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Radiotherapy and breast cancer: The risks of malignancies secondary to breast cancer treatment in patients with Li-Fraumeni syndrome

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Objective: This study aimed to highlight the risks of malignancy induced by radiotherapy in the treatment of patients with breast cancer with Li-Fraumeni syndrome. **Methodology:** To this end, a literature review was carried out in the PubMed scientific database, using the descriptors: "Li-Fraumeni syndrome," "TP53 gene," and "Malignancies secondary to radiotherapy," and as inclusion criteria, it was used: works in Portuguese and English, not duplicated and between the years 2016–2023, with the intention of using the most recent sources for the search result. **Results:** DNA damage by ionizing radiation is the main mechanism of radiotherapy action; therefore, disturbances in DNA repair can result in increased sensitivity to cancer treatment recessive radiosensitivity, for example, in patients with Li-Fraumeni syndrome. This is an autosomal dominant inherited disease that is usually associated with abnormalities in the P53 tumor suppressor protein (TP53) gene, located on chromosome 17p13. That said, the risk of malignancies correlates with the type of TP53 germline pathogenic variant, with the TP53 p.R337H mutation being particularly prevalent in Brazil. According to a published study in the journal Breast Cancer Research and Treatment, the risk of radiation-induced malignancy associated with Li-Fraumeni syndrome was higher for sarcoma and thyroid cancer in 12% of patients studied. **Conclusion:** Thus, when initiating radiotherapy treatment, early molecular diagnosis, with the intention of finding the Li-Fraumani syndrome, and careful assessment of the risks and benefits of treatment are essential for these patients, considering that the physician must always care for the well-being of the patient and, above all, do not cause harm to the patient.

Keywords: breast cancer; Li-Fraumeni syndrome; radiotherapy.