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Phrenic nerve paralysis induced by brachial plexus block

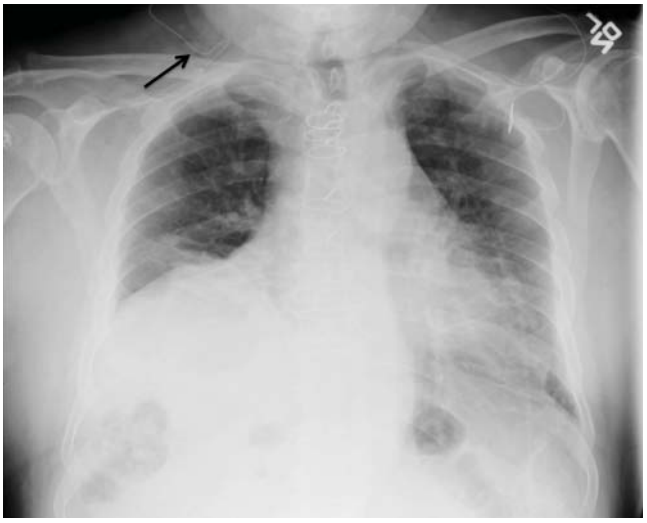

FIGURE 1. Chest radiography demonstrated an elevated right hemidiaphragm induced by brachial plexus block. The black arrow points to the catheter used to infuse ropivacaine.

FIGURE 2. A follow-up chest radiograph confirmed resolution of the elevated right hemidiaphragm.

A 72-YEAR-OLD MAN underwent elective ambulatory arthroscopic repair of the right shoulder rotator cuff. To manage postoperative pain, a supraclavicular catheter was placed for brachial plexus block, and he was sent home with a ropivacaine infusion pump.

The next day, he presented to the emergency department with right-sided chest pain and mild shortness of breath. He had normal vital signs and adequate oxygen saturation on room air. On physical examination, breath sounds were decreased at the right lung base, and chest radiography (**Figure 1**) revealed an isolated elevated right hemidiaphragm, a clear indication of phrenic nerve paralysis from local infiltration of the infusion.

The ropivacaine infusion was stopped, and the supraclavicular catheter was removed under anesthesia. He was admitted to the hospital for observation, and over the course of 8 to 12 hours his shortness of breath resolved, and his findings on lung examination normalized. Repeat chest radiography 24 hours after his emergency room presentation showed regular positioning of his diaphragm (**Figure 2**).

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RECOGNIZING AND MANAGING PHRENIC NERVE PARALYSIS

The scenario described here illustrates the importance of recognizing symptomatic phrenic nerve paralysis as a result of local infiltration of anesthetic from supraclavicular brachial plexus block. Regional anesthesia is commonly used for perioperative analgesia for minor shoulder surgeries. Because these blocks anesthetize the trunks formed by the C5–T1 nerve roots, infiltration of the anesthetic agent to the proximal nerve

roots resulting in phrenic nerve paralysis is a common complication.

Although phrenic nerve paralysis has been reported to some degree in nearly all patients, reports of significant shortness of breath and radiographic evidence of hemidiaphragm are few.[1–4] When it occurs, the analgesic regimen must be changed from regional anesthesia to oral or parenteral pain medications. Resolution of symptoms and radiographic abnormalities usually occurs spontaneously.

When available, an ultrasonographically guided approach for supraclavicular brachial plexus blocks is preferred over a blind approach and is associated with a higher success rate and a lower rate of complications.[5,6]

A potentially life-threatening complication of brachial plexus block is pneumothorax.

Contraindications to brachial plexus block include severe lung disease and previous surgery or interventions with the potential for phrenic nerve injury that could result in bilateral paralysis of the diaphragm. Ultimately, preprocedural chest radiography in selected patients at high risk should be considered to mitigate this risk.

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