

# Oncoplastic Split Reduction with Intraoperative Radiation Therapy

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## INTRODUCTION

A standard Wise-pattern reduction can be used to excise a breast cancer that falls within the Wise pattern.<sup>1</sup> When the tumor is located outside the Wise pattern, it can be removed by tunneling and pulling the lesion through the Wise-pattern incision. When it is necessary to take skin overlying the tumor, the Wise pattern can be reconfigured by moving either the lower inner or lower outer quadrant triangles, which are a normal part of the standard Wise pattern, to a position over the tumor. This change must be accompanied by splitting the vertical limb of the reduction to accommodate the repositioning of the triangle, a technique known as split reduction.<sup>2</sup> This alteration in the Wise pattern removes the skin directly over the tumor and guarantees that the anterior margin will be clear.

Intraoperative radiation therapy (IORT) is a technique used for administering a single dose of radiation therapy given during a ‘lumpectomy’ procedure. Two prospective, randomized trials have shown that, in selected low-risk patients, IORT may be adequate as the entire course of radiation therapy.<sup>3,4</sup> In this video, we combined IORT with a split reduction tumor excision.

## METHODS

The patient in this video presented with a right upper outer quadrant needle biopsy-proven invasive ductal carcinoma. The split reduction was designed by moving the lower outer quadrant triangle of a standard Wise pattern superiorly so that it overlaid the tumor. The right vertical limb was split into two sections to accommodate this change.

For IORT, a Xofigo Axxent that delivered 20 Gy to the surface of the IORT balloon was used. IORT criteria at our facility included age  $\geq 48$  years, preoperative MRI, ultrasound and digital mammography in all patients, and tumor span by all imaging  $\leq 30$  mm. At final pathology, tumor extent must be  $\leq 30$  mm, all margins must be  $\geq 2$  mm, and the sentinel node must be negative. If all of the criteria are not met, IORT becomes the boost and the patient receives 5 weeks of whole-breast irradiation. Patient satisfaction surveys were completed after 1 month, 6 months and 1 year of follow-up.

## RESULTS

Overall, 110 patients were treated with the combination of reduction excision plus IORT. Clear margins using no ink on tumor as the definition were achieved in 97 % of cases, and when 2 mm was used as the definition, clear margins were achieved in 88 % of cases. Forty patients failed one or more of our IORT criteria, 28 of whom agreed to undergo supplemental whole-breast irradiation. Two patients (1.8 %) opted for mastectomy rather than additional radiation therapy, five (4.5 %) underwent re-excision, and five declined additional local therapy. Only one local recurrence has been observed, which was outside the IORT field, but follow-up was short (average 21 months) since this is a new program. Side effects were

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**TABLE 1** Patient characteristics ( $n = 110$ )

Average age (years)	62
Average tumor size, mm (largest invasive component)	18
Average tumor span, mm (includes all components of the disease)	22
Average specimen weight (g)	144
Average margin width (mm)	6.9
Failed one or more IORT criteria	40 (36 %)
Margins <2 mm	12 (11 %)
No ink on tumor	3 (2.7 %)
Underwent re-excision	5 (4.5 %)
Received whole-breast RT	28 (25 %)
Converted to mastectomy	2 (1.8 %)
Recurrence inside IORT field	0 (0 %)
Recurrence outside IORT field	1 (0.9 %)
Hematomas that required drainage	2 (1.8 %)
Chronic seroma	0 (0 %)
Chronic hyperpigmentation	6 (5.5 %)

Data are expressed as  $n$  (%) unless otherwise specified

*IORT* intraoperative radiation therapy, *RT* radiation therapy

minimal. Ninety-eight percent of patients who answered the patient satisfaction survey after 1 year of follow-up said they would choose to have IORT again. Patient characteristics are shown in Table 1.

## CONCLUSIONS

The combination of reduction excision plus IORT works well. In this series, 68 % of patients received all of their

local treatment during a single operative procedure. This is profoundly convenient. Reduction excision allows the widest possible excision of the tumor while at the same time achieving excellent cosmetic results.<sup>1,2</sup> IORT is capable of delivering the entire course of radiation therapy in a single setting in selected low-risk patients. Should there be a local recurrence, it can be re-excised and whole-breast irradiation can be given at that time. Patient satisfaction is extremely high with the combination of reduction excision and IORT.

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