

## Internal Radiotherapy and Partial vs. Whole Breast Radiation

In many cases, cancer treatment is often comprised of more than just one technique. Rather, the primary treatment may be followed by an adjuvant therapy to enhance its effectiveness and reduce the chance of tumor recurrence. A commonly used adjuvant therapy is known as brachytherapy; or internal radiotherapy. Brachytherapy is a form of internal radiation treatment where radioactive sources are placed on or into cancer tissues. Two kinds of brachytherapy include low dose rate (LDR) and high dose rate (HDR), where the latter is typically used for the treatment of breast cancer. In HDR brachytherapy, a high intensity radiation source is delivered under computer guidance directly into the tumor, killing it from the inside out while avoiding injury to surrounding normal healthy tissue. Advantages of this method include the conservation of breast tissue, a reduced radiation dose to the heart, lungs and opposite breast and no delay in other treatments such as chemotherapy. However, recent research has further improved this method to reduce the treatment time to as little as 5 days. This method is known as accelerate partial breast irradiation (APBI). The shortened duration of treatment helps reduce issues with time and travel, allowing more women to have access to the proven benefits of radiation following lumpectomy. However, it is important to note that this option is only available with certain cases (1).

Interstitial brachytherapy, a form of administering the treatment, involves using a device such as a catheter or a needle that is placed into the tumor, while [radioactive seeds](#) are inserted into the catheter during treatment, and removed afterward. This technique is typically used to deliver an additional (boost) dose to the tumor bed after breast-conserving surgery (i.e. lumpectomy) and whole-breast irradiation. However, some women are opting to replace this method, using APBI post lumpectomy. Moreover, it is suggested that APBI following lumpectomy is enough to reduce tumor recurrence without the additional need of whole breast irradiation. The following randomized controlled trials have examined the efficacy of APBI partial radiation versus whole breast irradiation. (2)

-The Hungarian trial compared APBI to whole breast irradiation in 258 women after 5 years of follow-up. Results showed no significant difference between both groups in rate of local recurrence (4.7% vs. 3.4%) or in overall survival, cancer-specific survival or disease-free survival rates. However, improved cosmetic outcomes in APBI patients were a noted benefit. (2)

-The TARGIT-A trial compared partial vs. whole breast radiation in 1,000 patients. After 4 years, 6 local recurrences occurred in the partial radiation group and 5 in the whole breast radiation group. However, these numbers were not significantly different between groups. It was also noted that the risk of any major toxicity was not significantly different between the two groups (3.3% vs 3.9%) though radiation-related toxicity was significantly lower in the partial radiation group than the whole breast radiation group (0.5% vs. 2.1%). (2)

Given these results, APBI and whole breast irradiation seem to produce the same outcome, while advantages such as improved cosmetic appearance and decreased treatment time may increase the appeal of the APBI treatment.

## References

1. UCLA Health System (2012). *APBI Literature*. Retrieved from <http://radonc.ucla.edu/body.cfm?id=362>
2. Polgar C. and Major T. Current status and perspectives of brachytherapy for breast cancer. *International Journal of Clinical Oncology* 14:7–24, 2009.

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Note: The information provided should not replace medical advice and represents only some of the research conducted on each topic