474542 - DIAPHRAGM PARALYSIS & PNEUMOTHORAX AFTER US-GUIDED SUPRACLAVICULAR BLOCK

Douglas Chan, MD, Ban Tsui, MD, MSc, FRCPC

Anesthesiology & Pain Medicine, University of Alberta, Edmonton, AB, Canada

Introduction: Supraclavicular brachial plexus blocks may have risk of complications of pneumothorax (1) and diaphragmatic paralysis (2,3). We have been using ultrasound imaging to perform measurements related to the presence of hemidiaphragm paralysis and pneumothorax during performance of ultrasound and nerve stimulation-guided supraclavicular blocks (UNSGSB) for upper extremity surgery. This study was a retrospective database review to assess the postoperative incidence of diaphragmatic paralysis and pneumothorax from these blocks.

Methods: After REB approval, we reviewed medical records from patients (ASA I or II) who received chest ultrasounds before UNSGSB initiation (pre-block) and prior to discharge (post-op) over a one-month period. Patients were free from significant pulmonary disease and none required conversion to general anesthesia. Ultrasound guidance of the block was performed using in-plane needling to a small footprint curved probe, while chest imaging was performed using a longitudinally-placed large curved probe (8-5MHz C11e and 5-2MHz C60e respectively; MicroMaxx, Sonosite, Inc., Bothell, WA). Procedural sedation was administered after pre-block chest imaging. Patients received 20ml-40ml of 1.5% lidocaine with 0.125% bupivacaine for the nerve block. Under real-time ultrasonography, excursions of the cephalad border of the zone of apposition (Zap) between the diaphragm and rib cage were measured between the anterior mid-clavicular and mid-axillary lines (4). Bilateral excursions were recorded at functional residual capacity and during each of normal tidal volume, inspiratory capacity and forceful sniff. Complete, partial and absence of ipsilateral paralysis were defined as reduced diaphragmatic movement during forceful sniff of > 75%, 25-75% and < 25%, respectively, when compared to post-op contralateral excursions. Pneumothorax was defined by the absence of lung sliding as viewed at the anterior chest wall postoperatively.(5) Proportions or mean $\pm$ SD represent data and t-tests ($P < 0.05$) were performed to compare data between patients with and without paralysis.

Results: Twenty-two patient charts were reviewed. The postoperative incidences of partial (n=2) and complete (n=2) hemidiaphragm paralysis were 9.1% and 9.1% respectively. No patient was symptomatic. Patients with paralysis received more local anesthetic (0.43 ± 0.08 vs 0.33 ± 0.09 mL/kg, $P = 0.041$). The overall local anesthetic volume used was 26.9 ± 7.7 mL. The time between block initiation and post-op imaging was similar for all patients (93.8 ± 13.8 min for those with paralysis versus 112.7 ± 22 min for those without, $P = 0.119$). Lung sliding was seen in all patients.

Discussion: No pneumothorax was detected in this study. The rates of postoperative diaphragmatic paralysis were minimized and appeared to be associated with larger volumes of local anesthetic injected.

References: 1) Anesthesiology 1961;22:226-9, 2) Anesthesiology 1949;10:627-8, 3) Anaesthesia 2001;56:352-6, 4) Anesth Analg 1991;72:498-503, 5) J Trauma

2001;50:201-5