Belly dancer syndrome induced by salbutamol

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DESCRIPTION

A 54-year-old man with type 2 diabetes mellitus for 10 years on metformin 1 g two times per day and gliclazide 40 mg daily, and bronchial asthma for 30 years on metered-dose inhalers budesonide two puffs two times per day and salbutamol two puffs as required. There was no history of neuropsychiatry problems. He presented with sudden onset of frequent, intermittent, involuntary painless abdominal wall jerky movements. This occurred following usage of salbutamol metered-dose inhaler 1600 µg within half hour in the emergency department for asthma treatment. He was prescribed salbutamol inhalers instead of the usual nebulisers during the COVID-19 period. As his symptoms did not improve, he was subsequently given intravenous hydrocortisone 200 mg and intravenous magnesium sulfate 2.47 mmol/L. He developed signs of sympathetic hyperactivity as evidenced

Learning points

- ▶ Belly dancer syndrome refers to rhythmic, repetitive and involuntary myoclonic jerks of unilateral or bilateral hemidiaphragms.
- ▶ The condition can be caused by high doses of inhaled salbutamol.
- ▶ Exclusion of secondary causes is important.

by diaphoresis, increased heart rate 130 beats per minute, blood pressure 140/98 mm Hg and respiratory rate 24 breaths per minute. On examination, these movements ([video 1](#)) represented belly dancer syndrome. During sleep and rest at night, the movements still persist but reduced. The movements resolved after his salbutamol inhalers were ceased on the third day of admission following improvement in his symptoms. There was no further recurrence of his abdominal movements. The MRI of the spine, electroencephalogram and chest radiograph were normal.

Belly dancer syndrome or diaphragmatic flutter refers to rhythmic, repetitive and involuntary myoclonic jerks of unilateral or bilateral hemidiaphragms resulting in abdominal or truncal movements that resemble belly dancing that cannot be voluntarily suppressed.^{1 2} The pathophysiology and muscle distribution involved is postulated to be from spinal cord origin. However, the exact mechanism is still unknown.³ Roggendorf *et al* reported a patient who developed belly dancer syndrome 5 months following central and extrapontine myelinolysis, this suggests that the basal ganglia may be implicated as a generator of the involuntary movements.⁴

The causes originate from the central nervous system to the spinal cord and peripheral nervous system including the phrenic nerve.⁵ Psychogenic causes have been reported. We attempted to distract and entrain him during the process to look for possibility of functional disorder.

Potential medications that precipitate this condition include levodopa, galantamine⁶ and clebopride.¹ Our patient had concurrent acute exacerbation of bronchial asthma. A report of recalcitrant bronchial asthma emulating diaphragmatic flutter had been described previously in literature.⁷ Our patient had acute exacerbation of bronchial asthma that resolved with prompt treatment together with the belly dancer dyskinesia.

Myoclonus can be exacerbated by salbutamol use in previous case reports and was associated with high doses of salbutamol.^{8 9} Selective β₂-agonists have preferential affinity for this receptor but selectivity is lost at high drug concentrations. Overstimulation of catecholaminergic central nervous system

Video 1 Anterior abdominal muscle wall movements, and upon attempt to distract and entrain the patient to distinguish between functional disorder fail to reduce or abolish the movements.

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receptors by sympathomimetic drugs may induce seizures.¹⁰ Most drugs that cause myoclonus also lead to cognitive impairment. In contrary, our patient's electroencephalogram was normal and he had no cognitive impairment.

Our patient had high dosage of salbutamol usage that potentially exacerbated his belly dancer syndrome with signs of sympathetic hyperactivity. Following cessation of salbutamol inhalers, the symptoms completely resolved with no further recurrence.

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REFERENCES

- 1 Linazasoro G, Van Blercom N, Lasa A, *et al.* Etiological and therapeutical observations in a case of belly dancer's dyskinesia. *Mov Disord* 2005;20:251–3.
- 2 Amin OSM, Abdulkarim QH, Shaikhani M. Intermittent bursts of abdominal wall jerky movements: belly dancer's syndrome? *BMJ Case Rep* 2012;2012:bcr2012007393.
- 3 Illiceto G, Thompson PD, Day BL, *et al.* Diaphragmatic flutter, the moving umbilicus syndrome, and "belly dancer's" dyskinesia. *Mov Disord* 1990;5:15–22.
- 4 Roggendorf J, Burghaus L, Liu W-C, *et al.* Belly dancer's syndrome following central pontine and extrapontine myelinolysis. *Mov Disord* 2007;22:892–4.
- 5 Cvietusa PJ, Nimmagadda SR, Wood R, *et al.* Diaphragmatic flutter presenting as inspiratory stridor. *Chest* 1995;107:872–5.
- 6 Hernández-Fernández F, Pardal-Fernández JM, García-Martínez E, *et al.* Respiratory myoclonus, a side effect of galantamine. *Farm Hosp* 2011;35:97–9.
- 7 Harrison P, Onorato DJ. Diaphragmatic flutter emulating recalcitrant asthma. *South Med J* 1997;90:234–6.
- 8 Montoya-Giraldo MA, Montoya DV, Atehortúa DA, *et al.* Myoclonus induced by salbutamol: a case report. *Biomedica* 2018;38:303–7.
- 9 Micheli F, Cersósimo MG, Scorticati MC, *et al.* Myoclonus secondary to albuterol (salbutamol) instillation. *Neurology* 2000;54:2022–3.
- 10 Obeso J. Classification, clinical features and treatment of myoclonus. In: Watts RL, Koller WC, eds. *Movement disorders: neurologic principles and practice*. New York, NY: McGraw-Hill Companies, 1997: 541–50.

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