Evaluation of Collagen Fibers in Hyperkeratosis and Different Types of Oral Epithelial Dysplasia by Using Picrosirius Red Staining

Rachai Juengsomjit[1], Ounruean Meesakul[1], Sorasun Rungsiyanont[2]
[1]Department of Oral and Maxillofacial Pathology, Faculty of Dentistry, Mahidol University, Thailand
[2]Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, Srinakharinwirot University, Thailand

Corresponding Author: **Associate Professor Dr. Sorasun Rungsiyanont,** *Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, Srinkharinwirot University, Bangkok 10110 Thailand. (Email:* **peted2000@hotmail.com***)*

Abstract

Oral epithelial dysplasia (OED) is a sign of squamous cell carcinoma (SCC) progression. The dysplastic squamous epithelial cells degrade the stroma resulting in an invasion of the dysplastic epithelial cells into the underlying connective.

Objectives: We aim to evaluate collagen fibers by using picrosirius red staining among different types of epithelial dysplasia and their correlation to clinical parameters.

Methods: Eighty cases of paraffin blocks were retrieved and classified into 4 groups; hyperkeratosis, mild epithelial dysplasia, moderate epithelial dysplasia and severe epithelial dysplasia. Three cases of focal fibrous hyperplasia were used as positive controls. Picrosirius-red staining technique and investigating under a polarized light microscope were performed. The results were interpreted according to collagen fibers birefringence; (1) orange-red represents mature collagen patterns and (2) green-yellow represents the small diameter and immature collagen. (3) mixed birefringent rays of group (1) and (2).

Results: In hyperkeratosis cases, collagen fibers in most areas showed mixed orange-red to green-yellow similarly to collagen stained in mild epithelial dysplasia. However, in moderate to severe dysplasia, collagen fibers were generally stained in green-yellow. From clinical data, the average age of female samples was higher than that of male in all 3 types of epithelial dysplasia. The tongue was the most commonly affected site (32.5%) with homogeneous leukoplakia as the most common clinical feature (48.8%).

Conclusions: This present study reveals the relationship between the difference of the maturation of collagen fibers and histopathological diagnosis. The increase grade of OED represented in green-yellow birefringence refers to immature collagen.

Keywords: collagen fiber, epithelial dysplasia, picrosirius red staining

Introduction

Oral epithelial dysplasia (OED) is characterized by the dysplastic changes in the stratified squamous epithelium layer. This histopathological change known as dysplasia is accepted as a sign that precede the progression to squamous cell carcinoma (SCC).[1] The dysplastic squamous epithelial cells also degrade the stroma and resulting in the facilitation of the dysplastic epithelial cells invading into the underlying connective tissue. The World Health Organization (WHO) classification of head and neck