Breast cancer follow-up: a population-based cohort study

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BACKGROUND
Breast cancer survivorship guidelines recommend follow-up with a schedule of physician visits and annual mammography. However, literature reflects an increasing reliance on advanced imaging. Our goal was to analyze breast cancer follow-up practice with its roots and effects at a population level.

OBJECTIVE
1. To investigate routine follow-up for breast cancer survivors.
2. To identify the factors associated with receipt of different types of follow-up.

METHODS
We accessed the data warehouse of Lombardy Region in Italy (10 M habitants).
We analyzed women aged 18 and above who had early-stage breast cancer and underwent curative surgery between 2012 and 2014. We performed unsupervised clustering to identify statistically distinct follow-up groups based on the annual frequency of exams per patient.
We used the Kaplan-Meier method for overall survival (OS) curves estimation, and the Cox model for multivariable analysis.

RESULTS
Patients analyzed: at least 1 SDO related to breast cancer surgery at ID≥2012
N=28,775

No treatments* after ID+1 year: N=24,963
Lost 1 year: N=1,129
Alive: N=2,3454

At least 1 treatment after ID+1 year: N=3,812**
Dead 1 year: N=380
Lost 1 year: N=1,214
Alive: N=2,2598

Three groups show increasing follow-up intensity in clustering analysis

- minimal follow-up (Cluster 1)
- intermediate follow-up (Cluster 2)
- intensive follow-up (Cluster 3)

Distribution of clusters over time according to breast cancer subtypes

- Luminal-like
- HER2-positive
- Triple negative

Intensive follow-up (blue) was more likely after triple negative (30%) and HER2-positive (28%) than luminal-like (13%) breast cancer. Surveillance intensity decreased over time, resulting in almost 60% of survivors having minimal follow-up (light green) from the third year after surgery onward.

CONCLUSION
• Non recommended imaging is common after breast cancer surgery and its use increases with increasing risk of relapse.
• Intermediate and intensive follow-up are associated with OS.
• These results are exploitable for risk-adapted follow-up strategy.

At univariable Kaplan-Meier analysis patients starting with intensive follow-up (red line) had worse OS as compared with patients in less intensive (green) and intermediate clusters.
HR intensive vs less intensive follow-up (95% CI) of 2.36 (2.16-2.57) in multivariable 12-month landmark Cox model adjusted for age, surgery, axillary dissection, radiotherapy, and breast cancer subtype.

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