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Specter in the Crucible: Electroconvulsive lysis of treatment-resistant Malignant Catatonia in a patient with cochlear implant.

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Background

Malignant catatonia (MC) is a neuropsychiatric emergency characterized by catatonia, hyperpyrexia and autonomic instability. Cases that are refractory or partially responsive to benzodiazepines require electroconvulsive therapy (ECT) for definitive treatment. The Food and Drug Administration and device manufacturers consider a cochlear implant a contraindication for ECT. (McRackan, 2014). There remains a dearth of literature to guide safe and effective use of ECT in patients with cochlear implants.

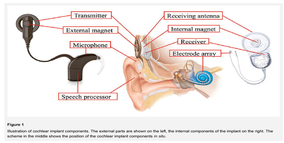


Figure 1. Illustration of cochlear implant components. The external parts are shown on the left, the internal components of the implant on the right. The scheme in the middle shows the position of the cochlear implant components in situ.

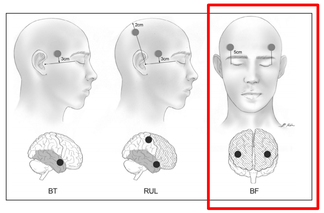
Case Summary

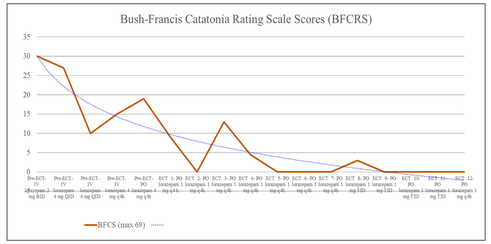
We present the case of a 19-year-old female, with congenital bilateral deafness, and right cochlear implant since age 2, presenting new onset epilepsy and combativeness. The patient's mother reported that the device had not been used since early childhood. The patient experienced sub-acute onset of depressive symptoms with precipitous functional decline. After seizures were stabilized with multiple antiepileptics, she developed delirious mania with florid catatonic excitement. Extensive workup revealed EEG abnormalities, but all CSF assays for autoimmune encephalitis were negative. Imaging studies were limited due to the implant presence and thus only CT imaging was available. She developed MC and only partially responded to lorazepam up to 24 mg/d. The patient became overly sedated with lorazepam 26 mg/d. ECT was pursued as an emergency treatment due to dysatonomia. In order to maximize the distance between the implant and the electrodes, a bifrontal electrode placement was selected and it yielded complete lysis of catatonic and mood symptoms. Our case further supports the safety and efficacy of ECT in this patient population. We also propose clinical pearls for navigating the challenges of catatonia assessment in patients with deafness.

Results

The patient was emergently treated with ECT for malignant catatonia. She received bifrontal ECT at maximum settings (pulse width [PW] 1 msec, frequency. 60 hz, duration 6 sec, current: 800 mA) 3 times per week. The treatment resulted in gradual improvement of symptoms and by treatment #8 catatonia resolved, and ECT was tapered to once per week with sustained remission. Interestingly, By treatment #11, the patient began using the implant and by treatment #12 she transitioned to once-monthly maintenance treatment. Bush-Francis Catatonia Rating Scale scores were not available during some assessments due to assessment limitations as ECT was is performed at an external facility.

Figure 2. Illustration of the three primary electrode placement sites. Our electrode selection is highlighted.





Graph 1. Trending of Bush-Francis Catatonia Rating Scale scores during treatment and ECT device settings

**Missing BFCS scores were from dates that patient received treatment and BCFS was not tracked. Last data point on ECT #8, when complete resolution of symptoms was reported. .

Discussion

This case presented many challenges including diagnostic complexity, progressively deteriorating clinical condition, limited head imaging due to the cochlear implant, communication/language barrier and ultimately the logistics pertaining to ECT treatment in Texas (administrative and legal).

Challenge	Intervention	Outcome
Cochlear implant precludes MRI	Obtained head CT scan,	Limited quality imaging but ruled out intracranial mass.
Over-sedation with high-dose benzodiazepine	Decreased dose to last effective dose	Plateau of BFCRS scores
Bilateral deafness	ASL translator	Improved communication flow with patient
Interpreter variability in commands for BFCRS.	Pre-assessment trial with interpreter to ensure instructions remain constant with different interpreters	Improved consistency of patient responses and actions in BFCRS assessments.
Difficulty conveying instruction to patient for BFCRS due to need for translation	Modification of tasks domains assessed to include only those that were consistently translated similarly by interpreters and observable features	We were able the response to treatment in objective findings that were not prone to modification by a loss in translation of the instruction.
State-dependent ECT laws and regulations	Extensive discussion with family and treatment team, patient's condition closely monitored and once it was deemed a life-threatening condition due to autonomic instability, ECT was pursued on an emergency basis.	Patient's condition rapidly improved with only a few treatment.
Cochlear implant reported as a contraindication for ECT	Extensive literature review with only a limited number of cases available. ECT was deemed a safe intervention in this population without any damage to the devices. Bifrontal ECT was selected for maximum distance from the device and bilateral stimulation due to severity of symptoms.	Pursued ECT successfully and the patient was now able to comfortably use the cochlear implant when she had not used it since early childhood due to pain/discomfort.

Conclusion

ECT is a safe treatment for malignant catatonia. Treatment parameters can be modified to mitigate theoretical risks. For cochlear implants, bifrontal electrode placement can safely yield adequate treatment response and preserve device functionality. Catatonia assessment through use of an American Sign Language translator (ASL) can complicate detection and appraisal of catatonic symptoms. Pragmatic strategies can minimize these complications.

Results

Jiam NT, Li D, Kramer K, Limb CJ. Preserved Cochlear Implant Function After Multiple Electroconvulsive Therapy Treatments. Laryngoscope. 2020 Nov 30. Epub ahead of print. PMID: 33252138.

McRackan TR, Rivas A, Hedley-Williams A, Raj V, Dietrich MS, Clark NK, Labadie RF. Impedance testing on cochlear implants after electroconvulsive therapy. J ECT. 2014 Dec;30(4):303-8. PMID: 24755726.