Electrophysiological studies

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Who does LEMG?

• ENT + Neurophysiologist, neurologist

Dr Martínez
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EMG Technique

• Sitting up or supine position
• Anesthesia. No sedacion
• Muscles to test:
  – Cricothyroid
  – Tyroarythenoid
  – Posterior Cricoarythenoid
  – Lateral Cricoarythenoid
  – Interarythenoid
Transcutaneous

• Guided by:
  – **Palpation** (cricothyroid membrane)
  – **Acoustic** (air, muscle, fibrillations, positive sharp waves, MUAP, recruitment)
  – **Visual EMG feedback**
Sounds

Air sound

Fibrillation sound

Fibrilations

Positive waves. High frec descharges
Emg with fibroscopic control
Muscles

- TA
- CT
- LCA
- PCA
- IA
TA muscle
**Technique:**

Insert needle midline, 30⁰ lat and 15⁰ superiorly
Pierce on cricoid, 45⁰ under thyroid

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TA muscle

• Technique:
  – Insert needle midline, 30º lat and 15º superiorly
  – Pierce on cricoid, 45º under thyroid.

• Agonist actions:
  – /i/ sustained
  – Holding breath by glottic stop
  – Swallowing (brief activation)
  – Expiration

• Antagonist actions
  – Forcefull sniffing
  – Inspiration
Different approaches to the TA

Current Practice in Injection Augmentation of the Vocal Folds: Indications, Treatment Principles, Techniques, and Complications

Lucian Sulea, MD; Clark A. Rosen, MD; Gregory N. Postma, MD; Blake Simpson, MD; Milan Amin, MD; Mark Courcy, MD; Albert Merati, MD
TA ins/expiration, swallow, valsalva
LCA mucle

- **Technique:** enter CT membrane, 10° superiorly, angulate 30° laterally. Deeper and lower than TA
- **Action:** /i/ short inicial burst and decreases after
PCA muscle

- **Technique:**
  - Through cricothyroid membrane, sagittal, 5-10mm off midline, glottic lumen, and 15° lateral. Young women
  - Rotate larynx, inside thyroid lamina posteriorly

- **Action:** deep inspiration

- **Confirmation:** not swallowing or /i/
PCA muscle
PCA muscle
CT muscle

- **Technique:** pierce on cricothyroid notch, 5mm off midline, angle 50º laterally and 15º superiorly. Enter 15-20mm
- **Confirmation:** elevate or lateralize head
- **Action:** glissando
CT muscle
CT actions
Neck MUAP
IA muscle

- **Technique:** Through membrane, glottic lumen, 12° down and central
- **Acción:** /i/
- **Confirmation:** not sniffing, not swallowing
IA muscle
Neurophysiological studies

• Tests muscle and nerve function

• When?
  – Movement problems

• What for? Differential diagnosis:
  – Nerve: central or peripheral
  – Muscle
  – Neuromuscular synapses
  – Cricoarytenoid joint problem

• Consider with caution

2. EMG. Registers electric activity in the muscle
   1. Neurogen or myogen damage
   2. If neurogen: active or chronic damage

3. Neuromuscular transmission
Neurophysiologic study

1. **Electroneurogram.** Measures the speed of the nerve. Myeline or axón damage

2. **EMG.** Registers activity in the muscle
   1. Insertional
   2. **Spontaneous:** active nerve damage: Fibrilation, positive waves
   3. **Volitional**
      1. MUP: normal, big, polyphasic
      2. Maximum effort

3. **Repetitive stimulation:** Neuromuscular transmission
EMG. Volitional activity. MUAP

- Check: MUAP duration.
- **Normal**: mean duration for the specific muscle in an specific age group
- **Big**: Chronic axonal process. The non impaired axon recruits other muscle fibers (synkinesis). Chronic reinervation: good prognosis
  - Polyphasic potential: beginning of reinnervation
- **Small**: myopathic
  - Polyphasic potential
Conclusion and key points

• Neurolaryngologic examination is vital to discover subtle movement disorders
• LEMG is important in the DDiag of movement disorders
  – Nerve (central or peripheral)
  – Muscle
  – Neuromuscular union
  – Cricoarythenoid fixation
Conclusions II

• Helps in prognosis
  – Better if myelin problem than axonal
  – Reinervation signs (MUP polyphasic and big)

• EMG: after the 3th week

• ENG: after the 5-7 day

• Useful for botulin toxin

• Be cautious interpreting
  – Difficult to find the exact muscle
Conclusions III

• If no organic lesion is found in dysphonia, perform LEMG
• Dysphonia can be the 1st sign in neuronal and muscular disorders
• Need of a multidisciplinary team
Thank you
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