

## Respiratory Shoulder Synkinesis: A Rare Case Report

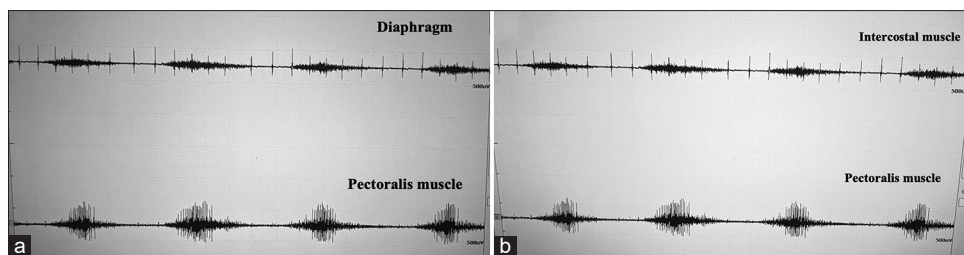
Sir,

Respiratory synkinesis (RS) is a rare synkinesis syndrome characterized by synchronous contraction of diaphragm and an upper limb muscle. It is usually reported in the context of preceding injury or inflammation to the cervical/brachial plexus resulting in the aberrant regeneration of the phrenic nerve.<sup>[1]</sup> RS with pectoralis major and minor muscles is rarely reported.

We report a case of a 36-year-old man who presented with vague pain in the left shoulder region associated with involuntary twitching movements for a nine-month duration. There was no paresthesia or weakness of limbs. He had a history of falling from about three feet with an outstretched left upper limb, without any injury or deficits following the incident two years before the onset of symptoms. The examination revealed synkinetic muscle contraction of the left pectoralis muscle on inspiration accentuated on deep inspiration [Supplementary Video 1]. The power and tendon

reflexes were normal. Magnetic resonance neurography of the brachial plexus and spinal cord were performed, which was normal. Ultrasonography of the pectoralis major and minor muscle showed prominent muscle contraction with deep inspiration without any abnormal echogenicity or spontaneous fasciculations [Supplementary Video 2]. Multichannel surface electromyography (EMG) of the diaphragm, upper intercostal muscles, and pectoralis muscle was done, which showed synchronous firing of respiratory muscle and pectoralis [Figure 1].

The brachial plexus branches of the lateral pectoral nerve (C5–C7) and medial pectoral nerve (C8–T1) supply pectoralis major and minor, respectively. Since the phrenic nerve and Brachial plexus (C5–T1) are both supplied by the C5 root, during reinnervation due to any etiology, there is a possibility of aberrant innervation<sup>[2]</sup> or ephaptic transmission<sup>[3]</sup> between phrenic nerves into upper and middle cervical roots resulting



**Figure 1:** Multichannel surface EMG of the pectoralis major and (a) intercostal muscle and (b) diaphragm showing synchronous contraction

in RS. There are previous reports of RS with biceps, deltoid,<sup>[1]</sup> and intrinsic hand muscles,<sup>[4]</sup> all following significant brachial plexus injury. Congenital synkinetic syndromes such as trigemino-abducens synkinesis exist mainly between cranial nerves. Chan Chun Kong *et al.* have described two cases of idiopathic RS with the pectoralis major muscle, which was described with clinical and sonographic synkinetic movements.<sup>[5]</sup> The unique features noted in our patient include simultaneous synchronous contraction of the diaphragm, intercostal muscle, and pectoralis major–minor muscles, which have not been reported before. Though the patient had a trivial fall two years before the symptom onset, there was no definite preceding injury or insult to the cervicothoracic roots raising the possibility of idiopathic nature.

This is a rare case of RS, which has to be considered in patients presenting with unexplained focal muscle contraction even in the absence of preceding events.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

**Dipti Baskar, Seena Vengalil, Saraswati Nashi,  
Nitish L. Kamble, Atchayaram Nalini**

Department of Neurology, National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, Karnataka, India

**Address for correspondence:** Dr. Seena Vengalil,  
National Institute of Mental Health and Neurosciences,  
Bengaluru, Karnataka, India.  
E-mail: seenavengalil@gmail.com

### REFERENCES

1. Swift TR, Leshner RT, Gross JA. Arm-diaphragm synkinesis: Electrodiagnostic studies of aberrant regeneration of phrenic motor neurons. *Neurology* 1980;30:339-44.
2. Montserrat L, Benito M. Facial synkinesis and aberrant regeneration of facial nerve. *Adv Neurol* 1988;49:211-24.
3. Kameyama S, Masuda H, Shirozu H, Ito Y, Sonoda M, Kimura J. Ephaptic transmission is the origin of the abnormal muscle response seen in hemifacial spasm. *Clin Neurophysiol* 2016;127:2240-5.
4. Friedenber SM, Hermann RC. The breathing hand: Obstetric brachial plexopathy reinnervation from thoracic roots? *J Neurol Neurosurg Psychiatry* 2004;75:158-60.
5. Chan Chun Kong D, Breiner A, Wolf G. Idiopathic respiratory synkinesis: A case series. *Muscle Nerve* 2020;61:E8-9.

**Submitted:** 17-Mar-2023 **Revised:** 21-Apr-2023 **Accepted:** 03-May-2023

**Published:** 29-May-2023

Videos available on: <https://journals.lww.com/annalsofian>

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**DOI:** 10.4103/aian.aian\_235\_23