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Incidence and clinical course of pneumothorax after supraclavicular brachial plexus block

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Introduction: The supraclavicular approach to brachial plexus block is highly practical and efficacious in achieving anesthesia of the arm, forearm, and hand. However, the main drawback of this technique is the potential risk of pneumothorax with incidence reported as high as 6.1% (1,2). In this study we sought to determine the incidence and clinical sequelae of pneumothorax associated with the supraclavicular brachial plexus block in a large cohort of patients.

Methods: The study included 12,556 patients who underwent upper extremity surgery under supraclavicular brachial plexus block between January 1985 and December 1998 at the Hospital del Trabajador, Santiago. A paresthesia technique according to Winnie with a 21-gauge 1½ inch needle was used for all blocks. Detailed chart review and clinical course was studied in all patients who were diagnosed with pneumothorax after supraclavicular brachial plexus block. Patient demographics, experience of the anaesthesiologists with this technique, presenting signs and symptoms, clinical course and treatment were described.

Results: Pneumothorax occurred in 36 patients (0.29%). Mean age of these patients was 33 years (range 14 to 52 years), 29 men and 7 women. Fifteen patients had undergone an emergency surgery, and 21 had an elective surgery of the upper extremity. All patients presenting with pneumothorax had mesomorphic body habitus. In 25 cases (69%) the anaesthesiologist had less than five years experience with the technique. Latency to clinical presentation ranged from 30 minutes to 72 hours (mean 5 hours). The most common signs and symptoms were chest pain, pleuritic pain, and decreased breath sounds. On the chest x-ray, magnitude of the pneumothorax ranged from minimum to massive. Fourteen patients (39%) required insertion of a chest tube, 22 (61%) were managed conservatively. Complete radiological resolution occurred in all patients between 6 and 24 days without permanent sequelae in any patient.

Discussion: The incidence of pneumothorax following the supraclavicular approach to brachial plexus block was 0.29% in this series. More than a third of the patients with this complication required insertion of a chest tube. The consequences and potential for insidious and delayed onset of pneumothorax observed in our study raise serious questions regarding the use of the supraclavicular brachial plexus block in outpatient surgery. Similarly, we believe that this block should not be used in conjunction with general anesthesia because of the implications of positive pressure ventilation in patients who may develop a pneumothorax. Future studies should focus on anatomical variables and alternative methods to localize the plexus during blockade (e.g., nerve stimulators, ultrasound) in order to increase the safety profile of this otherwise very useful anesthetic technique.

References

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