

# Changes in Tumor Micro-environment with Liquid Nitrogen Spray Cryotherapy (LNSC) and Chemoradiation (CRT) in Locally Advanced Esophageal Cancer

Tilak Shah MD, MHS FACG, Jennifer Koblinski PhD, Rio Boothello PhD Chetna Patel PhD, Hugh D Massey MD, Bhaumik Patel MD

## INTRODUCTION

- LNSC is hypothesized to enhance immune-mediated cell death of esophageal tumor cells and work synergistically with CRT, but published studies are lacking.

## OBJECTIVE

- To assess changes in tumor immune micro-environment (TIME) with LNSC and CRT.

## METHODS

- Retrospective case-control study
- Locally advanced esophageal cancer patients who underwent single session of LNSC plus concurrent CRT (CRYOCHEMORT) vs. CRT alone (CHEMORT)
- Matched for age, histology, pre-treatment stage.
- Tissue microarray generated from blocks
- Multiplex immunofluorescence for pancytokeratin (tumor cells), CD3 (overall T cells), CD8 (Cytotoxic T cells), FOXP3 (regulatory T cells).
- Images analyzed with Vectra Polaris Automated Quantitative Pathology Imaging System; data analyzed using R studio

## RESULTS

- Paired pre- and post-treatment tissue available for 5 pts in CRYOCHEMORT group and 4 patients in CHEMORT group
- 5X ↑ in intra-tumor T cells pre- and post-treatment in 40% with CRYOCHEMORT vs. 25% with CHEMORT group.
- 5X ↑ in cytotoxic T cells pre- and post-treatment in 60% with CRYOCHEMORT vs. 50% with CHEMORT group.
- However, regulatory T cells also increased more frequently with CRYOCHEMORT (40% vs. 25%)

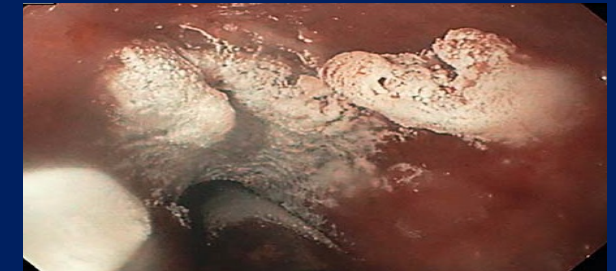
**Table 1: Clinical remission and survival among patients who received LNSC + CRT**

Patient	5X ↑ Tc post Rx	Long-term complete CR	Survival (days)
1	No	Yes	1231
2	No	Yes	735
3	Yes	No	1390
4	No	No	91
5	Yes	No	1414

Tc Cytotoxic T cells; CR Clinical Remission

## CONCLUSIONS

- In this exploratory study, LNSC increased likelihood of IT-TILs with CRT.
- Patients with a robust cytotoxic T cell response had a longer survival than patients who did not have a significant immune response.
- Larger studies are needed to corroborate these findings, and to better characterize tumor immune response with LNSC and CRT.



## REFERENCES

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- Gao Y, Guo W, Geng X, et al. Prognostic value of tumor Infiltrating lymphocytes in esophageal cancer: an updated meta-analysis of 30 studies with 5,122 patients. *Ann Transl Med*. 2020 Jul;8(13):822.