

Phototherapy in allergic rhinitis

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ABSTRACT

Allergic rhinitis, commonly known as hay fever, is a condition characterized by the inflammation of the nasal passages caused by allergens such as pollen, dust mites, animal dander, and mold. It affects approximately 10-30% of the global population, and its symptoms include sneezing, runny nose, nasal congestion, itchy eyes, and throat irritation. One of the treatment options for allergic rhinitis is phototherapy, a non-invasive and drug-free approach that has shown promising results in managing the condition.

Objectives. The main objective is to study phototherapy in the treatment of allergic rhinitis compared with placebo therapy. We want to apply an effective therapeutic method, a safe one, without notable side effects, cheaper, which improve the health of our patients, and the quality of their life.

Methods. It is randomized study, investigating the effect of placebo controlled rhinophototherapy, for a total of 187 patients who met the criteria for inclusion/exclusion. Rhinophototherapy effect was investigated measuring the nasal flow (rhinomanometry) and individual scores for subjective and objective symptoms.

Results. Patients treated with phototherapy = 65, placebo = 32 patients treated. Evolution lot phototherapy: very good - 67% improvement, good improvement - 28%, 5% - unfavorable evolution. Analyzing the placebo treated group: good results - 10%, 43% moderate-improvement, evolution - 47% unfavorable.

Conclusions. Phototherapy is an effective therapeutic method to treat patients with allergic rhinitis, is a well tolerated therapy, with minor side effects, easy to implement and monitor.

Keywords: rhinophototherapy, allergic rhinitis, rhinomanometry

INTRODUCTION

Allergic rhinitis has become a global health issue considering the frequency of disease (aprox. 20%). Costs of the therapeutical management of these patients are very high, which is why it is important to find a method that is efficient and yet cheaper. Drug therapy of allergic rhinitis has a high percentage of failure. Allergic rhinitis is a condition often associated with many diseases like: asthma, sinusitis, otitis media, recurrent infections of the lower airways. Allergic rhinitis seriously

affects quality of the patients life, their social life, school performance and labor productivity.

Phototherapy, also known as light therapy, involves exposing the skin or mucous membranes to specific wavelengths of light to stimulate healing and reduce inflammation. In the case of allergic rhinitis, phototherapy is used to reduce the inflammatory response of the nasal passages and improve the symptoms of the condition.

Intranasal phototherapy is based on the immunosuppressive and anti-inflammatory effect of electro-

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Article History:

Received: 22 March 2023

Accepted: 27 March 2023

magnetic radiation from UVA (ultraviolet type A) and UVB (ultraviolet type B) areas. The treatment consists of controlled exposure of the nasal mucosa of high intensity cold light having a special componence - 70% visible light, the rate of 25% ultraviolet type A (UVA), 5% ultraviolet type B (UVB).

GOALS

The main objective is to study phototherapy effect on pediatric patients with allergic rhinitis compared with placebo therapy. We want to apply an effective therapeutic method, without notable side effects, low cost, which improves the quality of our patients life

METHODS

We studied the effect of rhinophototherapy placebo-controlled, for a total of 187 patients who met the inclusion criteria. The patients included in the study group had to sum up a minimum *cumulative symptomatic score* (Table 1) of 5 points and the following parameters: age - between 18 and 70 years, positive allergy tests, signed by the patient informed consent.

TABLE 1. Cumulative symptomatic score

Nasal obstruction
0 – absent
1 – 0 to 1 hour/12 hours
2 – 1 to 2 hours/12 hours
3 – >2 hours /12 hours
Sneezing
0 – absent
1 – <5 bouts/12 hours
2 – 5-10 bouts/12 hours
3 – >10 bouts/12 hours
Mucus production (rhinorrhea)
0 – absent
1 – present
General symptoms
0 – absent
1 – present
Posterior drainage of secretions
0 – absent
1 – present
Ocular symptoms (pruritus, lacrimation)
0 – absent
1 – present

Diagnosis was set on: anamnesis, objective clinical ENT-examination, endoscopy of the nasal cavities, nasal and nasopharyngeal swab, allergy skin-testing and/or blood.

To investigate the effect of phototherapy on the nasal mucosa we measured the following parameters during

the study: nasal flow (anterior rhinomanometry), individual scores for subjective and objective symptoms (over 4 visits)

Phototherapy effect was measured: nasal flow (rhinomanometry) and individual scores for subjective and objective symptoms. Rhinomanometry is an objective method of study which measures the permeability of nostrils, by evaluating the resistance to the air flow and recording the *pressure-flow* and *area-distance* curves.

We excluded from the study patients with: participation in another clinical trial with one months before, history of intolerance to medications used in the study, clinical symptoms of infection-nose and/or sinusitis, significant anatomical abnormalities: nasal septum deviation, subcloazon deviation, nasal instillation of corticosteroids in the last two months, nasal polyps or a history of nasal polyps, other types of chronic rhinitis: chronic hypertrophic rhinitis, chronic rhinitis drug, nasal surgery with six months before, administration of systemic corticosteroids with six months before, pregnancy and lactation with drug therapy, antihistamines by general one months before, patients receiving immunotherapy.

All the participant patients underwent phototherapy with the device Rhinolight product by Rhinolight Ltd company, Szeged, Hungary.

For the placebo patients group we applied during therapy a UV filter on the top of the lamp.

The protocol consisted in a total of 6 meetings, every two days, starting with two minutes exposure to each nasal cavity, and then increasing with 15 seconds each visit until reaching the maximum exposure time of three minutes.

Each patient received one Worksheet that contained the main symptoms of allergic rhinitis: nasal obstruction, rhinorrhea, sneezing, nasal itching, eye symptoms, with a scale of gravity from 0 to 3 (0-absent 1-easy, 2-moderate-severe 3-severe), which they completed each session.

RESULTS

The lot was originally 187 patients of whom applying inclusion and exclusion criteria were excluded 90 patients, remaining a lot of study itself which included 97 patients who were randomized in report 2 phototherapy to 1 placebo. Patients treated with phototherapy 65 and patients that underwent placebo therapy 32 (Figure 1).

In this group there were 60 male patients (62%) and 37patienti female patients (38%).

Depending on the environment of origin of patients the majority is from urban areas 66 patients (68%) and 31 patients from rural areas (32%).

From the total of the 97 patients introduced in the study, a total of 7 patients left the study, representing

Patients with allergic rhinitis

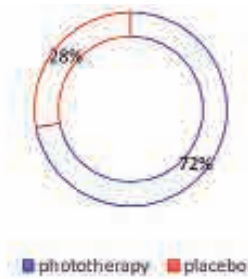


FIGURE 1. The study groups

7% of the total, among them, four were part of the group undergoing placebo therapy.

After the 6th visit, we obtained the following results: in the phototherapy group of patients: *Very good improvement*: 43 patients (67%), improved: 19 patients (28%), unfavorable: 3 patients(5%) (Figure 2).

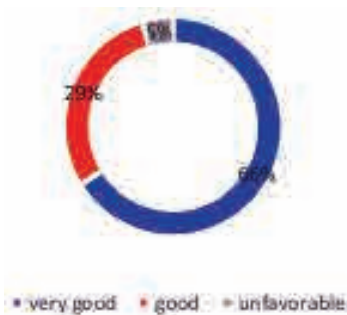


FIGURE 2. Phototherapy lot results

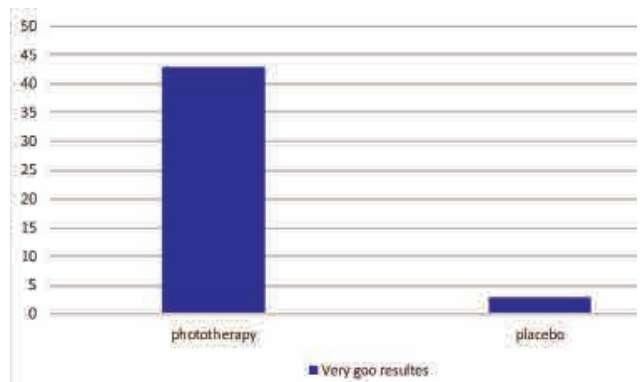
Analyzing the placebo treated group we had the following results: very good in 3 patients (10%), good in 14 patients (43%) and unfavorable results in 15 patients (47%) (Figure 3).



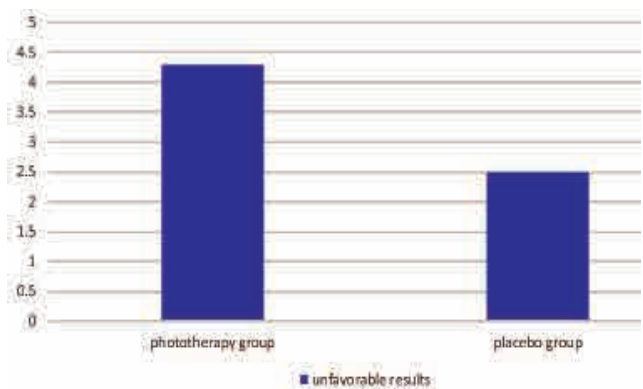
FIGURE 3. Placebo lot results

Comparing the two groups, placebo and phototherapy we found these issues: a very large difference in favor of phototherapy group, in terms of very good evolution during the 6 visits, 43 patients from the phototherapy group versus 3 patients on placebo (Figures 4, 5).

Comparing percentages of patients with unfavorable evolution we found that patients in the placebo prevailed with unfavorable evolution 15 versus 3 (Figures 4, 5).



FIGURES 4. Patients with very good results from the 2 lots



FIGURES 5. Patients with unfavorable results from the 2 lots

Side effects: The most common side effect reported by the patients was dryness of nasal mucosa (present in approximately 40% of patients), easily controlled by administration of topic intranasal emollient solution, Vitamin A. Another side effect reported during the study was moderate anterior epistaxis (rare) in 7 patients, 7% of the lot phototherapy, which we also controlled with topic administration of adrenostazin.

DISCUSSIONS

Phototherapy is listed among the attempts for nasal phototherapy, being based on the immunosuppressive and anti-inflammatory effect of UVA and UVB electromagnetic radiation. It was conceived and developed by experts in optics and quantum mechanics, as well as dermatology and allergic diseases, from the University of Szeged (Hungary). RhinoLight treatment consists of controlled exposure of the nasal mucosa to high-intensity cold light with a special, patented composition which has not been used in other rhinophototherapy attempts [6-9].

The spectrum of radiation used in RhinoLight treatment comprises 70% visible light, 25% ultraviolet A (UVA) radiation, and under 5% ultraviolet B (UVB) radiation. Studies have shown that the exposure of the nasal mucosa to RhinoLight has the following physiological effects [10-14]: it blocks histamine release

from mast cells, it blocks allergen-induced histamin release, it induces apoptosis in T lymphocytes and eosinophils, it reduces ECP and interleukin 5 levels, as well as the number of eosinophils in nasal secretions, which are regarded as markers of allergic inflammation. Due to its special light composition, this method does not have irreversible or malignant effects on the nasal tissues [14].

CONCLUSIONS

Analyzing the data, we can state the fact that phototherapy is an effective therapeutic method for the patients with allergic rhinitis, is a well-tolerated therapy,

Conflict of interest: none declared

Financial support: none declared

with minor side effects, easy to implement and monitor.

Certainly phototherapy is an alternative treatment method to treat local or general drug classes especially in patients like pregnant women, children under 5 years and athletes, because it has no major contraindications, or side effects. The therapeutical results are, in most cases, fast and durable. Repeated therapy induces tolerance towards allergens, so phototherapy can lead to healing. may offer a promising non-invasive and drug-free treatment option for allergic rhinitis. However, further research is needed to fully understand its potential benefits and drawbacks, and to determine its optimal use in the management of allergic rhinitis.

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