Editorial

Oral Cancer: Early Detection is Crucial

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Oral cancer is a growing problem globally and in some countries including India, Pakistan, Sri Lanka, and Taiwan is right at the top of the ladder. More than 95% of all oral malignancies are oral squamous cell carcinoma. Tobacco, alcohol, and betel quid (BQ) use have been recognized as risk factors of oral cancer. Cigarette smoking and alcohol drinking are the major risk factors in Western countries, whereas BQ use and smoking are the major risk factors in Asian countries.[1-3] Unfortunately, with all the advancement in the understanding of the disease process and recognition of the associated risk factors, the 5-year survival rate is still 50%.[4] It is generally acknowledged that both prevention and screening of oral cancer are important, and the early diagnosis of oral cancer may result in less aggressive treatment, which in turn not only improves the quality-of-life but also the overall 5-year survival rate.

Screening, in medicine, is a strategy used in population to detect a disease in individuals without any signs or symptoms of that disease or examination of a group of asymptomatic individuals to detect those with a high probability of having or developing a given disease. The purpose of this is to identify disease in a community early, thus enabling earlier intervention and management in the hope to reduce the mortality and suffering from the disease. Given the accessibility of the oral cavity, conventional oral examination (COE) is the most common method used for oral cancer screening. It has traditionally been the mainstay of oral cancer screening for decades, yet its utility remains controversial. While COE may be useful in the discovery of some oral lesions, it does not have the ability and accuracy to identify all oral premalignant lesions (their detection is dependent on the experience and skills of the operator), nor does it accurately detect the small proportion of biologically relevant lesions that are likely to progress to cancer.[5] In addition, it is a subjective test, and hence, performance varies between different clinicians based on their training and clinical skill.

The current identification and diagnosis of oral potentially malignant disorders and oral cancers relies on biopsy of the suspicious tissue followed by histopathological assessment by a pathologist. Although this method represents the gold standard for cancer diagnosis, it has several limitations. Tissue biopsy is an invasive, expensive, and often time-consuming procedure. In addition, the diagnostic interpretation of the tissue sample has been shown to suffer from both inter and intra-observer variability.[6] Therefore, there is ever growing need of developing newer screening tools that have the ability to accurately detect oral cancer in the early stages.

Optical technologies show the potential to provide real-time assessment through a minimally invasive route, eliminating lengthy waiting time (real-time result) and providing assistance in biopsy site selection. Autofluorescence is the most thoroughly investigated optical technique for the detection and characterization of oral lesions, and is simple and user-friendly, cost-effective, provides real-time results with limited operator variability and is highly sensitive to oral mucosal changes.[7] Although, autofluorescence is exceedingly accurate in distinguishing diseased oral mucosa from healthy oral mucosa (sensitivity 82-100%, specificity 63-100%), there is a lack of compelling evidence to show its ability to accurately discriminate between lesion types.[8] In addition to autofluorescence, trimodal spectroscopy (fluorescence spectroscopy, elastic scattering spectroscopy and Raman spectroscopy) has shown higher sensitivity and specificity toward diagnosis of oral potentially malignant and malignant.[9]

There are other early detection methods that have been developed by many researchers. Toluidine Blue (TBlue), a metachromatic dye that selectively stains acidic tissue components (sulphate, carboxylate and phosphate radicals) of the DNA and RNA, is based on the theory that the content of acidic cellular component is greater in dysplastic tissue than non-dysplastic tissue. Although, the dye is useful as an adjunct, its specificity is limited because of its tendency to bind to tissues undergoing rapid cell division such

as inflammatory and regenerative tissues. Overall, the sensitivity and specificity of TBlue staining ranges from 78-100% and 31-100% respectively.[5,10] Oral cytology is another diagnostic technique used to sample oral tissue for the histomorphological analysis, which includes cytomorphometry, DNA cytometry, and immunocytochemical analysis. The use of oral cytology in the detection of dysplastic lesions shows considerable promise but has been limited, thus far, by variable false-positive and false-negative results.

Even with the development and application of various technological advancements made by cancer advocates, researchers, and clinicians, the diagnosis of oral cancer often occurs at a late stage, conferring a dismal prognosis. Importantly, the improvement in patient outcome can only be achieved if the disease is detected and treated at an early stage. Although many of the techniques have been implemented or adapted in dental settings recently, they offer scientists highly sought-after methods for the early detection of oral cancer.

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