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Squamous Metaplasia with Atypia is Common in Re-excised Breast Tissue after Intraoperative Radiotherapy (IORT) for Breast Carcinoma

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Background

- IORT has similar efficacy to traditional adjuvant radiotherapy in select early stage breast cancer patients.
- The mechanisms associated with this efficacy remain largely uncharacterized.
- IORT-induced changes in the tumor bed are hypothesized to play a significant role.
- Few studies document these histologic or molecular changes after IORT.

Aims

To assess changes in the histological features of breast tissue after IORT

Methods

- We identified twenty patients who had a partial mastectomy for IDC or DCIS with a subsequent surgical re-excision.
- Re-excision tissue was assessed for histopathologic changes and compared between patients who did or did not receive IORT.

Results

Clinical Characteristics

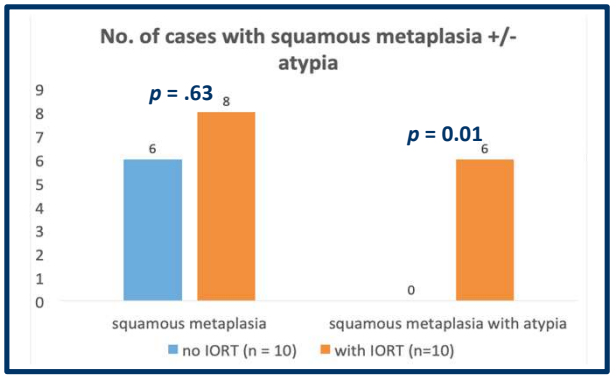
	no IORT (n=10)	with IORT (n=10)	*p value*
Median age, y (range)	62 (29-75)	68 (60-81)	0.03
Median Time to re-excision, days (range)	15 (7-21)	20 (13-25)	.30
T stage			.51
tis	3	1	
t1	5	7	
t2	2	2	

Tumor characteristics in primary specimen

	no IORT (n=10)	with IORT (n=10)	p value
DCIS present	9	10	
DCIS span in cm, avg	3.57	2.31	.22
< 1 cm	1	1	
1-2 cm	2	4	
2-3 cm	2	2	
> 3 cm	4	3	

Tumor characteristics in primary specimen (cont.)

	no IORT (n=10)	with IORT (n=10)	*p value*
IDC present	7	9	
Tumor size in cm, avg	2.36	1.82	.37
< 1 cm	1	1	
1-2 cm	3	4	
2-3 cm	0	3	
> 3 cm	3	1	
Receptor status			.74
ER+	9	10	
PR+	8	7	
Her 2+	0	0	
Nottingham Histologic Score			.41
1	2	5	
2	4	3	
3	0	1	
n/a	2	1	
Node positive	4	4	.46
Lymphovascular invasion	1	3	.58



Presence of abnormal histopathology

	no IORT (n = 10)	with IORT (n=10)	*p value*
squamous metaplasia	6	8	.63
focal (< 20% of slides)	5	3	
multi focal (20-80% of slides)	1	3	
diffuse (> 80% of slides)	0	2	
squamous metaplasia with atypia	0	6	.01
focal (< 20% of slides)	0	3	
multi focal (20-80% of slides)	0	3	
diffuse (> 80% of slides)	0	0	

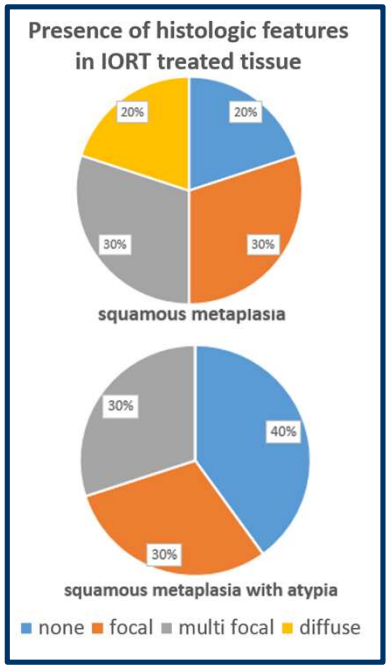
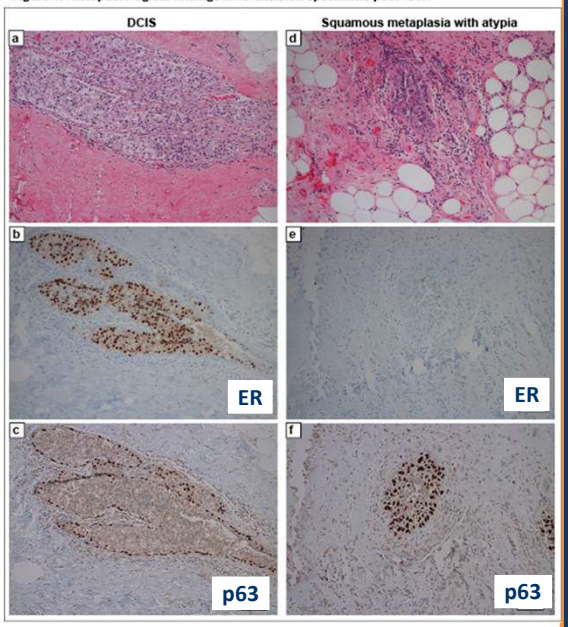


Figure 1: Histopathological findings in re-excision specimens post-IORT



Hematoxylin and eosin, Estrogen receptor (ER) & p63 stained slides from re-excision after breast conserving therapy and IORT. a-c DCIS, d-f squamous metaplasia with atypia. DCIS shows strong ER staining, while squamous metaplasia stains strongly with p63.

Conclusions

- Squamous metaplasia with atypia represents a major histological difference in the tumor bed in IORT treated tissue vs non treated, likely signifying underlying molecular processes.
- Squamous metaplasia with atypia can mimic DCIS, and warrants careful interpretation in IORT treated breast tissue. Additional stains such as ER and p63 can assist with diagnosis.