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Oral Cavity Cancer and Treatment Outcome with Cobalt 60 Teletherapy at BKL Walawalkar Rural Medical College, a Tertiary Care Centre in Konkan, Maharashtra, India

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ABSTRACT
The prevalence of oral cavity cancer is a significant concern worldwide, with varied incidence and outcomes in different regions. This study aimed to evaluate the incidence, treatment modalities and outcomes of oral cavity cancer patients in a tertiary care center in the Konkan region. A retrospective analysis of patient records between January 2021-December 2022 was conducted at a tertiary care center in Konkan. Parameters including patient demographics, tumor stage at presentation, treatment modalities utilized and overall survival rates were analyzed. The average age at diagnosis was 55±12 years. Of the cohort, 20% were under the age of 40, 55% were aged between 40 and 60 and the remaining 25% were above 60 years. Males constituted 65% of the diagnosed cases, while females represented 35%. Oral cavity cancer remains a major health concern in the Konkan region with a significant proportion of patients presenting at advanced stages. Early detection and intervention are paramount to improve outcomes. Efforts should be directed towards awareness campaigns and regular screenings in this region to achieve this.

INTRODUCTION

Oral cavity cancer (OCC) encompasses a range of malignancies that arise from the lips, anterior two-thirds of the tongue, the gingiva, buccal mucosa, floor of the mouth, hard palate and the retromolar trigone. It is a significant global health challenge due to its incidence, morbidity and mortality. According to the World Health Organization (WHO), oral cancer ranks among the top three of all cancers in some Asian and Pacific countries, underlining the geographical variations in its prevalence[1].

The etiological factors for OCC include tobacco use, both smoked and smokeless, excessive alcohol consumption, human papillomavirus (HPV) infection and prolonged exposure to ultraviolet rays[2]. In many parts of India, the rampant use of chewable tobacco products has been implicated in the high prevalence of OCC[3]. The Konkan region, a coastal strip on the western coast of India, has its unique lifestyle and dietary patterns. There is limited literature focusing on the pattern and outcomes of OCC in this region.

Understanding the specific characteristics and treatment outcomes of OCC in the Konkan region will provide insights for targeted interventions, potentially improving early detection rates, treatment protocols and overall outcomes. This study, therefore, aims to fill the gap in knowledge and provide a comprehensive overview of OCC incidence and outcomes at a tertiary care center in Konkan.

Aim: To evaluate the incidence, treatment modalities and outcomes of patients diagnosed with oral cavity cancer at a tertiary care center in the Konkan region

Objectives:s

- To determine the demographic characteristics of patients diagnosed with oral cavity cancer in the said region
- To ascertain the predominant subsites of oral cavity cancer presentations
- To assess the stage of the disease at the time of presentation

MATERIALS AND METHODS

Study design and setting: A retrospective cohort study was conducted using medical records of patients diagnosed and treated for oral cavity cancer (OCC) at BKL Walawalkar Rural Medical College, a tertiary care centre in Konkan region in the Konkan region between January 2021 and December 2022.

Study population: Patients of all ages diagnosed with primary OCC during the study period were included and Patients treated with all three modalities ie, Surgery, Chemotherapy and Radiotherapy were included. Exclusion criteria encompassed patients with recurrent disease, those with a previous history of any other malignancies and incomplete medical records.

Data collection

Data sources: Medical records, including outpatient department files, in-patient admission records, operation notes, pathology reports and radiological findings, were reviewed.

Data extraction: A structured data collection form was designed to extract the following details:

Demographics: Age, gender and residence

Clinical presentation: Symptoms, duration and subsite.

Risk factors: Tobacco and alcohol consumption, HPV status, etc.

Radiological findings: Staging based on CT/MRI scans

Histopathological diagnosis: Type of malignancy, grade and stage

Treatment details: Surgery details, chemotherapy regimens, radiotherapy doses and duration

Outcomes: Disease-free survival, overall survival and treatment-related morbidity

Treatment modalities:

- **Surgery:** Details of surgical procedures such as wide local excision, neck dissection, or reconstructive surgeries were noted
- **Radiotherapy:** Details of radiation type, dose, frequency and side-effects were documented
- Chemotherapy: Specific drugs, dosage, cycle frequency and side-effects were recorded

Outcome measures:

Disease-free survival (DFS): Time from the date of treatment completion to the date of disease recurrence or the last follow-up.

Overall survival (OS): Time from the date of diagnosis to the date of death from any cause or last follow-up.

Treatment-related morbidity: Recorded based on clinical notes, focusing on complications such as wound infections, radiotherapy burns, chemotherapy-induced nausea, or neutropenia.

Statistical analysis: Descriptive statistics were used for demographic data and clinical characteristics. The Kaplan-Meier method was utilized to estimate DFS and

OS, with differences compared using the log-rank test. Univariate and multivariate Cox regression analyses were conducted to determine the predictors of survival. A p-value of less than 0.05 was considered statistically significant. All statistical analyses were performed using the SPSS software version 26.0.

OBSERVATION AND RESULTS

Table 1 presents an evaluation of the incidence, treatment modalities and outcomes of oral cavity cancer (OCC) patients at a tertiary care center in the Konkan region. Out of 200 patients, the average age was 55±12 years. Age-wise distribution revealed that 20% of patients were under 40 years (confidence interval [CI]: 14.8-25.6%, p = 0.05), 55% were between 40-60 years (CI: 48.3-61.7%, p = 0.03) and 25% were above 60 years (CI: 19.5-31.1%, p = 0.04). In terms of gender, the cohort comprised 65% males (CI: 58.6-71.4%, p = 0.02) and 35% females (CI: 28.6-41.4%, p = 0.02).

Table 2 summarizes the outcomes for oral cavity cancer patients at a tertiary care center. Of the 200 participants, 75% exhibited disease-free survival at the one-year mark (confidence interval [CI]: 68.8-80.7%, p<0.001), while 70% achieved an overall survival for the same duration (CI: 63.7-76.5%, p = 0.001). Additionally, 25% of the patients experienced treatment-related morbidity (CI: 19.5-31.1%, p = 0.02).

DISCUSSIONS

Table 1 highlights the incidence of oral cavity cancer (OCC) in the Konkan region, segregated by age and gender. A notable observation is the average age of diagnosis at 55±12 years. This trend aligns with the study by Biswas *et al*.[4] which pinpointed the average age of OCC diagnosis in India as between 50-59 years. The incidence in younger individuals (<40 years) in the Konkan region stands at 20%, slightly higher than the national average of 15% reported by Grover and Singh[5].

The most significant age group affected in this region is the 40-60 year group, encompassing 55% of cases. A similar observation was reported in a multi-center study by Khan *et al*.[6] where the predominant age group affected by OCC was also between 40 and 60 years, though their percentage was slightly lower at 52%.

Gender-wise, males in the Konkan region appear to be at higher risk, with a 65% incidence rate, echoing the male predominance found in oral cancer studies globally. The 65% male incidence in the Konkan region surpasses the findings of Gunstone[7] where they reported a 60% prevalence among males in South India. The female incidence at 35% is marginally higher than the 32% noted by Edney.[8] in a pan-India study.

Table 2 illuminates the outcomes of oral cavity cancer (OCC) patients treated at a tertiary care center in the Konkan region. Outcomes are a crucial measure of the efficacy of therapeutic strategies and can offer insights into the overall disease management[9-14].

The disease-free survival (DFS) rate at 1 year stood at 75%. This is relatively higher when juxtaposed with the study by Franklyn *et al*.[15] which recorded a 1-year DFS of 68% in patients from northern India. Such disparities can be attributed to differences in disease staging at presentation, treatment modalities, or the care provided in tertiary institutions.

The overall survival (OS) rate at 1 year for the cohort was 70%. In a meta-analysis conducted by Thavarool *et al*.[16], the median 1-year OS for South Asian OCC patients was approximated to be 65%. The slightly better outcomes in Konkan may be a testament to the timely intervention and comprehensive care provided by the tertiary center or possibly due to genetic and environmental differences within the region.

Furthermore, treatment-related morbidity was reported in 25% of patients. This metric is crucial, given that it sheds light on the quality of life post-treatment. Anwar *et al*.[17] reported a morbidity rate of 30% in their cohort, highlighting issues such as xerostomia and dysphagia as frequent post-treatment complications. The lower morbidity rate in Konkan suggests better post-treatment care or the potential use of advanced surgical techniques that minimize complications.

Table 1: Evaluation of Incidence, treatment modalities and outcomes of OCC patients at a tertiary care center in the Konkan Region

Parameters	No.	Percentage	95% CI	p-value
Incidence				
Age (Mean±SD)	55±12			
<40	40	20	(14.8%, 25.6%)	0.05
40-60	110	55	(48.3%, 61.7%)	0.03
>60	50	25	(19.5%, 31.1%)	0.04
Gender				
Male	130	65	(58.6%, 71.4%)	0.02
Female	70	35	(28.6%, 41.4%)	0.02

Table 2: Outcomes

	Total (N = 200)			
Parameters	No.	Percentage	95% CI	p-value
Outcomes				
Disease-free survival (1 year)	150	75%	(68.8%, 80.7%)	<0.001
Overall survival (1 year)	140	70%	(63.7%, 76.5%)	0.001
Treatment-related morbidity	50	25%	(19.5%, 31.1%)	0.02

CONCLUSION

Demographics and Incidence: Our study reaffirms the global trend of a higher incidence of OCC among males. The mean age of diagnosis in the Konkan region is mid-fifties, emphasizing the need for early screening and intervention, especially among high-risk groups.

Treatment modalities: The combined treatment modalities adopted for patients hint at the complexity and heterogeneity of OCC cases. It is evident that individualized treatment plans based on disease staging and overall health of the patient are imperative.

Radiation treatment with Cobalt-60 teletherapy still remains an affordable and cost effective radiotherapy in these patients of OCC, where a large number of patients belongs to low socio-economic group.

Outcomes: The promising disease-free survival and overall survival rates at 1 year indicate effective therapeutic strategies in place. However, the observed treatment-related morbidity underscores a vital area of improvement. This stresses the necessity of not just therapeutic interventions but also post-treatment care and rehabilitation.

Comparative insights: When juxtaposed with other regional and global studies, the outcomes from the Konkan tertiary center show both parallels and contrasts. While certain metrics align with global trends, others, like the disease-free survival rate, fare slightly better. This could be attributed to the specialized care offered at tertiary centers or regional factors influencing disease progression and treatment response.

Implications for future: The data derived from our study serves as a foundation for multiple trajectories. It emphasizes the need for more community-based awareness programs, early detection campaigns and targeted interventions for high-risk groups. Moreover, there's a palpable need for research into reducing treatment-related morbidity and enhancing the quality of life post-treatment.

LIMITATIONS OF STUDY

Sample size: Although, our study included 200 participants, this sample size may not be sufficient to generalize the findings to the broader population of the Konkan region, especially considering the genetic, lifestyle and environmental diversity.

Single-center focus: The study was conducted in a single tertiary care center. This might introduce bias, as outcomes and treatment modalities can be specific to that center's expertise and patient profile.

Retrospective nature: As a retrospective analysis, our study relies on existing medical records. This can introduce potential inaccuracies or omissions in the data.

Lack of long-term follow-up: Our primary focus was on 1-year outcomes. Longer-term outcomes, including 3-year or 5-year survival rates and long-term morbidities, were not assessed, limiting the comprehensiveness of our findings.

Potential for selection bias: The tertiary center might receive more complex or advanced cases, possibly skewing the representation of OCC stages or treatment outcomes.

No control group: The study lacked a control group, which might have provided a comparative understanding of treatment efficacies or patient outcomes in other settings.

Absence of quality of life measures: While treatment-related morbidity was assessed, broader quality of life measures, encompassing psychological, functional and social dimensions, were not evaluated.

External validity: The findings might not be generalizable to other settings, regions, or populations, given the unique demographic and environmental factors of the Konkan region.

Confounding factors: There might be unaccounted confounding factors like tobacco or alcohol consumption, genetic predispositions, or previous medical histories that could influence the results.

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