Patient Safety: Needle EMG and the Risk of Pneumothorax

From the AANEM Quality and Patient Safety Committee

Certain indications for electrodiagnostic studies require needle EMG of muscles around and overlying the thorax. This is especially the case for the evaluation of scapular winging, shoulder weakness, and neuromuscular etiologies of dyspnea. Examples of muscles that might require needle examination include serratus anterior, rhomboids, paraspinals, or the diaphragm. Given the location of these muscles, there is a theoretical risk of pneumothorax from needle EMG.

Question: For patients in whom the needle EMG requires sampling of muscles in close proximity to the thorax, which of the following muscles poses the highest risk of iatrogenic pneumothorax?

A. Diaphragm
B. Serratus anterior
C. Thoracic paraspinals
D. Rhomboid major

Answer: B) serratus anterior

Explanation: Pneumothorax is a rare complication of needle EMG, with a frequency of approximately 0.1- 0.2% when studying high risk muscles, although data is very limited. The risk of iatrogenic pneumothorax after needle EMG is highly dependent on the muscle sampled and the technique utilized. In the largest study on this topic, 7 pneumothoraxes attributed to needle examination were identified over 71,782 needle examinations. Symptomatic pneumothoraxes usually present immediately or within 24 hours of EMG with pleuritic chest pain or shortness of breath. Almost all improve spontaneously with conservative management. The serratus anterior poses the highest risk, given its location over the thorax, with smaller risks associated with needle examination of the diaphragm, trapezius, rhomboids, supraspinatus, infraspinatus and paraspinals. Ultrasound-guided needle placement may be useful in diaphragmatic EMG. If high risk muscles are studied, patients should be informed of this potential risk, and symptoms to watch for after EMG.

Sources:

Kassardjian CD, O'gorman CM, Sorenson EJ. The risk of iatrogenic pneumothorax after electromyography. *Muscle Nerve*. 2016;53(4):518-521. doi:10.1002/mus.24883

Al-Shekhlee A, Shapiro BE, Preston DC. Iatrogenic complications and risks of nerve conduction studies and needle electromyography. *Muscle Nerve*. 2003;27(5):517-526. doi:10.1002/mus.10315

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