Which EEG Patterns Warrant Aggressive Treatment?

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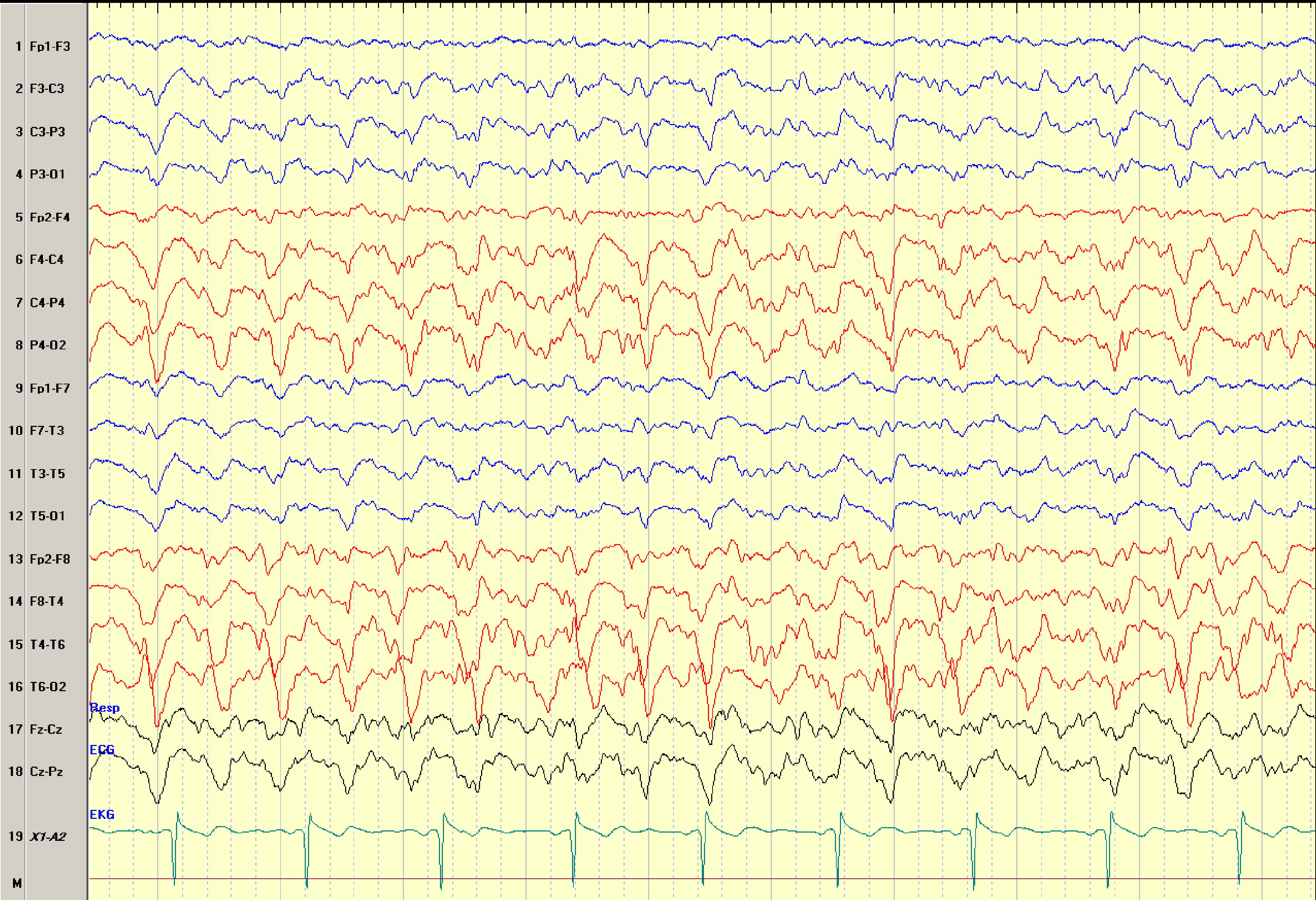
Case #1

- A 57 year old woman with hypertension and diabetes hospitalized on a medicine service for evaluation for a pain-rheumatologic disorder had a witnessed convulsive seizure in the hospital lasting one minute. Afterwards she remained altered. Specifically, she had a fluctuating level of consciousness and was confused when awake. An EEG was obtained STAT: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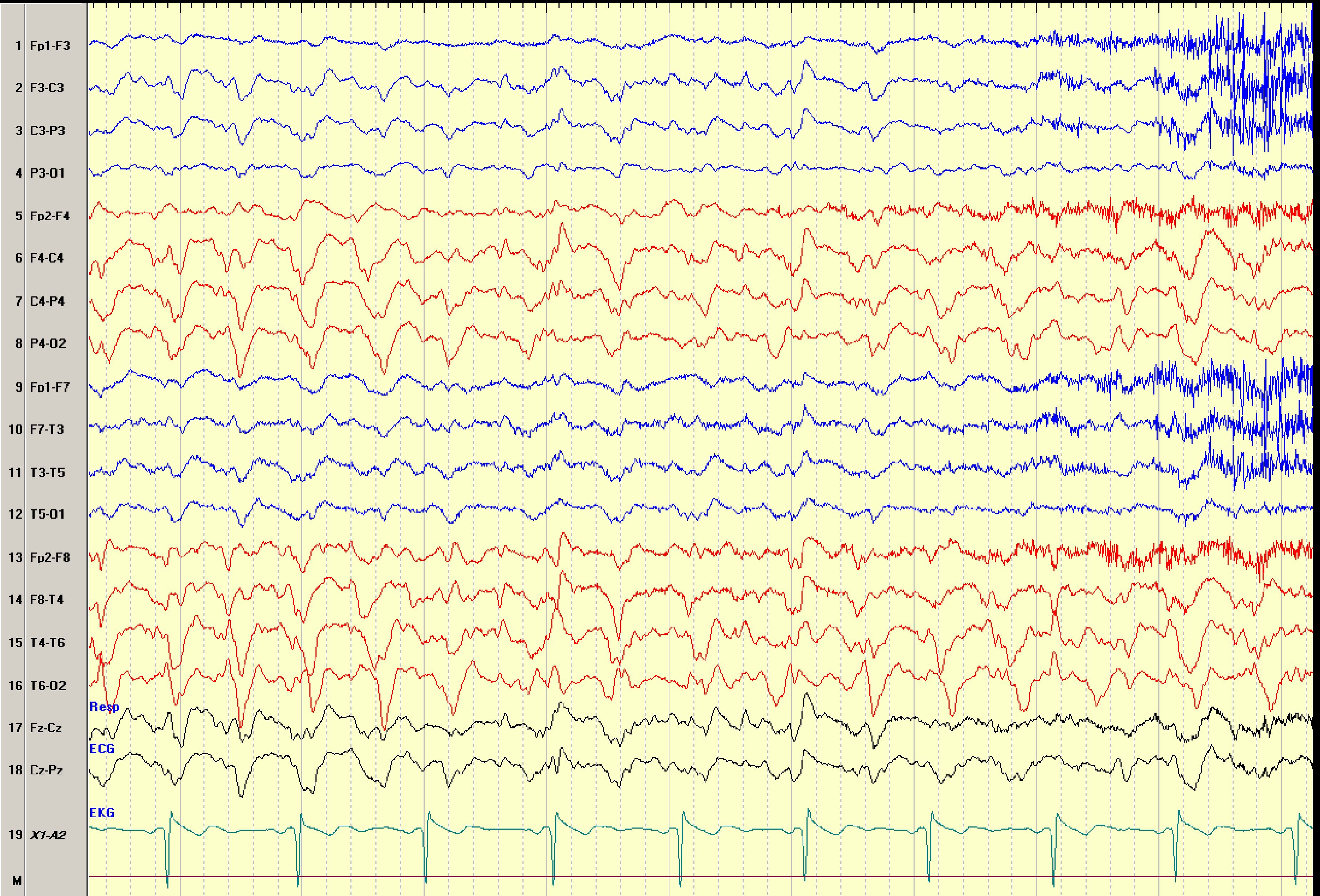
9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
15 T4-T6
16 T6-O2
Resp
17 Fz-Cz
ECG
18 Cz-Pz
EKG
19 X1-A2
M



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10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
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16 T6-O2
Resp
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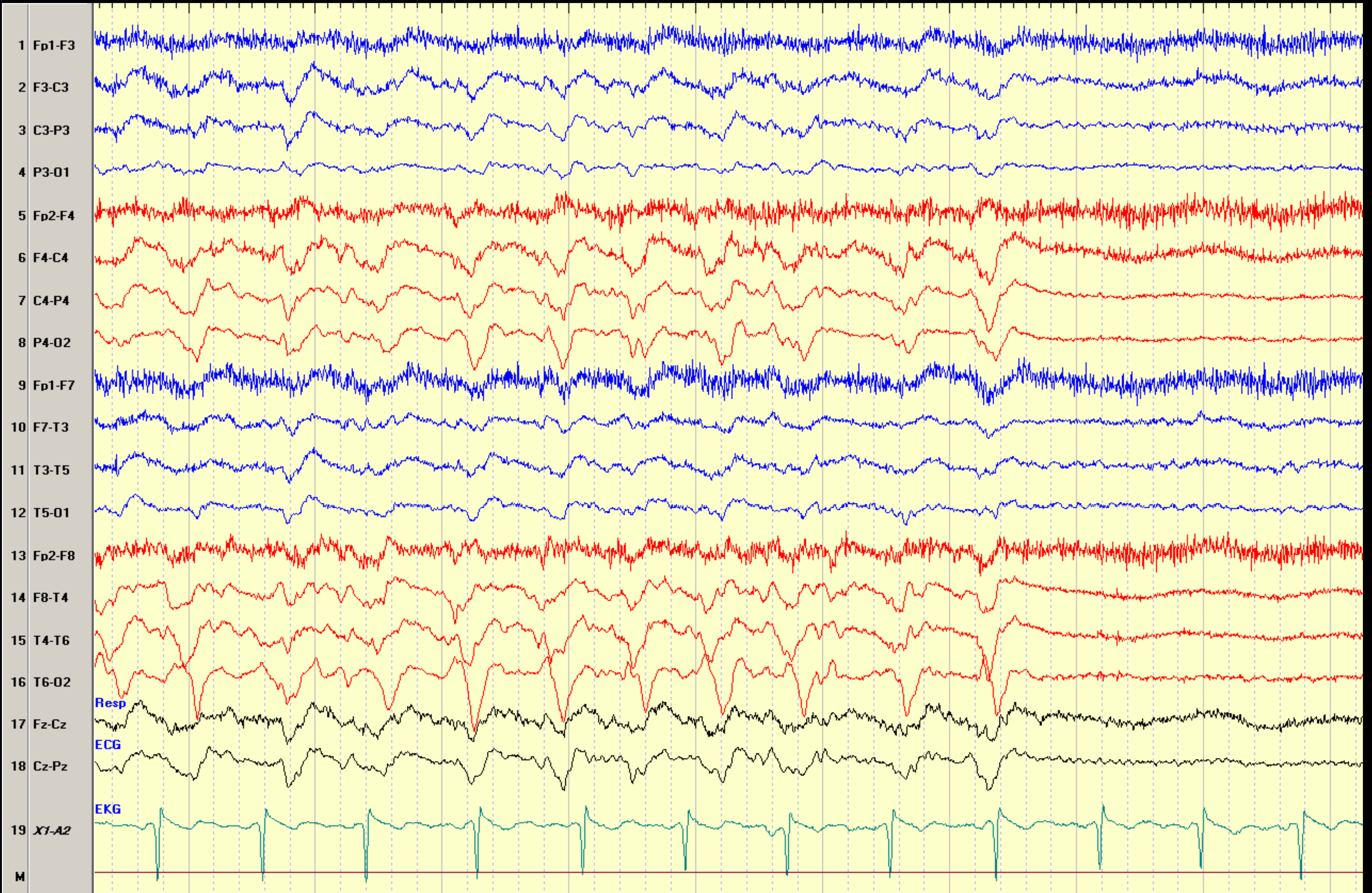
ECG
18 Cz-Pz
EKG
19 X1-A2
M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10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
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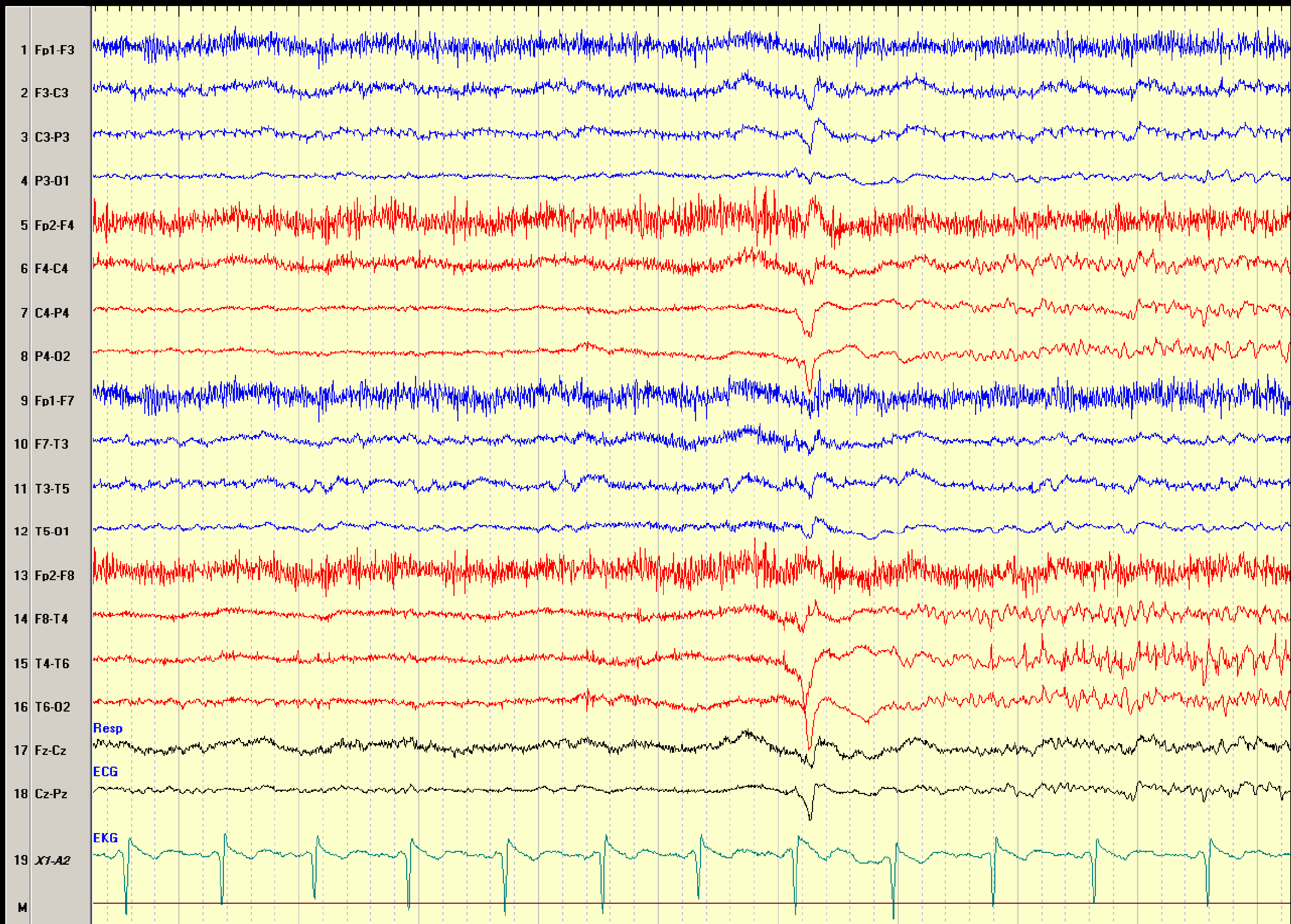
M
Resp
ECG
EKG



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9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
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ECG
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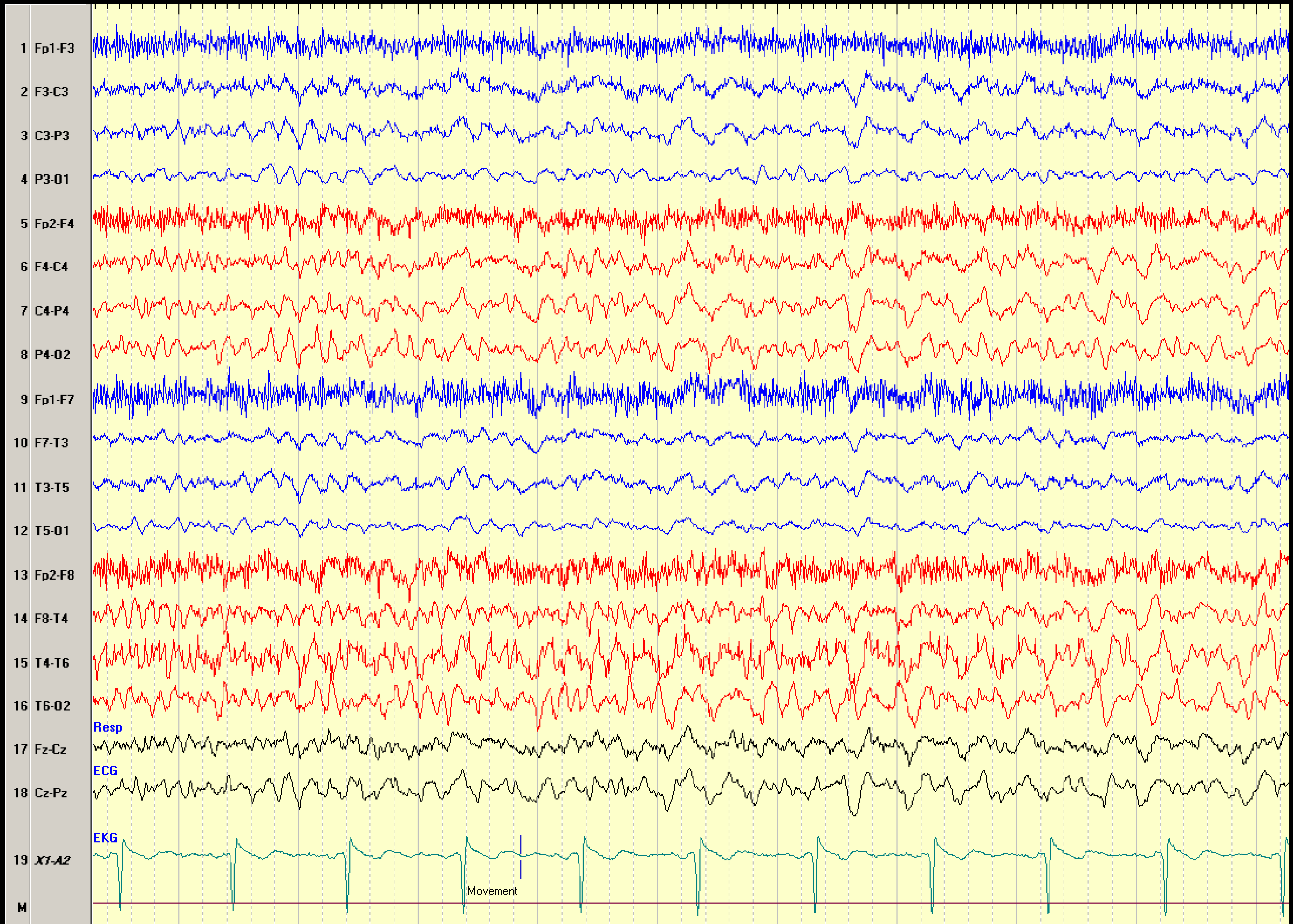
M



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10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
15 T4-T6
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Resp
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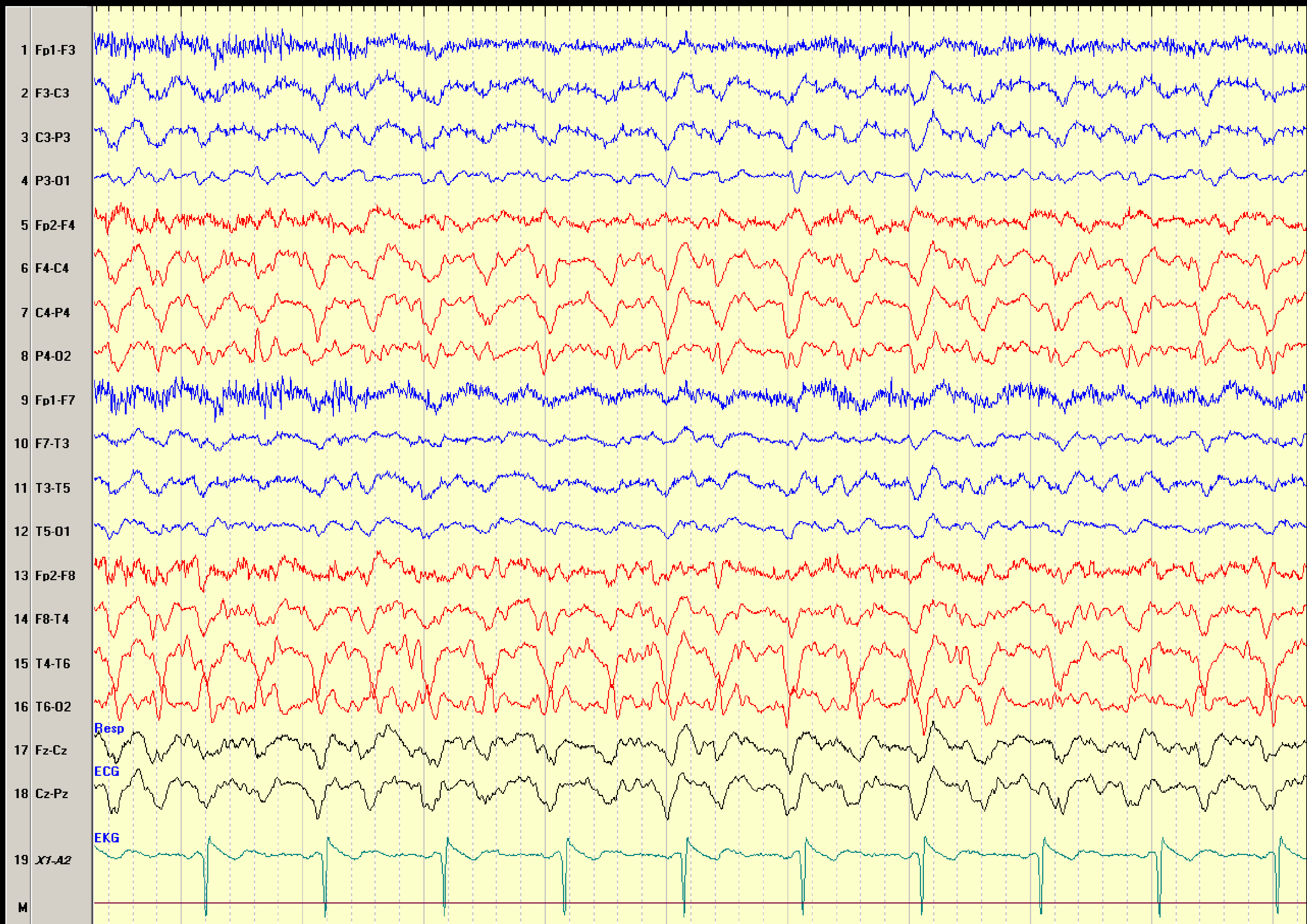
ECG
18 Cz-Pz
EKG
19 X1-A2
M
Movement



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3 C3-P3
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9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
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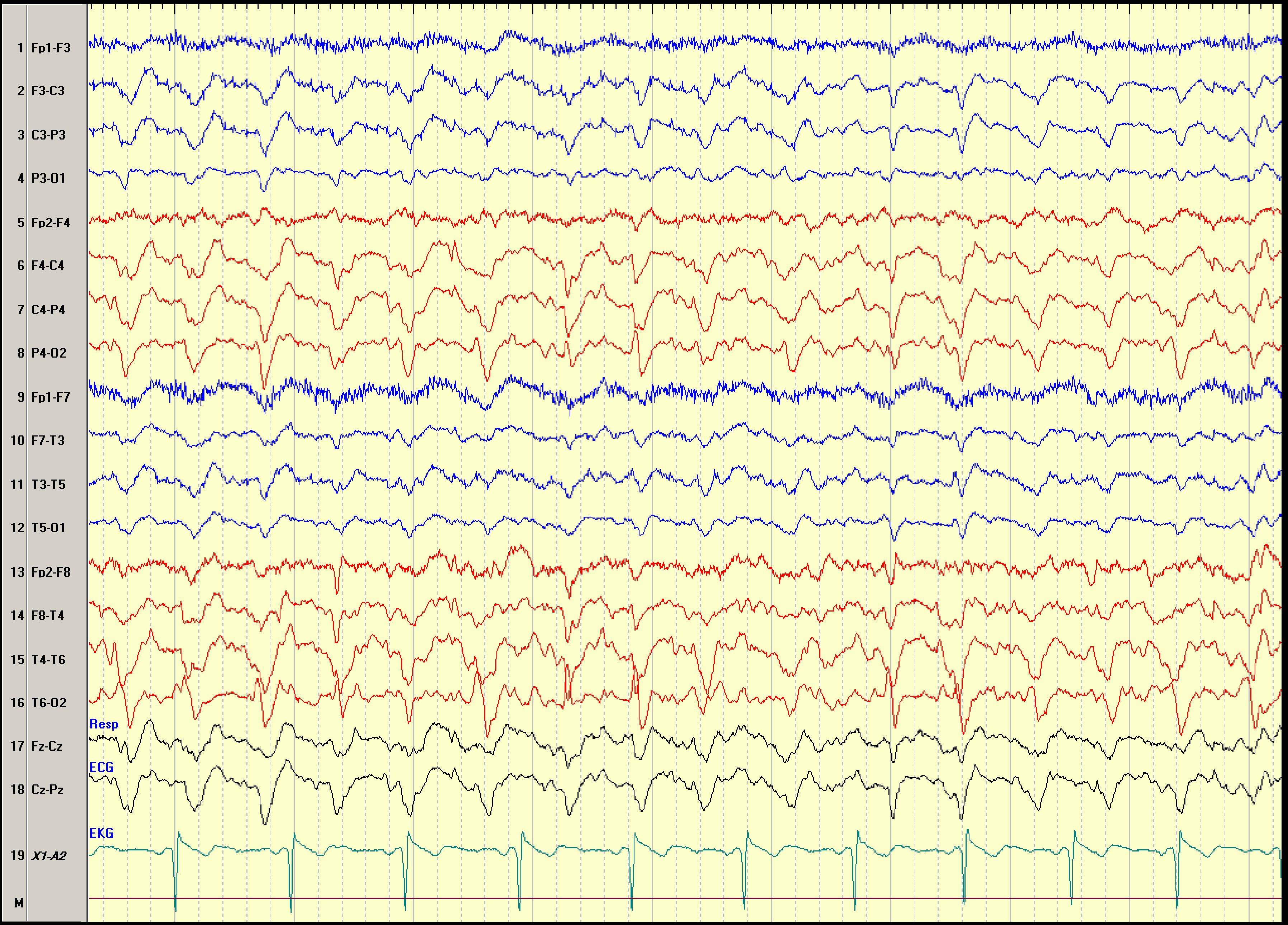
16 T6-O2
Resp
17 Fz-Cz
ECG
18 Cz-Pz
EKG
19 X1-A2
M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9 Fp1-F7
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11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
15 T4-T6
16 T6-O2
Resp
17 Fz-Cz
ECG
18 Cz-Pz
EKG
19 X1-A2
M

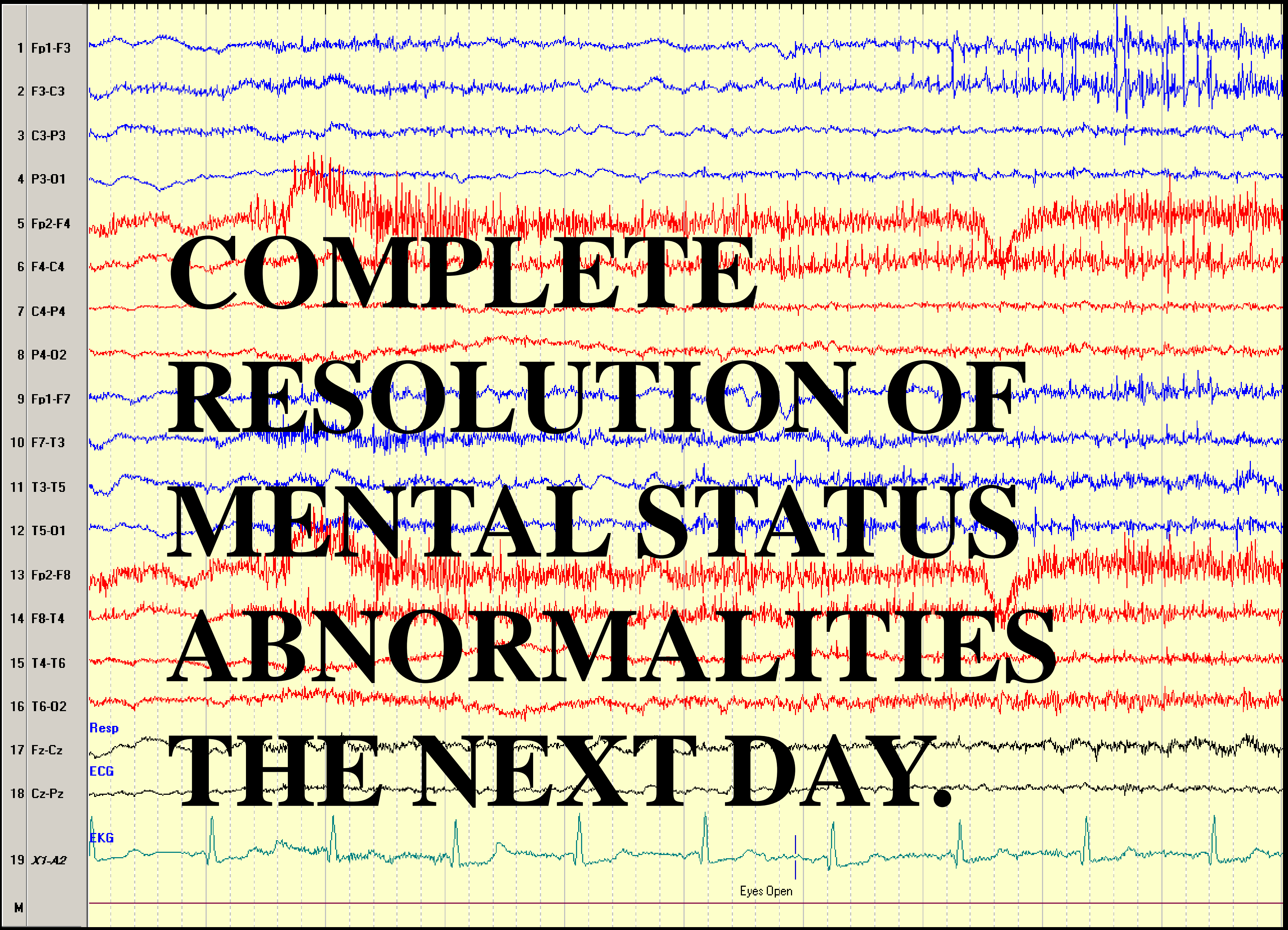
What is this?

Electro-clinical diagnosis: complex partial status epilepticus

How aggressively would you treat this?

What did I do?

- 2 mg IV lorazepam, followed by 1500 mg IV levetiracetam.
- Levetiracetam 1000 mg by mouth twice daily.
- Resident evaluation stat, MRI today, cEEG vs. repeat EEG the next day.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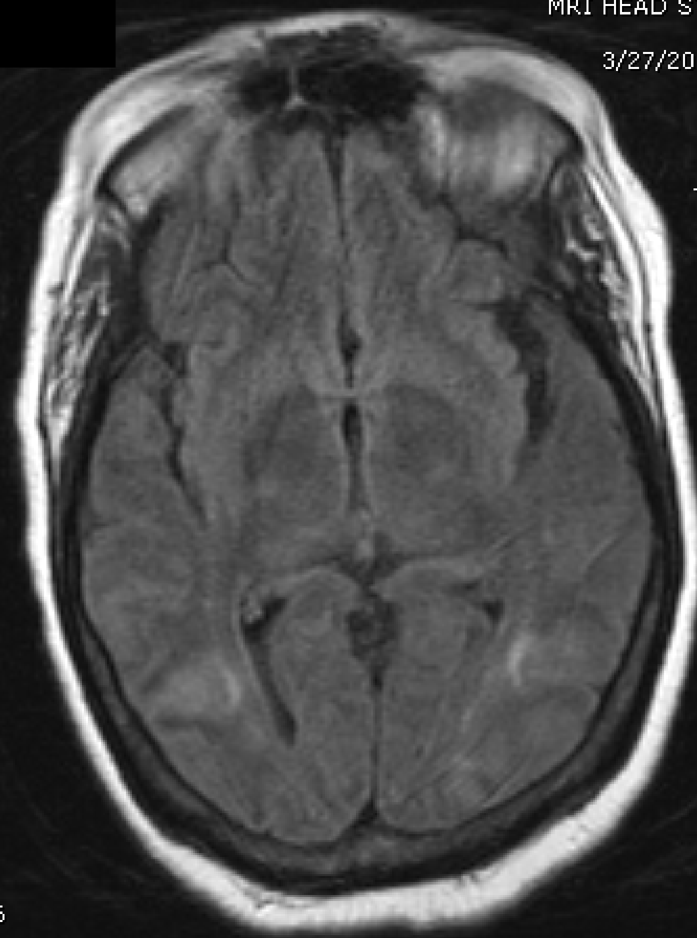
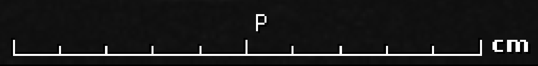
9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
15 T4-T6
16 T6-O2
17 Fz-Cz
18 Cz-Pz
19 X1-A2
M
Resp
ECG
EKG
Eyes Open
COMPLETE RESOLUTION OF MENTAL STATUS ABNORMALITIES THE NEXT DAY.

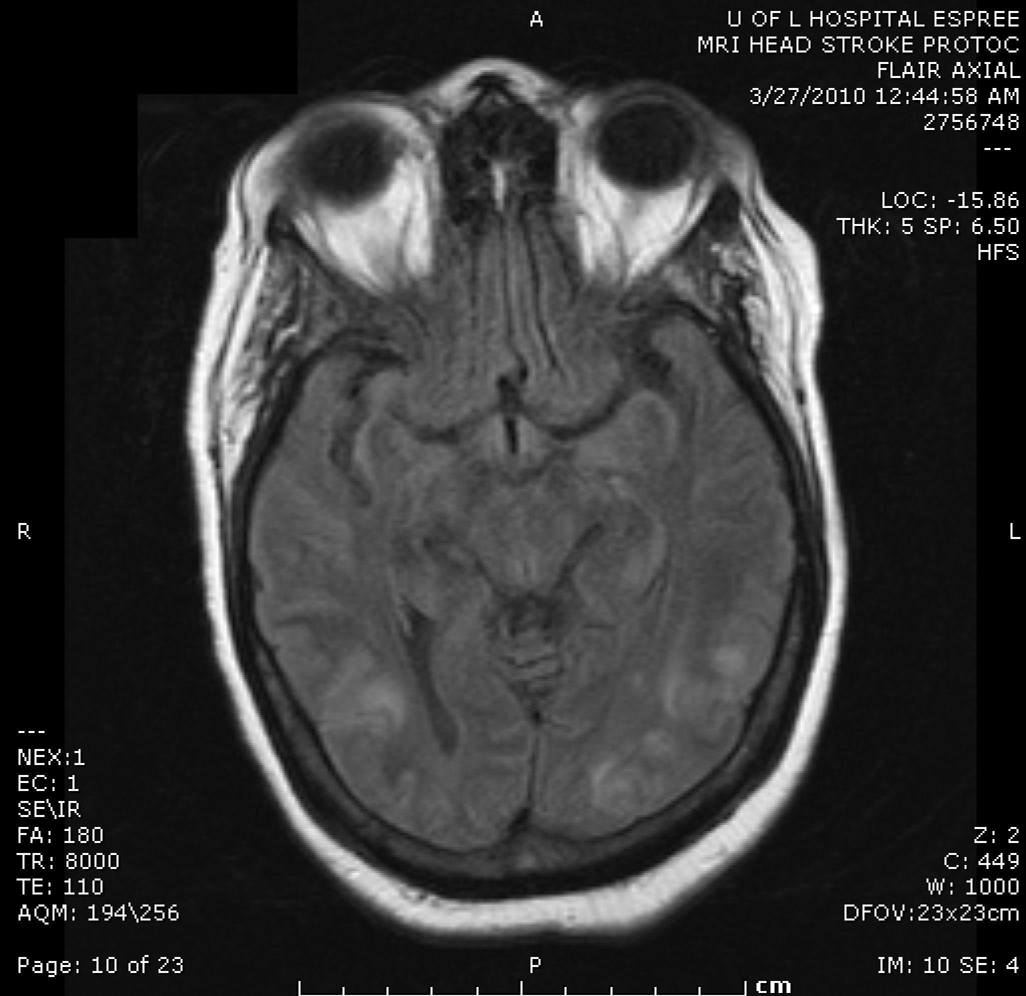

A
U OF L HOSPITAL ESPREE
MRI HEAD STROKE PROTOC
FLAIR AXIAL
3/27/2010 12:43:30 AM
2756748

LOC: -9.36
THK: 5 SP: 6.50
HFS
R
L

NEX:1
EC: 1
SE\IR
FA: 180
TR: 8000
TE: 110
AQM: 194\256
Z: 2
C: 420
W: 946
DFOV:23x23cm
Page: 11 of 23
P
IM: 11 SE: 4


cm

Systolic BP the morning of seizure = 258 mm Hg

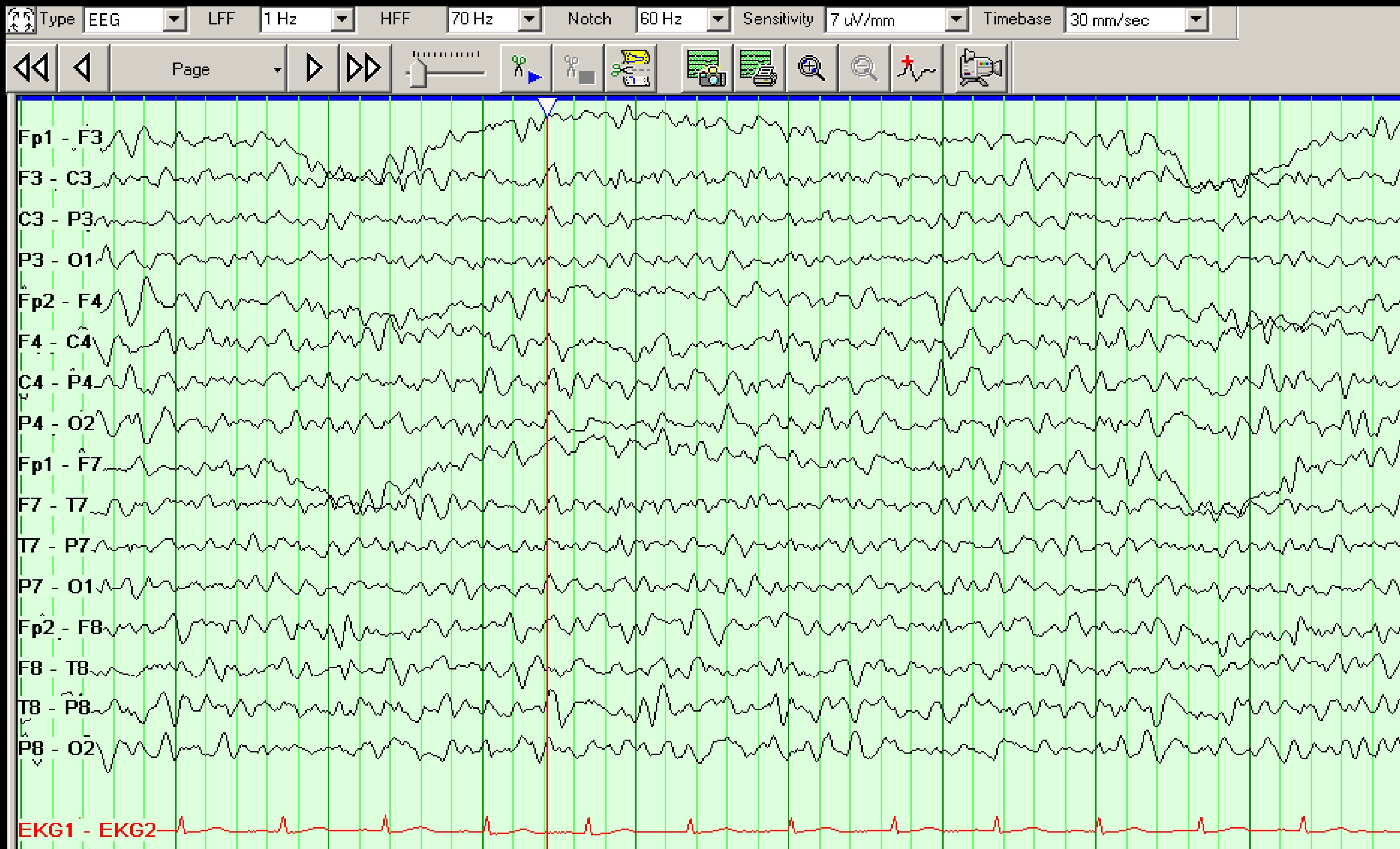


Summary of Case #1

- Diagnosis 1: PRES (Posterior Reversible Encephalopathy Syndrome) due to uncontrolled hypertension.
- Diagnosis 2: Acute symptomatic complex partial status epilepticus secondary to dx 1.
- Last question: How long should I keep her on levetiracetam?

Case # 2

- 79 y.o. woman who presented with an acute right frontal stroke and subclinical partial status epilepticus of right frontal origin on a routine EEG
- Treated with lorazepam and fosphenytoin 20 mg/kg PE initially and placed on maintenance phenytoin 150 mg bid
- She was placed on cVideo-EEG monitoring
- The status resolved and clinically the patient was more alert
- The EEG showed a different pattern: rhythmic right hemispheric epileptiform discharges noted only with sensory stimulations or arousal



Type
EEG
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HFF
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Notch
60 Hz
Sensitivity
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Timebase
30 mm/sec
Page
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F3 - C3
C3 - P3
P3 - O1
Fp2 - F4
F4 - C4
C4 - P4
P4 - O2
Fp1 - F7
F7 - T7
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P7 - O1
Fp2 - F8
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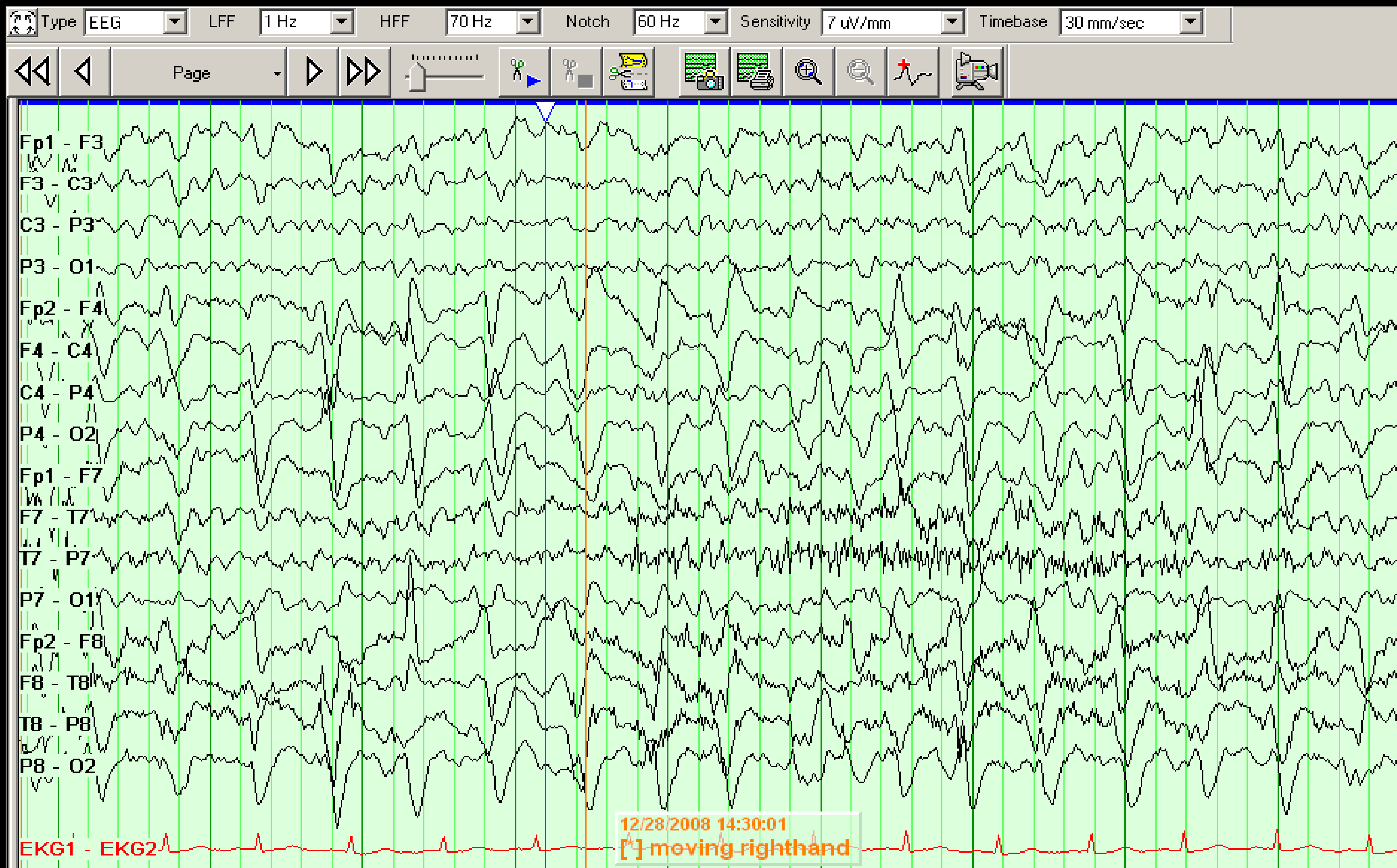
T8 - P8
P8 - O2
EKG1 - EKG2



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P4 - O2
Fp1 - F7
F7 - T7
T7 - P7
P7 - O1
Fp2 - F8
F8 - T8
T8 - P8
P8 - O2
EKG1 - EKG2
12/28/2008 14:30:01
[ ] moving righthand

WHAT IS IT?

DIAGNOSIS = STIMULUS INDUCED RHYTHMIC OR PERIODIC ICTAL DISCHARGES (SIRPIDS)

cont.

- Lorazepam 2 mg IV given once without EEG improvement
- Levetiracetam was added 1000 mg bid after load with 2000 mg IV x1
- This did not affect the EEG pattern
- Clinically the patient continued to improve (total of 3 days cVideo-EEG) without clear improvement in the EEG pattern

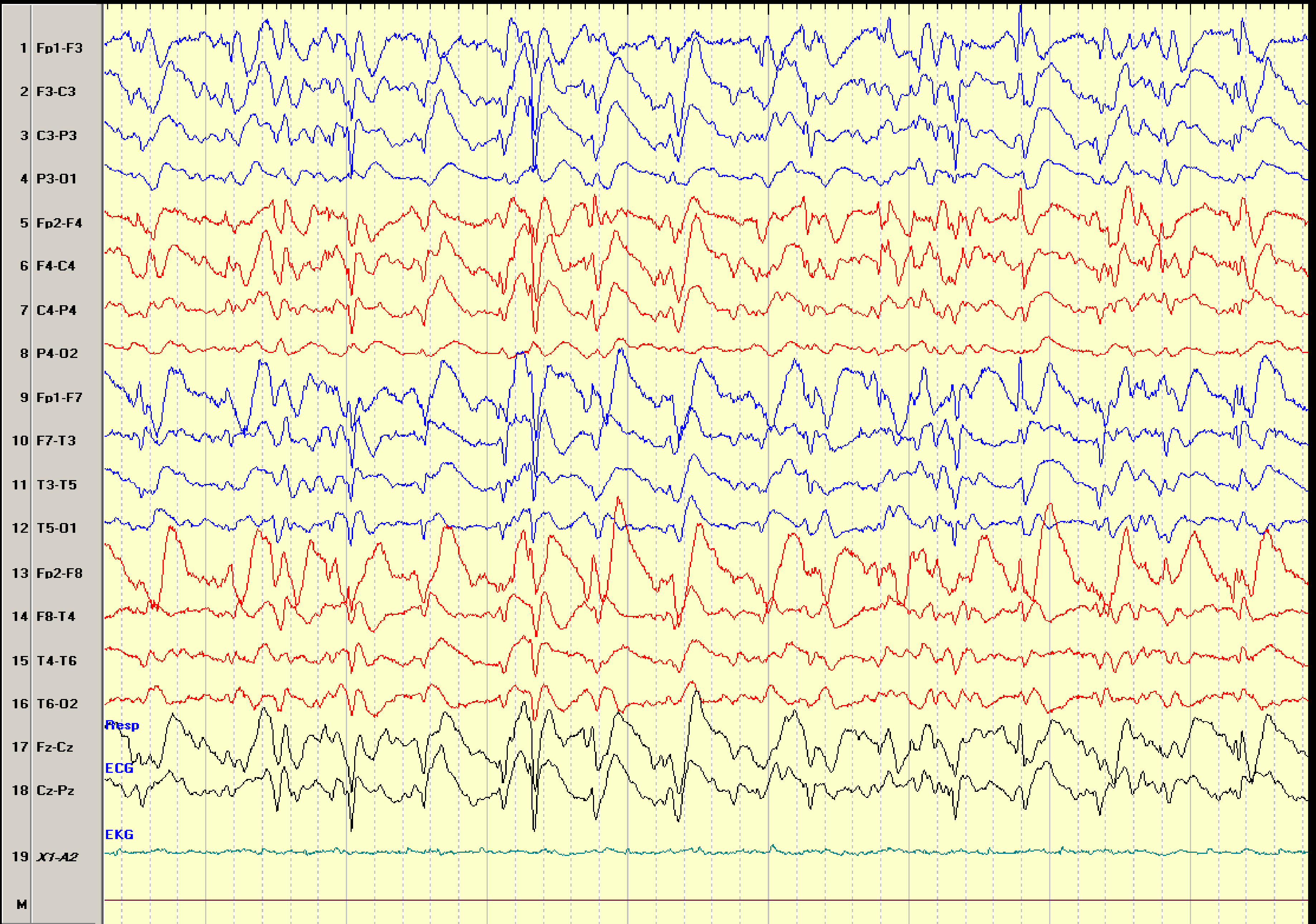
HOW AGGRESSIVELY WOULD YOU TREAT THIS PATTERN?

Case #3

- 67 year old man with no history of seizures presented with acute dysphasia (expressive > receptive). He had not motor deficits. He had no focal clonic, tonic or any other seizure-associated motor activity.
- He was alert and no alteration of consciousness, and had no other neurologic signs or symptoms.

Case #3

- He was evaluated emergently by the stroke team in the emergency department. The entire evaluation was unremarkable, including diffusion-weighted MRI. A STAT EEG was obtained:



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9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
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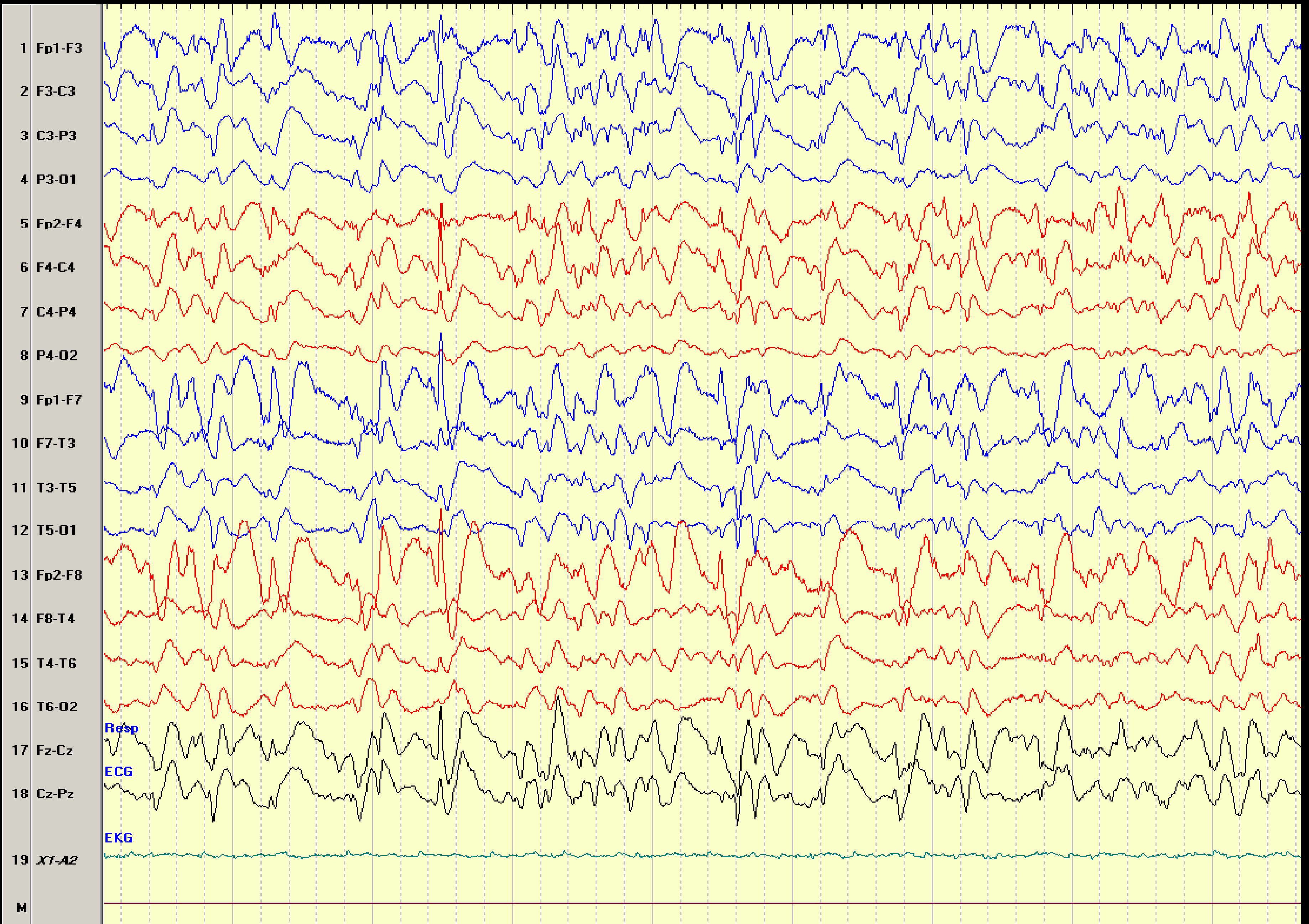
16 T6-O2
17 Fz-Cz
18 Cz-Pz
19 X1-A2
M
Resp
ECG
EKG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7 C4-P4
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9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
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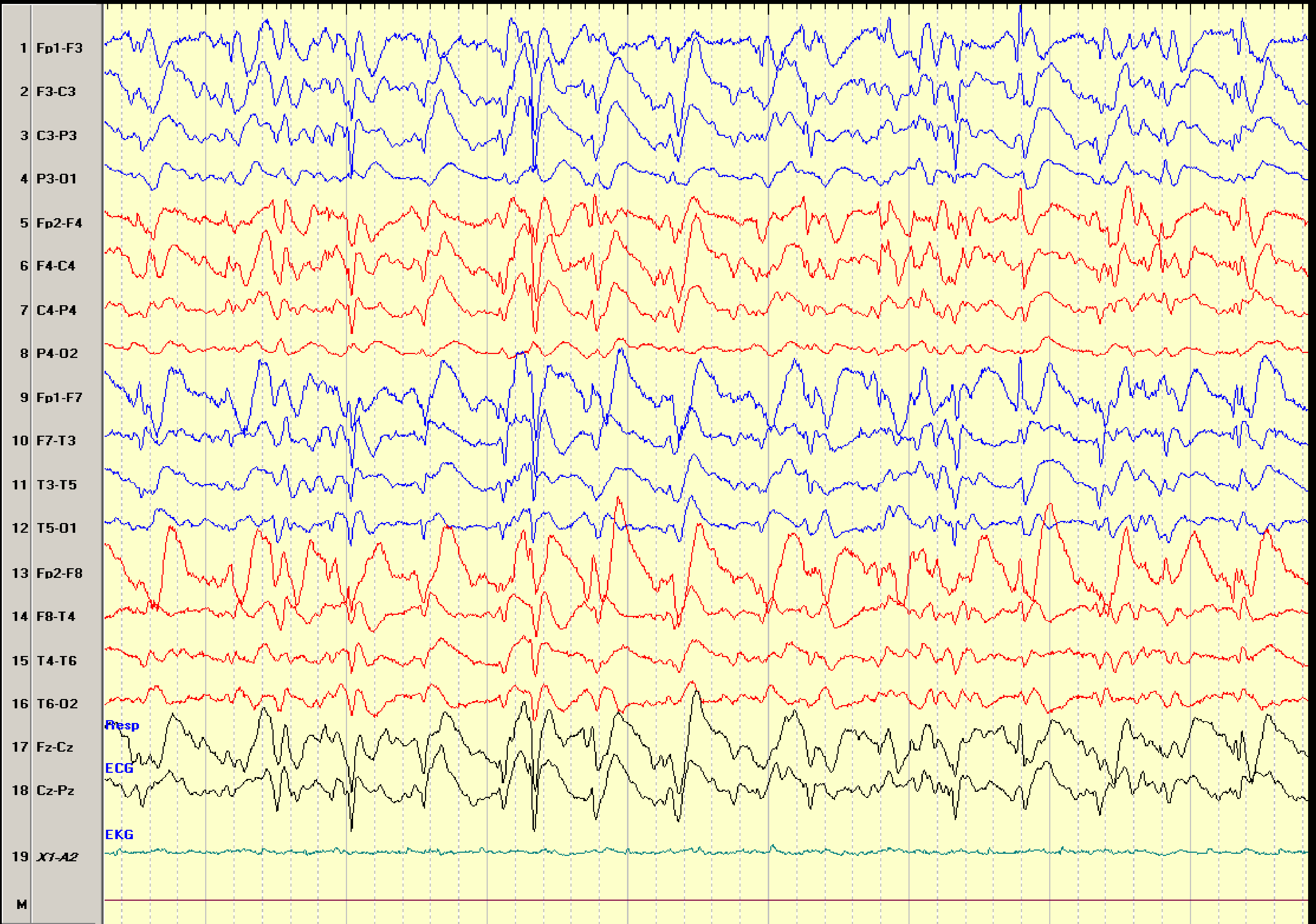
16 T6-O2
Resp
17 Fz-Cz
ECG
18 Cz-Pz
EKG
19 X1-A2
M



1 Fp1-F3
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10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
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17 Fz-Cz
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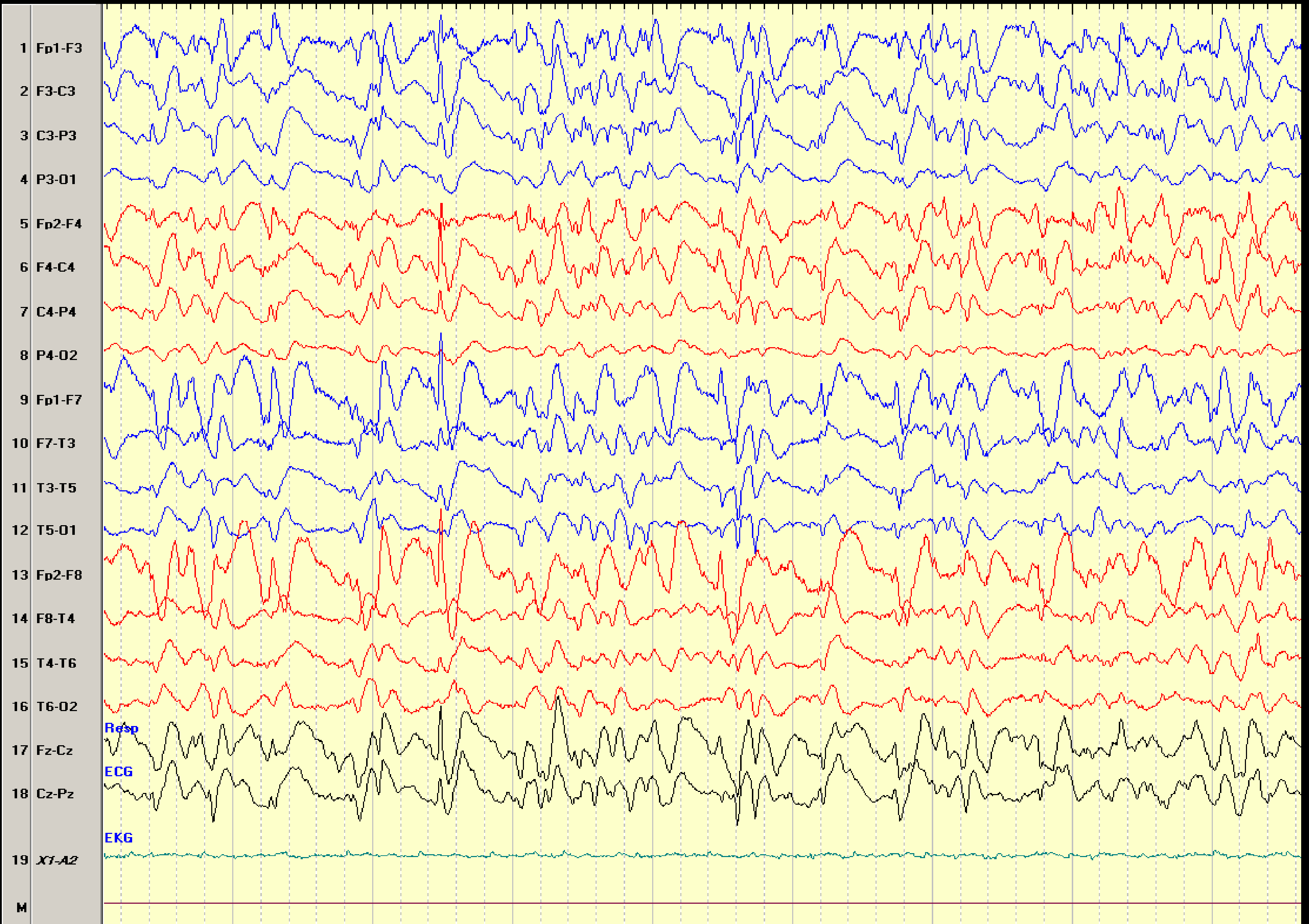
19 X1-A2
M
Resp
ECG
EKG



1 Fp1-F3
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7 C4-P4
8 P4-O2
9 Fp1-F7
10 F7-T3
11 T3-T5
12 T5-O1
13 Fp2-F8
14 F8-T4
15 T4-T6
16 T6-O2
17 Fz-Cz
18 Cz-Pz
19 X1-A2
M
Resp
ECG
EKG

What is this?

Electro-clinical diagnosis: (simple) partial status epilepticus

How aggressively would you treat this?

What did the resident do?

- 1500 mg IV levetiracetam stat.
- Levetiracetam 750 mg by mouth twice daily.
- Aphasia completely resolved by next day.

A

U of L Hospital GE3T
MRI BRAIN W/O&W CONTRA
Ax T2 FLAIR
2/20/2010 10:50:05 AM
2733567

LOC: 79.96
THK: 5 SP: 6.50
HFS

R

L

8HRBRAIN
NEX:1
EC: 1
SE\IR
FA: 90
TR: 11002
TE: 127.87
AQM: 320\320

Z: 1
C: 872
W: 1745
DFOV:24x24cm
Compressed 5:1

Page: 18 of 22

P

IM: 18 SE: 6

Summary of Case #3

- Diagnosis: Cryptogenic new-onset partial status epilepticus presenting with ictal aphasia – rare!

Case # 4

- 48 y.o. man with a right parietal GBM biopsy diagnosed in January 2010
- During his 2 weeks in rehabilitation for left sided hemiplegia, he developed intermittent “spasms” of his left hand that would progress to his arm then leg
- His hand would assume a dystonic posture, then his arm and leg would be affected
- There was no pain or alteration of awareness

cont.

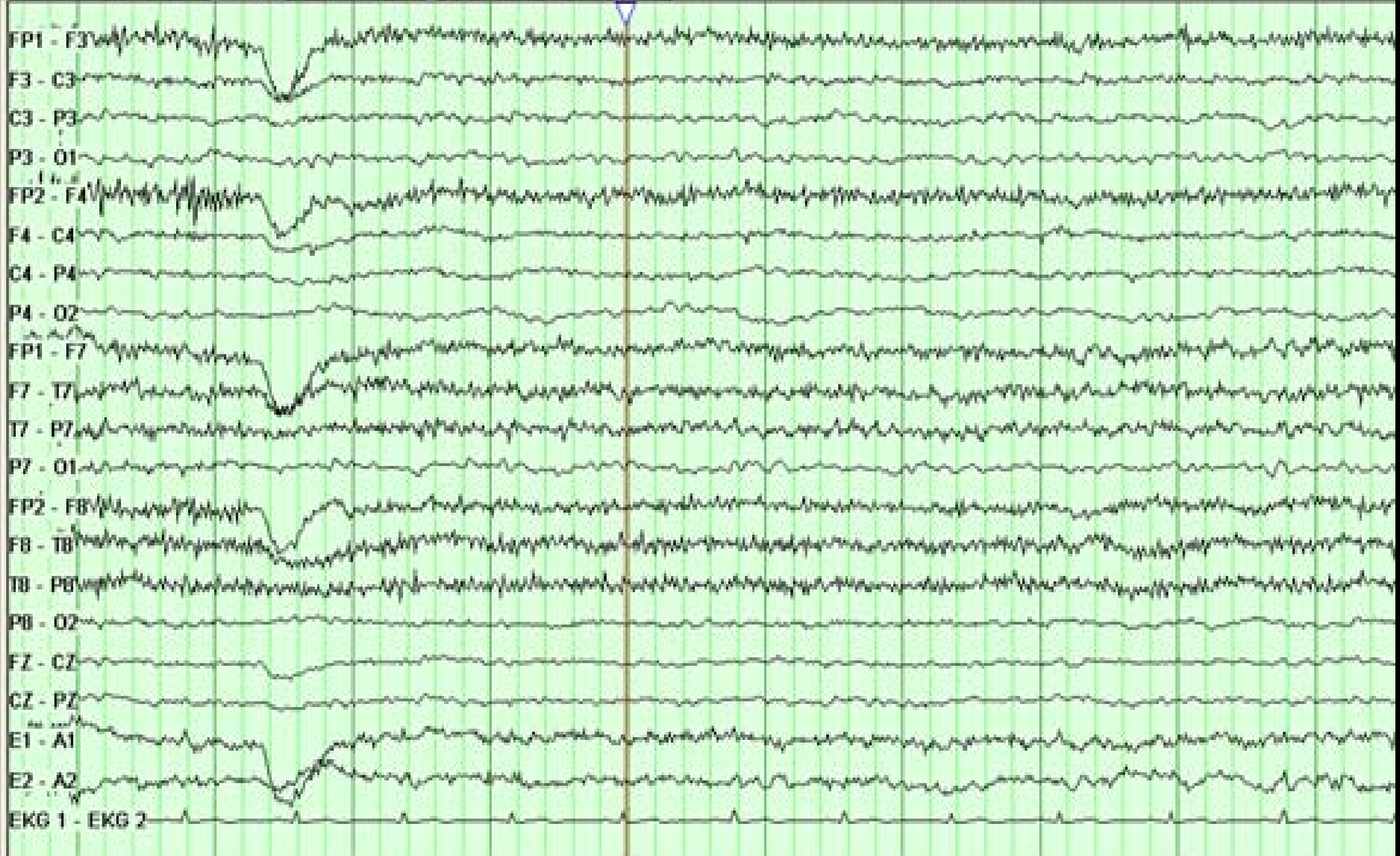
- While still in rehabilitation baclofen was initiated without any clear results
- One of these “spasms” eventually evolved further to a GTC seizure that lasted 2 minutes
- The patient received fosphenytoin load 20 mg/kg PE and was discharged on levetiracetam titration with goal of 1000 mg bid
- Chemotherapy with temozolamide and radiation therapy were started as an outpatient

cont.

- Few days after his discharge, the “spasms” become more frequent (every 5-15 minutes), somewhat painful, without alteration of awareness, occurring only during wakefulness
- He was brought to the ED and admitted to neurology
- Valproic acid was given IV 20 mg/kg in addition to levetiracetam 2 grams IV load
- He was discharged on maintenance levetiracetam 1500 mg bid and valproic acid 500 mg tid

cont.

- Few days later he had recurrence of “spasms”, every 5 minutes, becoming somewhat painful and spreading, in addition to his leg, to his neck and left face
- Still without alteration of awareness
- A routine EEG captured one of his events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HFF
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Notch
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Sensitivity
5 uV/mm
Timebase
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Page
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FP1 - F3
F3 - C3
C3 - P3
P3 - O1
FP2 - F4
F4 - C4
C4 - P4
P4 - O2
FP1 - F7
F7 - T7
T7 - P7
P7 - O1
FP2 - F8
F8 - T8
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P8 - O2
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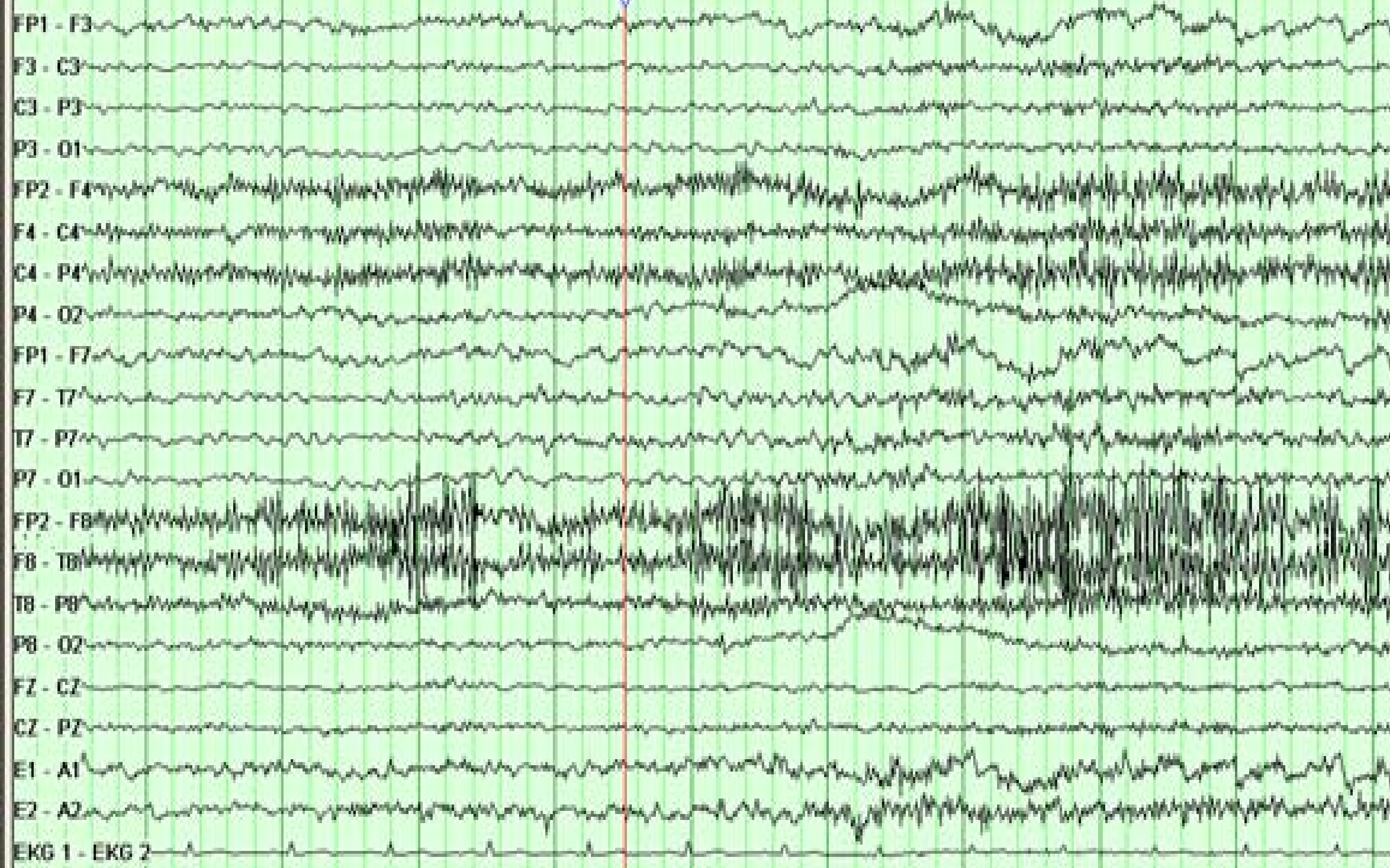
CZ - PZ
E1 - A1
E2 - A2
EKG 1 - EKG 2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FP1 - F3
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T7 - P7
P7 - O1
FP2 - F8
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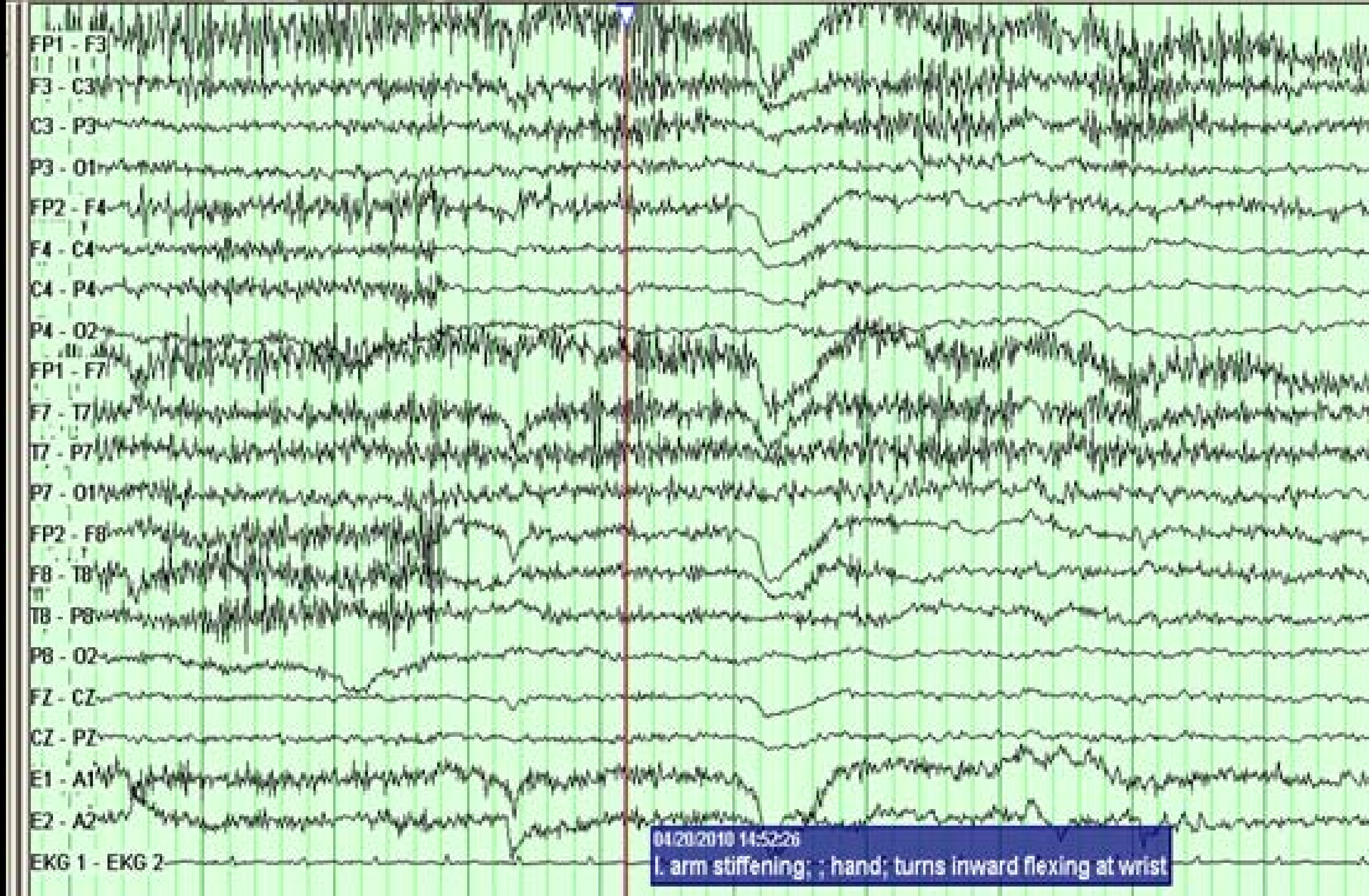
FZ - CZ
CZ - PZ
E1 - A1
E2 - A2
EKG 1 - EKG 2



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Notch
60 Hz
Sensitivity
5 uV/mm
Timebase
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Page
Speed
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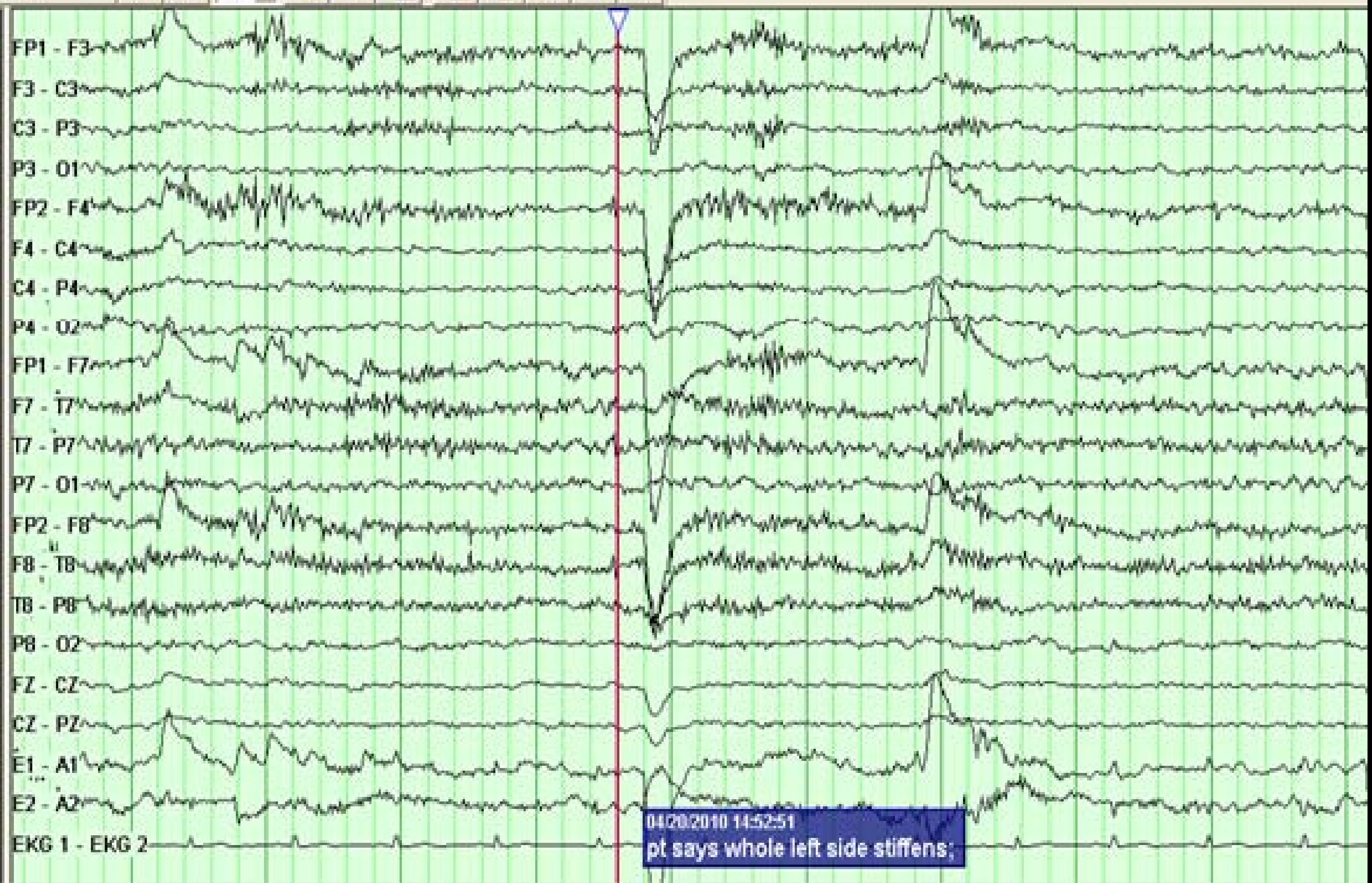
C3 - P3
P3 - O1
FP2 - F4
F4 - C4
C4 - P4
P4 - O2
FP1 - F7
F7 - T7
T7 - P7
P7 - O1
FP2 - F8
F8 - T8
T8 - P8
P8 - O2
FZ - CZ
CZ - PZ
E1 - A1
E2 - A2
EKG 1 - EKG 2
04/20/2010 14:52:26
l. arm stiffening; ; hand; turns inward flexing at wrist



LFF
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Sensitivity
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Timebase
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Page
Speed
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F3 - C3
C3 - P3
P3 - O1
FP2 - F4
F4 - C4
C4 - P4
P4 - O2
FP1 - F7
F7 - T7
T7 - P7
P7 - O1
FP2 - F8
F8 - T8
T8 - P8
P8 - O2
FZ - CZ
CZ - PZ
E1 - A1
E2 - A2
EKG 1 - EKG 2
04/20/2010 14:52:51
pt says whole left side stiffens;

WOULD YOU TREAT THIS EEG?

DIAGNOSIS = SIMPLE PARTIAL MOTOR SEIZURES

IS IT STATUS OR JUST NUMEROUS REFRACTORY PARTIAL SEIZURES?

cont.

- After IV load with additional 3000 mg of IV levetiracetam, has no “spasms” for up to 3 hours
- Levetiracetam is increased to 2000 mg bid
- Valproic acid dose is optimized (level 45 on admission) to 750 mg tid after IV “mini load”
- Thrombocytopenia noted
- Recurrence of spasms every 5-10 minutes

Cont.Cont

- Clonazepam is initiated
- "Loaded orally" with topiramate
- He was discharged on topiramte 100 mg bid, levetiracetam 2000 mg bid and valproic acid 500 mg tid
- He had 2 of his typical seizures in 4 hours prior to his discharge home

- **Thanks For Your Attention!**