STUDENTS' CORNER
LETTER TO THE EDITOR

Beta Defensin Index: The future of oral cancer detection?

Syeda Tehreem Irfan[1], Sameen Zafer[2], Hasan Baber[3]

Dear Madam, Oral cancer is defined as the malignancy of the oral tissues. Globally, its occurrence accounts for 90% of the head and neck tumours and it is the second most common cancer affecting the people of Pakistan.[1] The accepted diagnostic methods for the detection of malignant and premalignant oral conditions include biopsy and pathology reviews. It is further reported that Pakistan has only 18 established histopathology labs, mostly in major cities, leading to a higher rate of diagnostic errors within rural areas.[2,3] Moreover, barriers such as high costs and the risk of disturbing the lesion during biopsy highlight the need for a less invasive, cost-effective method to detect and monitor cancerous and precancerous oral lesions in Pakistan.

Beta Defensin Index (BDI) is a functional biomarker that assesses the proportion of human beta defensin-3 (hBD-3) and human beta defensin-2 (hBD-2) in precancerous and cancerous oral conditions i.e. carcinoma in situ, oral squamous cell carcinoma (OSSC), dysplasia etc.[4] BDI is measured using techniques like ELISA, qPCR, or western blotting and has a threshold value of 1.25 which indicates an increased susceptibility to infections and cancer.[5] Therefore, BDI exceeding 1.25 suggests a strong immune response, while BDI below 1.25 implies an increased vulnerability to infections and cancer.[5] Researches have concluded that hBD-3 activates tumour associated macrophages which facilitates tumour progression, and downregulation of hBD-2 indicates hypermethylation of DNA.[4,5] These findings imply that BDI will not only provide a foundation for non-invasive early detection of OSSC but will also reduce potential risks associated with biopsy, such as irritation of leukoplakic lesions.[4] Compared to other OSCC detection techniques, BDI also possesses the highest sensitivity and ability to be converted into a chairside point-of-care device.[4]

Limitations in implementing BDI in Pakistan would include investing in the training of the laboratory personnel and ensuring the availability of logistics. To check the feasibility of using BDI in Pakistan, larger demographic studies should be conducted to establish whether the BDI cut off value requires a biopsy or not.[4] This can be accomplished by public-private sector collaboration for funding the studies. Research projects are needed to establish population-specific ranges of beta-defensin levels, taking the local factors into account. Additionally, the development of point-of-care devices for chairside testing, even in rural areas should also be facilitated. By implementing these targeted improvements, this index can become a more effective and widely used tool in Pakistan, ultimately benefiting patient care and health outcomes.

[1,2]3rd Year BDS Student, Dow International Medical and Dental College, Karachi, Pakistan; [3]Department of Oral Biology, Dow International Medical and Dental College, Karachi, Pakistan.

Correspondence: Syeda Tehreem Irfan. e-mail: tehreemirfan481@gmail.com
ORCID ID: 0009-0008-9122-3221

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