

Impact of fractionation on the correlation between thermal imaging and dosimetric data in breast cancer radiotherapy

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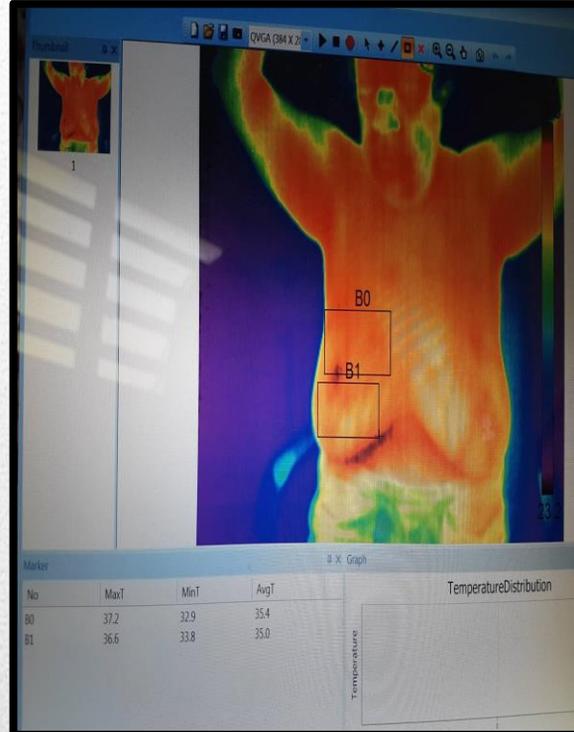


• **Background and Aims:**

Thermal mapping using infrared imaging is a worldwide developing technique; its actual simplicity could be used in the radiotherapy field. We aimed to analyze the temperature variation during breast cancer radiotherapy, and their correlation with their dosimetric parameters.

• **Methods:**

We evaluated the dosimetric parameters of 10 patients with a localized breast cancer, who underwent a conservative surgery and adjuvant radiotherapy. Patients were treated with Normo-fractionated radiotherapy received 50Gy with a boost of 16Gy, in 33 fractions. The patients treated with hypo-fractionated radiation received 42Gy in 15 fractions, with a boost of 10Gy in 4 fractions. The mean doses delivered to the breast, as well as the minimum and maximum dose to each quadrant were analyzed. We also collected the skin temperature data with an infrared camera (Thermal Expert) in the course of treatment, for the same patients: mean, maximum and minimum temperature to the whole breast, and to each quadrant, relatively to the contralateral breast. We used ordinary least square regression, to evaluate the relationship between the dosimetric and the temperature data, and compare it according to the fractionation schedule.



• **Results:**

The mean breast temperature relative to the contralateral breast for the patients treated with normo-fractionated radiotherapy was +1.44 °C (SD 0.85), and +0.7 °C (SD 0.53) for patients treated with hypo-fractionated radiotherapy. We found a trend of correlation between the average doses received to the breast and the variation of the mean temperature, in the patients receiving a normo-fractionated treatment ($r^2 = 0.18$). On the other hand, we did not find a correlation statistically significant, in the patients treated with hypo-fractionated radiotherapy ($r^2 = 0.019$).

• **Conclusion:**

There were no signs of acute radiodermatitis on the patients treated with hypo-fractionated radiotherapy, in contrast with normo-fractionated patients. Our study suggests a different radiation dose response of the skin, according to fractionation, warranting further investigation about the use of thermal imaging as an early indicator of skin radiation toxicity.

References

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