Development of New Serum Biomarkers for Early Lymphedema Detection

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Background: Early lymphedema detection may reduce the symptoms and improve clinical outcomes. However, the lack of reliable serum biomarkers capable of predicting lymphedema development is a current medical problem. In this study, we investigated if serum levels of hyaluronic acid (HA) and leukotriene B4 (LTB4), two molecules involved in lymphedema development, may work as predictors of this condition. Methods and Results: A mouse model of acquired lymphedema was generated through ablation of tail dermal lymphatic network. Tail diameter was measured daily, and HA and LTB4 serum levels were analyzed before and during the development of lymphedema. We found increased serum levels of HA and reduced levels of LTB4 at early days before the appearance of lymphedema signs. Similar results were observed in the lymphedema tissue. Increased local and systemic inflammation was also detected at early time points. Moreover, the ratio LTB4/HA arises as the strongest predictor for lymphedema development. In fact, we found an inverse correlation in our model, where reduced LTB4/HA levels showed increased lymphedema signs. Conclusions: These findings suggest that serum ratio of LTB4/HA may be a useful biomarker to predict acquired lymphedema development, with potential to be used in clinical conditions such as breast cancer patients.

acquired lymphedema

biological markers

mouse model

serum

biological marker

hyaluronic acid

leukotriene B4

animal experiment

animal model

animal tissue

Article

blood level

breast cancer

controlled study

early diagnosis

enzyme linked immunosorbent assay

histology

hyaluronic acid blood level

infant

inflammation

leukotriene B4 blood level

lymphedema

mouse

nonhuman

prediction

priority journal

real time polymerase chain reaction

tail