Diaphragm thinning due to phrenic nerve palsy

Hiroaki SATOH(ID)  
Kengo NISHINO(ID)  

Division of Respiratory Medicine, Mito Medical Center, University of Tsukuba, Mito, Japan  
Tsukuba Üniversitesi Mito Tip Merkezi, Solunum Tıbbı Bölümü, Mito, Japonya

To the Editor,

Phrenic nerve palsy is a relatively rare disease caused by several conditions that impair the phrenic nerve (1,2). Among them, patients with “idiopathic” phrenic nerve palsy, whose causative condition are unknown, is the most common (1,2). Neurological examinations such as electromyography are known as accurate diagnostic methods for phrenic nerve palsy (3). Since these examinations are complicated, many reports have used “lack of vertical movement of the diaphragm during inspiration and expiration” as a diagnostic method (1,2). The thinning of the diaphragm seems to be a consequence of the palsy, related to secondary muscle atrophy (4,5). We show, herein, a patient with idiopathic phrenic nerve palsy of the right, which was accompanied with diaphragm thinning on the affected side.

A 53-year-old man was referred to our hospital because of elevation of right diaphragm on chest radiograph and restrictive respiratory impairment on respiratory function test. The forced vital capacity was 3.59 L a year ago, but this year it was 2.44 L. On chest X-ray of inspiration and exhalation, no vertical movement of the right diaphragm was shown (Figure 1). On CT scan, no atelectasis due to obstructive lesion in central airway was found. There were no lesions that impaired the phrenic nerve. The right diaphragm was thinner than the left diaphragm (Figure 2). Since there was no medical history and imaging findings that caused phrenic...
nerve palsy, the patient was diagnosed as having an idiopathic phrenic nerve palsy.

Atelectasis due to lesions in the central airways may cause elevation of the diaphragm may involve peripheral (6). Therefore, it is necessary to pay attention to the presence or absence of endobronchial lesion in central airway even if there is apparent cancerous lesion adjacent to central airway. If there is no vertical movement of the diseased diaphragm during breathing, phrenic nerve palsy must be suspected. The majority of patients with phrenic nerve palsy are considered those with idiopathic clinical conditions (1,2). However, several diseases such as trauma, surgery, infections, and neurological disorders may cause phrenic nerve palsy, and head and neck cancers and lung cancers that damage the phrenic nerve from the C3-C5 nerve root may also cause phrenic nerve palsy (1,2). It should be noted that phrenic nerve palsy may be accompanied by the development of hypoventilation, basal pulmonary atelectasis, and can progress to the risk of hypercapnic respiratory failure (7). Therefore, when encountering a patient suspected of having phrenic nerve palsy, it is clinically important to search for the presence of the pathological condition causing the palsy rather than simply diagnosing it as "idiopathic". In the present patient, thinning of the diaphragm on the affected side was observed. The effect of diaphragm thinning on diaphragm atrophy and respiratory function is unknown, but it was reported that thinning had already observed 48 hours after the start of mechanical ventilation in the ICUs (4). Guinard et al. have reported a case of diaphragmatic paralysis with a thinning diaphragm muscle (5). Diaphragmatic vertical movement during respiration is the most important finding in phrenic nerve palsy, in addition to this, thinning of the affected diaphragm might also be a noteworthy finding.

REFERENCES


