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Título: IMAGE ACQUISITION OF BREAST CANCER PATIENTS WITH CIRCULAR POLARIZATION

Resumo: Introduction: Physicians currently uses a qualitative classification, known as RTOG/EORTC Late Radiation Morbidity Scoring Schema to rate the degree of injury that affects the skin due to ionizing radiation (radiodermatitis). There is no currently quantitative method to assess this degree of injury throughout Breast Cancer therapy. Objective: Develop a metric for the evaluation of radiodermatitis through the analysis of conventional digital images and also images acquired with the use of polarizers in patients submitted to treatment of breast radiotherapy. Methodology: Images of breast cancer patients were obtained at the HCFMRP-USP after the approval of the Ethics Committee of the FFCLPRP- USP and the hospital (CAAE nº 73541017.20000.5407). Digital photographs were taken from 3 different positions to reach all regions of the treatment field, frontal, lateral and below the breast. For each position, pictures were taken with or without room light, and when it was off, the camera flash was used. For both conditions, a photo was taken with non-polarized light and a photo with light circularly polarized orthogonally to a polarizer positioned on the camera lens. The images were processed in the RGB color space, where each channel was analyzed. We selected the medial region of the breast bordered by the edge of the radiation field, which in most patients is marked with tattoos, and the nipple. Other approach was normalizing the images by the mean of pixel intensity of the three channels of a white tape located on the patient, near the ROI. Analysis of the histogram and Kernel Smoothing Function (KSF) estimate for bivariate data and translation along time was done for patients with different conditions (skin color, mastectomy, etc). Results: It can be seen that the histogram, represented as a KSF curve, presents a translation along time. Also, the shape of the curve is modified showing that the number darker pixels increases. On the other side, we have also studied the time dependency of the intensity of each ROI. The results show as well that the mean of the pixels of the three channels decreases along time, which coincides with many other researches. Conclusion: Through study of different metrics for image processing, it has been shown that depending on the skin color, the relative intensity of the image varies as a function of radiation, which indicates that the proposed methodology can potentially be used for quantification of radiodermatitis.

Autores: IGNACIO AGUSTÍN VERDUGO NARANJO; Juliana F. Pavoni; George C. Cardoso;

Inscrição Responsável: IGNACIO AGUSTÍN VERDUGO NARANJO

Contato: iaverdugo@uc.cl   Cidade: SÃO CARLOS   Estados: SP

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