

Relation between characteristics of ICG lymphography and the development of breast cancer-related lymphedema

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Introduction: Breast cancer related lymphedema (BCRL) is a disabling condition affecting 14 to 40% of the patients that underwent breast cancer treatment. To date, the pathophysiology of BCRL has not been fully understood, making it difficult to understand why some patients develop BCRL and others do not. Studying lymph anatomy by means of indocyanine green (ICG) lymphography is one promising tool to help in better understanding BCRL. The aim of this study is to determine if there is a relation between ICG lymphography characteristics and the risk of developing BCRL.

Method: This study was a retrospective cohort study with a prospectively constructed database of patients scheduled for breast surgery with either unilateral axillary lymph node dissection (ALND) or sentinel node biopsy (SNB) in the Multidisciplinary Breast Clinic at the University Hospitals Leuven between November 2017 and May 2019. Patients were assessed at baseline and at 1, 3, 6, 9, 12, 18, 24 and 36 months post-operatively. BCRL was defined as a ³5% relative arm volume difference increase compared to preoperative measurement. The ICG lymphography characteristics visualized in this study were the number of lymph vessels and the presence of lymph nodes.

Results: 128 patients were included in this study. 45 patients (35.2%) developed BCRL in the course of 36 months after surgery. The number of lymph vessels visualized by ICG lymphography before surgery was not a statistically significant predictor of the risk of developing BCRL. Also the presence of visual lymph nodes and the change in presence of lymph nodes compared to baseline cannot be used as predictors of the risk of BCRL. However, an increase in number of lymph vessels compared to baseline measurement turned out to be a statistically significant protective factor for developing BCRL (OR=0.8). An increase of one lymph vessel corresponds to a 19% relative risk reduction of developing BCRL.

Conclusion: ICG lymphography can be used to visualize lymph anatomy of the upper limb before and after breast cancer surgery. An increase in number of lymph vessels compared to baseline is a protective factor for developing BCRL. Therapies with the ability to increase the number of lymph vessels can thus possibly decrease the risk of developing BCRL.