Original Article

Breast Cancer Patients Diagnosed by National Breast Screening Programme

Sarah Ellul, Kay Vanhear, Ramona Camilleri, Gordon Caruana-Dingli,

Abstract

Breast cancer is the most common cancer in Malta. A National Breast Screening Programme (NBSP) was introduced in 2009 for women in the 50 to 60 year old age group.

The first 112 patients diagnosed by the NBSP were compared to a matched control group of symptomatic patients randomly selected from the Breast Clinic, who had presented to the clinic with a breast lump. The files of all these patients were reviewed retrospectively.

In the screening group there were 94 patients with invasive cancer and 18 patients with ductal carcinoma *in situ* (DCIS) while in the control group there were 114 patients with invasive cancer and 3 with DCIS.

In the screening group, 81 (86.2%) patients with invasive cancer underwent wide local excision (WLE) and 13 (13.8%) underwent mastectomy. In the control group 88 (77.2%) patients with invasive cancer underwent WLE and 26 (22.8%) had a mastectomy.

Out of all the patients in the screened group with DCIS, 12 (66.7%) underwent WLE and 6 (33.3%) underwent mastectomy. In the control group only 3 patients had DCIS and these were all treated by WLE.

The average Nottingham Prognostic Index (NPI) of the screening population with invasive cancer is (3.28 (95% CI)) and is lower than the NPI of the control group is (3.74 (95% CI)).

This study shows that in the screening group there is a higher percentage of patients with DCIS when compared to the control group. Furthermore, the screened group patients with DCIS were more likely to undergo mastectomy than those with invasive cancer.

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Keywords

NBSP, Breast Cancer, NPI, Mastectomy, DCIS

Introduction

The concept of breast screening is to detect the disease at an earlier stage with the intention of increasing the life expectancy of the cohort of screened women.

The decision for a country to introduce breast screening is usually political (UK, EU, Malta) and the available evidence is based on Scandinavian trials carried out in the 1970s. The evidence for the benefit for breast screening has been recently analysed concluding that although breast screening will save some women from dying from breast cancer, it over diagnoses the disease and will submit many women to unnecessary surgery and other treatment.[1]

The benefits of breast screening have been questioned.[2-3] Some claim that overall mortality in patients screened for breast cancer may be worse than those that are not screened. This is because of damage to the coronary arteries secondary to unnecessary radiotherapy.[4]

There have been dramatic advances in surgery and adjuvant treatment for breast cancer in the fourty years since the Scandinavian trials were carried out. The effectiveness of modern treatment may mean that there is little benefit from detecting a breast cancer at an earlier stage. Breast screening has also led to an increase in patients diagnosed with ductal carcinoma *in situ* (DCIS). The clinical course of this condition has not been elucidated and as a result, a high proportion still undergo mastectomy. Studies in populations who have undergone breast screening fail to demonstrate the expected decrease in women presenting with late cancers.[3]

The National Breast Screening Programme (NBSP) was introduced in Malta in October 2009.[5] A dedicated unit was established at Lascaris, Valletta, and a database was established to screen patients between the ages of 50 and 60 every three years. Opportunistic screening is also carried out in the private sector and this is very popular due to a strong media campaign by the two breast non-governmental organisations (NGOs)[6] and also the private hospitals and clinics.[7]

At this stage it is not possible to compare mortality in the screened group with the unscreened population because of the small numbers and the short follow up period. This paper will study surrogates, even though it is accepted that they are imprecise indicators of the overall benefit of breast screening a population. We have studied mastectomy rates, number of patients with DCIS, size of tumour and Nottingham Prognostic Index (NPI).

Breast cancer in Malta

The crude incidence and crude mortality from breast cancer in Malta in the years 1995-2011 is plotted in graph 1. This shows that there has been a dramatic rise in incidence but the number of deaths has remained stable.

When the figures are adjusted to European Age Standardised Rates (EASR) the increase in incidence is less marked and this implies that crude figures have increased partly because of an aging population. The decrease in mortality is substantial, as shown in graph 2.

The third graph charts the age specific crude incidence of breast cancer in Malta. This has remained stable in the below 50 year age group. There was a marked increase in the 50-60 year age group and it has risen dramatically in the above 60 year age group. The fourth graph shows that the crude mortality rates remained constant in the three age groups studied.

***Figure 1**: Crude incidence and mortality of breast cancer in Malta 1995-2011*

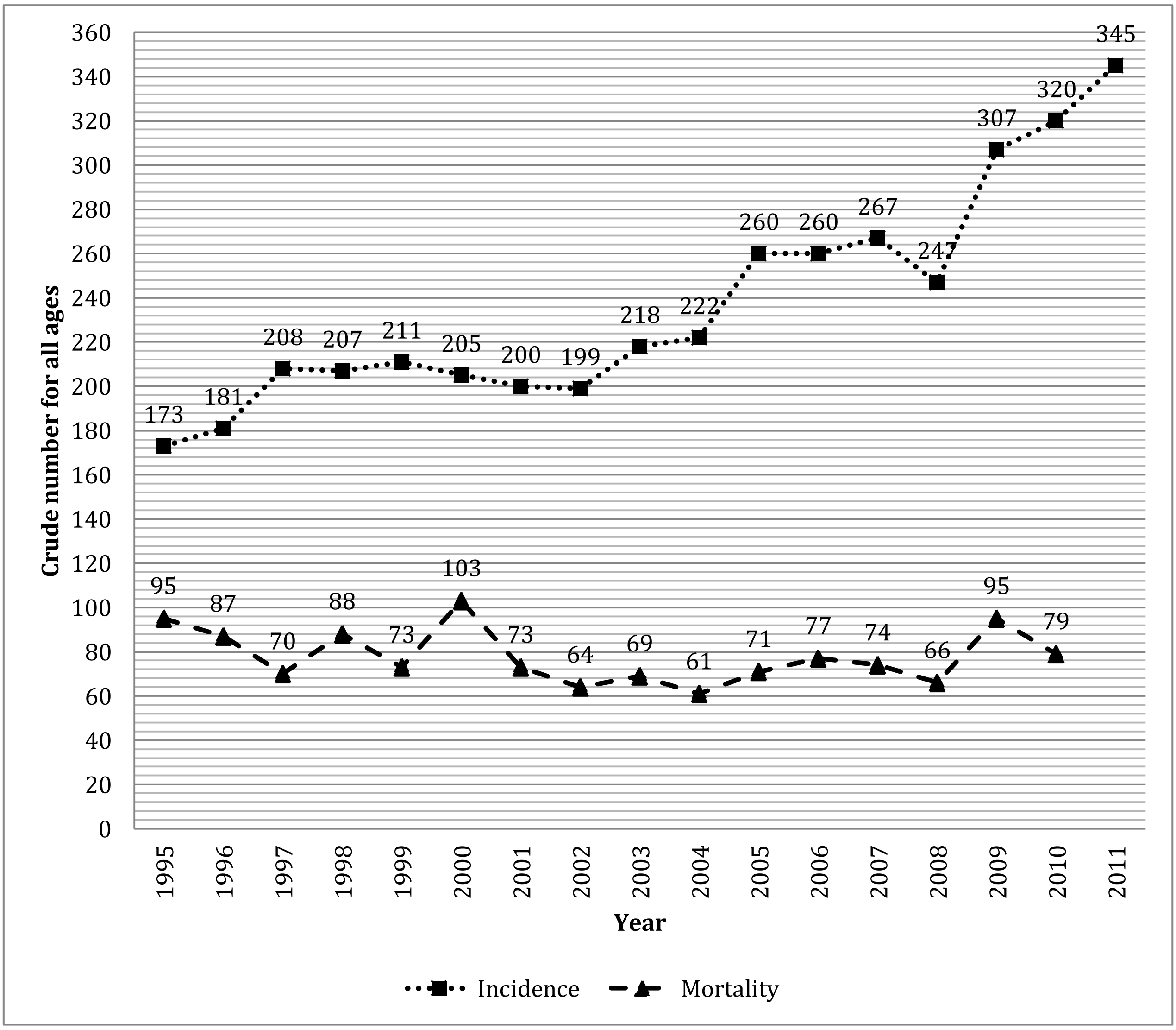


Figure 2: European age standardised rates of incidence and mortality of breast cancer in Malta

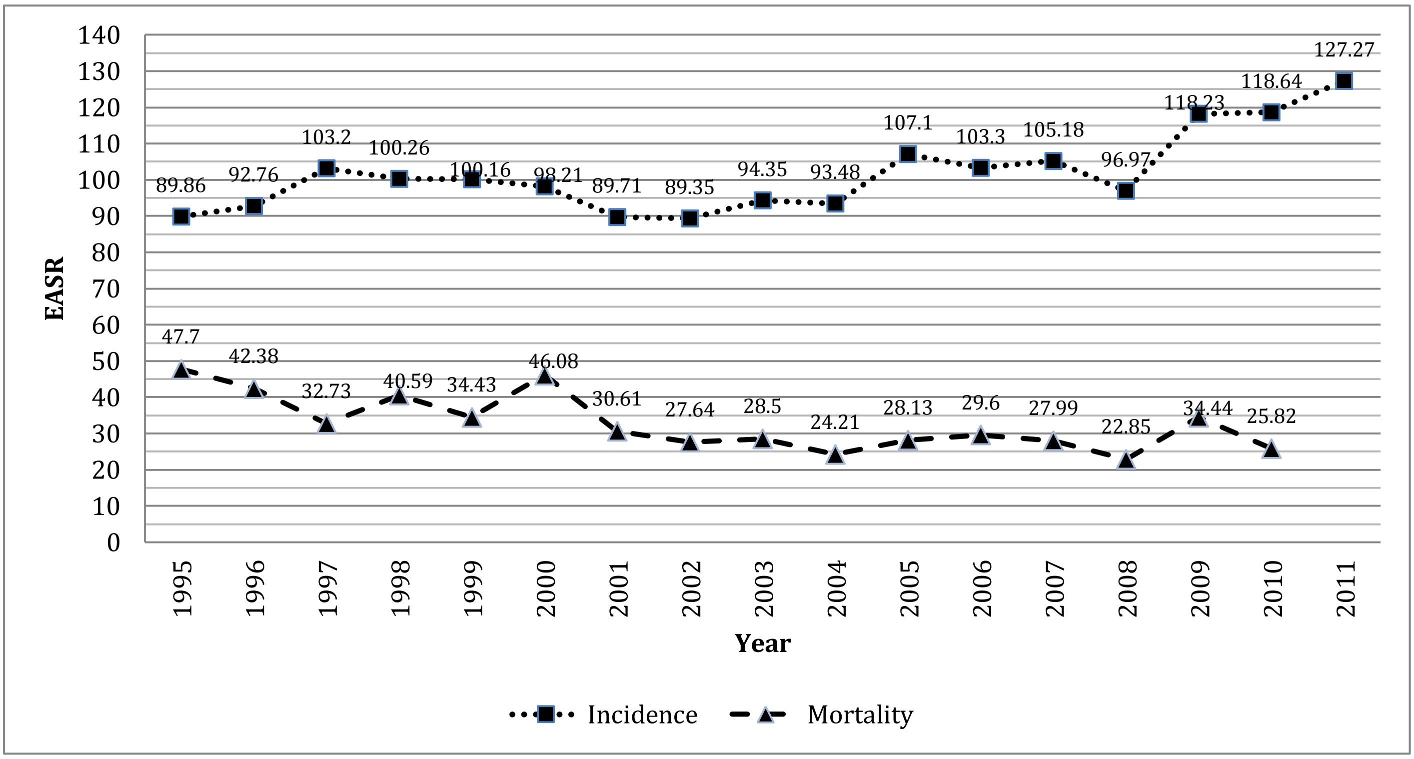
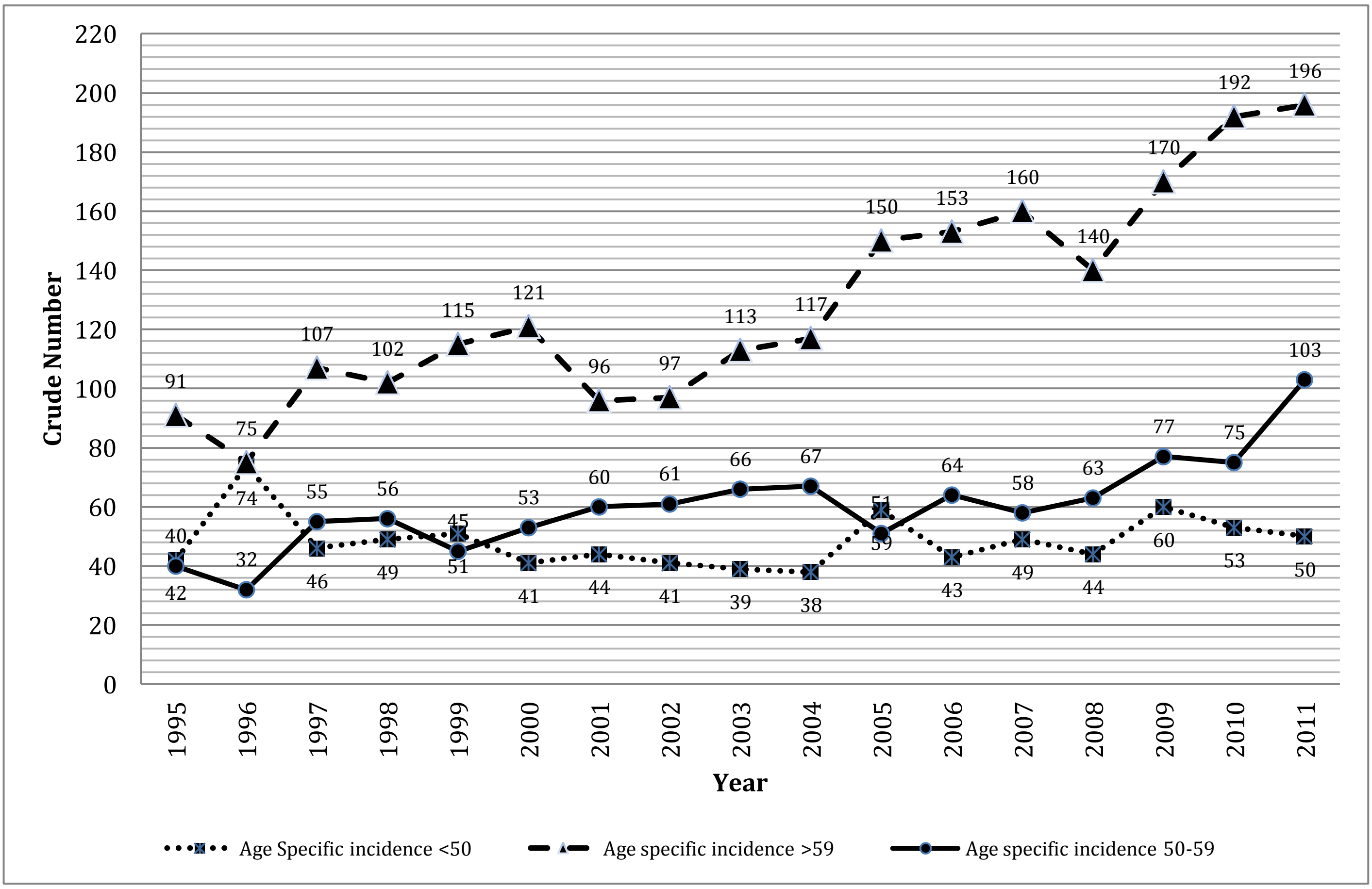
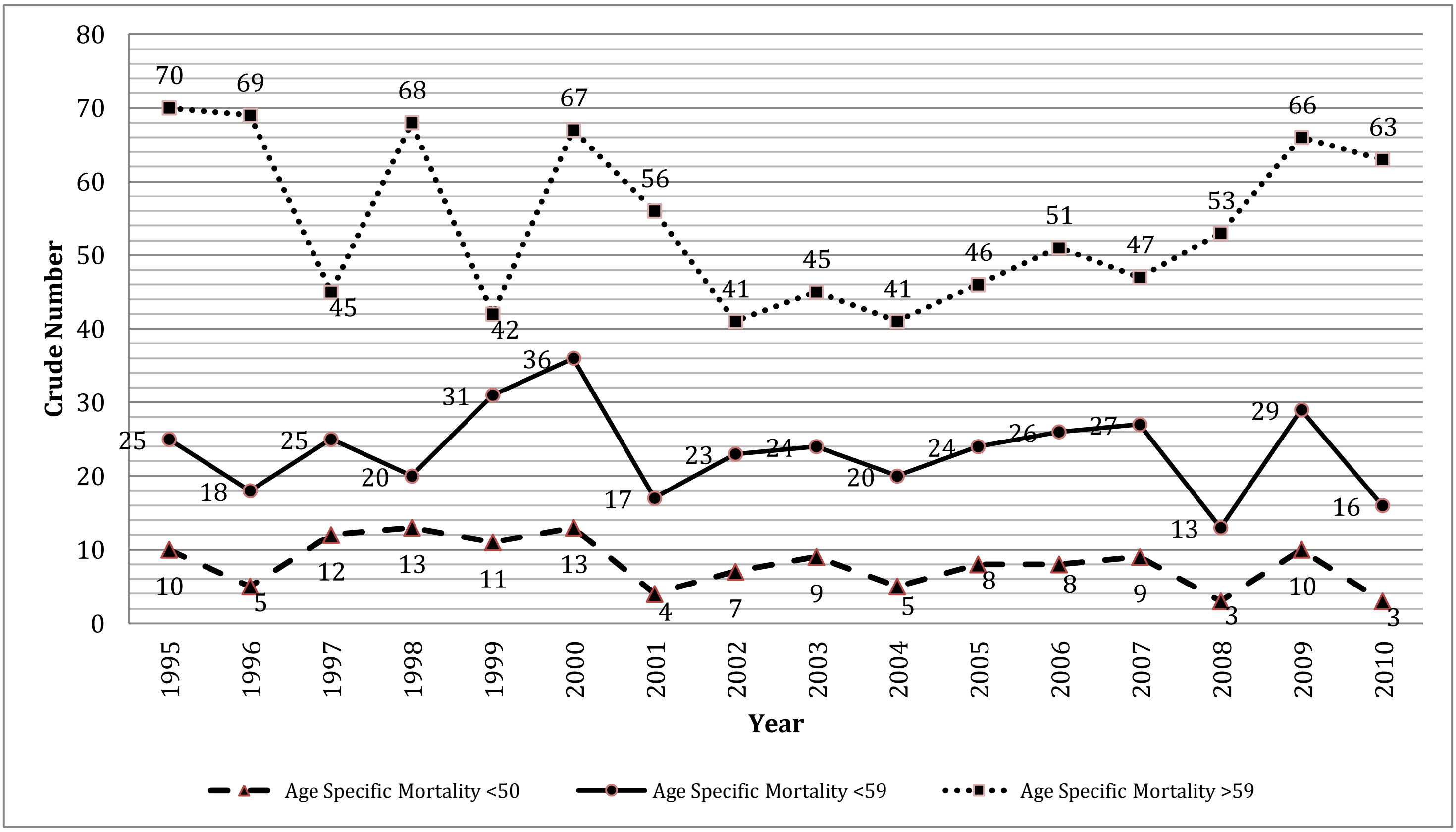


Figure 3: Age-Group Specific Crude Incidence Trends for Female Breast Cancer



***Graph 4**: Age group specific crude mortality for female breast cancer*



In Malta there has been a decrease in mean tumour size of invasive breast cancers from 28.2mm in 2000 to 22.9mm in 2010 (p value =0.007).[8] The same study also showed a decrease in axillary node metastases at presentation and an increase in breast conservation surgery. This change is attributed to the establishment of the breast clinic in 2000 and various programmes to increase breast awareness and not solely to the introduction of the NBSP.

Method

Two cohorts of patients were compared in this study. The screening group were all the patients who were found to have *in situ* and invasive carcinoma from the start of the NBSP (October 2009) until the date of this study (October 2012). There were 112 patients in this group.

The control group were patients who were diagnosed as having *in situ* or invasive breast cancer outside the NBSP during the same time period. The files of all such patients who were operated for *in situ* or invasive breast cancer in this same period were screened for age and those in the same age group as the screening group were selected. Of these, 117 were randomly chosen to form the control group.

The patient files were retrieved from the Medical Records Office at Mater Dei Hospital and the following data was compiled: patient's age, type of cancer (DCIS or Invasive), type of surgery (mastectomy or wide local excision (WLE)), and histological details for tumour size, grade and NPI.

The data was analysed as shown in Table 1 showing screening group data and control group data.

Statistical Analysis

The data collected was analysed using Statistical Package for the Social Sciences (SPSS).

The following variables using Pearson Chi-Square test were analysed: the numbers of mastectomies and WLE done in the screened group and control group, as well as, the type of surgery performed (mastectomy and WLE) and tumour status (DCIS and Invasive carcinoma).

In order to evaluate the tumour status with the type of surgery performed in screened group and control group independently, the Pearson Chi-Square and Fisher's Exact test were used respectively.

The *p* value of 0.05 was used as the cut-off for statistical significance.

The t-test was used in order to evaluate if age was a significant variable between the screened and the control group.

The univariate analysis of variance (UniANOVA) was used to analyse the mean NPI between the screened group and the control group, corrected for age. The *p* value of 0.05 was used as the cut-off for statistical significance.

***Table 1**: Screening Group and Control Group Data*

		DCIS (non-invasive)	Invasive (lobular/ductal/infiltrative)
Screening Group	WLE	12	81
	Mastectomy	6	13
Control Group	WLE	3	88
	Mastectomy	0	26

		DCIS (non-invasive)	Invasive (lobular/ductal/infiltrative)
Screening Group	WLE	12	81
	Mastectomy	6	13
Control Group	WLE	3	88
	Mastectomy	0	26

Results

Our unit aims at breast conservation treatment and opt for mastectomy if large tumours, small breasts or multifocal and multicentric disease is involved.[9]

The number of mastectomies in the control group was 26/107 (24%) which is higher than the number in the screening group which was 19/112 (17%), but these did not reach statistical significance according to the Pearson Chi- Sqaured Test (p 0.317).

There were less cases of DCIS in the control group (n=3, 2.6%) than in the screening group (n=18, 16.1%) using Fisher Exact Test (p<0.001).

The Nottingham Prognostic Index (NPI) uses the size, grade and lymph node status of a tumour to predict the prognosis.[10] The mean NPI in the control group (3.74 (95% CI)) was higher than that of the screening group which had a mean NPI (3.279 (95% CI)) adjusted for age (60.9).

The average tumour size for the control group was 20.24mm which was higher than that of the screening group which was 18.11mm.

Discussion

This study shows that in the screened group there was a higher percentage of patients with DCIS when compared to the control group. The difference in size of tumour in both groups did not reach statistical significance however the NPI was significantly lower in the screened group than in the control group.

In the screened group, patients with DCIS were likely to undergo mastectomy (33.3%) than those with invasive cancer (13.8%).

Ductal carcinoma in situ (DCIS) is an intraepithelial neoplastic proliferation of epithelial cells that is separated from the breast stroma by an intact layer of basement membrane and myoepithelial cells.[11] DCIS is usually detected by screen mammography. Up to 40% of these lesions progress to invasive disease if untreated but it is not yet possible to accurately predict which DCIS will progress to invasive breast cancer.[12]

The challenge is to treat DCIS effectively to decrease the risk of recurrence with the best possible cosmetic outcome. Mammography often underestimates the size of the lesion and MRI allows more accurate planning of surgery. Also large lesions often have foci of unsuspected invasive cancer. Mastectomy, possibly with immediate reconstruction, offers the highest possibility of clearance of DCIS but the cosmetic appearance can be severely compromised. Breast conservation surgery requires a balance between the margin of excision and oncological risk and cosmetic outcome but it is not suitable for large lesions or multicentric disease.

Studies in other institutions have shown that screened patients may be overtreated and this is also suggested by the results of this study.[4, 13-14] The lower NPI in the screened group implies a better prognosis in screened patients. However this has to be interpreted with caution because of lead time bias and possible complications from overtreatment.

The authors suggest repeating this study when a larger number of patients are screened.

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