PEI Breast Cancer Hormone Receptor Update

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Health PEI
One Island Health System

Prince Edward Island Cancer Treatment Centre

Breast cancer biopsies are tested for reproductive hormone receptors to estrogen and progesterone and for human epidermal growth factor receptor 2 (HER2). If positive for either of the reproductive hormone receptors, the corresponding hormone can bind resulting in uncontrolled growth of the cancer cell. If positive for the gene HER2, the breast cells may produce too much HER2 protein resulting in an uncontrollable growth of breast cells. Breast cancers can have any combination of these three hormone receptors, and those with none of these three receptors are referred to as triple negative cancers.

Knowing the receptor status of the breast tumour is important because it determines if hormonal therapy or HER2 targeted therapy will be added to the treatment. Those tumours that are estrogen receptor positive (ER+) and progesterone receptor positive (PR+) are commonly responsive to hormone therapy to block hormones from binding or to lower the hormone level. HER2 targeted drugs such as Trastuzumab can bind HER2 receptors to stop the excessive tumor cell expansion. Triple negative cancers are not susceptible to these types of treatments.

Table 1: Breast cancer by hormone receptor status in PEI women, 2010-2017

Receptor type	Estrogen	Progesterone	HER2
Number positive	796	692	126
Number negative	130	232	785
% positive	86.0%	74.9%	13.8%
% positive in SEER database	77%[1]	66%[1]	15-20%[2]

Table 1 presents the number of breast cancer tumours of each type of receptor for the last 8 years. The proportion of ER+ tumours is 86%, PR+ tumours is 74.9%, and HER2+ tumours is 13.8%. Using a reference from the Surveillance, Epidemiology, and End Results (SEER) database, the proportions of ER+ and PR+ are higher in PEI[1,2]. Some of the risk factors for ER+ include white race, higher BMI, older age at diagnosis, lower parity, older age at first parity, and current HRT use at time of diagnosis [3,4].

Table 2: Average characteristics of women with breast cancer in PEI, 2010-2017

Years 2010-2017	All women	ER+	PR+	HER2+
Median Age in years	65.4	65.5	65.3	61.9
Mean Tumour size (mm)	21.4	20.2	20.1	25.7
Mean Stage	1.7	1.7	1.6	2.0

Table 2 presents characteristics for breast cancer tumours in PEI. Compared to the averages for all tumours in PEI for 2010-2017, ER+ and PR+ tumours have similar age at diagnosis, tumour size, and staging. However, tumours positive for HER2 have a lower age at diagnosis, larger tumour size, and higher average stage.

Table 3: Characteristics of summary of hormone receptors for breast cancer in PEI, 2010-2017

Years 2010-2017	Triple negative	HER2 Enriched	Luminal A	Luminal B
Proportion of all tumours (reference[5])	8.9% (12%)	5.0% (5%)	77.0% (73%)	9.1% (10%)
Number of cases	81	45	699	83
Median Age in years*	62.3	63.5	65.7	**62.1**
Mean Tumour size (mm)*	**26.2**	**27.0**	19.8	**25.2**
Mean Stage*	**1.9**	**2.1**	1.6	**2.0**

*bolded if significantly different than Luminal A

Triple negative: *negative for all three hormone receptors*; HER2 Enriched: *negative for both ER and PR, positive for HER2*; Luminal A: *Positive for either ER or PR or both, negative for HER2*; Luminal B: *Positive for HER2, positive for ER, positive or negative for PR*

Table 3 presents the description of the tumours based on hormone receptor summary categorization. Comparing the proportion of each type of tumour in PEI, triple negative tumors are lower while Luminal A is higher than the reference proportions. Using simple linear regression, age at diagnosis, tumour size, and stage were compared between the predominant Luminal A tumours and all other summary categories (Triple negative, HER2 Enriched, and Luminal B). The mean age for women diagnosed with Luminal B tumours was significantly lower than Luminal A. The mean tumour size for Luminal A tumours was significantly lower than all other categories. The mean stage of luminal A tumours was also significantly lower than all other categories. Women diagnosed with Luminal A breast cancers have a lower mortality rate relative to the other tumour types[5]. The smaller tumour size and earlier stage at diagnosis as well as the option for hormone therapy may contribute to better outcomes.

This update was written by Dr. Carol McClure, PEI Cancer Surveillance Epidemiologist and Tanuj Fernando, Health Futures Summer Student. If you have any questions, please contact Dr. McClure at 902-894-0173 or cmcclure@ihis.org.

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