MedCrave
Step into the World of Research

Biometrics & Biostatistics International Journal

Assessment of Swallowing and Neck Dysfunction Post Radiotherapy/Chemo-Radiotherapy in Head and Neck Cancer Patients

Abstract

Background: Head and neck cancer (HNC) patients experience treatment-related complications that may interfere with health related quality of life. Swallowing and neck disability, impaired neck movements and eating or swallowing contribute to decrements in functional status of an individual. The aim of this paper is to assess swallowing and neck dysfunction in HNC patients post radiotherapy (RT)/chemo-radiotherapy (CXRT).

Materials and Methods: The purpose of this study was to assess neck dysfunction and functional status post RT/CXRT in HNC patients. Data was collected on forty nine out-patients after a course of RT / CXRT for cancers of Head and Neck using GUSS (Gugging Swallowing Screen), NDI (Neck Disability Index) and Neck Range of Motion (ROM).

Results and Conclusion: Forty nine out-patients were included in the study with mean age of 58.35 ± 13.34 years (21-80). Forty three (89%) were men. Majority (59.2%) were in the advanced stage (III & IV) of HNC. Flexion (51%), extension (79.6%), left (57.1%) and right (61.2%) rotation had decreased Active Range of Motion (AROM). Lateral Flexion and extension; flexion and NDI; and extension and flexion had a significant positive correlation ($p< 0.001$). Mean GUSS score was 14.65 ± 2.05 (9-19) and mean NDI score was 10.59 ± 7.96(0-30). Majority of the patients had mild swallowing {37(75.5%)} and mild neck {23(46.9%)} disability.

Keywords: HNC; GUSS; NDI; Neck ROM; Chemo-Radiotherapy; Active ROM

Research Article

Volume 3 Issue 3 - 2016

Paramjot Kaur[1], Aman Pannu[2]* and Sandeep Singh[1]

[1]College of Physiotherapy, Christian Medical College and Hospital, India
[2]Department of Community Medicine and Neurology, Christian Medical College and Hospital, India

***Corresponding author:** Aman Pannu, Department of Community Medicine and Neurology, Christian Medical College and Hospital, Ludhiana, India, Email: aman_pannu@yahoo.com

Received: January 08, 2016 | **Published:** February 19, 2016

Abbreviations: HNC: Head and Neck Cancer; QOL: Quality of life; ROM: Range of Motion

Introduction

Head and Neck Cancer (HNC) is a broad term that includes carcinomas arising from head and neck region and the most common type is squamous cell carcinoma [1]. HNC patients experience treatment-related complications that may interfere with health related quality of life (HRQOL [2]. Cancers of head and neck include malignant tumors of the buccal cavity, larynx, pharynx, thyroid, salivary glands, and nose/nasal passages [3]. Neck disability, impaired neck function, and eating or speaking contribute to decrements in HRQOL [4]. At the time of diagnosis, up to 2/3 of HNC Patients (HNCPs) present with dysphagia. Approximately, one third of dysphagic patients develop aspiration pneumonia requiring treatment, with mortality rates ranging between 20% and 65% [5]. Most troublesome and debilitating side effects of radiotherapy are lethargy, weakness, dry mouth, mouth ulcers and pain, taste changes, and sore throat. The single most debilitating side effect was oropharyngeal mucositis that was characterized by patients as sore throat, and mouth ulcers and pain; both negatively affecting the patient's ability to eat and drink, causing many patients to experience significant weight loss [6]. A study has shown that many of the treatment related performance and quality of life (QOL) that had declined, resolved in months [7]. The association between neck pain, Neck Disability Index (NDI) and cervical Range of Motion (ROM) showed that NDI is a valid, reliable and internally consistent clinical tool to measure self-reported disability as it relates to patients with neck pain [8]. It objectifies the patient's subjective experience. The NDI provides us with a starting point to springboard further research possibilities. When compared to other questionnaires, the NDI correlates well with other measures and has similar sensitivity to change and responsiveness, good convergent validity and correlates with pre and post treatment scores [8]. The Gugging Swallowing Screen (GUSS) is presented as a potentially better alternative to other dysphagia screens due to its safer progression of oral intake, more thorough evaluation of swallowing, and ability to enable earlier nutrition [9].

Aim

The purpose of this study is to describe the clinical features experienced by our subjects

i. Impaired neck mobility of joint function

ii. Swallowing impairment

iii. Cervical ROM

Objective

i. To assess neck function with NDI

ii. To assess neck ROM with goniometer

iii. To assess swallowing with GUSS

Materials and Methods

The study is descriptive in nature. Forty nine patients with HNC were recruited in the study. Written informed consent was obtained from each patient before enrolment. The study is one phase design including post RT/CXRT. The patients included were out-patients from the Department of Radiotherapy at Christian Medical College & Hospital (CMCH), Ludhiana.

Inclusion criteria

i. More than 19 years of age

ii. More than 4 weeks post RT/CXRT

Exclusion criteria

i. Without RT/CXRT

ii. Impaired neck function due to prior disease or surgery

iii. Residual disease

iv. Any metastatic tumor

v. On Nasogastric Tubing

vi. Any prior surgery limiting neck movement

Outcome variables

The following dependent variables were employed to assess dysfunction and functional status:

i. GUSS [10]

ii. NDI8

iii. Cervical ROM [11]

Tools

i. Cervical ROM by a 12-inch 360- degree goniometer

ii. NDI

iii. Eating and speaking impairment by using GUSS Scale

Statistical Analysis

In the descriptive analysis, continuous variables will be expressed as mean ± standard deviation and categorical variables will be expressed as count (percentages). Spearman's Rank correlation coefficient was used to assess the correlation between the range of motions and the outcome measures. All statistical analysis will be performed using SPSS, version 21.0. Armonk, NY: IBM corp.

Results

Out of 69 screened, 49 patients were included in the study, of which 43(89%) were men. Data was collected from 1 month to 30 months post RT/CXRT patients. The average age was 58.35 ± 13.34 (21-80) years and the median age was 60 years. Out of forty nine patients, 20(40.8%) received radiotherapy and 29(59.2%) received chemo-radiotherapy. Twenty patients (40.8%) had an early-stage tumor (I & II) whereas 29(59.2%) patients presented in advanced stage (III & IV). Table 1 describes the characteristics of our patient cohort. . Oropharynx {20 (40.8%)} was the primary site of tumor in HNC patients followed by Larynx {9(18.4%)}, Hypopharynx {8 (16.3%)}, oral cavity {7 (14.3%)} and Nasopharynx {5 (10.2%)} as shown in Figure 1. Table 2 shows the descriptive statistics for Active Range of Motion (AROM), in degrees, of the patients for the six cervical motions using Goniometer. All the readings were recorded after taking an average of three attempts.

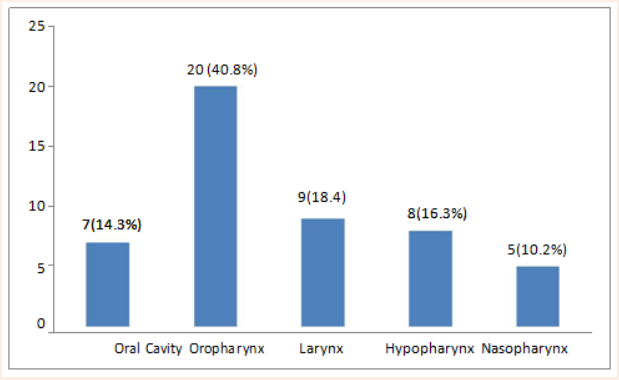

Figure 1: Common sites of Cancer.

Table 1: Characteristics of Subjects (N = 49).

Gender, n%	Male	43 (87.8%)
	Female	6 (12.2%)
Age	Mean ± SD	58.35 ± 13.34
	Range	21 - 80
	Median	60
Treatment, n%	Radiotherapy	20 (40.8%)
	Chemo-Radiotherapy	29(59.2%)
Stage, n%	I/II	20 (40.8%)
	III/IV	29(59.2%)

Table 2: Descriptive Statistics for Active Range of Motion (AROM).

Motion	Mean	SD	Range
Flexion	36.53	8.18	25-50
Extension	33.67	16.26	10-70
Left lateral flexion	38.27	8.99	15-60
Right lateral flexion	38.06	8.34	15-55
Left rotation	48.16	15.64	30-80
Right rotation	47.86	15.71	25-90
GUSS	14.65	2.05	19-09
NDI	10.59	7.96	0-30

*NDI: Neck Disability Index; GUSS: Gugging Swallowing Screen.

Table 3 explains that 25(51%) patients had an approximate decrease of 10 degrees in flexion; 39(79.6%) patients had an approximate decrease of 20 degrees in extension. Right rotation had approximately decreased by 8 degrees in 30(61.2%) cases whereas in left rotation 28(57.1%) patients had an approximate decrease of 10 degrees. Majority of patients had a normal left lateral flexion {47 (95.9%)} and right lateral flexion {48(98%)}.

Table 4 shows the correlation analysis among all the range of motions and outcome measures. Lateral flexion and extension; flexion and NDI; and extension and flexion had a significant positive correlation (p< 0.001). Mean GUSS score was 14.65 ± 2.05 (9-19) and mean NDI score was 10.59 ± 7.96(0-30). Majority of the patients had mild swallowing {37(75.5%)} and mild neck {23(46.9%)} disability as shown in Table 5.

Table 3: Counts (Percentage) for Active Range of Motion (AROM).

Motion	N	Percentage
Flexion		
Decreased	25	51
Normal	24	49
Extension		
Decreased	39	79.6
Normal	10	20.4
Left lateral flexion		
Decreased	2	4.1
Normal	47	95.9
Right lateral flexion		
Decreased	1	2
Normal	48	98
Left rotation		
Decreased	28	57.1
Normal	21	42.9
Right rotation		
Decreased	30	61.2
Normal	19	38.8

Table 4: Correlation between Outcome measures and ROM.

		1	2	3	4	5	6
1	Lateral Flexion	-					
2	Rotation	.392***	-				
3	GUSS	-0.09	-0.045	-			
4	NDI	-0.16	0.089	0.091	-		
5	Flexion	0.155	0.129	0.084	.395**	-	
6	Extension	0.189	0.222	0.262	0.127	.445**	-

*NDI: Neck Disability Index; GUSS: Gugging Swallowing Screen; ROM: Range of Motion

*** p<0.001

Table 5: Swallowing and Neck Disability.

GUSS (Mean ± SD; Range)	14.65 ± 2.05	19-9
Mild Disability	37	75.5
Moderate Disability	5	10.2
No Disability	7	14.3
NDI (Mean ± SD; Range)	10.59 ± 7.96	0-30
Mild Disability	23	46.9
Moderate Disability	12	24.5
Severe Disability	3	6.1
No Disability	11	22.4

Discussion

In this study we examined concerns of the patients who underwent RT/ CXRT. Results from this study suggest that patients receiving radiation treatment to the head and neck experience a range of common problems that continue to be concern one month post treatment. Two major areas of concern have emerged from this study:

i. The physical concerns related to the actual site of radiation treatment for HNC, and

ii. Concerns about functional status. The purpose of this descriptive study was to explore the disabilities of neck and swallowing for forty nine out-patients after a course of RT/CXRT for cancers of Head and Neck. Patients completed measures that assessed physical and functional status; GUSS, NDI, and physical measures. The results indicated overall decreased levels of physical and functional status.

Furthermore, the results from this study indicate that the participants were most bothered by adverse effects at the end of treatment, with only minimal improvement after one month of RT/CXRT. This shows that adverse effect post RT/CXT treatment may decrease QOL for patients in many aspects of perceived well-being, which the patient may not expect. The severity on the physical morbidity depends on the size and location of the tumor [1]. More patient-specific experience is reported in QOL and functional status studies characterizing patients' symptoms, functional outcomes, and overall well-being after RT; however, these QOL studies use instruments to measure global changes in the patients' conditions and have not been designed to measure the acute effects [6]. Neck problem with pain and mobility issues can be easily identified which is reported in both NDI and ROM and hence we observed positive correlation for NDI and Flexion, Lateral flexion and Extension and Extension and flexion. Neck dissection has a negative impact on the range of motion of neck and shoulder [12]. In another study it was shown that more extensive neck surgery is associated with worse pain and more restrictions in mobility, reduced ROM, less muscle strength, increased disability and worse electrophysiological evaluation compared to less extensive neck surgery [13].

In an another international study similar findings were observed on shoulder pain, functional status and HRQOL after HNC surgery and concluded that HNC patients who encountered shoulder pain, eating impairment, speaking impairment, and impaired body image which interfered with HRQOL during the early postoperative period [14]. The American Cancer Society in 2013 recommended early and regular assessment of symptoms and impaired body functions across the cancer care continuum [14]. Swallowing dysfunction were also evaluated by using endoscopic examination after radiotherapy in HNC patients [15]. Dysphagia was found to be late sequelae compromising the lives of more than one fourth of patients with nasopharyngeal carcinoma (NPC) who survive long after radiotherapy. The majority of patients were found to aspirate after the act of swallowing (77.4%) [15]. This study has been able to produce some preliminary insight into this very important patient group, and a larger sample, may give a clearer picture of patient's needs. These are the major factors that have been contributed to the weaker correlation between outcome measures. The absence of exercise intervention would be detrimental to patient care and the ability of the patient/family to cope with the effects of the disease or its treatment on their functional capacity and QOL [16].

Conclusion

The study was tested and accepted the hypothesis that there is a significant difference in Neck disability and swallowing performance of the subjects. There was a significant correlation between NDI and Flexion, Lateral flexion and Extension and Extension and Flexion. The participants had greater risk of aspiration and its effects. Hence, selected interventions such as Shaker exercise and Hyoid Lift Maneuver and positioning during Swallowing can be recommended for the patients. For the neck disability various neck exercises can be taught to the patient to help increase the performance.

Limitations

The study was limited to small sample size of 49 patients. The study was confined to a single cente i.e. confined only to CMCH, Ludhiana. The study was conducted using a single group. The complications were not divided into early and late sequelae.

Acknowledgement

The authors would like to that Dr. Jeewan S Prakash, Professor and HOD Department of Orthopedics, CMCH, Ludhiana, Dr. Jaineet Sachdeva, Department of Radiotherapy, CMCH, Ludhiana, Ashima Malhotra for their immense help.

Conflict of Interest

None.

References

1. Daniel SRAD (2013) Pilot Study to Investigate Concerns In Patients Undergoing Neck Dissection Surgery. The University of Western Ontario, Canada.
2. Jolly S (2015) Benefits of Exercise Training in Head and Neck Cancer Patients undergoing organ-preserving Definitive therapy. Clinical Trials Gov.
3. McNeely ML (2013) Exercise as a primary intervention in Head and Neck Cancer patients. Indian Journal of Medical Research 137(3): 451-453.
4. Capozzi LC, Lau H, Reimer RA, McNeely M, Giese-Davis J, et al. (2012) Exercise and Nutrition for Head and Neck Cancer patients: a patient oriented clinic supported randomized controlled trial. BMC Cancer 12: 446.
5. Russi EG, Corvò R, Merlotti A, Alterio D, Franco P, et al. (2012) Swallowing dysfunction in Head and Neck Cancer patients treated by radiotherapy: Review and recommendations of the supportive task group of the Italian Association of Radiation Oncology. Cancer Treat Rev 38(8): 1033-1049.
6. Ped R, Bellm LA, Epstein JB, Trotti A, Gwede C, et al. (2002) Complication of Radiation therapy for Head and Neck Cancer. Cancer Nurs 25(6): 461-467.
7. List MA, Siston A, Haraf D, Schumm P, Kies M, et al. (1999) QOL and performance in advanced Head and Neck Cancer patients on concomitant chemo radiotherapy: a prospective examination. J Clin Oncol 17(3): 1020-1028.
8. Emily R Howell (2011) The Association between neck pain, Neck Disability Index and cervical range of motion: a narrative review. J Can Chiropr Assoc 55(3): 211-221.
9. John JS, Berger L (2015) Using the gugging swallowing screen (GUSS) for dysphagia screening in acute stroke patients. J Contin Educ Nurs 46(3): 103-104.
10. Michaela T, Enderle P, Nowotny M, Teuschl Y, Matz K, et al. (2007) The Gugging Swallowing Screen. Stroke 38(11): 2948-2952.
11. Norkin CC, White DJ (2004) Measurement of Joint motion. A guide to goniometery. (3rd edn), Jaypee, USA.
12. Slappendel MA (2009) Neck & shoulder function after neck dissection. University Utrecht Department Health Sciences, Physical Therapy Science, Netherlands.
13. Slappendel MA (2009) Range of motion of neck & shoulders after neck dissection in patients with cancer in the oral cavity. Master Thesis. University Utrecht Department Health Sciences, Physical Therapy Science, Netherlands.
14. Wang, Keck JF, Weaver MT, Mikesky A, Bunnell K, et al. (2013) Shoulder Pain, Functional status and Health related Quality of Life after Head and Neck Cancer surgery. Rehabil Res Pract 10.1155/2013/601768.
15. Wu CH, Hsiao TY, Ko JY, Hsu MM (2000) Dysphagia after radiotherapy: endoscopic examination of swallowing in patients with nasopharyngeal carcinoma**.** Ann Otol Rhinol Laryngol 109(3): 320-325.
16. Paramjot K, Jaineet S, Aman P, sandeep singh (2015) Effect of Exercises on Swallowing and Neck Dysfunction Post Radiotherapy/ Chemotherapy in Head and Neck Cancer Patients. Int J Recent Scientific Research (9): 6040-6043.