

October 24 , 2025

*AMED (Japan Agency for Medical Research and Development)
Supports*

International Collaboration

**Implementation of wide band EEG in epilepsy care
by digital EEG**

No. 11

One point comment for last discussion

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Disclosure Form

Company Name	Nature of Affiliation
<ul style="list-style-type: none">Sumitomo Pharma CoNihon-Kohden	<ul style="list-style-type: none">Industry-Academia Collaboration CoursesCollaboration study
<ul style="list-style-type: none">UCB JapanEli Lilly JapanRICHO	<ul style="list-style-type: none">Collaboration study
Off-Label Product Usage	
<ul style="list-style-type: none">None	

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One point comment for the last zoom conference:



26th September 2025
(Friday)

Wide-band EEG from DC shifts to HFO 10

Moderator

Dr. Siwi Anindita

Central General Hospital Dr. Kariadi, Semarang, Indonesia

Contents

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by **Prof. Akio IKEDA**, Kyoto University, Japan
- ✓ **Case discussion from different institutes**
by **Dr. Aris Catur Bintoro**,
Central General Hospital Dr. Kariadi, Semarang, Indonesia



View our webinar archive for past session

<http://epilepsy.med.kyoto-u.ac.jp/amed-wide-band-eeeg-2025>



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Systematic review of ictal DC shifts of invasive recording

Original Manuscript

Infralow Activity on Intracranial EEG: A Systematic Review: Characteristics, Recording Methods and Predictive Value of the Zone to Remove

Rene Andrade Machado¹ and Sarah E Otterson²

Clinical EEG and Neuroscience

1-12

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icDCs occurred 97% (per pt) and 92% (per sz)

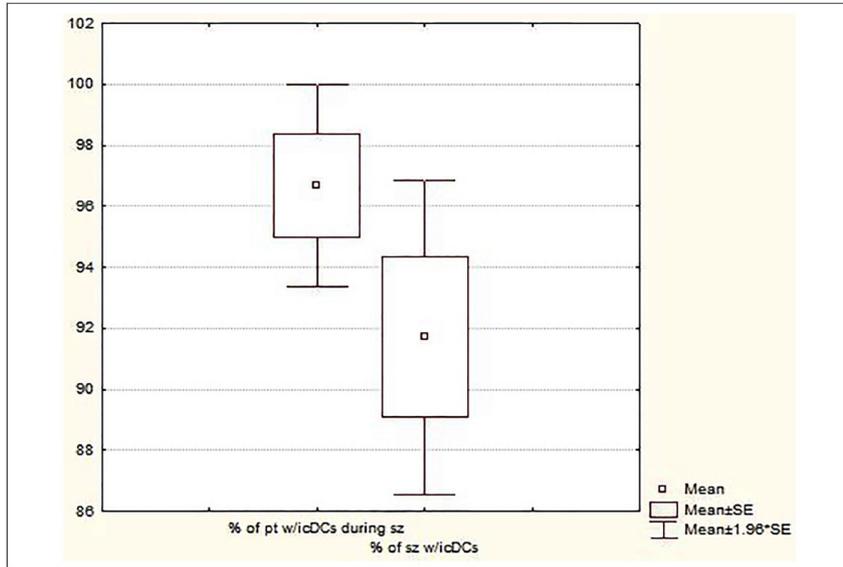
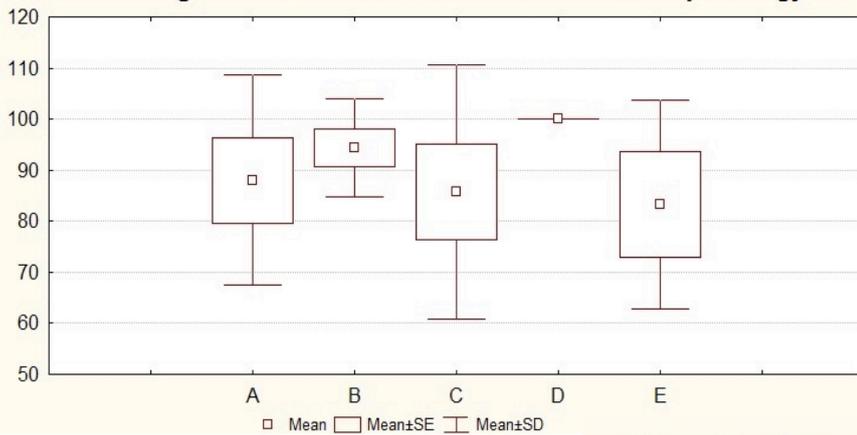


Figure 5. Percentage of patients and seizures with intracranial infralow activity.

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FCD type II and heterotopia showed icDCs very highly.

Percentage of seizures with icDCs across different pathology



A) HS: mean 88.0% ± 20.6
 B) FCD type II: mean 94.4% ± 9.7
 C) Gliosis: mean 85.7% ± 24.8
 D) Heterotopia: 100%
 E) Tumors: 83.3% ± 20.5

Friedman ANOVA and Kendall Coeff. of Concordance
 ANOVA Chi Sqr. (N = 3, df = 3) = 4.6 p = 0.20
 Coeff. of Concordance = 0.5 Aver. rank r = 0.26

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Resection of icDCs area gained better seizure free outcome.

Table 4. Engel's Scale in Patients with Complete or Incomplete Resection of icDCs.

Resection of icDCs	Seizure-free (%)	Poor outcome (%)	total
complete	66 (83.5)	13 (16.5)	79 (100)
incomplete	8 (53.3)	7 (46.7)	15 (100)
total	74 (78.7)	20 (21.3)	94(100)

Legend:

OR 4.44 $P = .01\%$ referred to the row's total. Two studies do not clarify the relationship between resection and areas with icDCs or did not consider the areas with icDCs as criteria for resection (Rodin et al, Clinical Neurophysiology 2014¹⁴ [n = 15] and Thompson SA et al, Clinical Neurophysiology 2016¹⁶ [n = 15]).

Nakatani M et al, Brain Commum 2022³¹ icDC were not resected in 15 patient 7 of them had good outcome.

Moudur PN et al, Journal Clin Neurophysiology 2012 icDC were not resected in 2 patients, 1 with good outcome.

Kim W et al., Journal Clin Neurophysiology 2009¹⁵ icDC were not resected in 3 patient (1 lost followed-up, 1 had good outcome an done bad outcome)

Mader et al., Neurology and Neurophysiology 2005¹² icDC was not resected in one patient. Patient was put on VNS.

Total of patients whom icDC were not resected nineteen, nine out them were seizure free 9 (42%) and 10 continues having seizures (47%).

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✓ Case discussion from different institutes
by **Dr. Aris Catur Bintoro,**
Central General Hospital Dr. Kariadi, Semarang, Indonesia

Chief Complaint : Recurrent seizures
Onset : At 2 weeks of age

4yo girl, scalp EEG

- First seizure at **2 weeks of age**, with **body stiffness and eye blinking**.
- Seizures occurred multiple times a day, lasting seconds, with cyanotic lips
- The child was admitted to the NICU and started on **valproic acid**.
- At 10 months, an EEG showed epileptiform activity, and therapy continued.
- Despite treatment, seizures persisted.

Seizure 7

= 1) **fencing posture** to the right and 2) **asymmetric tonic posture of the feet** like **SMA seizure**

Seizure 2

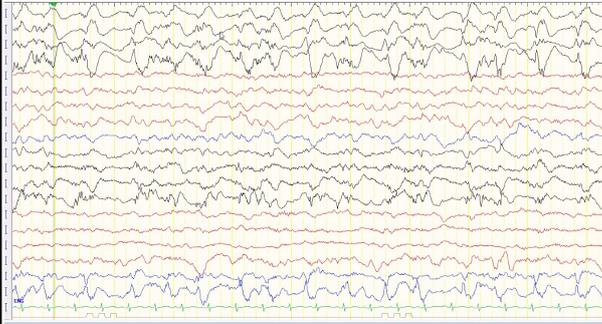
= Bilateral hands and **feet symmetric abduction**, like **tonic seizure**, no asymmetry

It suggests **frontal lobe origin** seizure, but it **could start from the occipital and quickly spread to frontal area** through the superior longitudinal fasciculus.

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scalp EEG



Interictally, almost continuous, regional spike, left hemisphere, both parietal and frontal
→ red spike in FCD

Intrinsic Epileptogenicity of Human Dysplastic Cortex as Suggested by Corticography and Surgical Results

Ann Neurol 1995;37:476-487

Cortical dysplastic lesions (CDyLs) are often associated with severe partial epilepsies. We describe the electrographic counterpart of this high degree of epileptogenicity, manifested by continuous or frequent rhythmic epileptogenic discharges recorded directly from CDyLs during intraoperative electrocorticography (ECoG). These ictal or continuous epileptogenic discharges (I/CEDs) assumed one of the following three patterns: (1) repetitive electrographic seizures,

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Will be published

Scalp-EEG
Repetitive spike (red spike)
↓ interictal

Low voltage fast activity
↓ ictal
Flat EEG
↓ ictal
Repetitive spike
ictal
Start-stop-start phenomenon

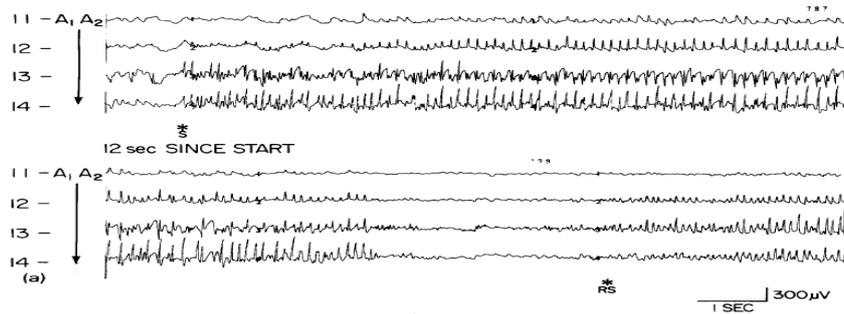
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The **start-stop-start phenomenon** of subdurally recorded seizures

Warren T. Blume and Masako Kaibara

University of Western Ontario, University Hospital, London, Ont. N6A 5A5 (Canada)

Electroencephalography and clinical Neurophysiology, 86 (1993) 94–99



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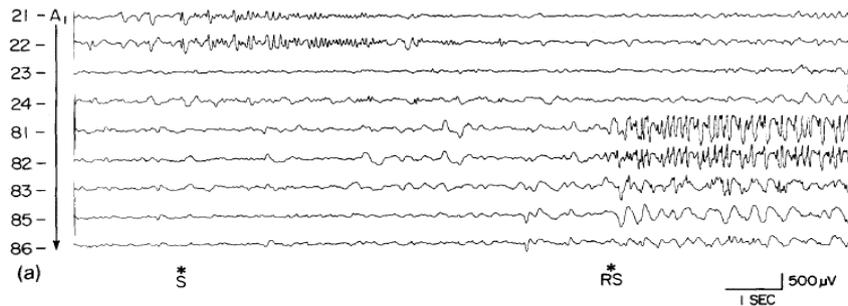
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No image

Will be published

Scalp-EEG
Repetitive spike (red spike)
↓ interictal

Low voltage fast activity

↓ ictal

Flat EEG

↓ ictal

Repetitive spike
ictal

Start-stop-start phenomenon

Ictal HFO more on the left,
in the F3-C3, C3-P3, P3-O1

Ictal DC shifts may not be reliable
due to cooccurrence of movement
artifacts

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1 start-stop

2 stop

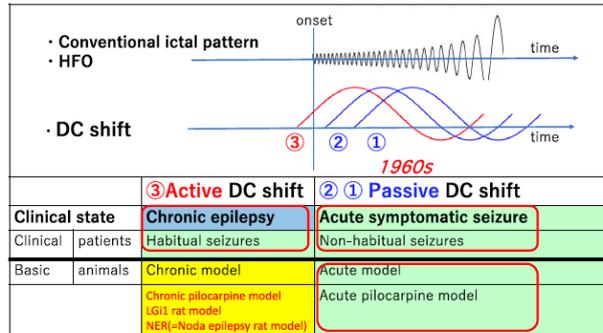
Start-stop-start phenomenon
= stop is LVFA (showing active or passive DC shifts?)

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by **Dr. Aris Catur Bintoro**,
Central General Hospital Dr. Kariadi, Semarang, Indonesia

Table 2 Hypothesis of active vs. passive DC shifts in the ictal period (cited from Ikeda et al., 2020 with permission)

Hypothesis of **active** vs. **passive** DC shift in the ictal period



(by Ikeda et al, 2020, Neuroscience Research) (as the working hypothesis of AMED research team of Epilepsy and Glia, chaired by Maehara, Japan, 2015-2018)

We defined the ictal "active" DC shift as the ictal DC shift preceding the neuronal ictal activities, which correspond to the conventional ictal EEG changes and more specifically the ictal HFO, whereas the ictal "passive" DC shift follows these neuronal activities. In the past such as 1990s, ictal HFO has not been described yet at all. Thus, we could not compare between ictal DC shifts and ictal HFO in the old recording data.

Ikeda et al: Active direct current (DC) shifts and "Red slow": two new concepts for seizure mechanisms and identification of the epileptogenic zone *Neurosci Res.* 156 (2020) 95-101

Ikeda A: Active direct current (DC) shifts and "Red slow": two new concepts for seizure mechanisms and identification of the epileptogenic zone, *Clin Neurophysiol (Tokyo)* : 53; 89-100, 2025 (in English)

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2 stop

3 start (=restart)

Start-stop-start phenomenon
= stop is LVFA (showing active or passive DC shifts?)

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by Dr. Aris Catur Bintoro,
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A

B

C

D

No image

Will be published

Invasive EEG
TC 2sec

Repetitive spike (red spike)

⇓ interictal

A

Low voltage fast activity

⇓ ictal = active ictal DC shifts

B

Flat EEG

⇓ ictal = passive DC shifts? **C**

Repetitive spike

ictal

D

Start-stop-start phenomenon