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Candesartan-Induced Cough Variant Asthma

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Abstract

In this report, we present the case of a 56-year-old female who was seen at an outpatient clinic with a persistent cough shortly after starting Candesartan. This lady was not a known case of asthma and never presented with any asthma related symptoms. In fact, she led a very active lifestyle with no respiratory limitations which she couldn't maintain after starting Candesartan. In the clinic, she was noted to have a high Fractional Exhaled Nitric Oxide (FeNO) (136 ppb) and Eosinophilia (0.44×10^9/L). Shortly after stopping Candesartan and starting Inhaled Corticosteroids (ICS), her symptoms resolved completely and she was able to return to her previous level of activity. She also managed to as needed ICS/Long Acting Beta Agonists (LABA) with no recurrence of symptoms on follow up review. To our knowledge, this is one of the few cases where Candesartan has contributed to cough in a predisposed asthma phenotype. It would be interesting to see if this case would highlight the association between Candesartan and cough variant asthma.

Keywords

Candesartan, Cough Variant Asthma, Fractional Exhaled Nitric Oxide (FeNO)

1. Introduction

Candesartan is an angiotensin II receptor antagonist (AIIRA), selective for type I (AT1) receptors, reported to have a very rare (< 1/10,000) incidence of cough in adults. A literature review revealed a scarcity of case reports on candesartan-induced asthma. In this case report, we studied the effect of Candesartan on bronchial asthma.

2. Case Summary

We present a case of Mrs. A, a 56-year-old female, a non-smoker, who was referred to our general medicine outpatient clinic with a two-month history of a

protracted dry cough. Five days prior to the onset of the cough, the patient had been started on Candesartan as treatment for newly diagnosed hypertension. Prior to commencing Candesartan, the patient denied ever having any respiratory symptoms including cough, sputum, dyspnoea or wheeze. She also denied any history of atopy or childhood asthma.

Mrs. A led a very active daily lifestyle; she was able to go to the gym every day and had no limiting exertional factors. Since symptoms started the patient was unable to maintain the same intensity of exercise and eventually had to stop regular physical activity altogether. Her past medical history was significant for hypertension and thyroid cancer in 2013 which was managed by a right hemi-thyroidectomy. No significant family history was identified. On examination her chest was clear to auscultation with good air entry bilaterally and she had no added sounds suggesting bronchospasm. Her oxygen saturations reached ninety eight percent on room air.

The patient's cough was also investigated by an Ear, Nose and Throat (ENT) specialist prior to her medical outpatient visit. No cause could be identified specifically within the sinuses and the oropharynx.

3. Investigations

During her outpatient visit the following investigations were performed:

- Fractional Exhaled Nitric Oxide (FeNO) was 121 parts per billion (ppb).
- Baseline Eosinophil count was 0.44x109/L before and after starting Candesartan.
- Spirometry was not performed on initial assessment as she was unable to comply with an appropriate technique due to cough.

4. Differential Diagnosis

In view of the laryngeal surgery and regular follow up by ENT, the initial differential diagnosis was pathology related to her vocal cords triggering a cough. This was in fact excluded as the patient had been thoroughly investigated by an ENT specialist and did not identify such a cause.

Given the timeline presented by the patient herself, her eosinophil count and the high FeNO, a diagnosis of asthma on a previously asymptomatic patient could be made. The patient denied sinusitis symptoms or nasal congestion and hence postnasal drip was excluded.

Therefore, since symptoms only appeared soon after the patient started Candesartan, and in the absence of a respiratory infection or a history of seasonal symptoms, Candesartan induced cough variant asthma could be considered as a plausible diagnosis.

5. Treatment and Outcome

The patient was started on a trial of a low-dose inhaled corticosteroid (ICS), Budesonide at 200mcg twice a day administered via a spacer. She was also advised

to stop Candesartan, replacing it with a calcium channel antagonist, Amlodipine, to manage her hypertension.

Within five days of stopping candesartan and starting Budesonide the patient reported complete resolution of her cough. She was able to return to her daily activities including going back to the gym at her previous level of exercise intensity. After two-months of low-dose ICS, the patient decreased her inhaler use to an as needed regimen. For more efficacious future asthma control, she was advised to switch onto Maintenance and Reliever Therapy (MART) on an as needed basis.

Repeat FeNO on a follow up visit one month later was 135 ppb and this had subsequently decreased further to 58ppb two months later.

6. Discussion

Following the latest British asthma guidelines publication, a diagnosis of bronchial asthma was established on the patient's suggestive symptoms and a very high FENO [1].

The use of Angiotensin Converting Enzyme (ACE)-Inhibitors is a cornerstone tool in the prevention and management of cardiovascular, renovascular and vascular diseases. The incidence of cough associated with ACE inhibitor use has been estimated to be between 3.5% and 35% and is a primary reason for physicians to switch treatment to AIIRA treatment [2]. Although the mechanism behind ACE-induced cough remains debatable, a commonly recognised understanding relates to the elevated levels of bradykinin and substance P degradation in the lung and consequent stimulation of the cough reflex. This mechanism is evaded with AIIRA use as the drug inhibits the renin-angiotensin-aldosterone system in an alternative mechanism that does not result in the accumulation of kinin.

Other studies have demonstrated patient factors such as gene polymorphism, bronchial hyperreactivity and a prior history of asthma and atopy as possible factors that can intertwine with the above mechanism to propel the development of ACE-Inhibitor induced cough [3]. Individuals found to have polymorphism in genes coding for bradykinin receptors tend to be more susceptible to ACE-induced cough [4]. ACE induced cough occurs more commonly in the female population and in non-smokers, two demographic features present in the presented case study.

Candesartan, an AIIRA has not been formally associated with the onset of cough. Even more so a study by Tanaka *et al*. 2001 has gone a step further to demonstrate that there should be no relationship between Candesartan use and the incidence or severity of persistent cough or heightened airway responsiveness in asthmatic patients [5].

In the presented case, an eosinophil count of 0.44×10^9/L prior to commencing drug therapy could potentially indicate an individual tendency for heightened hyperreactive eosinophilic airways that can potentially postulate a predisposition to an asthmatic phenotype. This hypothesis can be supported by the very high FENO reading on the initial patient encounter, which is a surrogate marker of eosino-

philic airway inflammation and a useful biomarker for asthmatic cough [6].

The clinical responsiveness to a treatment trial of an adequate therapeutic dose of inhaled corticosteroid further supports this diagnosis. Given that this lady had no prior clinical manifestations of asthma, given the timeline of symptoms onset with Candesartan introduction, it is reasonable to question if the Angiotensin Receptor Blocker (ARB) treatment could have triggered the onset of asthma symptoms in an individual with an asthma predisposition. As inhaled corticosteroid therapy was initiated at the same time as Candesartan treatment was withdrawn, it is difficult to ascertain that Candesartan unmasked asthmatic features. This hypothesis was further amplified by the fact that this lady's symptoms did not recur after downregulating onto MART and her asthma remained exceptionally well-controlled on follow-up reviews. The Naranjo Adverse Drug Reaction Probability Scale was developed in 1991 and assists in validating the causality of a drug related adverse reaction. The interpretation of the calculated score for our presented case delineates the adverse reaction to Candesartan as probable.

To date, we could not identify published case reports with similar observations. Nevertheless, use of AIIRA is an important observation to keep in mind whilst investigating patients with a cough especially if asthmatic clinical or biochemical markers are identified.

7. Conclusion

Cough and the presence of an AIIRA in a patient's drug history could potentially be a co-existing factor that should make clinicians aware of their rare but potential interference. Future systematic reviews of pharmacovigilance databases might help reveal similar reports of AIIRA associated cough-variant-asthma. In the clinical setting, it would be recommended to investigate asthma biomarkers such as FENO and eosinophilia and their relationship when it comes to the introduction of AIIRA and asthma associated symptoms. We hope that this report helps to create awareness of this possibility and perhaps provides more insight into other similar cases worldwide.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] National Institute for Health and Care Excellence, British Thoracic Society and Scottish Intercollegiate Guidelines Network (2024) Asthma Pathway (BTS, NICE, SIGN). (No. NG244). https://www.nice.org.uk/guidance/ng244

[2] Dicpinigaitis, P.V. (2006) Angiotensin-Converting Enzyme Inhibitor-Induced Cough. *Chest*, **129**, 169S-173S. https://doi.org/10.1378/chest.129.1_suppl.169s

[3] Yilmaz, I. (2019) Angiotensin-Converting Enzyme Inhibitors Induce Cough. *Turkish Thoracic Journal*, **20**, 36-42 https://doi.org/10.5152/turkthoracj.2018.18014

[4] Mukae, S., Aoki, S., Itoh, S., Iwata, T., Ueda, H. and Katagiri, T. (2000) Bradykinin B_2receptor Gene Polymorphism Is Associated with Angiotensin-Converting Enzyme

Inhibitor-Related Cough. *Hypertension*, **36**, 127-131.
https://doi.org/10.1161/01.hyp.36.1.127

[5] Tanaka, H., Teramoto, S., Oashi, K., Saikai, T., Tanaka, S., Suzuki, K., *et al*. (2001) Effects of Candesartan on Cough and Bronchial Hyperresponsiveness in Mildly to Moderately Hypertensive Patients with Symptomatic Asthma. *Circulation*, **104**, 281-285. https://doi.org/10.1161/01.cir.104.3.281

[6] Morice, A.H., Millqvist, E., Bieksiene, K., *et al*. (2020) ERS Guidelines on the Diagnosis and Treatment of Chronic Cough in Adults and Children. *European Respiratory Journal*, **55**, Article 1901136.