

Case Report

Ipratropium induced bronchoconstriction in a young Asthmatic: A case report

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Acute severe Asthma is a common paediatric emergency managed according to the BTS and SIGN guidelines. They recommend that if initial β_2 agonist treatment bears no response, frequent Ipratropium Bromide doses can be given every 20-30 minutes [1]. We present a case of paradoxical bronchospasm to Ipratropium, an observed but rare side effect.

Case Report

An eight-year-old girl presented to the Emergency Department with cough and shortness of breath. Her asthma was usually well controlled with Beclomethasone 100 micrograms twice-daily, Montelukast once-daily, and Salbutamol as and when required. She had no history of rhinoconjunctivitis nor any allergic triggers. She was diagnosed with an acute non-infectious exacerbation of Asthma and given ten puffs of Salbutamol inhaler every 20 minutes over one hour. As she showed marked symptomatic improvement, she required no investigation and was discharged with a wheeze plan and oral amoxicillin cover for seven days. However, she returned that evening with increasing breathlessness and an audible wheeze on auscultation. She was then started on ten puffs Salbutamol MDI, two puffs Ipratropium Bromide inhaler 20 microgram via spacer and Prednisolone 40 mg. She responded to the treatment and Salbutamol was gradually spaced to four-hourly. The next day she was discharged with a three- and seven-day course of Prednisolone and Amoxicillin to complete, respectively.

Three days later, she re-presented with cough and worsening breathing episodes, despite using Salbutamol two-hourly at home. On auscultation, she had bilateral diffuse wheeze with decreased air entry and crepitations on the left lower zone. She was started on a combination of Salbutamol (5 mg) and Ipratropium nebulizers (500 microgram) and 1L of Oxygen. On re-assessment, she showed increased work of breathing and oxygen requirements. She was then given a mixed nebulizer of Salbutamol (5 mg) and Ipratropium (250 microgram) prior to being managed on hourly Salbutamol,

four-hourly Ipratropium nebulizers and oral prednisolone to which she showed significant improvement. Over the next 24 hours, her nebulizers were gradually spaced to Salbutamol three-hourly and Ipratropium six-hourly, maintaining saturations in air.

The next evening, following a dose of mixed nebulizer, she deteriorated. Initially, she had increased work of breathing, tachycardia and a static oxygen requirement but no audible wheeze. However, her oxygen requirements began to increase alongside work of breathing and cough frequency. She now exhibited a bilateral wheeze and so the frequency of nebulizers was increased. Again, her clinical picture improved. Her day four chest radiograph showed hyper inflated lungs and bilateral perihilar bronchial wall thickening consistent with Asthma. By midday, she was slowly weaned off Oxygen and remained asymptomatic until her dose of nebulizers in the evening. Post nebulizer she again developed acute shortness of breath, an audible wheeze and crepitations, though her blood gas remained satisfactory.

The nurses observed a similar episode of acute deterioration following another dose of combined nebulizer later that night. She continued on mixed nebulizers, magnesium sulphate, hourly Salbutamol and four-hourly Ipratropium nebulizers. Her clinical picture showed little improvement so was transferred to HDU being commenced on IV Aminophylline, Hydrocortisone and continued on mixed nebulizers which were spaced over next 48 hours as she remained asymptomatic on air.

More Information

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Submitted: January 15, 2021

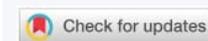
Approved: February 22, 2021

Published: February 23, 2021

How to cite this article: Aleshaa H, Collindridge J, Singh RK. Ipratropium induced bronchoconstriction in a young Asthmatic: A case report. Arch Case Rep. 2021; 5: 007-008.

DOI: 10.29328/journal.acr.1001046

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Over the next 48 hours her symptoms fluctuated so she continued on mixed nebulizers. A repeat chest radiograph done was normal. Due to clinical suspicion of paradoxical bronchospasm to ipratropium, she had a review pre and post combined nebulizer therapy. Prior to the nebulizer she was settled in air, no increased work of breathing with bilateral occasional wheeze and post nebulizer she developed increased work of breathing, bi-lateral prolonged expiration, wheeze and also complained of headache. Ipratropium was then stopped. Consequently, she was recommenced on Aminophylline, Prednisolone and hourly Salbutamol to which she responded, with significant improvement over the next two days. She was weaned off Aminophylline, her Salbutamol was spaced to four-hourly and she was stepped down from HDU. She continued to show improvement, remained asymptomatic and was discharged day 15 on Salmeterol 25 mcg + Fluticasone 50mcg Propionate combination evohaler (2 puff BD), Montelukast (5 mg at night), Cetirizine (5 mg BD) and Salbutamol via spacer with a wheeze plan.

Discussion

In retrospect, our initial clinical suspicion of symptoms aggravated by infection, foreign body or allergy was wrong. Clinical observation confirmed paradoxical bronchospasm following mixed nebulizer therapy, but not with salbutamol nebulizer alone. As there were no previous history of allergies nor any allergic manifestations during observed bronchospasm, we consider this case as an adverse effect rather than a hypersensitivity reaction. We believe this case highlights the need for continued assessment of symptom resolution to prescribed therapy. One should consider reviewing diagnosis or treatment side effects if there are no perceived benefits or there is a clinical deterioration.

Ipratropium is an acetylcholine antagonist via blockade of muscarinic cholinergic receptors. This blockade decreases the production of cyclic guanosine monophosphate (cGMP), which

at lower levels, leads to reduced smooth muscle contraction in lung airways. A literature search revealed a paucity of studies describing bronchospasm as an adverse effect of the newer isotonic Ipratropium solution. One case highlighted such an effect in adults [2] and many cases have been described a similar adverse response to beta-agonists [3,4]. Interestingly, an allergic response to Ipratropium has been highlighted in a paediatric patient whose mother had similarly developed a reaction to Ipratropium in the past [5].

It is important to note that the BNFC [6] does not mention paradoxical bronchospasm as a side effect of Ipratropium Bromide despite the manufacturer information guidance [7] highlighting it as a serious one. They recommend that in this situation, Ipratropium nebuliser should be stopped immediately. We believe the BNFC [6] should be updated to reflect this.

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