

عنوان مقاله:

Breast cancer screening by using near-infrared wavelengths: a phantom study

محل انتشار:

دوازدهمین کنگره بین المللی سرطان پستان (سال: 1394)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

Optical mammography (OM) by evaluation of near-infrared (NIR) light absorption and scattering method, can distinguish among different concentrations of hemoglobin in tissue via absorption coefficient factor. Identification of wavelengths spectral range that leads to achieve a great contrast is crucial goal for diagnosis of breast cancer. The early detection of breast lesions potentially benefits to prevention of possible breast tumors. This study aims to evaluate the effectiveness of OM in the breast phantom for screening. The breast phantom was used to optical imaging by NIR LED source at 600-1000 nm wavelength. For simulation of tumoral breast lesions, hemoglobin at twice concentration was injected to phantom vessels. Further, spectrophotometry method was carried out to determination of optimal wavelength that exhibits the best differentiation. Our results showed that, at wavelengths of 600-800 nm increasing in light absorption results in increase of hemoglobin concentration. In the wavelength of 625 nm absorption coefficient for the oxy-hemoglobin (normal blood) and twice hemoglobin concentration (abnormal blood) is 0.051 ± 0.02 and 0.067 ± 0.04 cm⁻¹, respectively. This data revealed that light at shorter wavelengths could provide better contrast. This technique is able to discriminate abnormal from normal tissues with 97% sensitivity and 91% specificity. Data from our study suggest that OM using LED light at specific wavelength at 625 nm is the non-invasive and safe method for early detection of breast disease. From the cost-benefit point of view this method is less expensive and promising the future novel tissue screening technique based on structural and functional changes of breast tissue.

کلمات کلیدی:

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