Real-world data on prognostication of early-stage breast cancer patients using CanAssist Breast- first immunohistochemistry based prognostic test developed and validated on Asians

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OncoStem CanAssist Breast

predicts risk of recurrence

Abstract

Background: Data on prognostication of Asian HR+/HER2- early-stage breast cancer patients using Western prognostic tests is limited and intriguing. Asian patients do get diagnosed almost a decade earlier and typically with slightly increased tumor burden than seen in the west, thus the underlying tumor biology could be different. CanAssist Breast (CAB) is an immunohistochemistry (IHC) and ML based prognostic test, was developed on Indian patient's tumors to ensure Asian patient's tumor biology is well represented. CAB has been validated in retrospective global studies in India, US, Spain, Germany, Austria, Italy and in prospective randomised completed TEAM trial in The Netherlands. CAB is able to segregate pre-and post-menopausal patients, clinically low and high-risk patients in CAB low and high-risk categories statistically significantly. Since mid 2016, CAB has been in clinical use in Southeast Asia, Turkey, UAE.

Methods: We analysed CAB user data over last ~8 years (from 2016 mid to June 2024) to assess the details of patients who have used CAB to plan treatment, specifically, we looked at age, stage of breast cancer, etc to assess real world performance of CAB.

Results: CAB has been prescribed on ~6000 HR+/HER2- breast cancer patients in this time period. Overall, 73% of the total patients are over 50 years of age, 64% with T2, 65% with Grade 2 tumors and 81% with N0 disease. Median age of patients and tumor size have been 58 years and 2.5 cms respectively. T2N0 ie Stage 2A is most represented (51%) while T1N1 and T2N1 together account for ~20%. Overall, 72% patients have been stratified as 'low-risk' for breast cancer recurrence. Majority of the patients have been from private hospitals thus leading to significant savings of the chemotherapy and associated side effect management costs.

Conclusion: CAB is first of its kind prognostic test developed and validated on Asian patients. The increase in prescriptions shows confidence of clinicians in the test. CAB represents tumor biology of younger patients and coupled with world-wide validation it presents as a cost-effective, ideal alternative to western prognostic tests to patients in Asia, Africa and ME.

Introduction

- Western tests-Oncotype DX, EndoPredict, Prosigna, MammaPrint are developed and validated on Western patient cohorts.
- These tests are not cost-effective and lack validation data on Asian patients and hence are not widely adopted.
- CAB is an IHC and ML based prognostic test,developed[1]and validated predominantly on Asian patients[2].
- CAB has been validated on retrospective global studies with ~4000 patients in India, US, Spain, and Europe and in prospective randomised completed TEAM trial in The Netherlands.
- Risk stratification by CAB has an NPV of > 94% and can save ~ 80% patients from Chemotherapy as indicated in Figure 2.
- Our data showcases that CAB works with equal accuracy across multiple ethnicities.

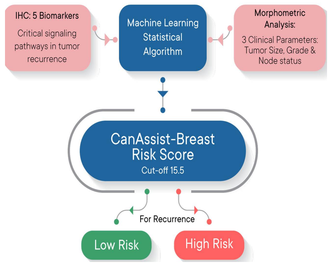


Figure 1: Generation of CAB risk score- IHC gradings of five biomarkers along with three clinical parameters are given as inputs in support vector machine algorithm to generate a risk score. Based on cut-off of 15.5, each patient is categorised as either low-risk or high-risk for recurrence

Figure 2: Representation of CAB risk stratification in all patients (A) and patients treated with endocrine therapy alone from CAB validation studies. (B)

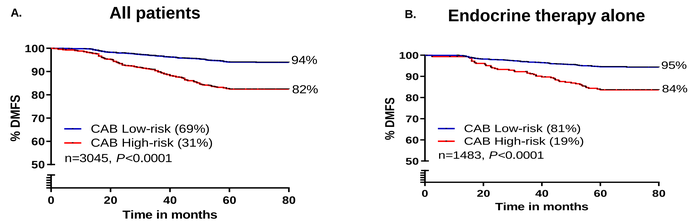
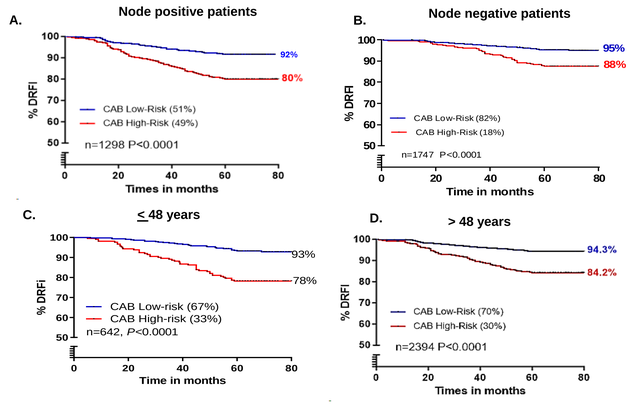


Figure 3: Representation of CAB risk stratification in node positive (A) and node negative patients (B), pre-menopausal (C) and post- menopausal women (D) from CAB validation studies.



- Fig 3A, 3B : CAB stratifies 51% of node positive patients as low risk with an acceptable DRFi of 92% and 18% of node negative patients as high risk as represented.
- Fig 3C: CAB stratifies 67% premenopausal patients into low risk with an acceptable DRFi of 93% as represented.

Aim

The current study assesses the real-world patient demographics of CAB usage over last ~8 years(from 2016 mid to June 2024).

Methodology

Figure 4: Methodology employed in CAB testing

5794 FFPE block from eligible patients diagnosed with early-stage HR+/HER2- breast cancer between May 2016-June 2024 from multiple centres were obtained.

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Post quality checks, IHC was performed for five CAB biomarkers[1] for 5794 samples using automated Ventana platform and graded by Oncopathologists.

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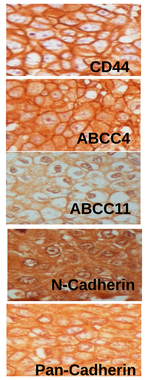
CanAssist-Breast risk category was assigned based on the risk score obtained. Data analysis was performed.

Figure 5: Representative IHC images of five CAB biomarkers

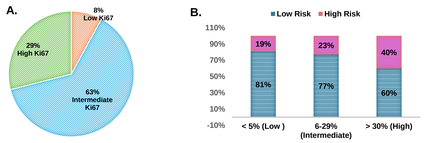


Results

Table 1: Distribution and CAB risk stratifications of patient demographics

Parameters	Clinical subgroups	Total (%)	CAB Low risk (%)	CAB High risk (%)
	Total (n=5794)	100	72	28
Gender	Female	99	72	28
	Male	1	73	27
Age at diagnosis (years)	≤ 50	27	76	24
	> 50	73	71	29
Tumor size (cm)	T1	34	83	17
	T2	64	69	31
Node status	Node negative (N0)	81	79	21
	N1 (up to 3 nodes)	18	45	55
Histological Grade	G1	15	94	6
	G2	65	81	19
	G3	20	26	74
Estrogen receptor status	1-10%	1	69	31
	≥70%	86	72	28

Figure 6: Ki67 distribution (A) , CAB Risk Stratification (B) (%)

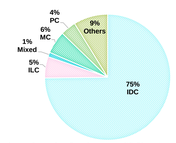


- Out of 5794 patients, Ki67 values were available for only 4066 patients.
- Fig 6A: Ki67 distribution is represented as per The International Ki67 in Breast Cancer working group (IKWG) guidelines.
- Fig 6B: CAB based segregation of each Ki67 categories.

Table 2: TNM status distribution (%)

Parameters	Total (%)
T1N0	29
T2N0	51
T3N0	2
T1N1	5
T2N1	13

Figure 7: Breast cancer types evaluated by CAB



*Invasive Ductal Carcinoma (IDC), Invasive Lobular Carcinoma (ILC), Mixed Carcinoma (IDC and ILC), Mucinous Carcinoma (MC), Papillary Carcinoma (PC), Others include invasive carcinomas with type not specified

Figure 8: Correlation curve showing acceptable performance of CAB on surgical specimen versus core needle biopsy (A), CAB risk stratification in male and female patients (B)

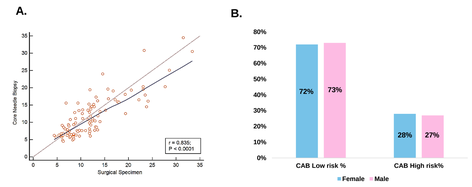
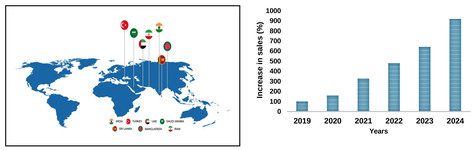


Figure 9: Global reach of CanAssist Breast (A), Increase in CAB prescriptions/adoption year on year (B)



Conclusion

- CAB is a pioneering prognostic test developed and validated on Asian patients.
- CAB is effectively able to stratify early-stage HR+, HER2- breast cancer patients across various clinical demographics routinely seen.
- Increase in prescriptions over the years demonstrates strengthening of clinician's trust in CAB's effectiveness and utility.
- CAB offers a cost- effective and suitable alternative to western prognostic tests to patients in Asia, Africa and ME.

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Conflict of interest

All authors have declared no conflict of Interest

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