

# A Case Study Showing Benralizumab's Effectiveness in Treating Uncontrolled Severe Eosinophilic Asthma that is Resistant to Omalizumab

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DOI: <https://doi.org/10.52403/ijshr.20221036>

## ABSTRACT

Asthma is a diverse illness that can range in severity. Because it has a significant impact on patients' quality of life and because people with severe asthma have symptoms, exacerbations, and drug side effects. Although first disregarded, eosinophils have since been directly linked to characteristics of the continuous inflammatory process in asthma, especially in the severe form. We present of the case of a 50year old female patient who presented with complaints of cough, breathing difficult on exertion and history of fever, chest pain and tiredness. The chest x ray showed left lower zone haziness. Patient was successfully treated with IV antibiotics, IV Proton pump inhibitor, Nebulised bronchodilators, IV Steroids, Anti-Hypertensive therapy and all other supportive medications along with pulmonary rehabilitations. In view of uncontrolled Eosinophilic asthma patient was treated with monoclonal antibody. Patient improved symptomatically better. This case study describes how benralizumab treatment for a patient with uncontrolled severe eosinophilic asthma resulted in significant improvements in lung function, asthma control, steroid use, and quality of life.

**Keywords:** Benralizumab, Severe eosinophilic asthma, Omalizumab, Monoclonal antibodies

## INTRODUCTION

Asthma is a common, chronic inflammatory, respiratory disease.[1] Severe eosinophilic asthma is associated with a heavy burden and impact on daily living in

patients experiencing uncontrolled symptoms, exacerbations, and treatment side effects. Globally, asthma has a prevalence of 1–18%, with severe asthma affecting 5–10% of the total asthma population.[2] Severe asthma is associated with frequent exacerbations that lead to the excessive use of systemic corticosteroids (SCS) that, with their associated side effects, can be burdensome to the lives of patients.[3] For patients with severe refractory asthma, monoclonal antibodies are a relatively novel therapeutic option that can be added to maintenance therapy. This reduces the requirement for systemic corticosteroid use, improves asthma symptom control, and lowers exacerbations. Benralizumab is a humanized, fucosylated, monoclonal antibody that targets the interleukin 5 (IL-5)  $\alpha$  receptor. Several phase III trials have shown that benralizumab can significantly reduce the incidence of acute exacerbations and improve lung function in patients with severe asthma.[4]

## CASE REPORT

Here we report a 50year female patient admitted to pulmonology ward, in a tertiary care hospital, Chennai, india, presented with complaints of cough, breathing difficulty on exertion and history of fever, chest pain and tiredness, decreased appetite. She had history of covid-19 and systemic hypertension. Her investigations were as

follows- Total WBC count 14710 cells/mm<sup>3</sup>, MCV-79 FL, MCH-24 pg, MCHC- 30g/dl, Neutrophils-90%, Lymphocytes-80%, Monocytes-1.6%, Eosinophils- 0.0%. The chest X-ray showed left lower zone haziness. All baseline and relevant investigations were done. Patient treated with IV antibiotics (inj. Augmentin 1.2gm IV BD), IV Proton pump inhibitor, Nebulised bronchodilators IV steroids, Anti-hypertensive therapy and all other supportive medications along with pulmonary rehabilitations. Inview of

uncontrolled eosinophilic asthma patient treated with monoclonal antibodies (omalizumab) with a partial reduction of symptoms. The patient had experienced two to three hospitalization per year. During follow up she showed signs of exacerbation and she was switched to bendralizumab (monoclonal antibodies). Patient improved symptomatically better. During the treatment and at follow-up after one-month, good tolerance and no side effects were observed.



**Fig 1: Chest X ray**

## **DISCUSSION**

Asthma is a common, chronic inflammatory, respiratory disease.[1] About 10% of the 300 million people worldwide suffer from asthma.[5] This case report demonstrated the efficacy of bendralizumab treatment in a patient with uncontrolled severe eosinophilic asthma refractory to omalizumab treatment and another study conducted by Adel H. Mansur et al reported the efficacy of bendralizumab treatment in a patient with severe eosinophilic asthma and chronic rhinosinusitis with nasal polyps refractory to mepolizumab treatment.[3] In the present study, treatment of uncontrolled

severe eosinophilic asthma with bendralizumab appears to be feasible, rapid and safe. A study conducted by Andrea baccelli et al reported that mepolizumab may be beneficial and safe as an add-on biologic in a patient with uncontrolled severe eosinophilic asthma.[6] In the current study chest X-ray, lung function tests and other baseline and relevant investigations helped in the diagnosis. Another study conducted by Corrado pelia et al reported a case that asthma control test, chest examination, lung function tests helped in the diagnosis of severe allergic eosinophilic asthma.[7] In this study patient presented

with complaints of cough, dyspnoea on exertion, fever, chest pain, tiredness and decreased appetite. Similar complaints reported in a case series conducted by Venkata nagarjuna mature et al [8] In this study uncontrolled severe eosinophilic asthma treated with omalizumab. Due to the signs of exacerbation, she was switched to bendralizumab. A study conducted by Willemien s. kalteren et al reported that omalizumab stopped in a patient with severe allergic asthma due to its side effects.[9]

## CONCLUSION

Patients with uncontrolled symptoms, exacerbations, and side effects from treatment who have severe eosinophilic asthma experience a significant burden and impact on their everyday lives. This case study describes significant improvements in asthma exacerbations, lung function, asthma control, steroid use, and quality of life in a patient with severe, uncontrolled eosinophilic asthma who was treated with benralizumab despite prior biologic therapy. Treatment of uncontrolled severe eosinophilic asthma with bendralizumab appears to be feasible, rapid and safe.

### Declaration by Authors

**Ethical Approval:** Not Applicable

**Acknowledgement:** None

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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How to cite this article: Stelphy Stephen. A case study showing benralizumab's effectiveness in treating uncontrolled severe eosinophilic asthma that is resistant to omalizumab. *International Journal of Science & Healthcare Research.* 2022; 7(4): 260-262.  
DOI: <https://doi.org/10.52403/ijshr.20221036>

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