

# 高雄榮民總醫院

## 乳癌治療團隊

### Principle of intra-operative radiotherapy for early stage breast cancer patients - balloon technique

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#### 注意事項

1. 本治療指引主要做為臨床醫師與其他醫療人員參考之用。
2. 如果您是一位癌症患者，直接引用此治療指引並不恰當，請與您的醫師討論決定您最恰當的治療。

本版與上版差異：

1. 文字修訂。
2. patient selection 修正 age 及 hormone status。
3. 更新參考文獻。

#### Indication:

Early stage breast carcinoma and low risk loco-regional recurrence

Low risk ductal carcinoma in situ

#### Patient selection and inclusion criteria:

1. Age: old than 45 y/o
2. Histology: invasive ductal, mucinous, medullary, colloid carcinoma
3. Image appearance: unifocal
4. Tumor size: < 2cm
5. Margin: free
6. Lymph node status: pN0 (SLNB)
7. Hormone status: ER positive
8. Ductal carcinoma in situ
  - (1) Screen detected
  - (2) Low to intermediate nuclear grade
  - (3) Size  $\leq$  2.5cm
  - (4) Receted with margins negative  $\geq$  3mm

#### Exclusion criteria:

1. Age: < 30 y/o
2. Margin: positive

3. > 3cm ductal carcinoma in situ
4. Lympho-vascular invasion (LVI): not allowed (ESTRO & ASTRO)
5. Metastatic disease

**Intra-operative radiotherapy (IORT) treatment procedures:**

1. Patient selection in GS OPD 【IORT 説明書】
2. Radiation oncology OPD for 2<sup>nd</sup> discussion
3. Arrange operation date, announce Xoft Inc. and Radiation oncology department for radiation protection procedures
4. Lumpectomy and sentinel lymph node biopsy (SLNB) or lumpectomy-breast reconstruction surgery and SLNB
5. Call radiation oncologist and waiting for the results of frozen section
6. If fulfilled the selection criteria, go on IORT. If not fulfilled the selection criteria, stop further procedures of IORT.
7. If final pathological report did not compatible with the selection criteria, adjuvant external beam radiotherapy (EBRT) for chest wall with or without regional lymphatic region should be arranged.

**Intra-operative radiotherapy (IORT) treatment technique and dosage protocol:**

1. Selection of proper balloon size: use Foley's catheter (cutting distal end) for testing, ex. 30 ml, 35 ml, 40 ml etc
2. Shielding of chest wall: when breast reconstruction surgery is performing, use 1-2 mm thickness lead with variable size depend on the size of balloon
3. Placement of treatment balloon: insert the treatment balloon into the lumpectomy cavity, use proper wet gauze for filling of the dead space among the balloon and cavity wall. (\* minimal gauze insertion is preferred)
4. Closing the lumpectomy wound temporarily and checking the distance between balloon surface to skin. If the distance exceed 1.0 cm, go on the IORT. If the distance is between 0.80 to 0.99 cm, adding wet gauze as spacer for exceed the standard of 1.0 cm. If this distance smaller than 0.8 cm, stop the IORT procedure.
5. Re-evaluate the placement of balloon and the possible dead space: by ultra-sonography
6. Dosage: surface dose 20 Gy  $\pm$  10%, depend on the clinical situation and the judgement of radiation oncologist.
7. Removal of the treatment balloon and closing the lumpectomy wound.

**Follow-up:**

1. Oncology survey: as regular schedule
2. Evaluation of cosmetic results: Fibrosis & skin atrophy etc by SOMA scale or

**Reference:**

1. 高雄榮民總醫院乳癌治療指引
2. 高雄榮民總醫院乳癌放射治療指引
3. NCCN breast cancer guideline (2021 version 5)
4. 台灣乳房醫學會治療指引 2018 版
5. Vaidya, Jayant S., et al. "Targeted intraoperative radiotherapy versus whole breast radiotherapy for breast cancer (TARGIT-A trial): an international, prospective, randomised, non-inferiority phase 3 trial." *The Lancet* 376.9735 (2010): 91-102.
6. Sperk, Elena, et al. "A cohort analysis to identify eligible patients for intraoperative radiotherapy (IORT) of early breast cancer." *Radiation Oncology* 9.1 (2014): 1-7.
7. Njeh, Christopher F., Mark W. Saunders, and Christian M. Langton. "Accelerated partial breast irradiation (APBI): a review of available techniques." *Radiation Oncology* 5.1 (2010): 1-28.
8. Smith, Benjamin D., et al. "Accelerated partial breast irradiation consensus statement from the American Society for Radiation Oncology (ASTRO)." *International Journal of Radiation Oncology\* Biology\* Physics* 74.4 (2009): 987-1001.
9. Polgár, Csaba, et al. "Patient selection for accelerated partial-breast irradiation (APBI) after breast-conserving surgery: recommendations of the Groupe Européen de Curiethérapie-European Society for Therapeutic Radiology and Oncology (GEC-ESTRO) breast cancer working group based on clinical evidence (2009)." *Radiotherapy and Oncology* 94.3 (2010): 264-273.
10. Wenz, Frederik, et al. "Intraoperative radiotherapy as a boost during breast-conserving surgery using low-kilovoltage X-rays: the first 5 years of experience with a novel approach." *International Journal of Radiation Oncology\* Biology\* Physics* 77.5 (2010): 1309-1314.
11. Cantero-Munoz, P., M. A. Urien, and A. Ruano-Ravina. "Efficacy and safety of intraoperative radiotherapy in colorectal cancer: a systematic review." *Cancer letters* 306.2 (2011): 121-133.
12. Correa, Candace, et al. "Accelerated partial breast irradiation: executive summary for the update of an ASTRO evidence-based consensus statement." *Practical radiation oncology* 7.2 (2017): 73-79.