Ablative Raditherapy (SABR) as primary treatment in inoperable and elderly women with breast cancer

De Haro Piedra R1, Velázquez Miranda S***1, Rodríguez García E**1, Muñoz Carmona DM**1**
**** Servicio de Oncología Radioterápica Hospital Universitario Virgen del Rocío, Sevilla, España**
*****Servicio de Física Médica Hospital Universitario Virgen del Roció, Sevilla.**
1 GiaCaMama Grupo de Investigación Avanzada en Cáncer de Mama. (EC Fase II PI-0113-16 Consejería de Salud)

Objectives

Our research team hypothesized that **SABR could be a safe and effective alternative to surgery** as a primary treatment for patients with inoperable breast carcinoma or those who declined surgery. It demonstrated a significant impact on primary tumour control, with lower rates of local and distant recurrence.

Materials & methods

A prospective, phase II, single-arm study was conducted using radical treatment with ablative radiotherapy, administering **a single dose of 21 or 24 Gy**. Patients aged 50 years or older, diagnosed by biopsy with tumour sizes T1-2 (≤ 5 cm), who were inoperable or had failed surgery, were included. The primary objective of the study was to assess the radiological response using RECIST 1.1 criteria, comparing it with results from PET-CT 18 FDG and contrast-enhanced breast MRI. Secondary objectives were to evaluate toxicity levels and cosmetic outcomes.

We used a breast stereotactic prototype with rib dampening (BSRD), developed and patented at our hospital in collaboration with the company AnatGe (Figure 1).

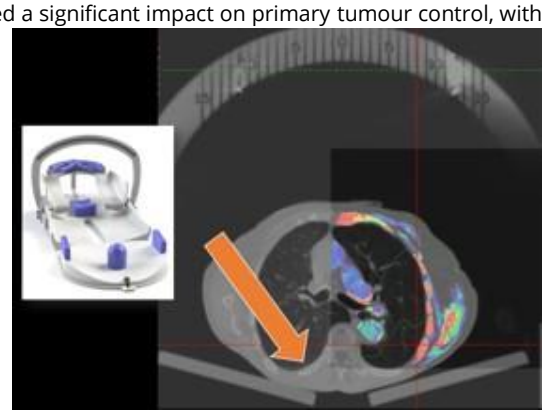

Figure 1. Patients are positioned on an antirotation truncated V-shaped surface

In the BSRD, patients sat perpendicular to the CT couch on a rotating platform that stabilized the symphysis and trochanters. The legs were elevated, and the platform rotated until it locked in alignment with the couch's advancement direction. Patients leaned on a truncated, V-shaped anti-rotation surface that left the spinous processes exposed and unsupported, shifting their weight to the paraspinal musculature. A Moldcare BR-3 (ALCARE CO., Ltd.) immobilized the arms, armpits, neck, and head (Figure 2a). A thermoplastic mask with a compression belt was then applied from the submammary crease to the end of the costal arch to prevent rib movement during unexpected deep breathing or coughing.

Treatment planning was carried out using Pinnacle, applying the **negative margin technique for 4π treatment with 15 beams** (Figure 2b), allowing high conformation to the target while maintaining the dose to organs at risk below established limits (Figure 2c)."

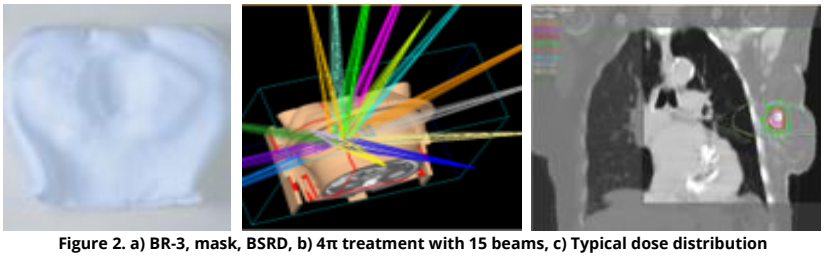

Figure 2. a) BR-3, mask, BSRD, b) 4π treatment with 15 beams, c) Typical dose distribution

Results

From June 2017 to June 2022, **41 patients with 46 lesions were included.** SABR treatment was performed in 37 patients, while 9 did not undergo treatment. The mean age was 82 years (range: 50-93 years), with a median follow-up of 29.5 months (range: 1-60 months). ECOG performance status was 0-1-2 in 88% of patients, and 3-4 in 12%. The most frequent histology was invasive ductal carcinoma not otherwise specified (IDC NOS) at 80%, followed by intraductal carcinoma at 10%, and infiltrating lobular carcinoma at 10%.

Immunophenotype distribution was as follows: Luminal B in 39.1%, Luminal A in 52%, and triple-negative in 8.4% of cases. Lesion location was the left breast in 43.5%, the right breast in 52.2%, and bilateral in 2.17%. Staging was as follows: Stage I in 37%, Stage II in 47.8% (90% IIA, 10% IIB), Stage III in 8.7%, and Stage IV in 6.52%.

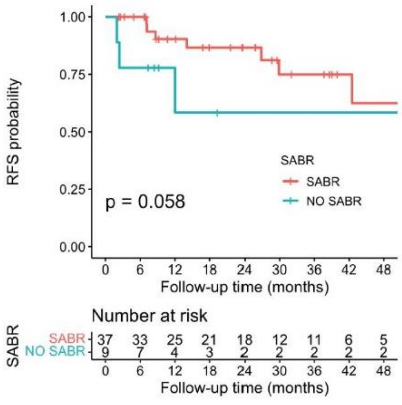

Figure 3. According to treatment (SABR). Kaplan-Meier. The last relapse observed occurred in 64.4 months of follow-up

Conclusion

SABR treatment for breast cancer has proven to be a safe and effective option, offering excellent local control with minimal acute and chronic toxicity, as well as superior cosmetic outcomes. It could serve as a radical alternative to surgery for patients with breast cancer. However, further phase II-III studies are needed to confirm these findings.

Acknowledgments

We extend our gratitude to the Ministry of Health of the Andalusian Government for their support and funding of our research projects.

References

Robotic Stereotactic Body Radiation Therapy for the Adjuvant Treatment of Early-Stage Breast Cancer: Outcomes of a Large Single-Institution Study. Anna Jaysing, BA, et al. Advances in Radiation Oncology, Volume 8, Issue 2, 101095, March 2023.Stereotactic Radiotherapy in Early-Stage Breast Cancer in Neoadjuvant and Exclusive Settings: A Systematic Review. Piras A., Sanfratello et al. Oncology Research and Treatment, 2023, 46:3 (116-123).