Interscalene block as a precipitant of respiratory dysfunction

Introduction

This article presents a patient without known respiratory pathology who underwent an interscalene block for a routine shoulder operation and subsequently developed acute respiratory distress. Phrenic nerve block caused temporary diaphragmatic paralysis and unmasked some otherwise asymptomatic respiratory disease.

Discussion

Interscalene blocks are used in upper arm surgery to anaesthetize both the brachial and cervical plexus. In one study phrenic nerve dysfunction occurred in 100% of patients (Urmey, 1992), so this procedure may not be tolerated in patients with reduced pulmonary function who are dependent on intact diaphragmatic function.

In this case the interscalene block and subsequent phrenic nerve palsy revealed hitherto undiagnosed respiratory dysfunction, which had not been identified during the routine pre-anaesthetic review. It had been noted that the patient was obese and the restrictive lung function tests are likely to be the result of reduced chest wall compliance caused by excessive soft tissue on her chest wall. The combination of this and the diaphragmatic palsy led to her respiratory distress.

Obstructive sleep apnoea is an additional problem for the patient, but would not be relevant during the anaesthetic while the airway is protected, nor when the patient was awake and walking to the car. Clinicians should be aware of the possibility of obstructive sleep apnoea in patients with an increased body mass index as it is present in 40% of obese patients (Vgontzas et al, 1994).

Dr Nic Wennike *is Consultant and* **Dr Andrew Thompson** *is Consultant in the Department of Acute Medicine, Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust, Taunton, Somerset TA1 5DA*

Correspondence to: Dr N Wennike (Nic.wennike@tst.nhs.uk)

Conclusions

Physicians may be asked to review patients who develop postoperative respiratory complications and need to be aware that there is a significant risk of phrenic nerve palsy with interscalene blocks. The majority of patients are asymptomatic but in a proportion of patients phrenic nerve palsy may cause a decrease in respiratory function leading to the unmasking of previously undiagnosed respiratory conditions. BJHM

Urmey WF (1992) Hemidiaphragmatic paresis during interscalene brachial plexus block: effects on pulmonary function and chest wall mechanics. *Anesth Analg* **74**(3): 352–7

Vgontzas AN, Tan TL, Bixler EO, Martin LF, Shubert D, Kales A (1994) Sleep apnea and sleep disruption in obese patients. *Arch Intern Med* **154**: 1705–11

Figure 1. Chest X-ray on admission showing right phrenic nerve palsy.

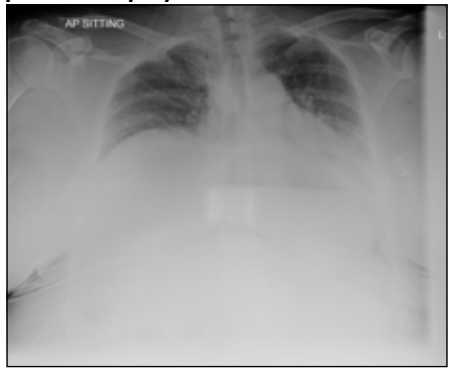
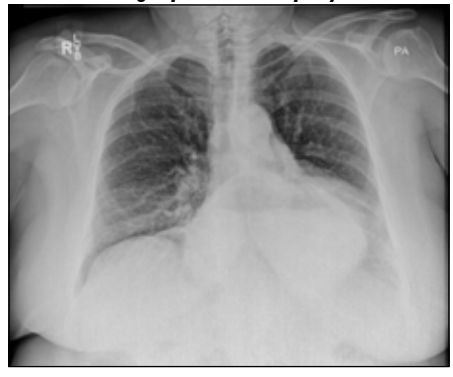


Figure 2. Chest X-ray after 24 hours showing resolution of right phrenic nerve palsy.



Case Report

A 66-year-old woman with no known respiratory disease was admitted to the medical assessment unit with acute onset of shortness of breath. She had undergone a general anaesthetic and interscalene block for a routine right shoulder arthroscopy, had been observed in recovery, and became acutely short of breath on walking to her car. She was referred by day case with a suspicion of a pneumothorax.

She was obese (body mass index = 41 kg/m^2), in respiratory distress with a respiratory rate of 30/min and saturations of 92% on air. On examination of the respiratory system there was dullness to percussion and decreased air entry at the right base. Cardiovascular examination revealed a tachycardia of 110 beats/minute in sinus rhythm and normal blood pressure (136/80 mmHg) with no right heart strain. The rest of the examination was normal. An arterial blood gas demonstrated type 2 respiratory failure, and a chest X-ray showed an elevated right hemidiaphragm suggestive of right phrenic nerve palsy and no evidence of a pneumothorax (*Figure 1*). She was commenced on non-invasive ventilation and made a full recovery. A repeat chest X-ray at 24 hours revealed resolution of the elevated hemidiaphragm (*Figure 2*) and normal diaphragmatic function was confirmed by thoracic fluoroscopy.

After recovery of the acute episode she underwent formal spirometry which demonstrated a restrictive pattern, and on further questioning she had symptoms of obstructive sleep apnoea (Epworth score =11) which was confirmed with overnight pulse oximetry.

LEARNING POINTS

- Interscalene block causes phrenic nerve palsy.
- Patients with asymptomatic or very mild respiratory disease may become symptomatic with temporary diaphragmatic paralysis.
- Treatment is supportive until paralysis wears off.