

Transient phrenic nerve paralysis after carotid endarterectomy in a patient with asthma

Takayuki Kunisawa · Satoshi Hanada ·
Syuhei Takeuchi · Hiroshi Iwasaki

Received: 28 May 2010 / Accepted: 26 June 2010 / Published online: 17 July 2010
© Japanese Society of Anesthesiologists 2010

To the Editor:

Transient phrenic nerve paralysis occurred in a patient with asthma after carotid endarterectomy (CEA). The patient, a 64-year-old male with a height of 164 cm and weight of 69 kg, had been suffering from asthma for 15 years for which he was taking 400 mg of theophylline daily. A respiratory examination showed a reduced percentage forced expiratory volume in 1 second (%FEV_{1.0}: 61.2%), and he was assigned to class II in Hugh–Jone’s classification. The patient was scheduled for CEA due to cerebral infarction with left lower extremity paralysis and transient dizziness 1 year earlier. With respect to the patient’s positioning during surgery, the anterior edge of the skin on the sternocleidomastoid muscle was located at the highest point by placing a shoulder pillow under the right

shoulder in the supine position and rotating the head 30° to the left side; the jaw was tracted in the cephalic direction and the right shoulder was also tracted in the caudal direction. Anesthetic management was performed without difficulty for 4 h and 2 min, and surgery was completed without complications in 2 h and 43 min. Since the neurosurgeons were concerned about possible respiratory disorders, such as atelectasis, due to the patient’s asthma and wanted to ensure that there was no problem, they requested an X-ray before extubation. The post-operative X-ray revealed right diaphragm elevation at the end-inspiratory phase during spontaneous breathing (Fig. 1). Since there were no problems in emergence from anesthesia or in respiratory functions, such as blood gas data or respiratory pattern or tidal volume, extubation was attempted in the sitting position. There was also no respiratory disorder after extubation. Diaphragm elevation was improved the next day.

Post-operative transient phrenic nerve paralyse mainly occur after cardiac surgery due to direct injury or hypothermia, mainly on the left side, and can be caused after other surgery due to traction or compression caused by the patient’s position [1, 2]. Unilateral diaphragmatic paralysis in adults generally has minimal symptoms or no symptoms, but bilateral or unilateral diaphragmatic paralysis in children can cause serious medical problems [1, 3]. The cause in the patient described here is thought to be traction by the head position. Although extubation was performed in the sitting position because of the possibility of respiratory disorder caused by unilateral phrenic nerve paralysis with asthma, there was no problem in the respiratory system after extubation.

In the present case, a post-operative X-ray, which was taken because the patient had asthma, revealed, by chance, transient phrenic nerve paralysis. However, X-rays are not standard procedures following CEA in many institutions.

Presented at the Annual Meeting of the Japan Society for Clinical Anesthesia, Osaka, October 24, 2004.

T. Kunisawa
Surgical Operation Department,
Asahikawa Medical College Hospital,
Asahikawa, Hokkaido, Japan

S. Hanada
Department of Anesthesiology,
Maimonides Medical Center, 4802 Tenth Avenue,
Brooklyn, NY 11219, USA

S. Takeuchi
Department of Radiology, Yoshida Hospital, 4-East4-1-2,
Asahikawa, Hokkaido 0700054, Japan

T. Kunisawa (✉) · H. Iwasaki
Department of Anesthesiology and Critical Care Medicine,
Asahikawa Medical College, 2-1-1 Midorigaoka-higashi,
Asahikawa, Hokkaido 0788510, Japan
e-mail: taka.kunisawa@nifty.ne.jp



Fig. 1 Post-surgery X-ray. Right diaphragm is elevated at the end-inspiratory phase under spontaneous breathing

In our case, the transient phrenic nerve paralysis would have not been detected if an X-ray had not been taken. The incidence of transient phrenic nerve paralysis without

clinical problems after CEA may be higher than has been thought. If patients have severe lung complications, such as impaired respiratory function or at the status after contralateral pneumonectomy, we may need to pay attention to the respiratory condition at extubation after CEA.

Acknowledgments Financial support was provided solely from institutional and/or departmental sources.

References

1. Sharma AD, Parmley CL, Sreeram G, Grocott HP. Peripheral nerve injuries during cardiac surgery: risk factors, diagnosis, prognosis, and prevention. *Anesth Analg*. 2000;91:1358–69.
2. Wakeno M, Sakamoto S, Asai T, Hirose T, Shingu K. A case of diaphragmatic paralysis in a patient with diabetes mellitus after surgery in prolonged prone position (in Japanese with English abstract). *Masui (Jpn J Anesthesiol)*. 2001;50:1019–21.
3. Joho-Arreola AL, Bauersfeld U, Stauffer UG, Baenziger O, Bernet V. Incidence and treatment of diaphragmatic paralysis after cardiac surgery in children. *Eur J Cardiothorac Surg*. 2005;27:53–7.