

## RISING DERM STARS

### ***Staphylococcus Aureus* Nasal Colonization is Associated with Severity of Radiation Dermatitis in Patients Receiving Radiotherapy**

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**Introduction:** Acute radiation dermatitis (RD) is a common adverse effect of radiation therapy (RT)<sup>1,2</sup>. Up to 95% of patients undergoing radiotherapy develop some degree of RD. Radiation-induced skin changes are thought to increase the risk of secondary skin infection. However, little is known regarding the baseline incidence of microbial colonization prior to RT and whether it is associated with development of RD.

**Objective:** The goals of our prospective study were to 1) characterize the incidence of baseline bacterial colonization in patients undergoing RT, and 2) examine the association between radiation dermatitis severity and baseline bacterial colonization. We hypothesize that microbial colonization prior to initiation of RT is associated with development of RD.

**Methods:** We conducted a prospective non-interventional trial at Montefiore Einstein Center for Cancer Care in the Bronx, New York between July 2017 to June 2018. Patients undergoing radiotherapy for treatment of cancers of the head and neck, breast, or anus underwent bacterial culture from the nares and irradiated skin prior to RT initiation and again upon treatment completion. Patients were evaluated weekly during RT, and dermatitis was graded using

CTCAE version 4.03. Odds ratios were utilized to present associations between culture results and skin toxicity.

**Results:** Eighty-three subjects with cancers of the breast (49%), head and neck (45%), and anus (6%) completed RT (Table 1). All subjects developed some degree of RD: 59% grade 1, 33% grade 2, and 8% grade 3 dermatitis. Baseline bacterial culture was positive for *Staphylococcus aureus* (SA) in 17 subjects in the nares and in 5 subjects on the irradiated skin. All subjects with positive baseline skin cultures for SA also had a positive baseline nares culture for SA. A positive baseline nares culture was associated with increased risk of developing grade 2-3 dermatitis (65% vs. 34%, OR=3.6, p=0.025) (Figure 1). Out of 64 patients with negative baseline nares cultures, 8 were found to have positive cultures for SA in the nares at later time points. Among patients with negative cultures at baseline, finding positive cultures at a later time point was not significantly associated with development of grade 2+ dermatitis (50% vs. 32%, OR=2.11, p=0.327).

**Discussion:** Bacterial colonization with SA prior to initiation of RT is a risk factor for development of higher grade RD. Because a positive nares culture was able to predict skin toxicity, even in the absence of a positive skin

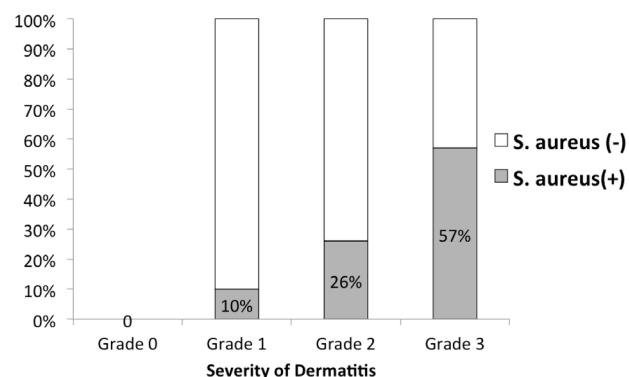
December 2018 Volume 2 Supplemental Issue

culture, it is possible that bacterial colonization in the nares plays a role in the pathogenesis of RD. SA colonization has been shown to have a role in inflammatory skin disorders similar to RD, such as atopic dermatitis<sup>3,4</sup>; thus, it is possible SA colonization prior to RT may facilitate skin barrier defects and drive inflammation, contributing to increased severity of RD. Antimicrobial therapy in the nares prior to initiation of RT may be a strategy to lessen the severity of RD<sup>5</sup>. Further studies are needed to understand the association between microbial colonization and development of RD, as well as the role of specific staphylococcal toxins in the pathogenesis of RD.

**Table 1:** Patient demographics and results.

Total patients	n = 83	
<b>Gender:</b>	<b>n</b>	<b>%</b>
Male	23	27.7%
Female	50	60.2%
<b>Type of cancer</b>	<b>n</b>	<b>%</b>
Breast	41	49%
Head & Neck	37	45%
Anal	5	6%
<b>Most severe</b>		
Grade 1— <i>faint</i>	49	59%
Grade 2—	27	33%
Grade 3— <i>moist</i>	7	8%
<b>Baseline culture</b>		
Nares	17	21%
Skin	5	6%
<b>Post-treatment</b>		
Nares	21	25%
Skin	14	17%

**Figure 1.** Radiation Dermatitis Severity and Nares Bacterial Colonization Status at Baseline.



## References:

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