Recovery of Sense of Smell by Mepolizumab in a Patient with Chronic Rhinosinusitis and Nasal Polyposis

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CASE REPORT

Recovery of Sense of Smell by Mepolizumab in a Patient with Chronic Rhinosinusitis and Nasal Polyposis

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Abstract:

Introduction: To date, there is no permanent medical treatment for nasal polyposis and loss of sense of smell. Mepolizumab is an anti-IL-5 monoclonal antibody approved for the treatment of patients with eosinophilic asthma. It has been suggested that it is capable of improving olfactory dysfunction in patients with chronic rhinosinusitis and nasal polyposis.

Case: We present a 35-year-old Emirati male with progressively worsening rhinosinusitis, recurring nasal polyps and total loss of sense of smell. He was treated with oral steroids, normal saline nasal sprays and all available topical steroids without significant or permanent symptom relief. He was commenced on Mepolizumab, and upon receiving the 4th dose, he reported full recovery of his sense of smell.

Conclusion: Mepolizumab appears to be very effective in treating loss of sense of smell. Further studies should be conducted to assess the efficacy and effectiveness of Mepolizumab in patients with chronic rhinosinusitis, nasal polyposis and anosmia.

Keywords: Mepolizumab, Nasal polyps, Olfaction disorders, Sinusitis, Paranasal sinus diseases, Rhinosinusitis.

1. INTRODUCTION

Chronic rhinitis with nasal polyposis is characterised by symptoms such as nasal discharge, stuffiness, facial pressure or pain, cough from post-nasal drip, and olfactory dysfunction or total loss of sense of smell (anosmia) [1]. In inflammatory conditions such as rhinitis, there are two components: an inflammatory component, and a conductive component, which is the one in direct association with the olfactory neuro-epithelium [2]. Olfactory dysfunction in inflammatory conditions can occur as a result of damage to the neuro-epithelium, due to local inflammation, that prevents odours from reaching the cilia receptors found in the epithelium. More specifically, the neuro-epithelium is damaged as it becomes oedematous from the inflammatory process occurring, and the products of the inflammatory process cause damage to the olfactory neurons, thus preventing any transmission of synaptic impulses [2]. In addition to chronic rhinitis, there are other conditions that have been proven to be associated with olfactory dysfunction, such as nasal polyposis, asthma, septal deviation, turbinate hypertrophy, tobacco and allergic rhinitis [3]. Clinical treatment of olfactory dysfunction remains limited and of temporary effect [3, 4]. One study has shown that anti-IL5 therapy (mepolizumab) is effective in patients with chronic rhinitis with nasal polyposis, and it has also resulted in a significant improvement in olfactory function [5].

Recently, a case report was published, describing a patient suffering from chronic rhinitis, nasal polyposis, asthma, and eosinophilia with olfactory dysfunction [6]. The patient was commenced on nasal and injective corticosteroids, which were unsuccessful in treating the loss in the sense of smell. As the patient was a severe asthmatic, they fulfilled eligibility criteria for Mepolizumab treatment, and after 4 months of treatment, the patient experienced full recovery of their sense of smell, with good control of their severe asthma.
2. CASE NARRATIVE

The patient is a 35-year-old Emirati male attending Cleveland Clinic Abu Dhabi with longstanding and recurrent nasal polyps, hyposmia and nasal congestion. He has mild intermittent asthma and adverse reaction to oral Voltaren (Diclofenac Sodium), otherwise he has no personal or family history of note. He has a history of Functional Endoscopic Sinus Surgery (FESS), carried out in 2008 (Fig. 1), with partial improvement. His symptoms have become progressively worse and he underwent further FESS in 2017 for nasal polyp removal. A year later, he suffered from significant nasal mucosal swelling with polypoid inflammation, mostly on the left side with the almost total loss of sense of smell. He was treated over the course of his disease with several antihistamines, montelukast, short courses of oral steroids, normal saline nasal sprays and almost all available topical steroids without any significant or permanent symptomatic relief. Furthermore, he was commenced on subcutaneous immunotherapy with environmental allergen vaccines without any improvement. His nasal symptoms, mainly anosmia, caused significant emotional stress and impairment and affected his daily activity and social life. He was looking for a permanent cure to resolve his nasal symptoms and recover his sense of smell.

The patient underwent extensive allergy assessment, including blood tests and skin prick tests that showed positivity for tree, grass, and weed pollen. The nasal polyp score of the patient was Grade 2, bilaterally, according to Hadley’s Clinical Scoring System of Nasal Polyposis. His full blood count showed no eosinophilia. Olfactory dysfunction was investigated via the Visual Analogue Scale (VAS).

He was offered a trial of mepolizumab as it was the only biologic available in our hospital back then. The patient consented to receive the anti-IL-5 biologic, fully aware that it has not been approved for any nasal or sinus disorder. It was agreed that he will receive 100mg of mepolizumab subcutaneously every 4 weeks for a trial period of 4-6 months.

The patient’s sense of smell started to improve after the 1st dose and by the 4th dose, he reported full recovery of his sense of smell, with almost total relief of nasal symptoms, which also reflected on his VAS score (Fig. 2). He is currently doing very well and almost asymptomatic. He stopped all his medications, including immunotherapy, as he felt very well after receiving mepolizumab. The disease state was clinically investigated via Computer Tomography (CT) of the paranasal sinuses (Fig. 3). Before treatment, CT showed significant mucosal thickening of the bilateral of the maxillary sinuses in the axial plane, and significant mucosal thickening of the maxillary sinuses, nasal cavities, and ethmoids in the coronal plane. Three months after treatment, CT showed much improved mucosal thickening of the bilateral of the maxillary sinuses with patency of the left antrostomy opening in the axial plane and much improved mucosal thickening of both maxillary sinuses and ethmoids with patency of the left antrostomy opening in the coronal plane. The drug was administered at our healthcare facility, and so adherence to the drug was monitored accordingly. There were no adverse or unanticipated events reported upon drug administration.

Fig. (1). Timeline and associated treatment outcomes.
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3. DISCUSSION

We report an Emirati patient with longstanding and recurrent nasal polyps, anosmia and nasal congestion who fully recovered his sense of smell after treatment with mepolizumab. Mepolizumab and Omalizumab are thought to improve nasal polyposis, as shown in a meta-analysis of five studies comparing the treatment outcome of biological therapy with placebo, quantified by the nasal polyp score [5]. The anti-IL-5 monoclonal antibody mepolizumab is indicated in the severe eosinophilic asthma phenotype [7] and has not been licensed to treat other eosinophil driven diseases. However, there is no reason to believe that it will not be as effective in other conditions, including chronic rhinosinusitis with nasal polyposis. There is only one case report similar to ours of a patient suffering from chronic rhinitis, nasal polyposis, asthma, eosinophilia with olfactory dysfunction, that displayed improvement in olfaction after treatment with mepolizumab [6]. Our patient showed no blood eosinophilia; however his remarkable improvement on mepolizumab raises the possibility that his inflammatory process is eosinophil driven and suggests that local eosinophilia may have played a role in the disease.
process. Furthermore, the patient did not respond to immunotherapy, suggesting that his symptoms are unlikely to be driven by a Type I hypersensitivity reaction, further warranting the use of Mepolizumab.

CONCLUSION

Dupilumab has only recently been approved by the FDA as biologic therapy for the treatment of chronic rhinosinusitis with nasal polyposis [8]. Mepolizumab appears to be very effective in treating loss of sense of smell. We recommend that studies of patients with chronic rhinitis and nasal polyposis with anosmia/hyposmia should be conducted to assess the efficacy and effectiveness of mepolizumab in treating olfactory dysfunction in these patients.

PATIENT PERSPECTIVE

“I fully consented to receiving Mepolizumab to treat my anosmia, for a trial period of 4-6 months, with a dose of 100mg per injection, subcutaneously. I suffered no adverse events during or after the injection procedure. The drug has fully treated my anosmia, as well as my nasal symptoms, with control of my asthma. I am willing to continue on the drug for a longer time period.”

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Consent to disclosure of clinical data and radiological images was obtained from the patient.

STANDARD FOR REPORTING

The CARE guidelines were carefully followed for writing this case report.

FUNDING

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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REFERENCES