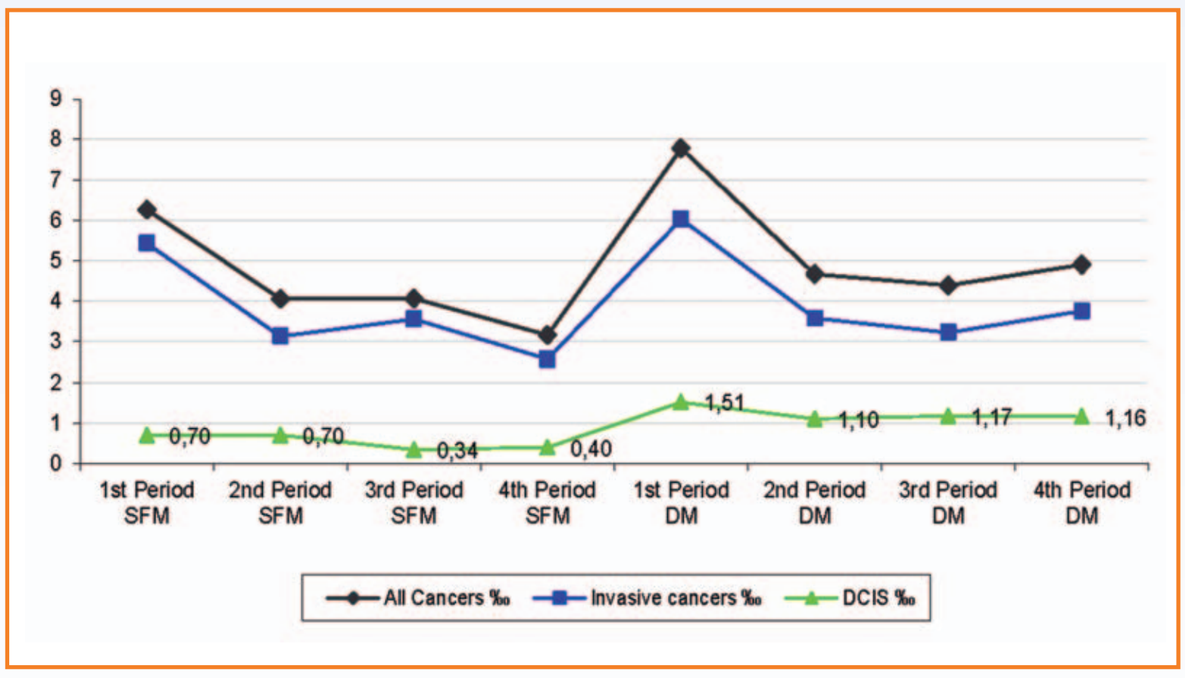
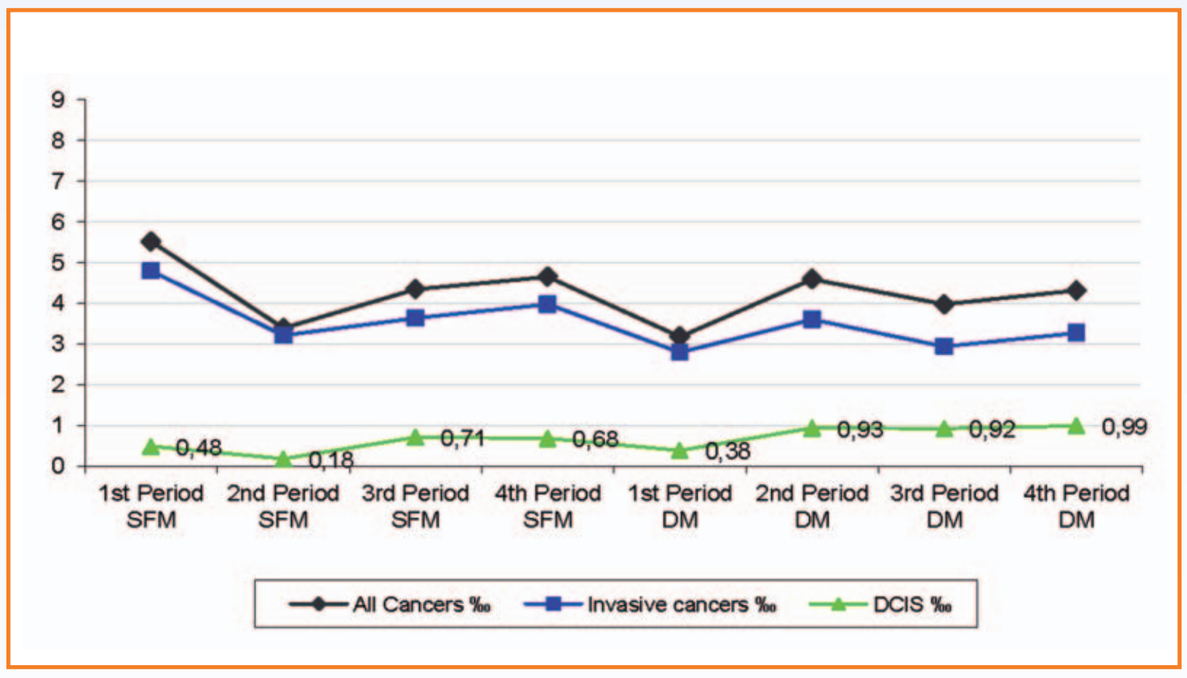


Figure 2. Total, invasive and DCIS breast cancer rates in successive screening according SFM and DM periods



Conclusion

Some controversies have risen concerning the higher detection rate of DCIS with digital mammography. Observed trends in rates of DCIS and invasive cancer in initial and successive screenings after the introduction of DM suggest an advance in early diagnosis.

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