DOI: http://doi.org/10.4038/jccp.v49i2.7854

Case report

Acute non-cardiogenic pulmonary oedema: a rare side effect of olanzapine

Apirami M[1], Kumanan T[1,2], Selvaratnam G[1,2], Sujanitha K[1,2], Guruparan M[1]

Journal of the Ceylon College of Physicians, 2018, **49**, 70-71

Summary

Olanzapine is a safe and potent second generation atypical antipsychotic drug with a very good safety profile among its counterparts. Respiratory failure due to olanzapine is an extremely rare life threatening side effect. Here we report a case of respiratory failure due to non cardiogenic pulmonary oedema in a patient with schizophrenia who has been on olanzapine for 10 years.

Introduction

Olanzapine is a successful atypical antipsychotic agent in the management of major psychotic illness including schizophrenia. Even though it has a good safety profile it rarely causes life threatening side effects and death. One of the extremely rare life threatening side effects of olanzapine is respiratory depression and respiratory failure. Here we report a case of respiratory failure in a patient who was on olanzapine for schizophrenia.

Case history

A 60-year-old patient with schizophrenia presented with sudden onset shortness of breath of four hours duration. He was on olanzapine 10mg twice daily for 10 years and was regularly followed up with good drug compliance. He had good exercise tolerance before the illness with no diagnosed respiratory or cardiac illness and had no modifiable or non-modifiable risk factors for coronary vascular disease.

On admission he was severely dyspnoeic with preserved cognition. Respiratory system examination showed respiratory rate of 32/minute with vesicular breathing and scattered fine crepitation on both lungs. Detailed physical examinations of the other systems were unremarkable.

On admission his SPO_2 was 74% on ambient air. Arterial blood gas analysis was suggestive of type 1 respiratory failure. (pH -7.46, PCO_2 - 25mmHg, PO_2- 55mmHg, HCO_3- 22mmol/l]

His 2D echocardiogram showed an ejection fraction of 70% with normal size and thickness of the heart. Chest radiograph revealed upper lobe diversion and bat wing appearance without pleural effusion or cardiomegaly. There were no features to suggest pneumonia or pneumothorax.

His serum sodium was 120 mmol/l with low serum osmolality (270mosmol/kg) and his urinary Na excretion was 60mEq/l with the urine osmolality of 320mosmol/kg. Hormone profiles including adrenal and thyroid functions were normal. He was diagnosed to have the syndrome of inappropriate ADH secretion (SIADH).

Other differential diagnoses for the above presentation were effectively excluded. He had normal D dimer level and there was no evidence of deep vein thrombosis. All other basic laboratory investigations including inflammatory markers and a septic screen were well within normal limits.

As there was no response to initial management of type 1 respiratory failure including CPAP, he was intubated and ventilated. On endotracheal intubation he was noted to have normal upper respiratory airway including normal movements of vocal cords and epiglottis. There were no dystonic movements.

With appropriate management he recovered completely and weaned off from the ventilator. One month later he underwent a high resolution CT scan of chest which was normal.

Discussion

Olanzapine is a commonly prescribed second generation atypical antipsychotic medication presumed to have less association with dystonia and other extrapyramidal side effects.

[1] *Teaching Hospital, Jaffna, Sri Lanka.*

[2] *Faculty of Medicine, University of Jaffna, Sri Lanka.*

Corresponding author: Apirami M
E-mail: apiramy04@gmail.com

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Olanzapine is classified as a thienobenzodiazepine. It has potent antagonist properties at brain post synapticdopaminergic, D2 receptors and serotonergic receptors, with some antagonist properties on muscarinic, histaminergic and adrenergic receptors[1, 2].

Even though olanzapine is associated with less extra-pyramidal effects, metabolic effects including weight gain, sedation, hyperglycemia and hyperlipidemia are frequently observed side effects[3]. Severe hyponatremia, bradycardia and respiratory depression were extremely rare reported side effects.

Respiratory failure related to olanzapine may be due to an acute dystonic reaction (ADR) of laryngeal muscles which is a potentially life threatening complication if left unrecognized. Male gender and young age are the main risk factors. ADR occurs shortly after the initiation of the drug and can be diagnosed by laryngoscopy finding which will show abnormal motion of the vocal cords[4]. We could reasonably exclude such possibility in this patient as he was on long term medication and his vocal cords were normal on intubation.

The other known cause for respiratory failure is sedation and secondary CO_2 narcosis. Sedation is observed in 39% of patients who are treated with 15mg daily dose of olanzapine[5]. Our patient neither had evidence of CO_2 narcosis nor excessive sedation clinically and the ABG analysis excluded CO_2 retention and type 2 respiratory failure due to sedation.

Olanzapine has been reported to cause mainly the peripheral oedema but the mechanism and association of non-cardiogenic pulmonary oedema is still not well understood. Peripheral oedema is thought to be due to blockade of alpha-1 adrenergic receptors by olanzapine, causing peripheral vasodilation and edema. Other than this mechanism, blockade of serotonergic muscarinic and histaminic receptors results in inhibition in a physiological rise in IP3, which down regulate the ATP-dependent calcium pump, and causes smooth muscle relaxation and edema. Other factors thought to be involved in the edema formation are renal fluid and electrolyte imbalance and allergy related edema formation[1].

In conclusion, here we have reported an extremely rare life threatening side effect of non-cardiogenic pulmonary oedema and respiratory failure in a patient who has been on olanzapine, a widely used atypical antipsychotic for schizophrenia and bipolar affective disorders. Early detection and appropriate ventilatory support is life saving and prevents devastating complications of prolonged hypoxia.

Conflicts of interest

Authors declare that they have no conflicts of interest.

Consent: Written informed consent was obtained from the patient for the publication.

References

1. Ipek Toz H, Tasdemir DM , Ozer U , Toz B , Ozgen G. Bilateral pedal edema associated with olanzapine treatment. *The Journal of Neurobehavioral Sciences* 2015; **2** (1):1-3.
2. Seeman P. Atypical antipsychotics: mechanism of action. *Can J Psychiatry* 2002; **47**(1): 27-38.
3. Tran PV, Dellva MA, Tollefson GD, Beasley CM, Potvin JH, Kiesler GM. Extrapyramidal symptoms and tolerability of olanzapine versus haloperidol in the acute treatment of schizophrenia. *J Clin Psychiatry* 1997: **58**(5): 205.
4. Collins N, Sager J. Acute laryngeal dystonia: drug-induced respiratory failure related to antipsychotic medications. *Journal of Neurology and Neuromedicine* 2018; **3**(1): 4-7.
5. Mouallem M, Wolf I. Olanzapine-induced respiratory failure. *Am J Geriatr Psychiatry* 2001; **9**(3): 304-5.