# THE DIAGNOSTIC VALUES AND LABORATORY FEASIBILITY OF IDENTIFYING BREAST CANCER STEM CELLS CONCURRENTLY WITH TELOMERASE EXPRESSION, WITH THEIR PUTATIVE ROLE IN METASTASIS, RECURRENCE & THERAPEUTIC REFRACTORINESS.



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**The diagnostic values and laboratory feasibility of identifying breast cancer stem cells concurrently with telomerase expression, with their putative role in metastasis, recurrence & therapeutic refractoriness.**

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## ABSTRACT

Two novel concepts have been emerged in breast cancer biology: the role of cancer stem cells (CSC) in tumor initiation, and the Telomerase role in cell division and keeping the CSC immortal, as well as avoiding senesence. CSC are a small subpopulation of cells within tumors that initiat the tumor, and renew their self, as well as giving rise to a large population of differentiated progeny that constitute the bulk of the tumor. Telomerase is the intracellular reverse transecriptase responsible for the elongation of chromosomal telomer, which progressively shorten with ongoing cell division.

The objective of this study is to analyse and determine the prevelance, and significance of CSC, and Telomerase activity, in primary and metastatic breast carcinoma, and correlation inbetween these concepts, then to determine the diagnostic importance as well as clinical implication and laboratory feasibility of identifying CSC, and telomerase activity in routine clinical practice.

A total of 167 surgically resected primary invasive breast carcinomas, were retrieved from the archive of the Pathology Department , QEH. Specimens were obtained from patients who underwent surgery between January 2011 and March 2013. We analysed the immunohistochemical localization of the breast CSC markers CD44 and CD24, by double staining IHC technique, as well as Telomerase activity, in formaline fixed parafin embedded tissue of 167 case of invasive breast cancer, the result was validated by double staining immunoflourecent, which has done on 10% of the cases.

The results from this large clinical study showed that The CSC was significantly increased in node-positive tumours ($p<0.0001$), and n high grade (III) tumors ($p<0.0001$), so CSC are independent, negative prognostic factor, its presence indicate poor prognosis, there was considerable high incidence of CSC expression in metastatic lymph node lesion compared to primary tumor (p-0.000), CSC was more prevalent and in significant number in ductal carcinoma insitu

comparing to its invasive counterpart (p- 0.001),. There was no significant correlation observed in between Telomerase activity and tumor grade, size, lympho-vascular permeation, lymph node status, ER, PR, Her2, and skin or nipple involvement, but there was considerable high incidence of Telomerase expression in metastatic lymph node lesion. Its wise to conclude that increase number of CSC in DCIS lesion regarded as an intial step in the stromal invasion and propagation of breast cancer, and high prevalence of CSC, promoting tumor invasivness and metastasis. There is no association or significant correlation between the existence of CSC and detection of Telomerase activity in tumor cells.

Finally, we can conclude that the currently used detection methods for CSC are not efficient to identify this subtype of tumor cell. The clinical relevance on prognosis and therapy response has to be further evaluated in a prospective trial.