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Focal botulinum toxin injections lead to rapid resolution of myogenic artifact during EEG monitoring

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Case summary

A 40 year old man was admitted to the EEG monitoring unit for localization of epileptic focus and changes in medication regimen. The patient had undergone left frontal lobe resection during childhood for unknown pathology (Fig.1 A). Subsequently he developed secondary epilepsy characterized by nocturnal complex partial seizures with occasional secondary generalization. During the first two days of monitoring, a persistent myogenic artifact was seen localized to the T3 EEG electrode (Fig. 1 C). The artifact prevented localization of the patient's clinical seizure during monitoring. We attributed the artifact to excessive muscle activity, as electrode lead replacement and repositioning did not resolve the artifact. The persistent muscle activity in the left temporalis was likely due to surgical-induced muscle damage (Fig.1 B). On the third monitoring day, a total of 80 units of botulinum toxin type A (BTX-A) were injected in the temporalis muscle, at four locations around the T3 electrode. The artifact disappeared completely within three days, demonstrating F7 interictal discharges (Fig.1 D) and the focal onset of ictal activity at F7-T3 (Fig. 1 E). No BTX-A-related side effects were reported by the patient.

Comment

Myogenic artifact is a common finding which may interfere with the correct interpretation of EEG monitoring data. Previous reports have shown efficacy of prophylactic BTX-A injections in multiple locations along frontalis and temporalis muscles a couple weeks prior to EEG monitoring (1, 2). Injections had a clear impact on the identification of the epileptic focus in these reports and were associated with minimal side effects. Our case demonstrates that targeted BTX-A injections can have a more rapid effect on muscle activity than previously reported. In select cases, this procedure could thus be utilized in an ad hoc manner to assist in seizure focus localization after the patient is admitted for EEG monitoring.

References

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Fig. 1. MRI findings (A, B) and EEG recordings (70 Hz high frequency filter) before (C) and after (D, E) Botulinum

A. Axial FLAIR MRI image showing the left frontal post surgical brain defect. B. Coronal T1 with gadolinium MRI image showing the intact temporalis muscle in the T4 electrode region on the right and the damaged muscle on the left, in the T3 electrode area (arrows). C. Myogenic artifact at T3 obscuring possible interictal discharges (arrows). The inset depicts a compressed EEG tracing (80 seconds) showing the artifact's persistence and variable frequency. D. Interictal discharges at F7, clearly seen in the absence of the myogenic artifact. E. Ictal pattern with F7-T3 onset, which would have been obscured by the T3 artifact.