

ECT in Special Populations

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Conflicts and Disclosures

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Purpose:

To examine the use of ECT in special populations with an emphasis in patients with physical or medical conditions in medical settings.

Pregnancy

Catatonia due to Autoimmune Encephalitis

Electroconvulsive Therapy (ECT)

80+ years of clinical practice

Numerous improvements over the years in:

- Indications
- Clinical approach
- Technique (anesthesia, muscle relaxation, placement)
- Devices, electrical stimulus

ECT

Unsurpassed efficacy and safety in the treatment of severe mental conditions.

Estimated that more than 1,000,000 patients receive ECT annually worldwide

APA guidelines

Focus on **clinical need** rather than diagnosis.

Need for fast response (suicidality, agitation, medical conditions such as catatonia, neuroleptic malignant syndrome)

Lack of response to other treatment modalities

Patient preference

ECT

One of the shortest procedures performed under general anesthesia

5-15 minutes under general anesthesia

ECT

One of the safest procedures performed under general anesthesia

Mortality <2 in 100,000 procedures
(compare to colonoscopy : 4 in 100,000)

ECT in Pregnancy

Considered:

In acute cases (catatonia, agitation, suicidality)

Risk of relapse – maintenance

When pharmacotherapy is contraindicated

ECT in Pregnancy

Electrical stimulus does not radiate beyond the head

No direct effect on the fetus

No significant changes on fetal heart rate or uterine tone

No teratogenic effects with commonly used anesthetics

ECT and Pregnancy

Physiological changes of consideration:

Increased abdominal volume over time

Loosening of esophageal sphincter due to increased progesterone

Parasympathetic surge during stimulus resulting in gastric contraction

ECT and Pregnancy

American Society of Anesthesiology
considers pregnancy beyond week 12 as
“full stomach”

This requires intubation to avoid aspiration

Frequent intubations carry considerable
risks

ECT in Pregnancy

Physiological changes of consideration:

Adrenergic (sympathetic) surge during seizure with tachycardia and hypertension

Caution with patients prone to eclampsia

ECT and Pregnancy

Obtain obstetric consultation

Monitor fetal heart rate before and after ECT in high-risk pregnancies

Try to limit the number of treatments and intubations

Catatonia due to Autoimmune encephalitis

Review of recent experience

Review

- First case report on “neuropsychiatric lupus with catatonia” treated with ECT. (G L Fricchione, L D Kaufman, B L Gruber, M Fink, Am J Med, Apr 1990)
- Impetus to study catatonia in a general hospital

Review

- Catatonic Disorder due to General medical Conditions

BT Carroll et al, J Neuropsychiatry Clin Neurosci 1994

- 471 cases

- 177, phencyclidine

- 80, structural CNS damage

- 67, encephalitis or other CNS infection

- 25, seizures

- 21, metabolic disturbances

Review

- “Catatonia rating scale and standardized evaluation”

Bush G, Fink M, Petrides G, Dowling F, Francis A. Acta Psychiatr Scand
1996 93: 129-136

- Quantification of symptoms –increase in catatonia studies
- Recognition of catatonia in conditions other than schizophrenia

Antibody mediated Encephalitis

- Voltage Gated Potassium Channel complex (LGI1, CASPR2, contactin-2) 2001, 2010
- N-Methyl-D-aspartate receptor (NMDA) 2008
- AMPA receptor 2009
- GABA-B 2010 • mGluR5 2011
- Glycine receptor 2012
- D2 receptor 2013
- DPPX 2013
- Glycine receptor 2014
- IgLON5 2014
- GABA-A receptor 2015
- Neurexin-3-alpha 2016

Anti-NMDA Receptor Encephalitis

- Decreased level of consciousness and catatonic-like state in 88%(Dalmau 2008)
- Psychiatric Phenotype (Warren 2018, Sarkis 2019)
 - Agitation 56-59%
 - Psychosis 46-54%
 - Catatonia 33-42%

Case 1

18 y/o Indian male with no known medical or psychiatric history, presenting nonverbal with odd pacing behavior, admitted for altered mental status

- Left India 3 months ago without telling anyone
- Lived in Mexico for 2 months. Crossed border illegally.
- Detained at ICE Detention center for 2 weeks. Had a copy of passport and a relative's phone number in pocket.
- Family friends flew patient from California to NY.
- He has remained nonverbal for a reported 5 weeks

Case 1

After arrival to New York:

- Mute
- Refused to speak but responded with nods.
- Refused food most times.
- When ate, he chewed his food for a long time, refused to swallow and would start vomiting.
- Had thrown up on most days for the last one week.
- Episodes of urinary and fecal incontinence.

Initial Psychiatric Evaluation:

18 yo Indian male who appears significantly younger than stated age. At times appears “childish, scared”

- Lying in bed with eyes closed, arousable only to tactile stimulation.
- Staring
- Unresponsive to questions
- Posturing
- Echopraxia
- Gesturing as if throwing something in garbage.
- Unable to eat, found to be crying and pacing the hallway after hours,
- HR oscillating between 98-107.

Clinical picture fluctuating within the day.

Case 1 (Continued)

- Medical evaluation at ICE detention center: “Speech Disability, Neurodevelopmental delay”
- Evaluated and discharged from 2 Emergency rooms after normal neuroimaging--once in California and once in New York.
- The family friends did not know the patient very well – no reliable history

Differential Diagnosis

Acute Stress Disorder
Brief Psychotic Reaction

Adjustment disorder with
mixed anxiety and depression
Autism Spectrum Disorder/
Intellectual disability with
affective illness

Conversion Disorder

Victim of
Human Trafficking/Sexual or
Physical abuse

Encephalitis:
Viral
Limbic
Metabolic
Anti-NMDA

Infection:
(including parasitic infection)

Hyperthyroidism

Stroke/ TBI

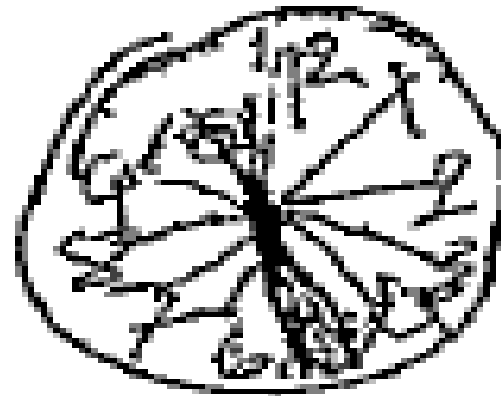
Case 1 (Course of Illness)

- Day 3:
- Became tachycardic (136) with a fever of 102.9, infectious work up negative
- Continued to be restless each night, pacing and crying.
- Neurology reconsulted.

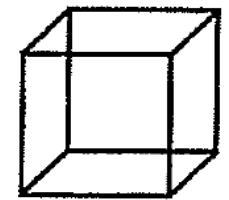
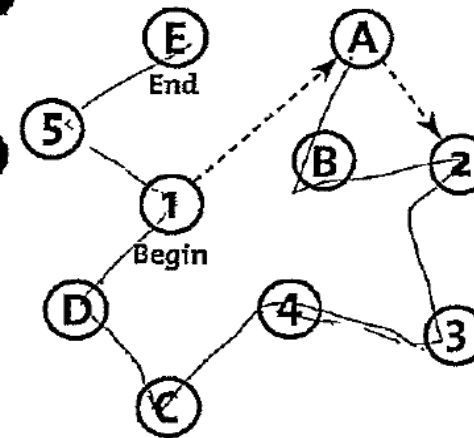
Case 1 (Further workup)

- Continued to have poor PO intake, Rapid response called for ↓ SBP and ↑HR
- 5 days after admission, **C-reactive protein** had trended up from <5 to 112.4 along with Haptoglobin was 288 (normal: 34-200). CRP then decreased to 8.4.
- Full body CT Scan: negative, Ultrasound Testicles: negative
- **MRI: Parenchymal volume loss out of proportion to the patient's age is seen.** Developmental venous anomaly in left cerebellar region.
- **EEG:** Abnormal with generalized background slowing semirhythmic theta and delta indicating moderate diffuse cerebral dysfunction. EEG overall reminiscent of **delta brush pattern** observed with NMDAR encephalitis, though somewhat less rhythmic than is typical.
- **LP:** Preliminary results negative
- Neurology empirically began treatment for Anti-NMDA receptor encephalitis with methylprednisolone and IVIG

*At the time of
ECT consult*



VISUOSPATIAL / EXECUTIVE



Copy
cube



Case 1 (ECT Course)

- After completing trial of 5 days of IVIg and Steroids, patient's status remained relatively unchanged
- An acute course of Bitemporal ECT was started.
- Some transient improvement was noted after the first treatment, but was short lived (smiling, waving, more alert, making active efforts to answer the questions).

After 5 ECTs Treatments

- The speech continued to have apraxia. Occasionally gave relevant answers, which were more intelligible, but for most part the speech could not be understood.

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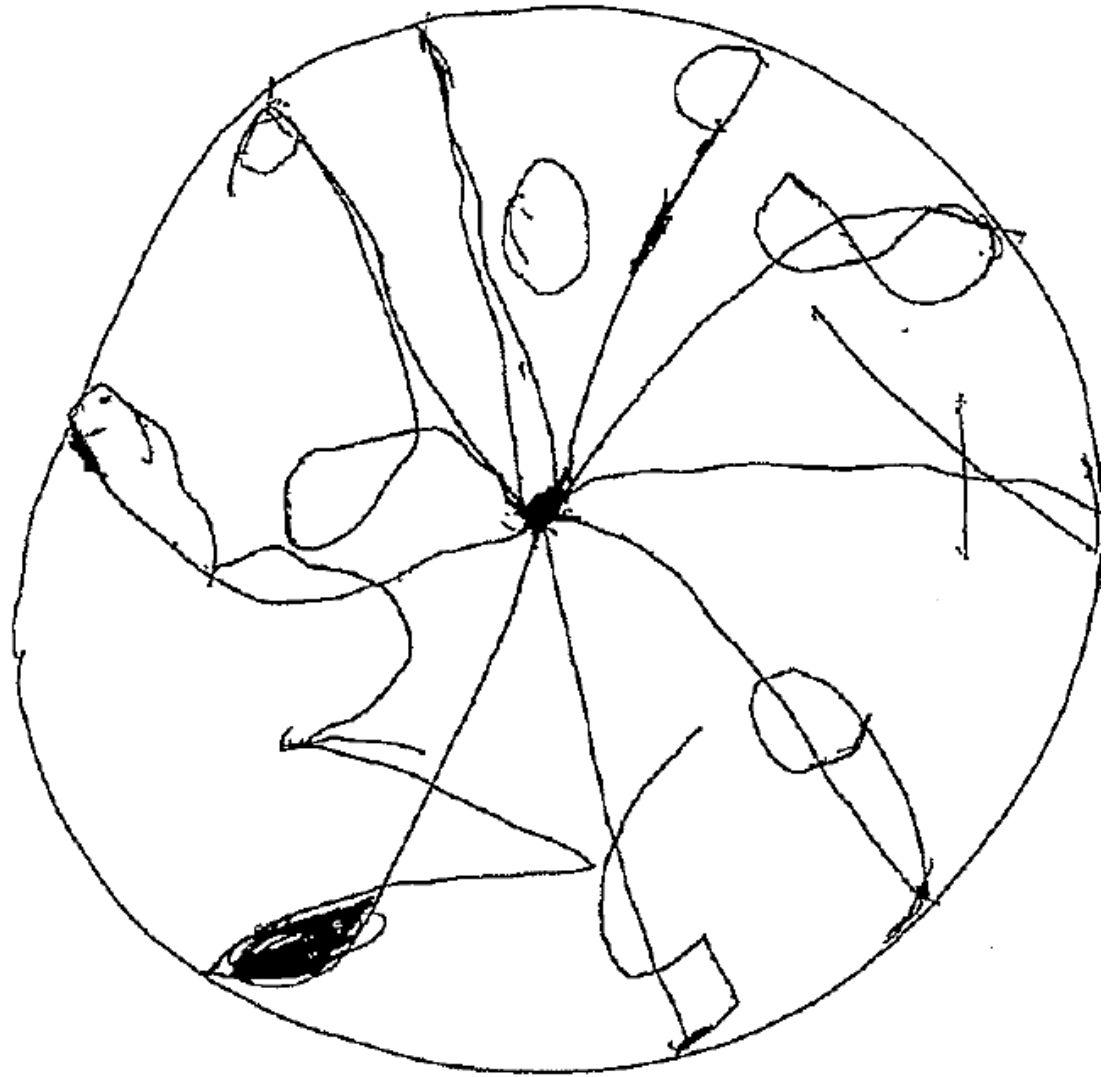
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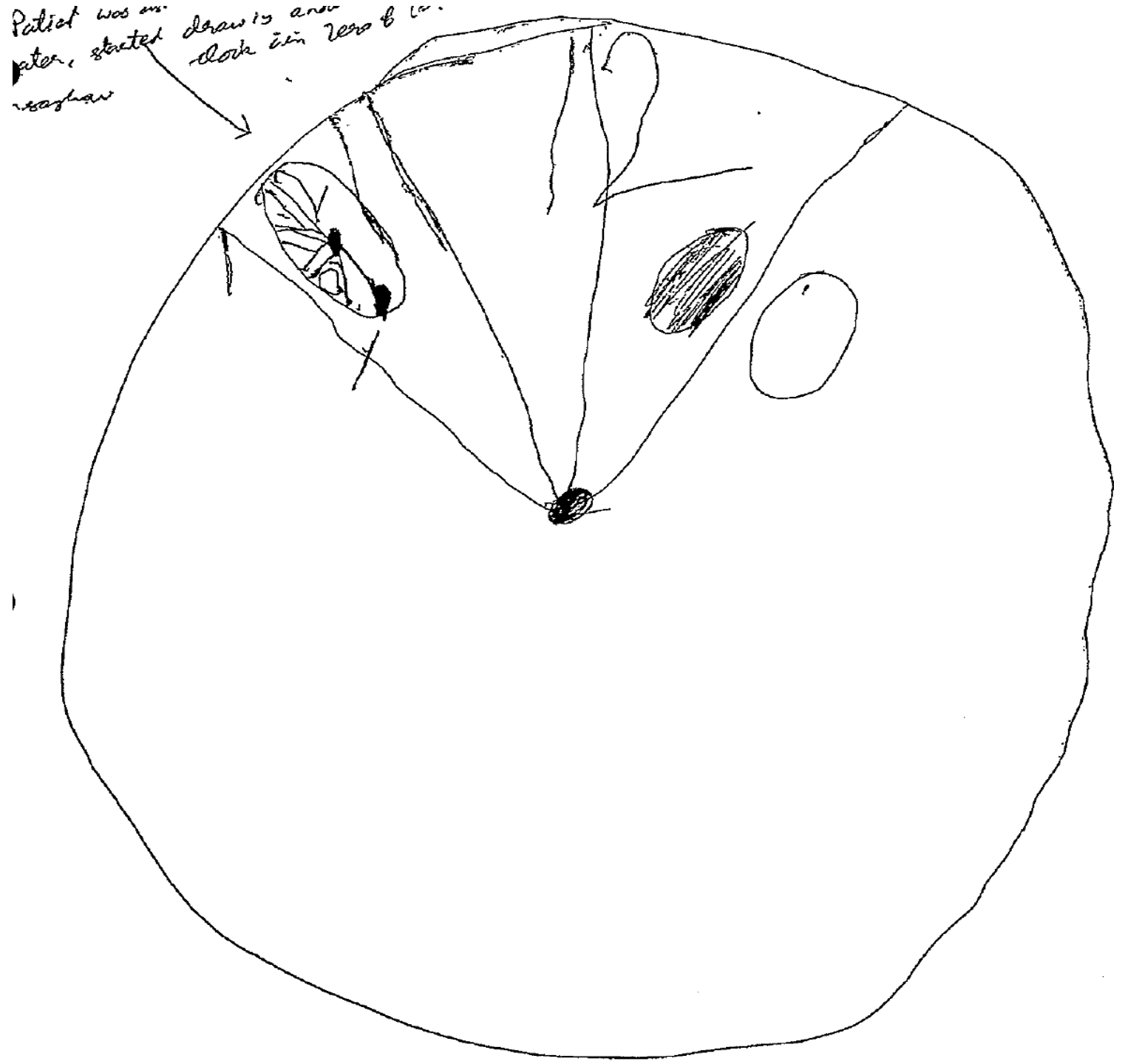
After 17 ECTs Treatments

- 1st Attempt at drawing the clock
- Continued to show improvement.
- Continued to have apraxia of speech, but better than before.
- Exhibited some delusional misidentification syndrome



After 17 ECTs

- 2nd attempt at clock drawing test
- Perseveration
- Continues to have difficulty in shifting the sets.

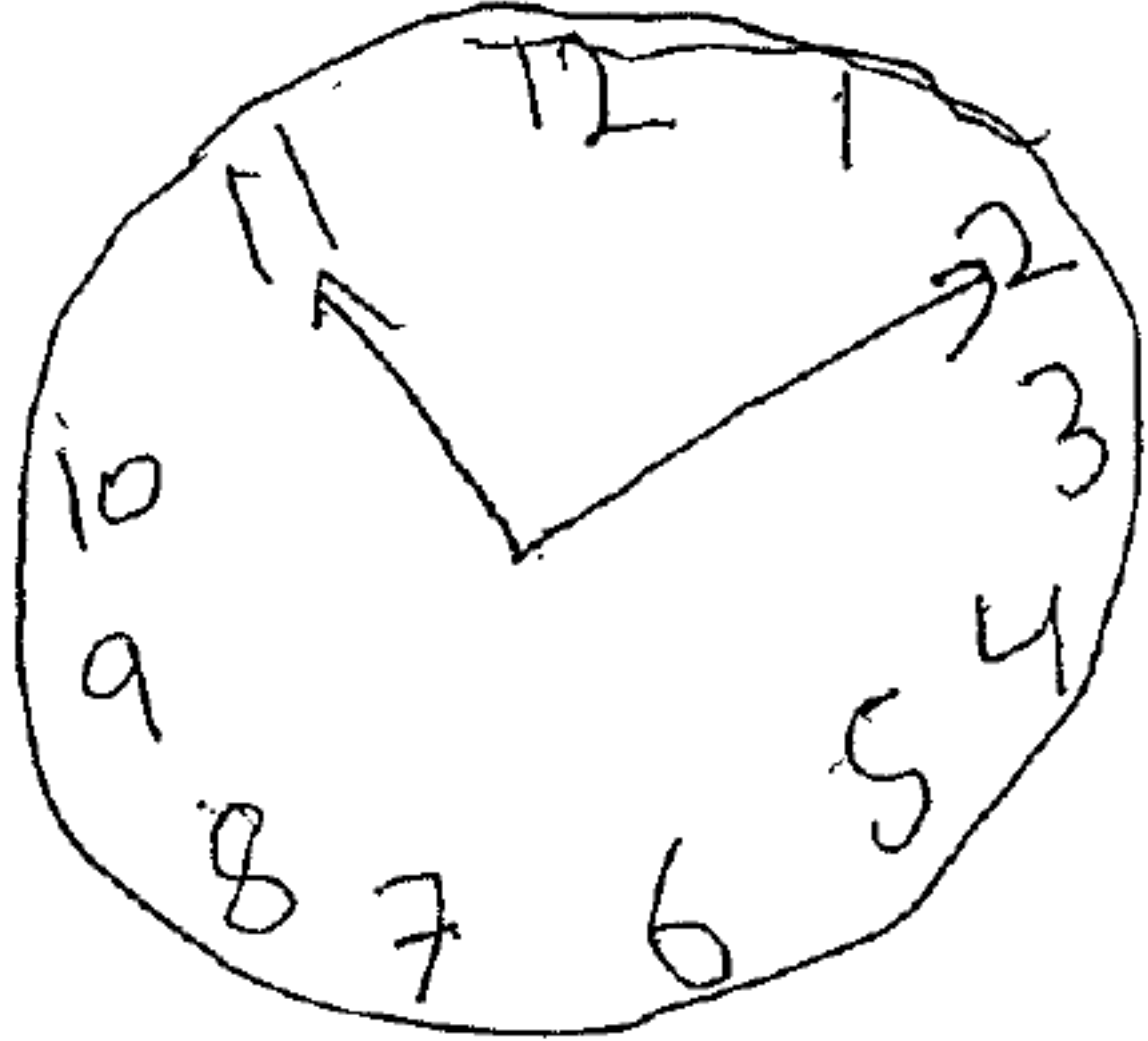


Case 1 (Continued)

- 2.5 months after the original presentation: Repeat CSF Paraneoplastic panel: **GAD65 Antibody positive (0.23)**
- (This profile is consistent with predisposition to thyrogastric disorders, including thyroiditis, pernicious anemia, and type 1 diabetes, but has low specificity for neurological autoimmunity. GAD65 antibody values less than 2.00 nmol/L have a lower positive predictive value for neurological autoimmunity than values of 20.0 nmol/L and higher)
- Monthly IVIg and Steroids were continued for 2 more cycles. IVIg alone subsequently. (total 4 rounds of monthly ivlg).
- Patient received 21 ECT treatments: 3 times/week interval. He subsequently received 2 treatments at weekly interval and then was discharged with the plan for outpatient ECT.

At first outpatient ECT

- Sleep: normal
- Appetite: good
- Mood: euthymic.
Continues to have
some apraxia of
speech, much better
than before.
- No perseveration.
- Clock drawing test:
normal.
- Attends to ADLs
appropriately
- No psychosis



Case 1 (Continued)

- Received 4 more weekly ECT treatments.
- No show at q 2 weeks follow up.
- At last follow up: continued to have some residual difficulty in speech and trouble following complex directions. He was able to operate cell phone, computer. Some wandering tendencies.
- Family friends decided to take him back to India without notifying the physicians.

CASE 2

Case 2

- A 22 y/o, single female, employed full time as an accountant manager.
- Presented to a community hospital ED accompanied by grandmother with complaints that patient was acting bizarre at home over past 3-4 days. Stated had some headaches several days ago, occasionally slightly confused (tried going to work on Saturday etc).
- Lived at home with her grandmother, had a very supportive family, no pertinent medical issues, no prior psychiatric history, no current drug abuse, social EtOh use.
- In the ED, patient received haloperidol and lorazepam. Admitted to the medicine floor.

Case 2 (Collateral from Grandmother)

- At baseline: “calm, quiet, and levelheaded girl”.
- No symptoms of depression, mania/hypomania, and psychosis prior to Sunday.
- On Sunday she went to a party.
- Did not sleep since the weekend.

Case 2 (Continued)

Patient's presentation worsened.

- More disorganized
- Preoccupied with AH, responding to internal stimuli
- Paranoid
- Impulsive
- Thought latency
- Echolalia
- Catalepsy
- Autonomic instability

Case 2 (Continued)

- Labs, Preliminary CSF studies, ECHO, MRI Brain: all WNL.
- Day 6-7: Worsening of catatonia and psychosis:
- Autoimmune encephalitis suspected: Transferred to our hospital from the community hospital.

Case 4 (Continued)

- Day 8: Rt Ovarian dermoid identified. Left ovary normal.
- 2 days later: Laparoscopic Rt Oophorectomy.
- IVIg and Steroids : started.
- Post op day 3: CSF -Positive for anti-NMDA receptor antibodies

Case 2 (Anti-NMDA receptor Encephalitis)

3 month medical hospital stay that involved:

- MICU stay, complicated by possible seizures (EEG normal)
- Infections: Aspiration Pneumonia, C. Diff
- PEG tube placement
- 2 rounds of IVIg + Steroids, 3 infusions of Rituximab
- 4 rounds of plasmapheresis/plasma exchange,

Case 2 (Discharge after 3 months)

- D/C to rehab: In the days prior to discharge had minimal verbal output, periods of agitation requiring PRNs and needing 1:1 staff.
- From Rehab medicine's point: *“Agitation and restlessness are a normal part of brain injury recovery. Patient will require PT, OT and SLP, to work on cognitive impairment, dysphagia, dysarthria/dysphonia, mobility, ADLs, functional independence. Patient is medically complex and therefore requires daily supervision by a rehab physician”*.
- Within 1 week: Readmitted: Withdrawn, not talking or interacting, with periods of agitation requiring multiple people to hold her down. Hypotensive and not participating in rehab activities.

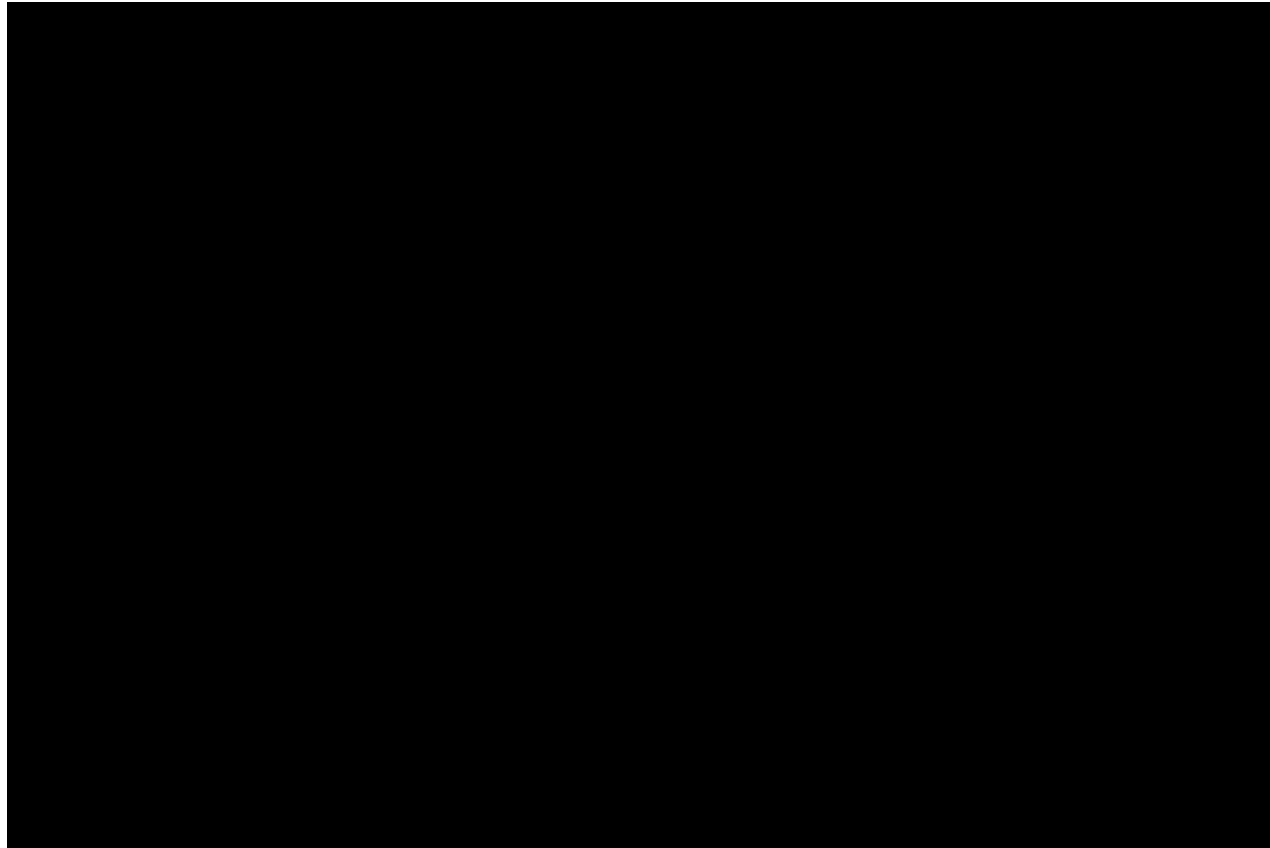
Case 2 (Re-Admission)

- One week after re-admission: 3rd round of IVIg and pulse steroids.
- Continued to have catatonia and psychosis.
- ECT Service consulted
- Bitemporal ECT started (3.5 months after the original presentation).
- Grandmother noticed improvement after 1st ECT—short lived.

Case 2 (Discharge)

- Received 10 treatments at 3 times/week and then 2 more twice/ week frequency and then was discharged with the plan for outpatient ECT. Continued to receive monthly IVIg + Steroids + olanzapine.
- The ECT interval increased to weekly → Tapered → Monthly → Discontinued after total 10 more treatments. (total of **22 inpatient + outpatient ECT treatments.**)
- Doing well for 8 months since discharge from the hospital.
- At 8-month time point: On monthly IVIg, Prednisone 5 mg, lorazepam 1 mg TID (being tapered off), Lamotrigine 150 mg BID (for seizure disorder).

Case 2 Video Presentation



CASE 3

Case 3

- 52 y/o male, Director of Finance, first presented to a community hospital ER for paranoid thoughts (eg. people following him, police coming into his house), either hearing or believing people were in his house, confusion, whispering, being unusually quiet, and decreased interaction/communication that started 3 days prior.
- No prior psychiatric history.
- Past medical history: Scoliosis s/p back surgery with Harrington rod, Isolated seizure (3 years ago) not on any antiepileptics, no h/o seizure work-up.

Case 3 (Continued)

- Admitted to Psych Unit x 3 days..
- Day 3: Staring spell, unresponsive → transferred to Med/surgical floor. Improved and discharged on the following day. (Day 4)
- Day 6: ER visit with unsteady gait, difficulty with balance, not answering questions, transiently unresponsive/unarousable. CT head Negative. He had a 2 minute convulsion. Mental status improved after Lorazepam.
- Transferred to a general hospital for continuous EEG monitoring.

Case 3

Labs & Imaging:

- MRI brain w/ and w/o contrast: Patchy areas of white matter T2 hyperintensity compatible with mild microvascular-type changes.
- CT C/A/P: No abnormality
- Lumbar Puncture: **Elevated protein, IgG, albumin, + Oligoclonal bands. Elevated ANA.**
Paraneoplastic panel: pending
- EEG results: Within normal limits.
- Urine Protein Electrophoresis: No abnormal protein
- Serum Protein Electrophoresis: **a mild M spike of 2.8** (normal 0-2).

Case 3 (Continued)

Day 11: Started on Methylprednisolone and IVIG x 5 days.



Day 16: Catatonic. Significant improvement after lorazepam. Began speaking and moving spontaneously, eating lunch.....




However, also began reiterating paranoid thoughts towards wife, VH, some disorganization and disorientation.



Day 18: Discharged home with outpatient Neuro and Psych follow-up.

Case 3 (Day 19 to Day 120)

2 ED visits and 2 other hospitalizations for worsening catatonia and later for 2 grand mal seizures.



5 rounds of IVIg, multiple doses of iv steroids, 2 doses of Rituximab

Case 3 (Hospital Course)

- **Day 121** :Transfer to our hospital for ECT for catatonia

Case 3 (ECT Course)

- **Day 126 (Monday):** Patient's first ECT ---Cancelled
- Patient had 2 spontaneous seizures on the morning of ECT (possibly secondary to holding off of 2 lorazepam dosages as well as early morning lacosamide dose)

Case 5 (ECT Course)

- **Day 128:** First Bitemporal ECT treatment.
- s/p ECT treatment #1: Much improved: alert, cooperative, sitting in chair, able to converse. Speaking, answering most questions appropriately. Occasional irritability continued.
- Received a total of **6 Bitemporal ECT treatments** as inpatient (**3/week, 2/week, 1/week**).
- Discharged on Quetiapine 100 mg, lorazepam 2 mg QID, clobazam 10 mg OD and weekly ECT.
- Continued to have mild disorganization, but improving

Case 3 (Outpatient Course)

- Received 5 outpatient ECTs, interval extended to 3 months and discontinued. Total 11 ECTs (including inpatient ECT).
- Continued to show improvement.
- Some word finding difficulty and over-inclusiveness. Remote memory impairment, some problems with attention

Case 3 (Outpatient Course)

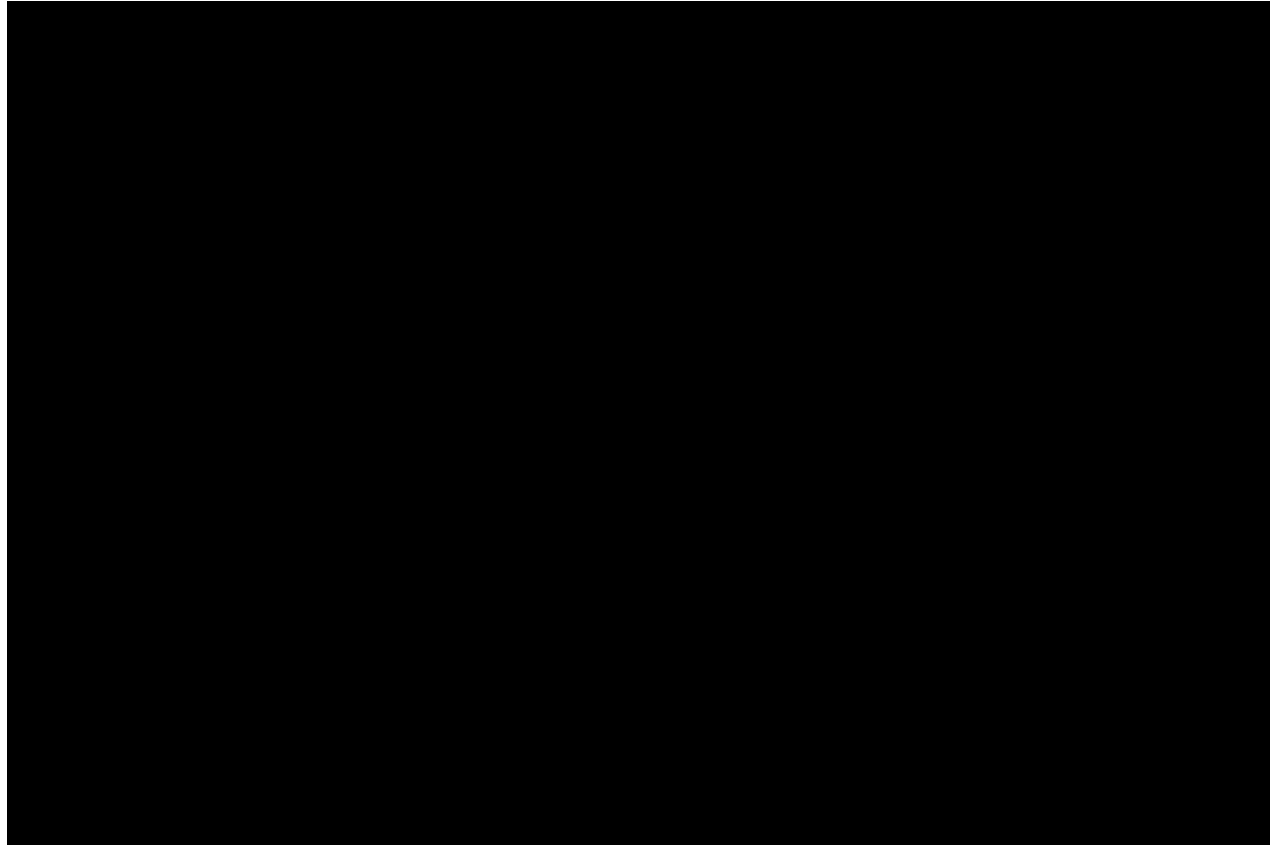
- At 3 months after discharge from the hospital:

On lorazepam 2 mg TID, quetiapine 100 mg q hs, clobazam 10 mg daily.

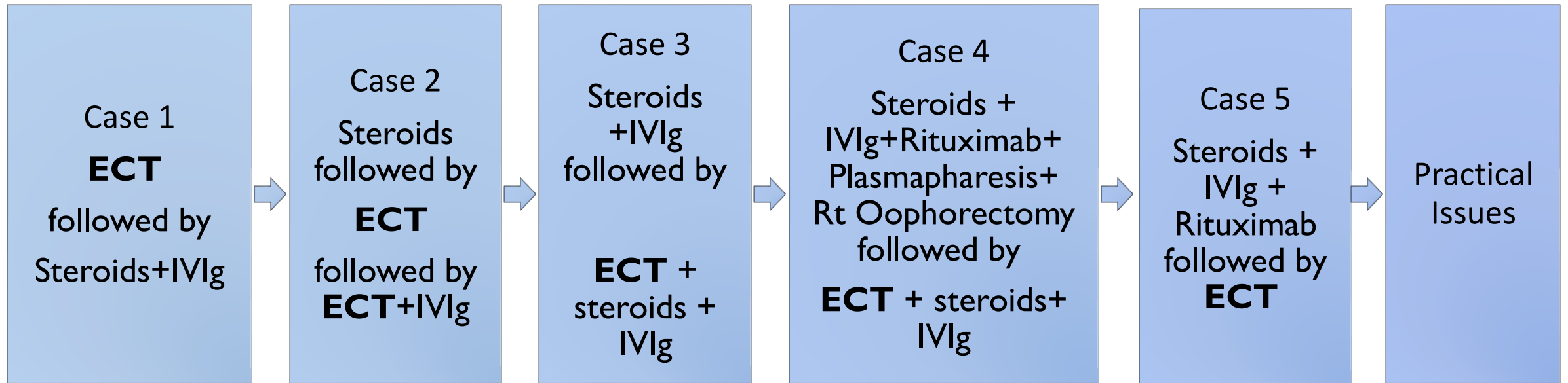
Ran 4 mile race (was a marathon runner prior to getting sick).

Still unable to return to work because of cognitive deficits.

Case 3 Video Presentation



Overview



Learning points:

- The presence of past psychiatric/substance use history does not preclude the possibility of autoimmune illness.
- Identification of particular antibody may get delayed or may never happen (e.g. seronegative autoimmune encephalitis).
- Monitoring with Bush Francis Rating Scale is very helpful.
- We recommend documenting each item score in addition to the total score.

Bush-Francis Catatonia Rating Scale

Items	Subject No. 1	Subject No. 2	Subject No. 3	Subject No. 4	Subject No. 5
1. Excitement:			+	+	
2. Immobility/stupor:	+	+		+	+
3. Mutism:	+	+	+	+	+
4. Staring:.		+		+	+
5. Posturing/catalepsy:			+	+	+
6. Grimacing:.				+	
7. Echopraxia/echolalia:		+		+	
8. Stereotypy:	+		+	+	

BFCRS Items	Subject No. 1	Subject No. 2	Subject No. 3	Subject No. 4	Subject No. 5
9. Mannerisms:		+	+	+	
10. Verbigeration:				+	
11. Rigidity:					+
12. Negativism:	+	+		+	+
13. Waxy flexibility:					
14. Withdrawal:	+	+	+		+
15. Impulsivity:				+	

BFCRS Items	Subject No. 1	Subject No. 2	Subject No. 3	Subject No. 4	Subject No. 5
16. Automatic obedience:					
17. Mitgehen:		+			
18. Gegenhalten:					
19. Ambitendency:		+			+
20. Grasp reflex:					
21. Perseveration:			+	+	
22. Combativeness:				+	
23. Autonomic abnormality:	+	+	+	+	+

Teamwork

- ECT as the treatment for catatonia or relevant psychiatric symptoms, but NOT as a treatment for autoimmune encephalitis itself.
- Need for Primary team, CL Psychiatry and Neurology Service to be in agreement.
- To resolve any disagreement before beginning the course of ECT.

Discussion with Family

- Stigma
- Highlight overall safety of ECT. No absolute contraindication.
- Catatonia is a syndrome i.e. “a symptom complex” and the underlying cause can be medical or psychiatric.

Sample Recommendation in a case of Catatonia of Idiopathic origin

- ECT is the treatment of choice for this patient's catatonia.
- Patient does not have capacity to consent for the procedure. Discussed explicitly with health care proxy that catatonia is a syndrome that can be associated with psychiatric as well as medical conditions. It is possible that in the future, underlying medical conditions may be identified. While the primary team continues to look for the potential causes, the lack of definitive results do not preclude ECT.
- ECT remains indicated for the symptomatic management of catatonia irrespective of the underlying condition.

ECT Procedure

- **Placement:** Bitemporal
- **Pulse width:** Wider pulse-width. We used 1 msec pulse width.
- Possibility of high fasting sugar (if on steroids).
- **Anticipate High Seizure Threshold:** Due to anti-epileptics & high dose of benzodiazepines.
- **Generous use of flumazenil** for patients on benzodiazepines.
- **Induction:** Hyperventilation. Most cases started with etomidate as induction medication. At times, required remifentanyl.
- Later in the course of ECT: Reduction in anti-epileptics/ holding anti-epileptics/switching to monotherapy, etc. may be needed.
- **Muscle Relaxant:** Succinylcholine if patient is ambulatory and afebrile. Non-depolarizing agent (rocuronium) in cases with pyrexia or prolonged immobility.

Summary from the case series:

- Autoimmune Encephalitis is a severe condition with varying presentations.
- ECT is an effective treatment for catatonia (and psychosis) associated with Autoimmune Encephalitis.
- ECT is NOT a substitute to the Immunomodulator treatments
- Early initiation of ECT may help prevent a protracted medical course.

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