Radiation-Induced Sarcoma After Breast Cancer in a TP53 Mutation Carrier: Case Report and Review

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Background: Li-Fraumeni syndrome (LFS) is a hereditary condition conferring substantially elevated risk of malignancies and radiation-induced secondary tumors.

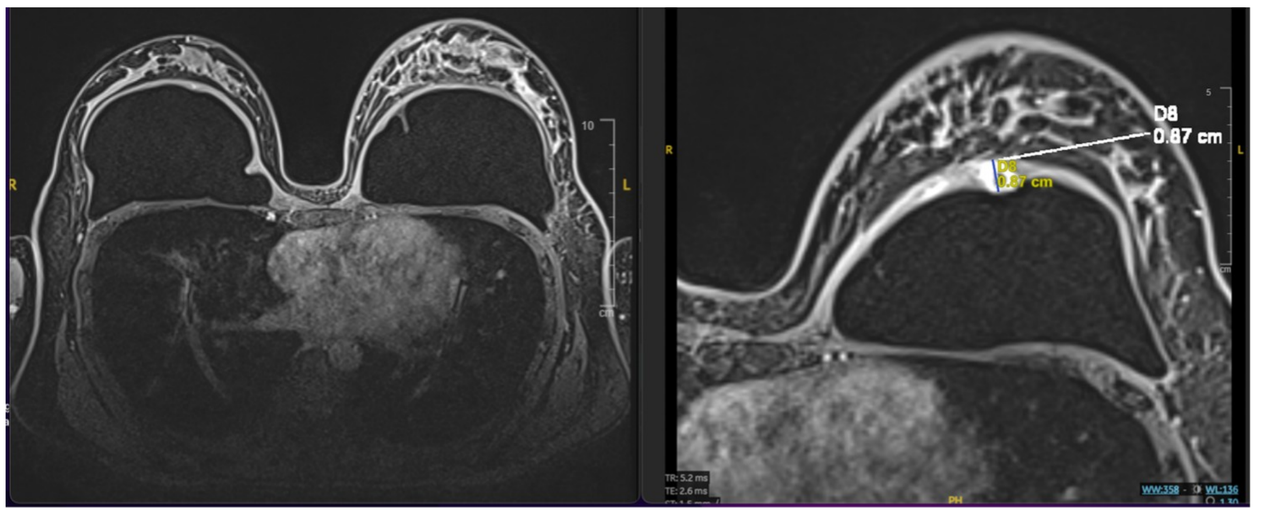
Case presentation: A 31-year-old female with prior breast augmentation developed left-sided breast cancer. Treatment included lumpectomy and adjuvant radiotherapy. TP53 mutation was identified following treatment completion.

Clinical course: At 22 months post-radiotherapy, MRI revealed two suspicious nodules within the radiation field, adjacent to the breast implant. Mastectomy disclosed a pleomorphic sarcoma within the capsule. Extensive surgical resection with latissimus dorsi flap reconstruction was performed. Histopathology identified a second lesion: chondroblastic osteosarcoma with muscle infiltration.

Key findings:

- LFS patients demonstrate increased radiosensitivity.
- Current guidelines recommend mastectomy over breast-conserving surgery.
- Radiotherapy should preferably be avoided when feasible.
- Early genetic testing and multidisciplinary planning are essential to optimize oncologic safety and functional outcomes.

Conclusion: Early genetic testing should be offered to young breast cancer patients. TP53 mutations contraindicate radiotherapy, requiring mastectomy over breast-conserving surgery. Prophylactic contralateral mastectomy should be considered given the elevated lifetime risk of contralateral malignancy. Management requires specialized multidisciplinary teams at reference centers experienced in hereditary cancer syndromes.



MRI, October 2020 *MRI, October 2021*

Surgical enlargement

Post-conservative breast radiotherapy Why?

Reduction of recurrence
Decrease in tumor-related mortality

References

Effect of radiotherapy after breast-conserving surgery on 10-year recurrence and 15-year breast cancer death: meta-analysis of individual patient data for 10,801 women in 17 randomised trials. EBCTCG, Darby S., McGale P.

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The relationship between radiation-induced G1 arrest and chromosome aberrations in Li-Fraumeni fibroblasts with or without germline TP53 mutations.J. M. Boyle

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A Cancer Family Syndrome in Twenty-four Kindreds. F. P. Li