

Circulating Tumor DNA as a Biomarker for Oral Squamous Cell Carcinoma

Oral cancer is a rapidly growing life-threatening disease of the world. Oral cancer is considered as the sixth most common cancer in the world. Biopsy is contemplated as the gold standard in the diagnosis of oral cancer. Biopsy to assess prognosis is questionable unless an obvious recurrence is clinically evident. Moreover, it is an invasive procedure which is traumatizing to the patients.^{1,2}

Contemporary inventions in the field of biomedicine have incredibly upgraded our knowledge of the pathogenesis of the disease, particularly in genetics and molecular biology. The use of circulating tumor DNA (ctDNA) as a biomarker has shown significant results in the assessment of oral squamous cell carcinoma. Moreover, it is a minimally invasive procedure which can provide detailed information on tumor differentiation, biologic behavior and response to different therapeutic modalities even before the manifestation of the disease.³ Deoxyribonucleic acid integrity, mutation at different sites, loss of heterozygosity, microsatellite alterations can be deduced through the ctDNA in the blood of oral cancer patients.^{3,4}

Circulating tumor DNA serves as valuable tool in prognostication and monitoring of oral cancer as the levels of ctDNA starts to decline gradually after successful anti-cancer treatment. The progression of the disease can also be accredited with varying levels of ctDNA. It can also be used as an alternative when tissue biopsies from a metastatic tumor is contraindicated. Hematological analysis is simple, minimally invasive and samples can be obtained repeatedly.^{5,6}

A set of techniques, such as whole genome sequencing, digital polymerase chain reaction (PCR), mutant-enriched PCR, nested methylation-specific PCR has shown promising results in the detection of ctDNA in solid metastatic tumors with hematogenous dissemination.^{5,7}

Repeated analysis of ctDNA can serve as a tool in treatment surveillance prospectively and can determine local and systemic relapse with greater precision than tissue biopsy in oral squamous cell carcinoma.⁶

Circulating tumor DNA will be an innovation in the field of oral cancer research as it has the ability to detect genetic aberrations, that are periodically noticed in oral tumors and they have a significant role in its malignant transformation. Relevant appraisal of ctDNA in the recognition of an array of mutations, status of promoter gene methylation will be the primary focus of research in the future involving ctDNA.^{5,6}

Lack of homogeneity in the presentation and interpretation of research data, as well as shortage of information in regard to its structure and function are contemplated as the likely obstacle, prohibiting the use of ctDNA as a clinically practicable biomarker in the diagnosis of oral squamous cell carcinoma.^{6,8}

Although the blueprint for oral cancer detection involving ctDNA is promising, further research is necessary regarding its clinical utility, potential benefits and limitations to validate its use in the routine diagnosis of oral cancer.

References

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