## Summary

The etiology of oral lichen planus OLP) is not fully elucidated, so treatment of this disease is usually symptomatic. The treatment of OLP includes pharmacotherapy with corticosteroids, photochemotherapy with PUVA (Psolaren Ultra-Violet A)/PUVASOL (psolaren ultra-violet A and solar radiation), narrow band UVB-NB-UVB, cryotherapy and surgical removal of the lesion. All these methods are characterized by limited efficacy and various adverse effects. Therefore, new, more effective and, at the same time, possibly non-invasive methods of treatment are being sought.

In recent years, photodynamic therapy (PDT) has been introduced to the treatment of OLP. It involves the use of a photosensitizer that penetrates the cells in the affected area. The photosensitizer is then activated with light of the appropriate wavelength, inducing selective immunomodulatory and cytotoxic effects against the affected cells present in lichen planus lesions. To date, no effective PDT protocols are known to produce predictable and long-term treatment results.

Therefore, the purpose of this study was to evaluate the long-term efficacy of the original photodynamic therapy protocol using aminolevulinic acid in the treatment of oral lichen planus.

Forty-four patients aged 30-88 years (34 females and 10 males) who presented to the Department of Periodontal and Oral Mucosa Diseases of Medical University of Białystok for treatment of oral lesions were enrolled in the study. The inclusion criteria were: histopathologically confirmed oral lichen planus lesion; age above 18 years. The exclusion criteria were: coexistence of general diseases in the course of which oral lesions may occur; smoking; pregnancy and breastfeeding; treatment of lesions within the last six months.

The therapeutic procedure involved the application of a proprietary PDT protocol using 5% 5-aminolevulinic acid (ALA) (Ala-Plus, Farmapol, Poland) as a photosensitizer. The gel was applied on the lesion dried from saliva and on the surrounding mucous membrane 2h before irradiation and then protected with non-woven fleece occlusive dressing. Gel application was performed four times at 30-minute intervals. After 2 hours from the first gel application, the OLP lesion was irradiated with a self-made diode lamp delivering radiation of 630nm

wavelength and 300mW power from the end of the optical fiber. The surface energy density was 120 J/cm2. PDT sessions were repeated 10 times at weekly intervals.

The clinical examination consisted of evaluating the location and size of the lichen planus lesions (surface area) using the PCPUNC15 periodontal probe. The examination was performed before treatment, immediately after treatment, and 12 and 48 months after treatment.

The REU -Reticulation, erythema, uceration (reticulation, erythema, ulceration) index was used to analyze the size and severity of the lesions.

In addition, a questionnaire study on subjective observations of oral lesions was conducted. The severity of complaints such as pain, burning, itching was assessed using Visual Analogue Scale (VAS).

The obtained data were statistically analyzed using Statistica and PQStat software.

In the examined group of patients 110 OLP lesions were diagnosed, including 94 lesions typical for reticular form and 16 for erosive form. Mean OLP lesion area was  $4.05 \text{mm}^2 \pm 3.86$ . Immediately after treatment, lesion size decreased significantly to  $1.51 \text{mm}^2 \pm 1.98$ . OLP lesion area was further significantly reduced to  $0.69 \text{mm}^2 \pm 1.39$  at 12 months and  $0.77 \text{mm}^2 \pm 1.53$  at 48 months after treatment. Complete healing was observed in 65/110 OLP lesions, with a type of 55/94 reticular and 10/16 erosive lesions. Analyzing the location of the lesions, it was found that 46/79 lesions on nonkeratinized mucosa and 19/31 on keratinized mucosa were cured.

The median VAS score before treatment was 4. After treatment, this value significantly decreased to 2 and 1 in subsequent follow-ups.

The mean value of REU index before treatment was  $4.86\pm3.46$ . The value of this index was significantly reduced to  $3.72\pm2.89$  immediately after treatment and to  $2.97\pm2.67$  and  $1.68\pm1.83$  in the subsequent follow-up examinations.

Based on the results, the following conclusions were drawn:

1. Photodynamic therapy using aminolevulinic acid is a safe method for the treatment of oral lichen planus lesions.

- 2. A significant reduction in lesion size and a high percentage of healed lesions confirm the efficacy of the authors' photodynamic therapy protocol in the treatment of oral lichen planus.
- 3. Application of photodynamic therapy with aminolevulinic acid has a beneficial effect on tissue healing after treatment.
- 4. Photodynamic therapy can achieve long-term remission in both reticular and erosive forms of OLP.
- 5. The size, type and localization of OLP lesions do not influence the efficacy of the applied photodynamic therapy protocol.
- 6. Photodynamic therapy significantly improves the quality of life of patients with chronic disease such as OLP.