



CORRELATION BETWEEN THE NO.OF RADIATION THERAPY SESSIONS AND MOUTH OPENING , GOTHENBURG TRISMUS QUESTIONNAIRE AND NECK DISABILITY INDEX- A CROSS SECTIONAL STUDY.

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ABSTRACT

Background: Primary treatment of Head and cancer consisting of surgery along with radiation and chemotherapy results in complication such as trismus , which is defined as reduced mouth opening (<35 mm) .There is a lack in literature on the effects of radiation on patient reported outcome measures along with the maximal interincisal opening in rural population . So , this study was under taken to find out the effects of radiation on the symptoms of trismus in patients of head and neck cancer. **Method:** It is an cross sectional study conducted on 11 patients with head and neck cancer where relation between radiation therapy with MIO (Maximal interincisal opening) , Gothenburg trismus questionnaire (GTQ) and Neck disability Index (NDI) was seen. **Result:** It was found that only MIO was found to have a negative correlation with no. of radiation sessions ($r = -0.822$) but GTQ and NDI did not have relation with no. of radiation session. **Conclusion:** From this study we can conclude that as the no. of radiation sessions increases the mouth opening reduces in the patients of Head and neck cancer but there was no such relation found between no. of radiation sessions and trismus related questionnaire as seen in the score Gothenburg Trismus Questionnaire & Neck Disability score.

KEYWORDS : Head and Neck cancer, Radiation, Trismus, GTQ and NDI.

INTRODUCTION:

Head and neck cancer is a broad term that describes external and internal cancers occurring in this region of the body (e.g., tongue, lips, nose, paranasal sinuses and nasal cavity, oropharynx, nasopharynx, larynx, and salivary glands). 200,000 cases of head and neck cancer (HNC) are reported each year in India.⁽¹⁾

The treatment of head and neck cancer patients include Surgical resection of the tumour, radiation therapy and/or chemotherapy. Sometimes a combination of the three is used to treat patient.⁽²⁾

Due to the recent advances in the treatment of cancer the life expectancy of cancer patients has increased but the complications associated with the treatment strategies have decreased the quality of life.⁽²⁾

One such complication seen after primary treatment of cancer in Head and neck region is trismus/reduced mouth opening. Reduced cervical range of motion and shoulder range of motion, mucositis, etc are also commonly seen in these patients.⁽³⁾

Out of the following trismus is most often seen as a treatment sequelae of radiation therapy. It has been found that a radiation dose of 60 Gy and above is more likely to cause trismus .Trismus is defined as a tonic contraction of the muscles of mastication and results in a limited ability to open the mouth.⁽⁴⁾

As the sessions of radiation increase the symptoms of trismus also become more severe which was seen in a study done by Sindhu Nagaraj et al in 2016 it was found that at the end of 3, 6 and 12 months 31.9%, 34.04% and 38.39% cases of trismus in head and neck cancer patients were seen respectively .⁽⁵⁾

But there is lack in literature on the effects of radiation on patient reported outcome measures along with the maximal interincisal opening in rural population and hence this study was under taken to find out the effects of radiation on the symptoms of trismus in patients of head and neck cancer.⁽⁶⁾

METHODOLOGY:

An cross-sectional study was carried out in Tertiary care

hospital, Department of Oncology and Department of Physiotherapy of Vikhe Patil Institute, Ahmednagar. 11 patients of Head and neck cancer undergoing chemotherapy and radiation therapy were included in this study from September 2021 to December 2021 . After the patients consent the necessary demographic data such as age, gender, cancer type, surgery performed , dose and session of radiation and chemotherapy were collected from the patients. This was followed by measuring the maximal interincisal opening with the help of digital calliper⁽⁷⁾ Three readings for each patient were taken and the best of three was then considered the final reading of maximum interincisal opening. Then the participants filled the Gothenburg trismus questionnaire⁽⁸⁾ and the Neck Disability Index⁽⁹⁾ .Gothenburg trismus questionnaire is a self-administered Questionnaire with a reliability of 0.97 . The NDI is a 10-item questionnaire which asks patients about their symptoms and the effect of their neck pain on a range of functional activities. The test-retest reliability of the NDI is high 0.86–0.97.⁽⁹⁾

The collected data was then statistically analysed using Pearson's correlation to find the correlation between the number of radiation sessions and the mouth opening, and various components of GTQ and NDI.

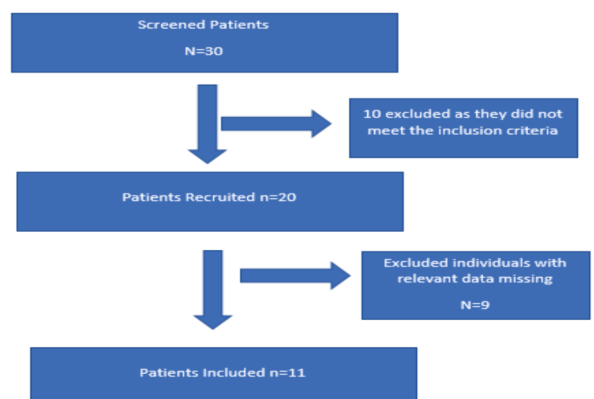


Fig 1. Showing flow chart of recruitment of patients

RESULT:

A total of 11 patients were included in this study. Table 1 shows the Demographic data of the patients and table 2 shows the

mean and standard deviation of the different variables.

Table 1: Anthropometric Data

Components	Patients
Age	47 (9.36)
Gender	10 males, 1 female
Cancer type	
Ca buccal mucosa	5
Ca glottis	1
Ca neck	2
Ca mandible	1
Ca Alveolus	1
Ca Tongue	1
Drug Taken	Cisplastin

Table 2: Mean and standard deviation of various components

Components	Mean ± Standard deviation
Age	47 ± 9.36
No of sessions	18.45 ± 4.435
MIO	13.55 ± 2.293
Eating Limitation	14 ± 2.828
Jaw related	9.09 ± 1.221
Facial pain	3.72 ± 0.90
14.How Much facial pain do you have right now?	2.63 ± 0.809
15.How strong was the worst pain you had during the last month?	2.54 ± 0.687
16.On average , how strong has your been during the last month?	1.36 ± 0.674
17.How much has your pain interferred with your social, leisure and family activities during the last month?	1.27 ± 0.4671
18.How much has your facial pain affected your ability to work during last month?	1.63 ± 0.504
19. How limited are you in your ability to open your mouth right now?	2 ± 0.894
20. How much has you limitation to open your mouth with your social, leisure and family activities during the last month?	1.8 ± 0.87
21. How much has your limitation to open your mouth affected your ability to work during last month?	1.909 ± 0.70
Neck disability	24.23 ± 6.387

The mean age of the patients was 47. Majority of the patients were male and Ca Buccal mucosa was more prevalent in the given population.

Table 3 and 4 show the Pearson's correlation between the no. of radiation therapy sessions and Maximal mouth opening, GTQ and NDI.

Table 3: Corelation of No. of radiation sessions with MIO, GTQ

Corelation of Outcome	Pearsons value ®	p-value	Result
No of sessions & MIO	-0.822	0.002	Significant
No of Sessions & GTQ(Eating limitation)	-0.225	0.506	Not Significant
No of Sessions & GTQ facial pain	-0.305	0.305	Not significant
No of Sessions & GTQ jaw related symptoms	0.308	0.357	Not significant
No of sessions & Q14	-0.61	0.859	Not significant
No of sessions & Q15	0.238	0.480	Not significant
No of sessions & Q16	-0.94	0.783	Not significant
No of sessions & Q17	-0.211	0.534	Not significant

No of Sessions & Q18	-0.232	0.493	Not significant
No of Sessions & Q19	0.101	0.768	Not significant
No of Sessions & Q20	-0.286	0.394	Not significant
No of sessions & Q21	0.015	0.966	Not significant

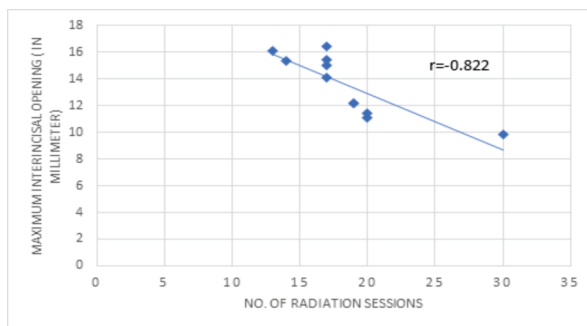


Fig No. 2. Shows the pearsons correlation between No.of radtion sessions and maximum interincisal opening.

Table 4: Corelation of No. of radiation sessions with NDI

Correolation of Outcome	Pearsons value	p-value	Result
No of sessions & NDI (1)	-0.544	0.609	Not Significant
No of sessions & NDI (2)	-0.234	0.590	Not Significant
No of sessions & NDI (3)	-0.404	0.370	Not significant
No of sessions & NDI (4)	0.435	0.360	Not significant
No of sessions & NDI (5)	-0.590	0.677	Not significant
No of sessions & NDI (7)	0.240	0.450	Not significant
No of sessions & NDI (9)	-0.98	0.356	Not significant
No of sessions & NDI (10)	-0.450	0.654	Not significant

There was significant negative corelation found between the No. of sessions and Mouth opening in the patients included in the study with $r = -0.822$ and $p = 0.002$ as seen in Table 3 & 4 which means that as the number of radiation sessions increase the mouth opening reduces in patients with head and neck cancer. This can also be seen in figure 1.

The components of the other two outcome measures i.e , GTQ and NDI did not show significant correlation with No. of radiation therapy session $p < 0.005$

DISCUSSION:

Trismus secondary to head and neck cancer patients is a major problem as the limitation to open one's mouth has detrimental affect on eating, quality of life and the maintenance of dental health.⁽⁴⁾

In this observational study it was found that there was a significant correlation between the restriction in mouth opening and no. of radiation therapy sessions. This finding is supported by a study conducted in 2007 by B. Scott et. al , where the researchers found that limited mouth opening was significantly related to clinical tumour stage and the use of radiotherapy.⁽¹¹⁾ This can be explained by the pathophysiology of radiation which induces damage in normal tissue. There is an initial inflammatory phase which is followed by a subsequent, sometimes irreversible, atrophic and fibrotic phase.

Another study by Wang and colleagues found that the maximum interincisal distance significantly decreased between one and nine months post operatively. These findings are also supported by a systematic review which concluded that between 6 and 12 months post radiotherapy patients have a reduced mouth opening of 18%. It is seen that the radiation of pterygoid muscles appear to be critical in development of trismus.

Also it has been seen that radiation dose greater than 70 Gy is

associated with greater degree of restricted mouth opening.⁽¹²⁾ this could be because of fibrosis induced in the lateral pterygoid muscle leading to restricted mouth opening.

The components of patient reported outcome measures such as Gothenburg Trismus questionnaire and Neck Disability index did not show a significant correlation with radiation therapy sessions which can be seen in table 3 and 4.

This could be because most of the patient in this study had Riley's tube for feeding and so did not have to mobilize their temporomandibular joint and so did not find it to be limiting their eating ability.

One of the limitation of this study is the small sample size. Also the patients in this study were still undergoing radiation therapy so another study should be conducted to see the long term effects of radiation therapy.

CONCLUSION:

From the results of this study we conclude that Restricted mouth opening has a significant correlation with the no. of radiation therapy sessions taken by the patients of head and neck cancer and is one of the important factors responsible in developing trismus in patients of head and neck cancer.

Conflict of interest: None

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