



PULMONARY EFFECTS ON CANCER PATIENTS – PRELIMINARY STUDY

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ABSTRACT

Introduction: For the production of voice respiratory, articulatory, resonatory, phonatory, prosody form the basic systems. Any drugs administered can have direct impact on these systems so in the case of introduction of chemotherapy.

Method: Chemotherapy participants of head and neck cancer were included in the study. The instrument used was aerophone for finding pulmonary functions in these individuals. Paired t test was used for statistical analysis.

Result and discussion: Variations were observed in only few measures whereas other factors remained unchanged indicating limited effect of chemotherapy drugs on the system.

Conclusion: Being a initiating study, it gives more insights to professionals and practitioners to deal with head and neck cancer patients undergoing chemotherapy and to work with them efficiently.

KEYWORDS : Head and neck cancer, chemotherapy, pulmonary measures

INTRODUCTION

Human body consists of several systems which include skeletal, muscular, Digestive, Respiratory, Circulatory, Lymphatic, Nervous system, the Endocrine system, Urinary system and the reproductive system. Each bodily system work in coordination with another in order to perform efficiently and therefore keeping the body stable. Any disturbances in any area of these systems can result in inefficient functioning of that system or related systems and corresponding body function. Therefore each unit should work together as a well-coordinated system. The human voice, aerodynamics of the respiratory system and swallowing mechanism are few of such outcomes of highly coordinated one or more systems.

Any deviancy of the systems or subsystems can result in disease conditions and would affect voice, aerodynamics and also swallowing of individuals. Aerodynamics is the study of motion of air. During speaking, we move air through the speech production system, and the air movements are therefore a useful means of representing the voice and speech characteristics of a person. Changes in the shape and size of lower airway produce an airstream which is continuously modified by laryngeal and supra laryngeal structures. The movement of air through the respiratory tract is governed by physical forces and controlled by neural and chemical events. The system is very complex because the specialized aerodynamics of speech is superimposed on a highly regulated respiratory system.

AIM OF THE STUDY

The aim of the study is to investigate the aerodynamic measures in individuals undergoing concurrent Chemoradiotherapy for head and neck cancer.

METHOD

Aerodynamic measures such as mean airflow rate, vital capacity, peak flow, phonation quotient; maximum phonation duration were calculated using Aerophone II (Voice function analyser), Manufacture F.J Electronics, Ellebuen 3 DK-290 Vedback, Denmark. Statistical analysis was performed with SPSS 16.0 for Windows (SPSS Corporation, Chicago, IL) for paired t test. The individuals selected had very narrow inclusion criterion such as they were devoid of any other health ailments and were diagnosed with head and neck cancer without any history or suspecting associated factors. This stringent rule was applied for patient participating in the research study.

RESULT

Table 1: Mean and standard deviation for pulmonary function parameters for chemotherapy participants

Parameter		Mean	Standard deviation
Peak flow	Pre Treatment	4.233	1.68246
	Post Treatment	2.6243	1.29931
Vital capacity	Pre Treatment	1.3116	0.62557
	Post Treatment	1.2645	0.26932
Mean air flow rate	Pre Treatment	0.477	0.21096
	Post Treatment	0.318	.22749

Phonation Quotient	Pre Treatment	0.0629	0.02998
	Post Treatment	0.0856	0.03596

Significant mean difference was obtained on peak flow ($F(2,14)=3.484, p=.05$, mean air flow rate ($F(2,14)=3.68, p=.05$ for all assessment comparisons. However no significance was found for vital capacity ($F(2,14)=.536, p=.597$) and for Phonation Quotient measures ($F(2,14)=0.517, p=.607$). On paired t test, significant difference was seen for peak flow pretreatment ($M=3.793, SD=2.0282$) and post treatment ($M=2.2843, SD=1.6534$) conditions; $t(14)=3.282, p=.005$, MAFR pretreatment ($M=.4401, SD=.2334$) and post treatment ($M=.2306, SD=.19185$) conditions $t(14)=3.692, p=.002$.

DISCUSSION

The present study hypothesized that chemotherapeutic drugs given for head and neck patient has effects on their whole bodily system irrespective of the site of cancer. From the present study, it can be delineated that any site of cancer and its subsequent treatment options has impact on person's respiratory system irrespective of any site of cancer of head and neck and not just laryngeal carcinoma alone.

Comparing pretreatment and post treatment changes in chemoradiotherapy participants, variations were seen in aerodynamic parameters such as peak flow, MAFR. Aerodynamic measures revealed changes in peak flow, mean air flow rate whereas vital capacity and phonation quotient did not show any change.

Peak flow showed significance in pretreatment vs post treatment. This can be supported by study done by Sjögren, Rossum and Langeveld (2008), where they revealed that abnormal aerodynamic measures can be due to impairment of vocal fold vibration such as reduced closure and mucosal wave, ventricular activity. Flow of exhaled air from the lungs which determine peak flow can be restricted due to inflammation even any mucosal irritation which is the resultant of chemotherapy.

Vital Capacity differs in individuals secondary to the age, body weight and size of the individual. It showed no significance in the group.

Mean air flow rate (MAFR) showed significance on pretreatment – post treatment. As mean air flow is measured during phonation in adequate loudness and pitch, this parameter can be affected as phonatory system is disturbed in them.

Phonation quotient has no significance within group. Phonation Quotient was considered relevant for both lung and laryngeal functions because it provides information regarding the air use during phonation. Dogan, Eryuksel, Kocak, Celikel and Sehitoglu (2007) studied the subjective and objective evaluation of voice quality and they considered Phonation Quotient to be calculated by dividing Vital Capacity by the Maximum Phonation Duration. Phonation Quotient was considered relevant for both lung and laryngeal functions because it provides information regarding the air use during phonation. As there are limited study done on normal healthy individuals undergoing chemotherapy after sudden diagnosis of head and neck cancer for aerodynamic parameters, the literature search provides only limited information on the same. This study can be considered as a milestone

in pulmonary function in chemotherapy individuals who are treated for head and neck cancer.

From the present study it is clear that, along with many other side effects seen in these participants, these parameters can be affected. This effect is only for the duration of the treatment or for a little longer which needs to be further studied. As there is a probability of recovery seen in most of all the parameters taken up for the study in all of the participants, these effects can be kept monitored.

REFERENCE

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