

Title: Disparities in the application of post-mastectomy radiotherapy in Switzerland: a pooled analysis of 7 cancer registries over the 2003-2005 period.

Zimmermann M, Ess S, Bordoni A, Bouchardy C, Frick H, Konzelmann I, Mousavi M, Rohrman S, Oehler C* and Zwahlen D*. Kantonsspital Graubunden, Chur, Switzerland. Krebsregister Sankt-Gallen-Appenzell, Sankt-Gallen, Switzerland. Registro tumori del Ticino, Locarno, Schweiz. Registre genevois des tumeurs, Geneva, Switzerland. Krebsregister Graubunden-Glarus, Chur, Schweiz. Registre valaisan des tumeurs, Sion, Switzerland. Krebsregister beider Basel, Basel, Switzerland. Krebsregister der Kantone Zurich und Zug, Zurich, Switzerland.

*contributed equally as senior authors

Body: Background: The aim of this study was to identify factors that influence the delivery of post-mastectomy radiotherapy (PMRT) in Switzerland, and to analyze the adherence to consensus guidelines.

Methods: Based on 7 regional cancer registries covering 45% of the Swiss population, we identified 1408 women which underwent mastectomy for stage I-III breast cancer between January 1, 2003 and December 31, 2005. We categorized patients according to ASCO grouping in similar fashion to other comparable studies: low-risk group (T1/T2 N0): PMRT not routinely recommended; intermediate-risk group (T1/T2 N1): PMRT controversial; high risk group (T3-T4 and/or N2-N3): PMRT recommended. We further investigated factors leading to potential overtreatment (PMRT in low-risk group) or undertreatment (absence of PMRT in high-risk group). Data analysis was performed for the entire cohort, and separately for patients <70 years and ≥ 70 years of age. Probability of receiving PMRT was assessed using logistic regression.

Results: A total of 421 patients (29.9%) received adjuvant RT after mastectomy. The rate of PMRT delivery was 76% in the high-risk group, compared to 9% and 15% in the low-risk and intermediate-risk groups.

For patients at high-risk of chest wall recurrence after mastectomy (T3-T4 or N2-N3 disease), the risk of PMRT omission (after correcting for confounding factors) was significantly associated to older age (HR 4.25 [95% CI: 2.27-7.95; $p < 0.001$] for patients ≥ 70 years) and to the absence of chemotherapy (HR 4.30 [95% CI: 1.97-9.36; $p < 0.001$]). In the subgroup with T3-T4 disease, PMRT was delivered in 77% for patients < 70 years and in 42% for patients ≥ 70 years ($p < 0.001$). In the subgroup with N2-N3 disease, PMRT was delivered in 82% for patients < 70 years and in 51% for patients ≥ 70 years ($p < 0.001$).

For patients at low-risk of recurrence after mastectomy (T1-T2 N0, negative margins), PMRT is not routinely recommended. It was however delivered to 28 patients (7%). It was more frequently offered to patients aged <40 years (HR 3.86 [95% CI: 1.01-14.76]; p=0.048), with T2 tumors (HR 3.43 [95% CI: 1.45-8.11]; p=0.005) and negative hormone receptor status (HR 2.60 [95% CI: 1.04-6.50, p=0.04]).

Positive or close surgical margins (< 1mm) were a strong indicator for PMRT (p=0.001) and chest wall boost (p<0.03).

Table1. RT after mastectomy for high-risk disease.

	PMRT		No PMRT		Total
Any T, N2	133	67%	65	33%	198
Any T, N3	103	83%	21	17%	124
T4 any N	84	60%	57	40%	141
T3 any N	85	71%	35	29%	120

Conclusions: After mastectomy, one quarter of patients (24%) with high-risk disease failed to receive PMRT. Even if we consider only patients < 70 years, a non-trivial proportion of patients with clear indication for treatment delivery did not receive PMRT (T3-T4 disease: 23%; N2-N3 disease: 18%). Further analyses are planned to explain the apparent failure of evidence-based guidelines to impact the adoption of PMRT in women with high-risk breast cancer.