Inflammation is associated with psychosocial stress in patients with head and neck cancer undergoing radiotherapy: A longitudinal study

Yufen Lin[1], Telisa Spikes[1], Deborah W. Bruner[1,2], Andrew H. Miller[2,3], Nabil F. Saba[2,3], Kristin A. Higgins[2,3], Dong M. Shin[2,3], Canhua Xiao[1,2]

[1]Nell Hodgson Woodruff School of Nursing, Emory University, [2]Winship Cancer Institute, Emory University, [3]School of Medicine, Emory University

Background

- Patients with head and neck cancer (HNC) have been increasing dramatically in the United States.
- Psychosocial stress leads to higher symptom burden, decreased functional status, and poorer quality of life for patients with HNC undergoing intensity-modulated radiotherapy (IMRT).
- While inflammation has been shown to be associated with psychosocial stress in cancer patients, little is known about the links between inflammation and stress over time.

Purposes

- Examine the association between inflammation and psychosocial stress in patients with HNC receiving IMRT across four time points (i.e., prior to IMRT (T1), at the end of IMRT (T2), 3 months post IMRT (T3), and 12 months post IMRT(T4)).

Methods

- We conducted a prospective longitudinal study.
- Psychosocial stress was assessed using the Perceived Stress Scale (PSS) across four time points along with the assessment of peripheral blood inflammatory markers (i.e., interleukin (IL)-6, IL-1β, IL-10, IL-1ra, soluble tumor necrosis factor receptor 2 (TNFR2), tumor necrosis factor-α, and C-reactive protein (CRP)).
- Linear mixed effects model was used to examine the association between inflammatory markers and psychosocial stress over time, , controlling for covariates.

Figures

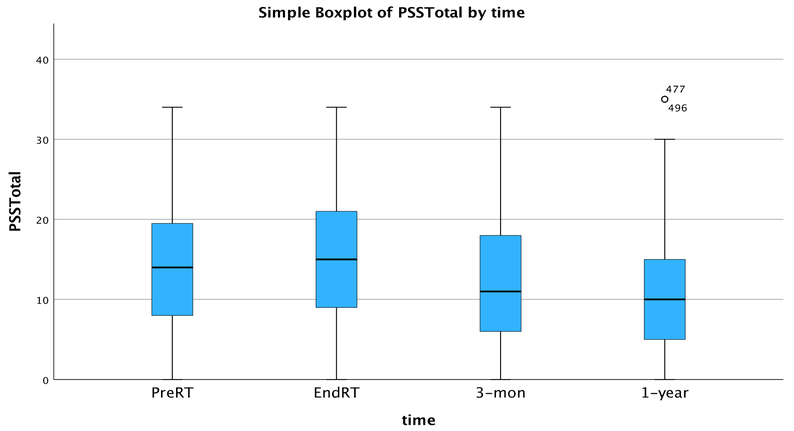

Figure 1. Psychosocial stress scores across four time points

Table 1. Linear mixed effects modeling results (N=127)

	Model 1 (CRP)		Model 2 (IL-1ra)		Model 3 (TNFR2)	
Predictors	Estimates	*p*	Estimates	*p*	Estimates	*p*
Inflammatory marker	1.761	**<0.001**	6.027	**<0.001**	4.249	**<0.001**
Time 2	0.604	0.468	1.301	0.101	0.751	0.394
Time 3	-1.870	**0.012**	-1.844	**0.012**	-2.872	**<0.001**
Time 4	-2.692	**0.001**	-2.030	**0.017**	-3.176	**<0.001**
Age (<65y)	1.523	0.187	1.445	0.218	1.757	0.135
HPV status (negative)	3.411	**0.005**	3.571	**0.004**	3.545	**0.004**
Tobacco (no)	-0.701	0.549	-0.894	0.452	-0.785	0.504
Alcohol (no)	0.665	0.552	0.650	0.567	0.756	0.501
Treatment (chemo)	-2.496	0.082	-2.363	0.106	-2.710	0.064
Treatment (chemo+surgery)	-3.153	0.066	-2.556	0.143	-3.447	**0.049**

Results

- A total of 127 patients with HNC were enrolled in the study with a mean age of 59.4±10.1 years, 72.4% male, and 81.9% non-Hispanic White.
- Psychosocial stress scores increased slightly from T1 to T2, decreased significantly at T3, and gradually decreased at T4, with the stress level lower than T1.
- Significant associations between psychosocial stress and CRP, IL-1ra as well as TNFR2 were identified across four time points (p values <0.001), controlling for covariates: elevated inflammatory markers were associated with higher levels of psychosocial stress.

Conclusions

- Findings from our study suggest that inflammation is associated with psychosocial stress over time in patients with HNC receiving IMRT.
- Clinicians and researchers may use the findings to develop personalized psychosocial interventions that target inflammation to reduce stress for patients with HNC during their treatment and survivorship.

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yufen.lin@emory.edu