Original Research Paper

Volume - 15 | Issue - 07 | July - 2025 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

ENT

"WHEN WHITE LIGHT FAILS: NARROW BAND IMAGING GUIDED DETECTION OF OCCULT BASE OF TONGUE MALIGNANCY"

Dr Gautam S MBBS, (MS), Junior Resident , Dept of ENT, Rajarajeswari Medical college & Hospital, Dr.M.G.R Educational & research institute, Bengaluru 560074 , Karnataka, India

Dr Manoj Kumar. N* MBBS, MS, Assistant Professor , Dept of ENT, Rajarajeswari Medical college & Hospital, Dr.M.G.R Educational & research institute, Bengaluru 560074 , Karnataka, India. ORCID ID: 0000-0002-5509-3254 *Corresponding Author

ABSTRACT **Introduction:** Narrow band imaging (NBI) endoscopy is an optical method that helps to characterise tissue vasculature. Base of tongue malignancies are often asymptomatic in early stages and may be missed on routine video laryngoscopy. Narrow Band Imaging enhances mucosal vascular patterns and can aid in early diagnosis & precise biopsy can be taken at sites where spread of malignancy can be seen based on the pattern & different subsites involvement causing upstaging of malignancy. **Case Report:** 60-year old male presenting with progressive dysphagia and throat pain over 6 months. Conventional white light laryngoscopy showed nonspecific findings & was inconclusive, while NBI revealed a suspicious endophytic lesion over the right base of tongue extending to tonsil lingual surface. Biopsy revealed moderately differentiated squamous cell carcinoma of both the subsites prompting early diagnosis & immediate treatment. **Conclusion:** NBI serves as a valuable adjunct to routine laryngoscopy, aiding in the identification of mucosal lesions not visible on white light, thus facilitating early biopsy and diagnosis, this technique can help in the workup of several conditions of upper airway especially the hidden areas & in distinguishing benign from malignant tumors.

KEYWORDS : Narrow Band Imaging, oropharyngeal neoplasms, laryngoscopy, carcinoma

INTRODUCTION

Oropharyngeal squamous cell carcinoma (OPSCC), a subset of head and neck cancers involving the upper airway & digestive tract, frequently diagnosed at an advanced stage due to its anatomical location which is not accessible easily and functionally silent location. [1].The complex structure of the oropharynx, particularly regions like the base of tongue and tonsillar crypts, often delays clinical recognition. Furthermore, OPSCC can occur in conjunction with other primary lesions elsewhere in nearby locations, either synchronously or metachronously, which significantly worsens prognosis and complicates treatment options especially with regard to preserving speech and swallowing function.[2].Routine endoscopies of the oropharynx and adjacent structures in high-risk individuals is essential. This includes patients with a primary tumor undergoing treatment or follow-up, as well as individuals with significant risk factors such as chronic tobacco and alcohol use. Early detection of synchronous or second primary malignancies can facilitate timely intervention and improve clinical outcomes. Enhanced endoscopic techniques like Narrow Band Imaging (NBI) offer significant value by improving the visualization of mucosal and submucosal abnormalities that may not be visible under conventional white-light examination. Oropharyngeal squamous cell carcinomas (OPSCC), particularly those involving the base of tongue (BOT), may often go undetected in the early stages due to their subtle presentation and anatomical location. Traditional white-light endoscopy may fail to reveal mucosal or submucosal lesions. Narrow Band Imaging (NBI) is an optical imaging technique that enhances the visualization of mucosal vasculature and surface patterns, allowing improved detection of early neoplastic changes.

This report highlights the utility of NBI in diagnosing an occult base of tongue malignancy, which was not evident under conventional laryngoscopy.

CASE REPORT

A 60-year-old male farmer presented to the ENT outpatient department with complaints of progressive dysphagia and throat pain for the past 6 months. The symptoms were insidious in onset, gradually worsening over time, and were more for solid foods compared to liquids along with odynophagia but denied any voice changes, regurgitation of food, or retrosternal burning. He reported an unintentional weight loss of approximately 8 kg over the past year. The patient had a significant history of tobacco and alcohol use, including smoking approximately 8 beedi's per day for 40 years and daily alcohol consumption for the past 30 years. He was otherwise a known diabetic for 10 years on regular treatment.

Clinical examination revealed tobacco-stained gums, partially edentulous dentition, and a stained anterior two-thirds of the tongue, with preserved mobility. The floor of mouth, retromolar trigone, hard palate, and soft palate appeared normal. Oropharyngeal evaluation showed minimal congestion of the anterior pillar and grade II right tonsillar hypertrophy with a non-bleeding ulceration. The left tonsillar fossa exhibited grade I hypertrophy without congestion. The posterior pillars, posterior pharyngeal wall, and uvula were within normal limits.

On indirect laryngoscopy, a non-ulcerated endophytic lesion measuring approximately 3 × 2 cm was observed over the right base of tongue. The epiglottis, vallecula, aryepiglottic folds, pyriform fossae, false vocal cords, and true vocal cords were unremarkable. There was mild overriding of the left arytenoid over the right. Neck examination revealed bilateral level Ib cervical lymphadenopathy, hard in consistency. A provisional diagnosis of oropharyngeal malignancy involving the base of tongue was made. Videolaryngoscopy using white light showed no overt mucosal lesions apart from the base of tongue lesion (Figure 1). A contrast-enhanced CT scan revealed heterogeneous enhancement of the ventrolateral aspect of the posterior third of the tongue (Figure 2).

Figure-1: Endophytic growth over right side of posterior 1/3rd of tongue

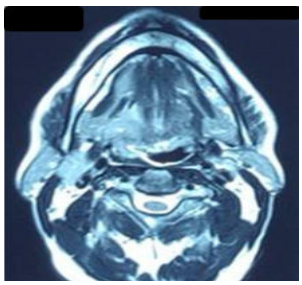

Figure-2 : CT scan showing enhancement in venterolateral part of tongue

To further characterize the lesion, Narrow Band Imaging (NBI) was performed, which revealed an endophytic growth with abnormal mucosal texture and irregular intrapapillary capillary loops (IPCLs) involving the right base of tongue extending to the tonsillolingual sulcus (Figure 3a & 3b), findings highly suggestive of malignancy.

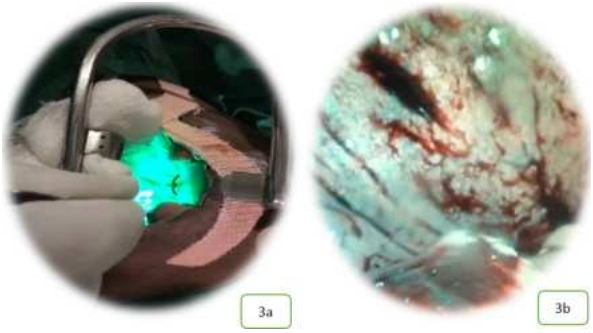

Figure-3a : NBI guided examination under general anaesthesia
3b: Right tonsillolingual sulcus showing increased pattern of vascularity on NBI

Targeted biopsies under NBI guidance were taken from two subsites: the base of tongue and the right tonsillolingual sulcus. Histopathological examination of both samples confirmed the diagnosis of moderately differentiated squamous cell carcinoma as shown in figure-4. The patient was started on concurrent chemoradiotherapy immediately & the tumor is almost regressed.

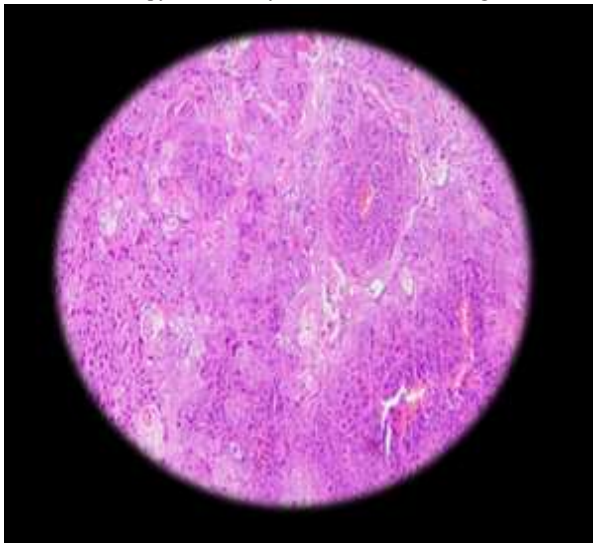

Figure-4: Histopathology showing squamous cell carcinoma with abundant tumor cells

DISCUSSION

Narrow Band Imaging (NBI) is an advanced optical technology that enhances the contrast of mucosal and submucosal vascular structures using specific wavelengths of light such as blue and green corresponding to the absorption peaks of haemoglobin. This contrast enhances superficial mucosal capillaries in brown and submucosal vessels in cyan, allowing detailed visualization of vascular architecture [3]. Key features visualized by NBI is the intraepithelial papillary capillary loops which are terminal vessels in the epithelial layer. These vascular patterns are critical in distinguishing benign from malignant lesions. Ni et al. proposed a classification system (Types I to V, with subtypes Va–Vc) based on IPCL morphology to aid in the differential diagnosis of neoplastic versus non-neoplastic lesions in the head and neck region [4].

Head and neck cancers comprise a wide range of malignancies affecting the oral cavity, oropharynx, nasopharynx, larynx, and hypopharynx. Among these, oropharyngeal squamous cell carcinomas especially those involving the base of tongue and tonsillar crypts are of rising concern due to their deep anatomical location, nonspecific early symptoms, and frequent association with high-risk behaviours such as tobacco and alcohol use, as well as human papillomavirus (HPV) infection. In the present case, white-light videolaryngoscopy failed to identify the lesion at the base of the tongue. However, NBI clearly highlighted abnormal vascular patterns, guiding a targeted biopsy, which ultimately led to the diagnosis of moderately differentiated squamous cell carcinoma.

The diagnostic utility of NBI lies in its ability to detect neo-angiogenesis, a hallmark of early malignancy, by improving visualization of mucosal surface patterns and vascular anomalies. NBI has been shown to offer superior sensitivity and specificity compared to conventional white-light endoscopy. The combination of enhanced illumination, magnification, and contrast resolution has substantially improved the diagnostic accuracy for early detection of upper aero digestive tract malignancies [5]. Several studies have demonstrated that NBI is particularly valuable in high-risk populations, including patients with a history of smoking and alcohol use, and those with previous head and neck cancers, where the risk of synchronous, metachronous, or recurrent tumors is significant. In such scenarios, NBI serves as a quick, non-invasive, office-based tool for early diagnosis, intraoperative tumor margin assessment, and post-treatment surveillance [6].

The anatomically concealed nature of the oropharynx often results in delayed diagnosis, contributing to poor five-year survival rates when compared to cancers like those of the breast, cervix, or colon. NBI has become an increasingly standard component of endoscopic evaluation in head and neck oncology. Numerous meta-analyses have investigated its diagnostic performance across various anatomical subsites [7–14]. However, to date, only one meta-analysis has systematically evaluated NBI's role in diagnosing head and neck cancers as a whole [15], while another has assessed its performance in detecting second primary tumors in patients with oesophageal and head and neck cancers [16].

The current case reinforces NBI's utility in early, accurate detection of occult oropharyngeal malignancies, supporting its broader application in routine ENT clinical practice.

CONCLUSION

This case highlights the pivotal role of Narrow Band Imaging in diagnosing occult base of tongue carcinoma spreading to tonsillolingual sulcus. In patients with high-risk profiles and vague symptoms, NBI serves as a non-invasive and efficient tool to guide early biopsy and intervention. Routine incorporation of NBI in head and neck diagnostic protocols can significantly enhance early cancer detection and improve patient outcomes.

Consent For Publication: INFORMED **Written consent was obtained**

Availability Of Data And Material: Yes

Competing Interests: None

Funding: None

Acknowledgements: Nil

REFERENCES

1. Muto M, Nakane M, Katada C, Sano Y, Ohtsu A, Esumi H, et al. Squamous cell carcinoma in situ at oropharyngeal and hypopharyngeal mucosal sites. *Cancer*. 2004;101(6):1375–81.
2. Watanabe A, Tsujie H, Taniguchi M, Hosokawa M, Fujita M, Sasaki S. Laryngoscopic detection of pharyngeal carcinoma in situ with narrow band imaging. *Laryngoscope*. 2006;116(4):650–4.
3. Gono K, Yamazaki K, Doguchi N, Nonami T, Obi T, Yamaguchi M, et al. Endoscopic observation of tissue by narrow band illumination. *Opt Rev*. 2003;10(4):211–5.
4. Ni XG, He S, Xu ZG, Gao L, Lu N, Yuan Z, et al. Endoscopic diagnosis of laryngeal cancer and precancerous lesions by narrow band imaging. *J Laryngol Otol*. 2011;125(3):288–96.
5. Mannelli G, Cecconi L, Gallo O. Laryngeal preneoplastic lesions and cancer: challenging diagnosis. A qualitative literature review and meta-analysis. *Crit Rev Oncol Hematol*. 2016;106:64–90.
6. Piazza C, Cocco D, De Benedetto L, Del Bon F, Nicolai P, Peretti G. Narrow band imaging and high definition television in the assessment of laryngeal cancer: a prospective study on 279 patients. *Eur Arch Otorhinolaryngol*. 2010;267(3):409–14.
7. Hu YY, et al. Diagnostic performance of magnifying narrow-band imaging for early gastric cancer: a meta-analysis. *World J Gastroenterol*. 2015;21:7884–94.
8. Song J, et al. Meta-analysis of the effects of endoscopy with narrow band imaging in detecting dysplasia in Barrett's esophagus. *Dis Esophagus*. 2015;28:560–6.
9. Huang W, Wang L, Du J, Yang JM. The value of narrow-band imaging with magnifying endoscopy in diagnosis of early gastric cancer: a meta-analysis. *J Zhejiang Univ Sci B*. 2015;44:435–42.
10. Qumseya BJ, et al. Advanced imaging technologies increase detection of dysplasia and neoplasia in patients with Barrett's esophagus: a meta-analysis and systematic review. *Clin Gastroenterol Hepatol*. 2013;11:1562–70.e1–2.
11. Wanders LK, East JE, Uitentuis SE, Leeflang MM, Dekker E. Diagnostic performance

of narrowed spectrum endoscopy, autofluorescence imaging, and confocal laser endomicroscopy for optical diagnosis of colonic polyps: a meta-analysis. *Lancet Oncol*. 2013;14(13):1337–47.
12. McGill SK, Evangelou E, Ioannidis JP, Soetikno RM, Kaltenbach T. Narrow band imaging to differentiate neoplastic and non-neoplastic colorectal polyps in real time: a meta-analysis of diagnostic operating characteristics. *Gut*. 2013;62(12):1704–13.
13. East JE, Tan EK, Bergman JJ, Saunders BP, Tekkis PP. Meta-analysis: narrow band imaging for lesion characterization in the colon, oesophagus, duodenal ampulla and lung. *Aliment Pharmacol Ther*. 2008;28(7):854–67.
14. Xiong B, et al. Detection of bladder cancer by narrow band imaging cystoscopy: a meta-analysis. *Zhonghua Wai Ke Za Zhi*. 2014;52(4):289–93.
15. Cosway B, Drinnan M, Paleri V. Narrow band imaging for the diagnosis of head and neck squamous cell carcinoma: A systematic review. *Head Neck*. 2016;38(Suppl 1):E2358–67.
16. Chung CS, et al. Image-enhanced endoscopy for detection of second primary neoplasm in patients with esophageal and head and neck cancer: a systematic review and meta-analysis. *Head Neck*. 2016;38(Suppl 1):E2343–9.