Introduction

Oral and pharyngeal cancer, grouped together, is the sixth most common cancer in the world [1]. Oral cancer is one of the most common malignancies as well as a major cause of cancer morbidity and mortality, worldwide [2]. Although the progress of surgery, radiotherapy and chemotherapy, unfortunately, the 5-year survival rate of patients with distant metastases at the time of the first diagnosis is only 19%, whereas for operable tumors in an early, localized stage it approximates 80% [3]. Oral squamous cell carcinoma (OSCC) is the most common type of oral cancer, which usually develops from precancerous lesions, such as oral leukoplakia (OLK) [4] [5]. The location of the carcinoma of oral mucosa is superficial, biopsy repeatedly is easy and observation is convenient, so the early diagnosis of oral cancer is feasible.

Histopathological diagnosis as the golden criteria is an invasive method. Exfoliative cytology is accepted worldwide, as a successful method in order to screen for epithelial dysplasia in situ or invasive carcinomas of the uteri cervix [6]. Due to the progress of Thin Cytologic Test (TCT) and Automatic Imaging Cytometer (AICM), the exfoliative cytology has already been used in diagnosing oral cancer and premalignant diseases. Exfoliative cytology is always assisted with DNA quantitative analysis, micronucleus analysis and other analysis. Currently, exfoliative cytology and DNA quantitative analysis is increasingly used for early detection of oral cancer and observation of OLK [7]. The sensitivity of DNA quantitative analysis used in OSCC early diagnosis ranged from 70.0% to 100%, and the specificity ranged from 90.0% to 99.5% [3,8,9,10,11,12,13]. Although this technology has higher sensitivity and specificity, it also exists false positive and false negative samples. Meanwhile, due to the change of DNA content is earlier than the histopathology, the DNA quantitative analysis could find the OSCC earlier [14]. The other studies have been shown that the DNA quantitative analysis has been used in OLK lesion to analyze whether the OLK lesion is characterized as malignant change. The sensitivity ranged from 92.9 % to 100.0%, and the specificity ranged from 97.4% to 100% [3,10,15].

The diagnosis criterion of DNA quantitative analysis only used fewer data of the DNA index (DI), that lost lots of information. One study analyzed the other cytomorphometric variables of exfoliative cells, showed a statistically significant difference for nuclear perimeter, area, the minimum and maximum Feret, intensity, DNA content and DNA index between the malignant, premalignant oral lesion and normal oral mucosa [16].

So, the aim of this study was to find another statistical analysis method to analyze the DI to improve the sensitivity and the specificity of DNA quantitative analysis.

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