# Germline BRCA mutation and clinical outcomes in breast cancer patients focusing o n survivals and failure patterns: A long-term follow-up study of Koreans

**Hakyoung Kim[1],** Doo Ho Choi[2], WonPark[2]

[1]Department of Radiation Oncology, Korea University Guro Hospital, Korea University College of Medicine, Seoul, Republic of Korea

[2]Department of Radiation Oncology, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

## INTRODUCTION

- Whether BRCA mutation in breast cancer is ass ociated with poor prognosis remains controvers ial. Some studies have demonstrated that *BRCA 1/2*mutation carriers have worse survival outco me, while others have shown that *BRCA1/2*mut ation carriers have similar or better survival than non-carriers.

- In terms of failure patterns, several studies have suggested that the recurrence rate in *BRCA1/B RCA2*mutation carriers is not increased compar ed to that in non-carriers. Other studies have co mpared ipsilateral and/or contralateral breast re currence in *BRCA1*and *BRCA2*mutation carriers and patients with sporadic cancers. These studi es have consistently found an elevated risk of c ontralateral breast cancer in BRCA mutation car riers. However, whether the risk of ipsilateral re currence is higher in women with BRCA mutati on carrier remains controversial.

- Current treatment for BRCA mutation-associate d breast cancer is not different from that for sp oradic breast cancer.

- The purpose of this study was to evaluate the e ffect of BRCA mutation on survival and recurre nce rate, focusing on risk of ipsilateral recurren ce and contralateral breast cancer in breast can cer patients who underwent genetic screening for *BRCA1/2*mutation and were treated at Sam sung Medical Center.

## MATERIAL & METHODS

- We retrospectively reviewed medical records of 300 patientswith breast cancer who underwent genetic screening for *BRCA1/2*genes and were treated at Samsung Medical Center between Ja nuary 1, 2000 and December 31, 2010.

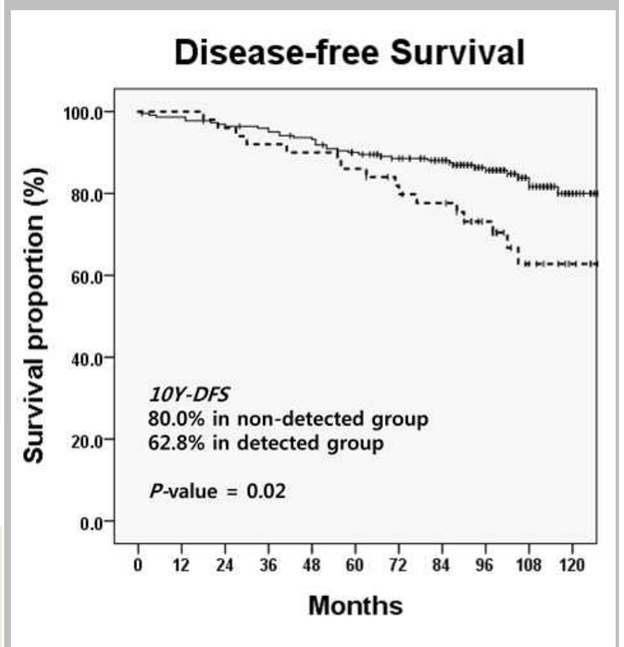
- Ultimately, clinical outcomes of 273 patients w ere analyzed.

- Genetic screening was performed for those who met the criteria of National Health Insur ance System of Korea, including breast cance r with family history, bilateral breast cancer, breast cancer with family history of ovarian c ancer, male breast cancer, and diagnosed be fore 40 years old.

## RESULTS

- The median follow-up duration was 102 mo nths (range, 1 to 220 months).

- *BRCA1/2*-mutated tumors had shorter 10-ye ar disease-free survival (DFS) rate compared t o those with non-mutated tumors(62.8% vs. 80.0%, $p$= 0.02).




**Disease-free survival curves based on the presence of BRCA Mutation**

| Characteristics | Non-mutated tumors ($n$ = 223) | BRCA1/2-mutated tumors ($n$ = 50) | $p$ value |
|---|---|---|---|
| Survival outcomes | | | |
| 10-year overall survival | 96.2% | 98.0% | 0.844 |
| 10-year disease-free survival | 80.0% | 62.8% | 0.020 |
| Patterns of failure | | | |
| Local recurrence | | | |
| Ipsilateral | 10 (4.5%) | 3 (6.0%) | 0.649 |
| Contralateral | 11 (4.9%) | 13 (26.0%) | <0.001 |
| Regional recurrence | 9 (4.0%) | 2 (4.0%) | 0.991 |
| Distant metastasis | 14 (6.3%) | 4 (8.0%) | 0.657 |
| Secondary cancer | | | |
| Ovarian cancer | 5 (2.2%) | 7 (14.0%) | 0.001 |

Survivals and patterns of failure in BRCA1/2-mutated carriers versus non-carriers

- Regarding failure patterns, *BRCA1/2*-mutated tumors showed higher incidence of contralater al breast cancer than non-mutated tumors (*BRCA1/2* non-mutated vs. mutated tumors: 4.9% vs. 26.0%, $p$< 0.001).

- In terms of breast recurrence, BRCA mutation status ($p$< 0.001), hormonal receptor status ($p$= 0.021), and histologic grade ($p$= 0.035) were significantly associated with contralateral breast RFS on univariate analysis. However, there was no significant prognostic factor for ipsilateral b reast RFS.

- On multivariate analysis, only BRCA mutation status remained as a significant prognostic facto r for contralateral breast RFS (HR: 4.155; 95% CI: 1.789-9.652; $p$= 0.001).

## CONCLUSIONS

- Korean patients having BRCA mutation showed inferior DFS compared to those without BRCA mutation.

- BRCA mutation status is a strong predictor of recurrence in contralateral breast.

- Strategies such as prophylactic treatment and active surveillance should be discussed with bre ast cancer patients who have BRCA mutation.