

**Acute Radiodermatitis clinical manifestation in
comparison with reflectance confocal microscopy**

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2019-11-08

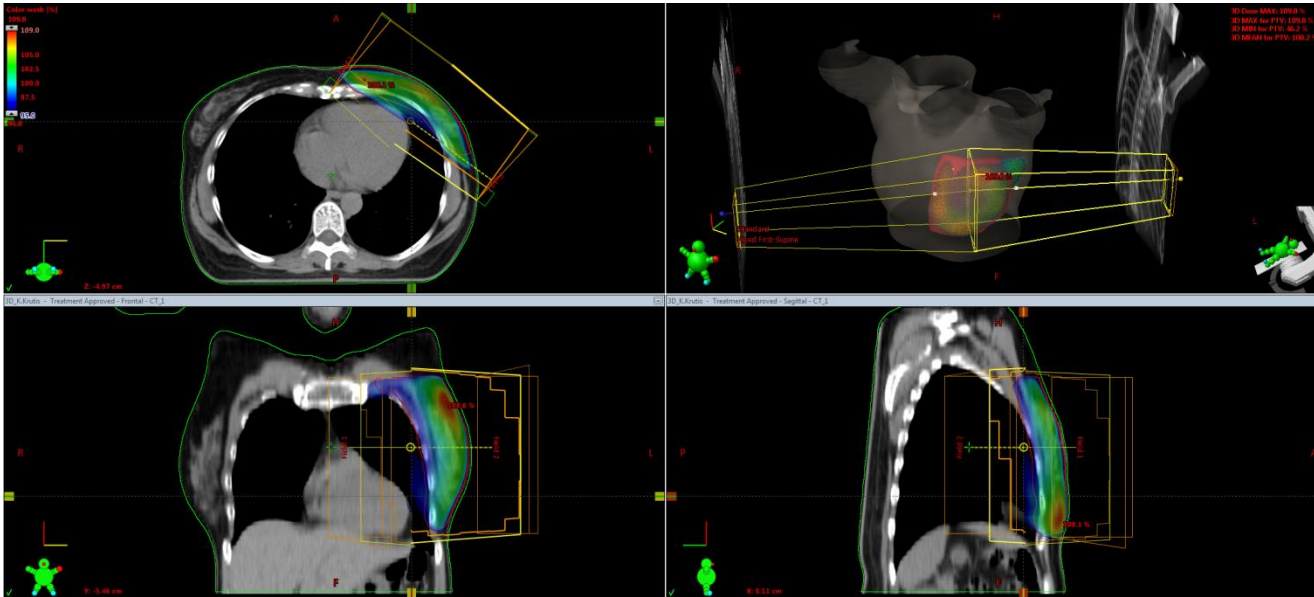
Radiotherapy (RT)

- part of cancer treatment;
- therapy using ionizing radiation (IR) to kill malignant cells;
- about 52% of cancer patients are treated with RT*.

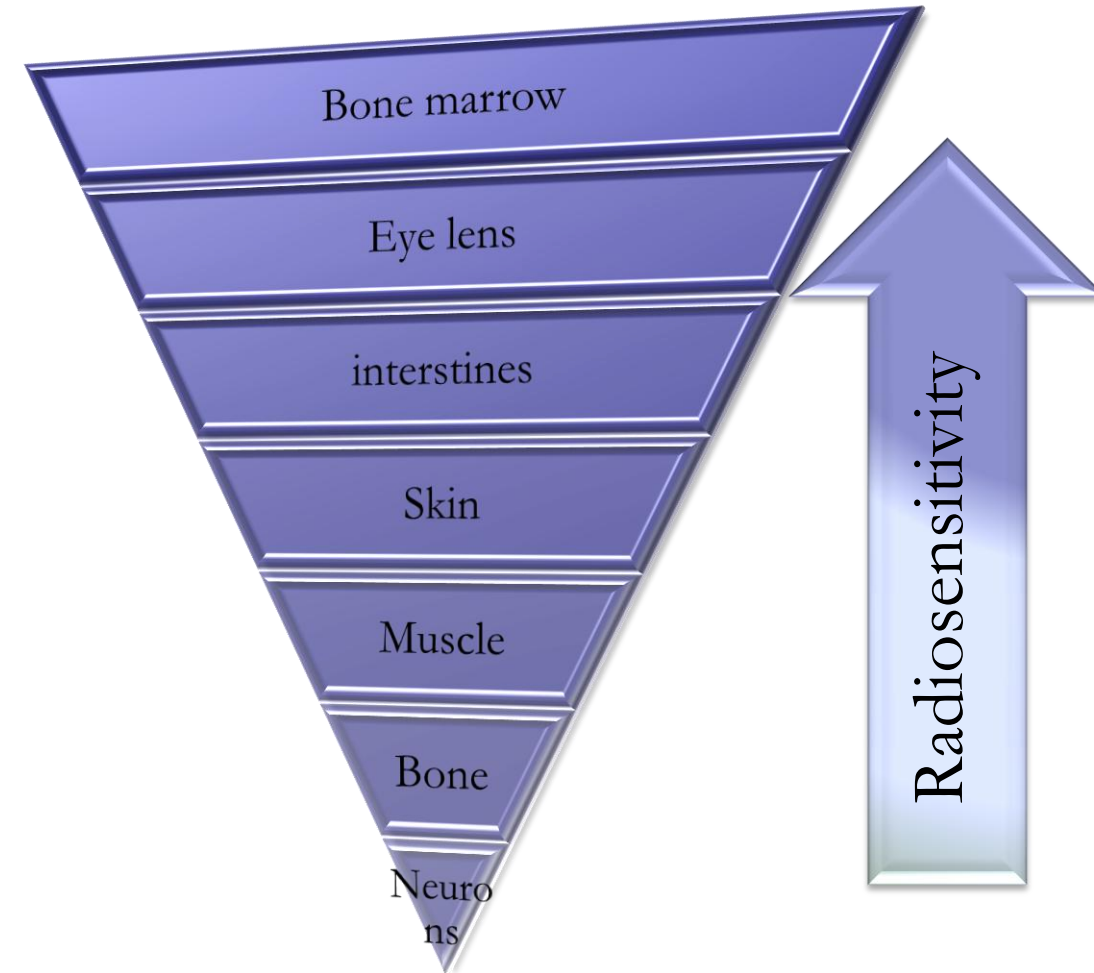


* Delaney G, Jacob S, Featherstone C, Barton M. The role of radiotherapy in cancer treatment: estimating optimal utilization from a review of evidence-based clinical guidelines. Cancer. 2005;104(6):1129-37

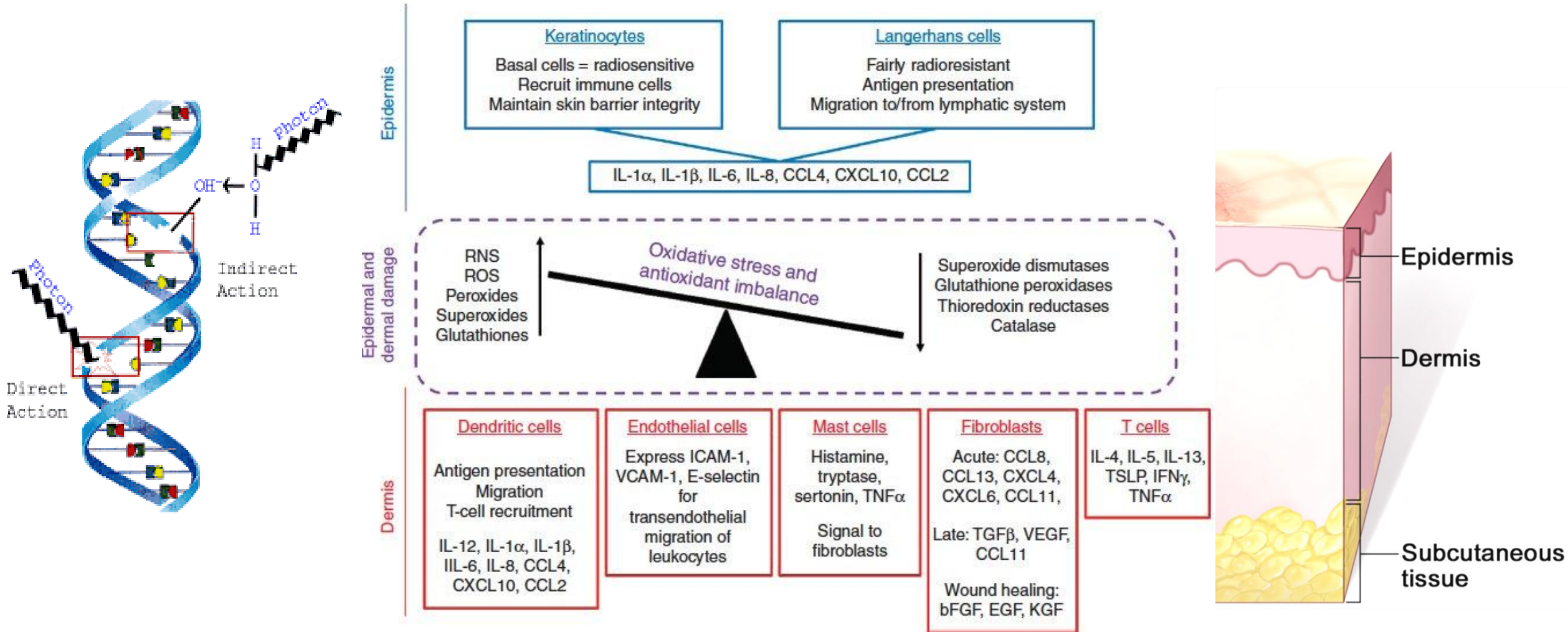
Radiation dermatitis (RD)



RD affects up to 95% of irradiated patients



RD pathogenesis



Symptoms of RD

Acute skin effect	Dose (Gy)	Onset
Early transient erythema	2	Hours
Faint erythema; epilation	6–10	7–10 Days
Definite erythema; hyperpigmentation	12–20	2–3 Weeks
Dry desquamation	20–25	3–4 Weeks
Moist desquamation	30–40	≥4 Weeks
Ulceration	>40	≥6 Weeks

<i>Late skin effect</i>		
Delayed ulceration	>45	Weeks after radiation
Dermal necrosis/atrophy	>45	Months after radiation
Fibrosis	>45	6 Months to ≥1 year after radiation
Telangiectasia	>45	6 Months to ≥1 year after radiation

Information compiled from Mendelsohn *et al.*, 2002; Hymes *et al.*, 2006; Bey *et al.*, 2010; Wolbarst *et al.*, 2010; and Brown and Rzucidlo, 2011.





Douglas & Fowler

Evaluation

0	Normal
0.25	50/50, Doubtful if any difference from normal
0.5	Very slight reddening
0.75	Definite but slight reddening
1	Severe reddening
1.25	Severe reddening with white scale; "papery" appearance of skin
1.5	Moist breakdown in one very small area with scaly or crusty appearance
1.75	Moist desquamation in more than one small area
2	Moist desquamation in 25% of irradiated area
2.25	Moist desquamation in 33% of irradiated area
2.5	Moist desquamation in 50% of irradiated area
2.75	Moist desquamation in 66% of irradiated area
3	Moist desquamation in most of irradiated area
3.25	Moist desquamation in most of irradiated area with slight moist exudate
3.5	Moist desquamation in most of irradiated area with moist exudates; necrosis

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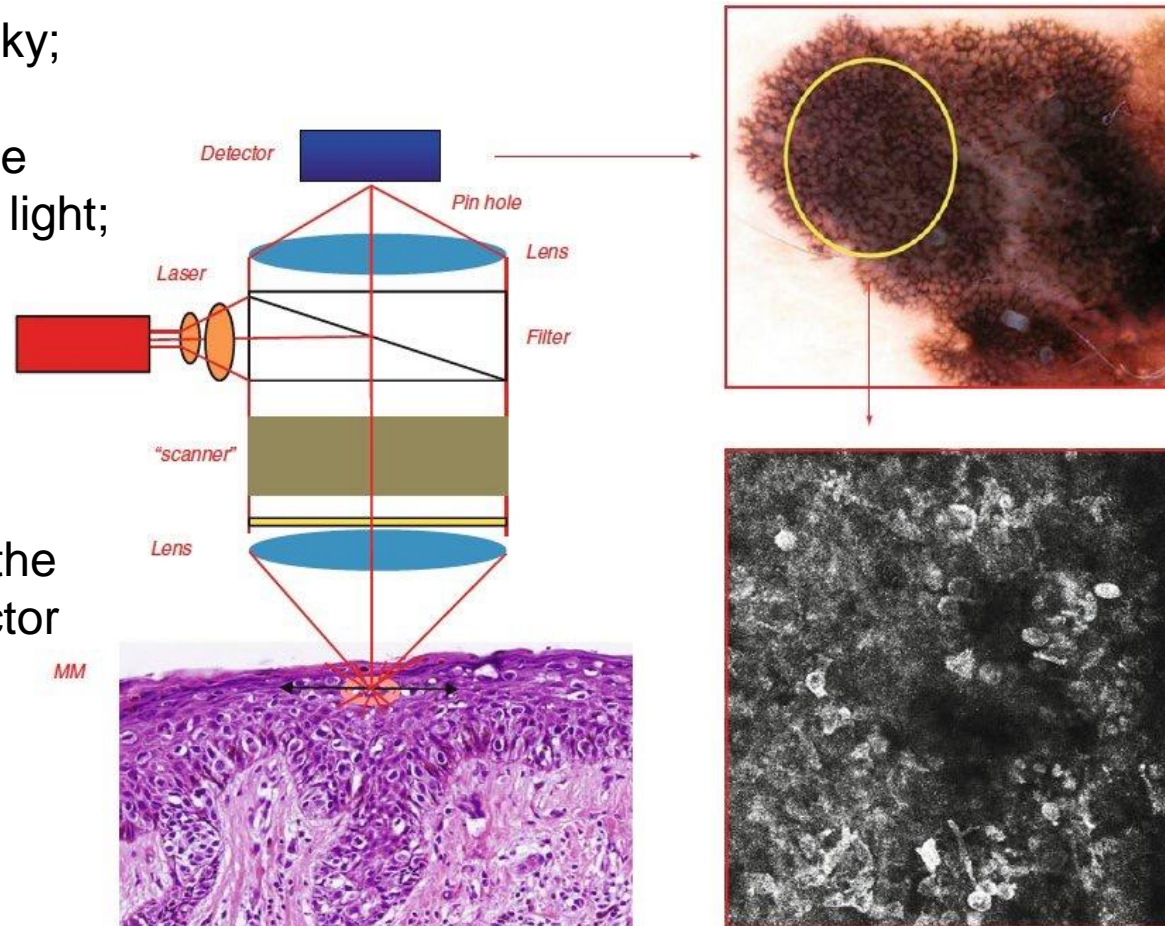
0	No change
1.0	Faint or dull erythema
1.5	Bright erythema
2.0	Dry desquamation with or without erythema
2.5	Small to moderate amount of moist desquamation
3.0	Confluent moist desquamation
3.5	Ulceration, hemorrhage, or necrosis

Radiation dermatitis severity scale

0.0	Normal or none
0.5	Patchy faint/slight follicular erythema; faint hyperpigmentation
1.0	Faint and diffuse erythema; diffuse hyperpigmentation; mild epilation
1.5	Definite erythema; extreme darkening/hyperpigmentation
2.0	Definite erythema/hyperpigmentation with fine dry desquamation; mild edema
2.5	Definite erythema/hyperpigmentation with branny/scaly desquamation
3.0	Deep red erythema with diffuse dry desquamation; peeling in sheets
3.5	Violaceous erythema with early moist desquamation; peeling in sheets; patchy crusting
4.0	Violaceous erythema with diffuse moist desquamation; patchy crusting; ulceration; necrosis

Reflectance confocal microscopy (RCM)

- ❖ described in 1957 by M. Minsky;
- ❖ uses a diode laser as a source of monochromatic and coherent light;
- ❖ light penetrates into the skin and illuminates a small point inside the tissue;
- ❖ small pinhole does not allow the reflected light to reach the detector from another tissue point.

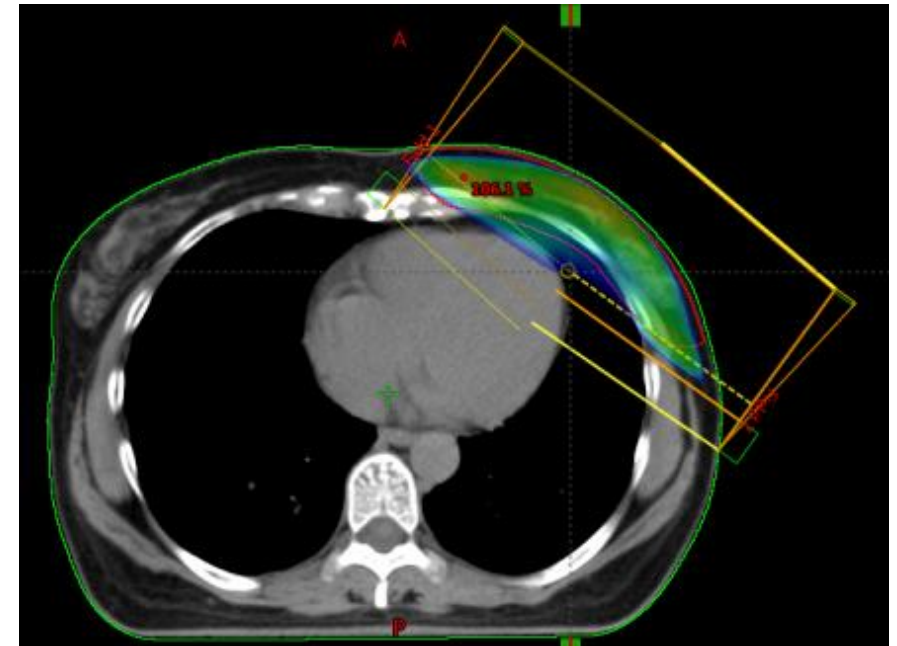
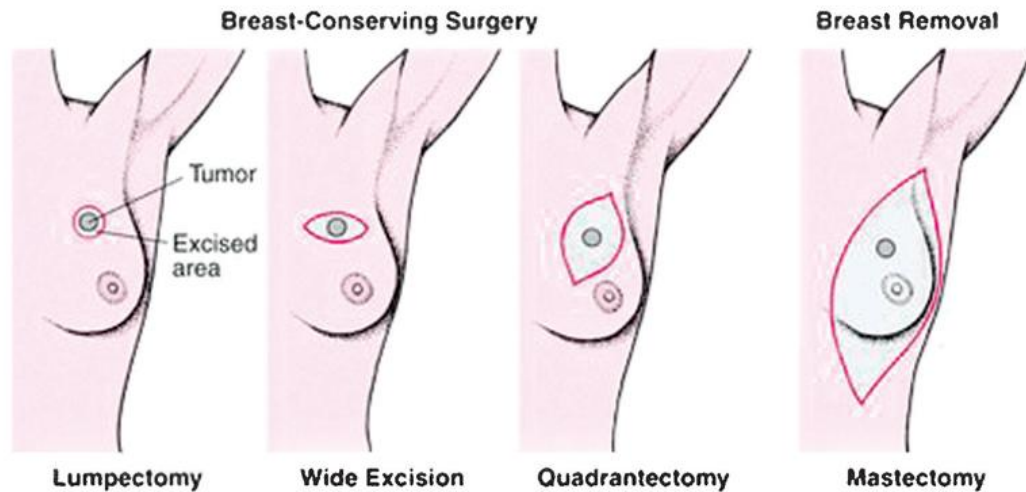


Aim

- ✓ dynamically evaluate radiation dermatitis by a standard method (CTCAE scale) and RCM.

Materials and methods

Methods / Techniques of Breast Cancer Surgery



Assessment of skin lesions

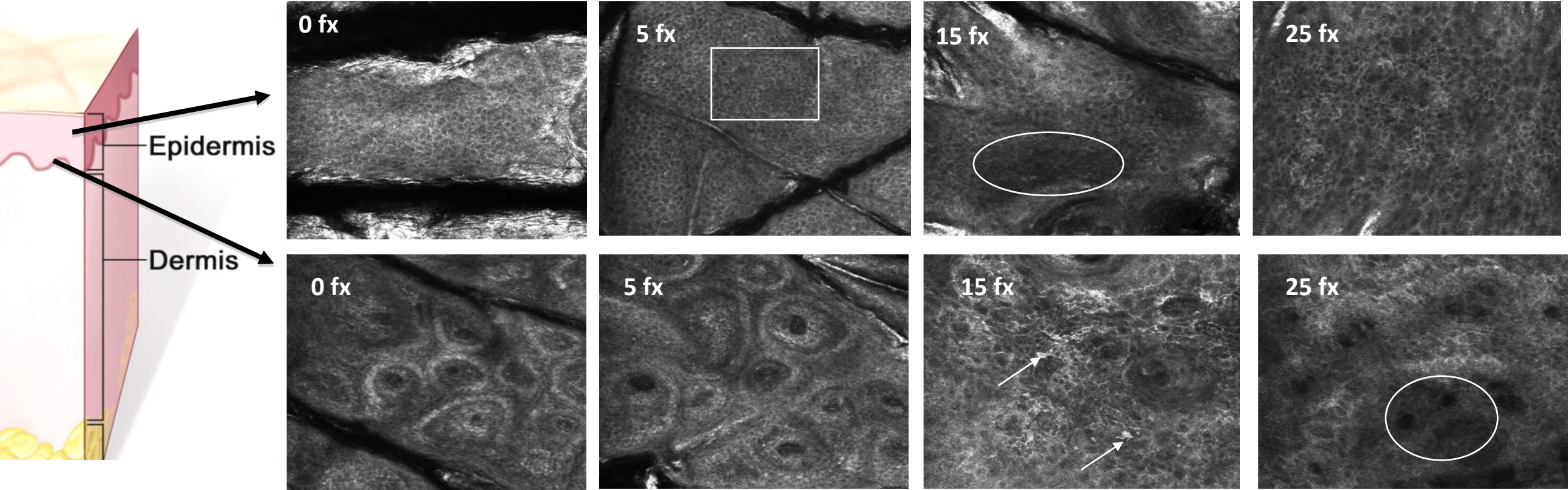


Results: The degree of RD

FR	0* of RD	1* of RD	2* of RD
0	10	-	-
5	7	3	-
10	5	5	-
15	2	8	-
20	2	6	2
25	0	6	4



Results: RCM imaging



RCM signs:

- exocytosis (Ex);
- Spongiosis (S);
- Mild contrast cells (MCC);
- Disarrayed epidermis (DE);
- Abnormal dermal papillae (ADP)

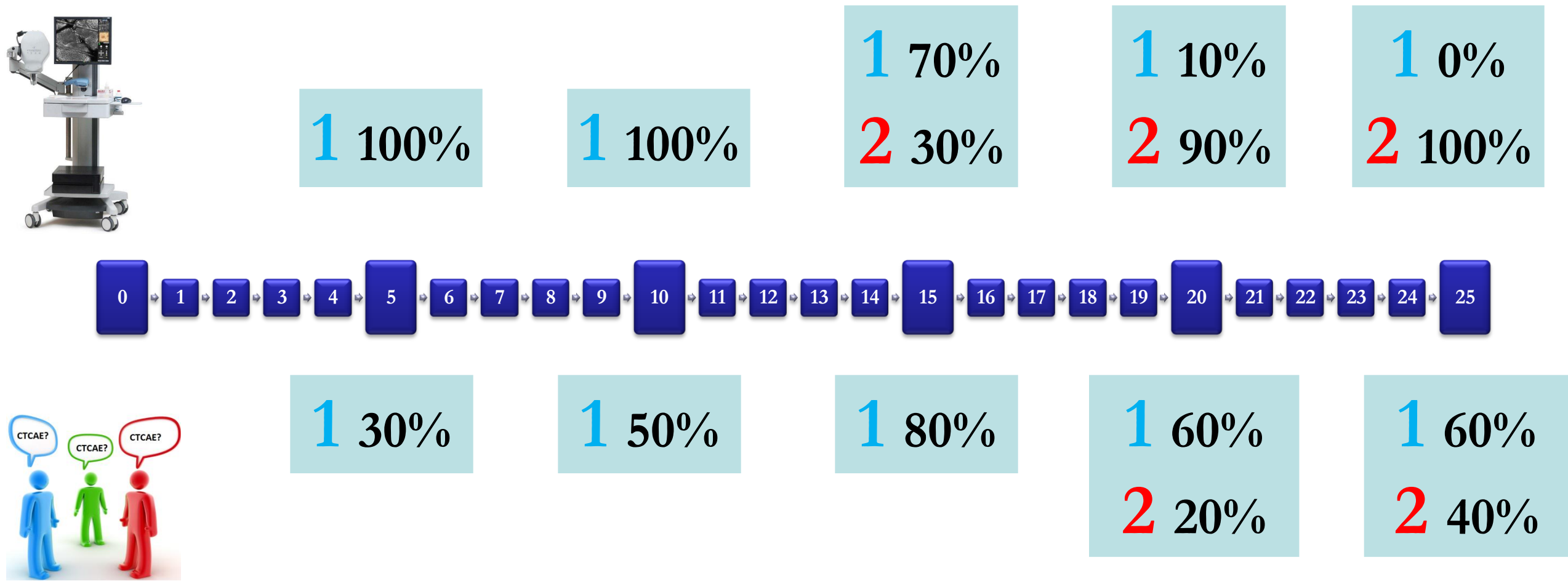
Results: RCM imaging

FR	Exocytosis (Ex)	Spongyosis (S)	Mild contrast cells (MMC)	disarrayed epidermis (DE)	abnormal dermal papillae (ADP)
0	-	-	-	-	-
5	9	3	5	-	-
10	10	5	3	-	-
15	10	9	7	2	3
20	10	10	9	8	5
25	10	10	10	10	8

1

2

Results: RCM vs CTCAE



Conclusions

- RCM is capable to detect radiation induced skin changes before clinical manifestation.
- After 5 fx of RT skin lesions was detected for 100% of patients during RCM imaging, while clinical symptoms were diagnosed only for 30% of them.
- At the end of RT lesions DE, ADP were visible in all patients RCM images, but second degree of RD was diagnosed only for 40% of them.
- DE or ADP appearance in RCM imaging could be a signal for the clinician to expect a worsening of patient skin condition after treatment.
- RCM possibly could help to reduce misdiagnosis of severe IR induced skin injury.



Thank you

