IMRT-Induced Acute Fatigue in Patients with Head and Neck Cancer: a Prospective Study

Canhua Xiao[1] PhD RN, Jonathan J. Beitler[2] MD, Kristin A Higgins[2]MD,
Luke Yeeloo Ong[1]Undergratuate student,
Andrew H. Miller[2] MD, Deborah W. Bruner[1]PhD RN FAAN
[1]Emory University Nell Hodgson Woodruff School of Nursing, Atlanta, GA
[2]Emory University School of Medicine, Atlanta, GA

EMORY WINSHIP CANCER INSTITUTE
NCI-Designated

Background & Significance

- Fatigue profoundly impacts a cancer patient's quality of life, treatment adherence, and health care utilization.
- Pre or post radiotherapy (RT) fatigue is a prognostic factor for pathologic tumor response and survival.
- Patients with head and neck cancer (HNC), who usually treated with RT because of the structural complexity and functional importance of cancer sites, have particularly high rates of fatigue during treatment.
- Most recent research on Intensity-modulated Radiation Therapy (IMRT), a commonly used new radiotherapy targeting tumors with higher doses while avoiding normal structures, has shown that patients experience even higher fatigue compared to conventional-RT.

Purposes

- The purposes of this study were to
- 1) describe acute fatigue changes from pre to one-month post IMRT,
- 2) examine the risk factors for IMRT-induced acute fatigue changes, and
- 3) explore the relationship between fatigue and other most common treatment-induced symptoms during the acute phase.

Acknowledgement

The study was supported by the Oncology Nursing Society Foundation and NIH/NINR 1K99NR014587. The authors appreciate the support from Emory School of Nursing and School of Medicine. The authors are also grateful for the support from participants and research staff and students.

Methods & Analysis

- This was a longitudinal study investigating 44 HNC patients pre- to 1-month post-IMRT.
- Fatigue was measured by the Multidimensional Fatigue Inventory-20.
- Other common symptoms were collected using the Patient-Reported Outcomes version of the Common Terminology Criteria for Adverse Events (CTCAE) that categorizes depressive symptoms, sleep problems, cognitive problems, pain, dry mouth, difficulty swallowing, skin burn from radiation, mouth or throat sores, taste change, nausea, vomiting, and sensation of thirst.
- Risk factors (age, gender, race, education, marital status, alcohol and smoking history, BMI, HPV, surgery, chemotherapy, cancer stage, and cancer site) were collected through chart review.
- Paired t-test was used to examine fatigue changes from pre to post IMRT. Regression modeling was used to correlate risk factors with fatigue changes over time. Correlation coefficients and regression modeling were used to explore the relationship between fatigue and other symptoms.

Results

- Patients' overall fatigue increased significantly from pre (47 ± 16) to one-month post (60 ± 16) IMRT (t=5.27, p=0.000). Forty percent of the patients experienced severe fatigue (MFI ≥ 65) at one-month post IMRT, while only 10% had severe fatigue at pre IMRT (see Figure 1).

Results

- Multivariate analysis revealed that chemotherapy and pre-IMRT fatigue were significantly correlated with fatigue changes over time (F=10.89, p=0.000). The patients receiving chemotherapy experienced increased fatigue changes from pre to one-month post IMRT (t=2.29, p=0.027; see Figure 2).
- Fatigue was the third severest symptom among the13 common symptoms at pre-IMRT in our sample (the first two were sleep problems and pain), and the second severest symptom at one-month post IMRT (the first is taste changes).

Figure 1. Fatigue changes over time

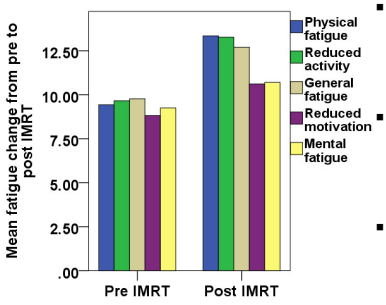
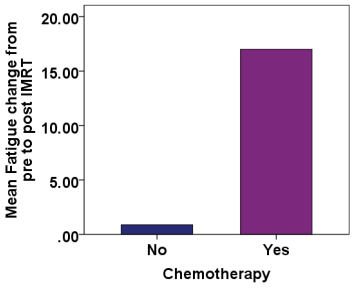


Figure 2. Fatigue changes with or without chemo



Results

- Fatigue at either pre or post-IMRT was significantly correlated with other biobehavioral symptoms, including depressive symptoms, sleep problems, and cognitive problems at either or both time points.
- Pre IMRT fatigue explained the most variance (20%) in a previously identified HNC specific symptom cluster, involving symptom of pain, dry mouth, difficulty swallowing, skin burn from radiation, mouth or throat sores and taste change, after controlling other variables, such as sleep problems and chemotherapy (F=9.22, p=0.000).

Conclusion

- Fatigue is one of the major treatment-related symptoms experienced by patients with HNC.
- HNC patients receiving IMRT report significantly increased acute fatigue from pre to one-month post IMRT.
- Concurrent chemotherapy further worsens the symptom of fatigue.
- Fatigue, in turn, is the most significantly risk factor for other common radiation-induced symptoms, or the HNC specific symptom cluster.
- Although these findings are from a prospective longitudinal study design, further larger studies are needed to verify our results.
- Additionally, future research on understanding the molecular and genetic mechanisms of fatigue is critical to its successful management.