

Early Experience of SEEG in Non-lesional Refractory Epilepsy: a Case Illustration

LAM Shek Ching¹, SEE Ka Wing¹, CHOW Shuk Wan Joyce¹, FONG Ka Wing², POON Tak Lap¹

¹ Department of Neurosurgery, ² Department of Medicine, Queen Elizabeth Hospital, Hong Kong

Background

In non-lesional refractory epilepsy, it is challenging to delineate the epileptogenic zone (EZ). Stereotactic electroencephalograph (SEEG) allows more accurate lateralization and localization of seizure foci.

Case Illustration

A 42-year-old male suffered from non-lesional refractory epilepsy since the age of 31. Regarding seizure semiology, it began with cephalic aura and bilateral hearing loss, then became dialeptic with left facial and upper limb twitching, drooling of saliva as well as aphasia, and eventually developed post-ictal amnesia.

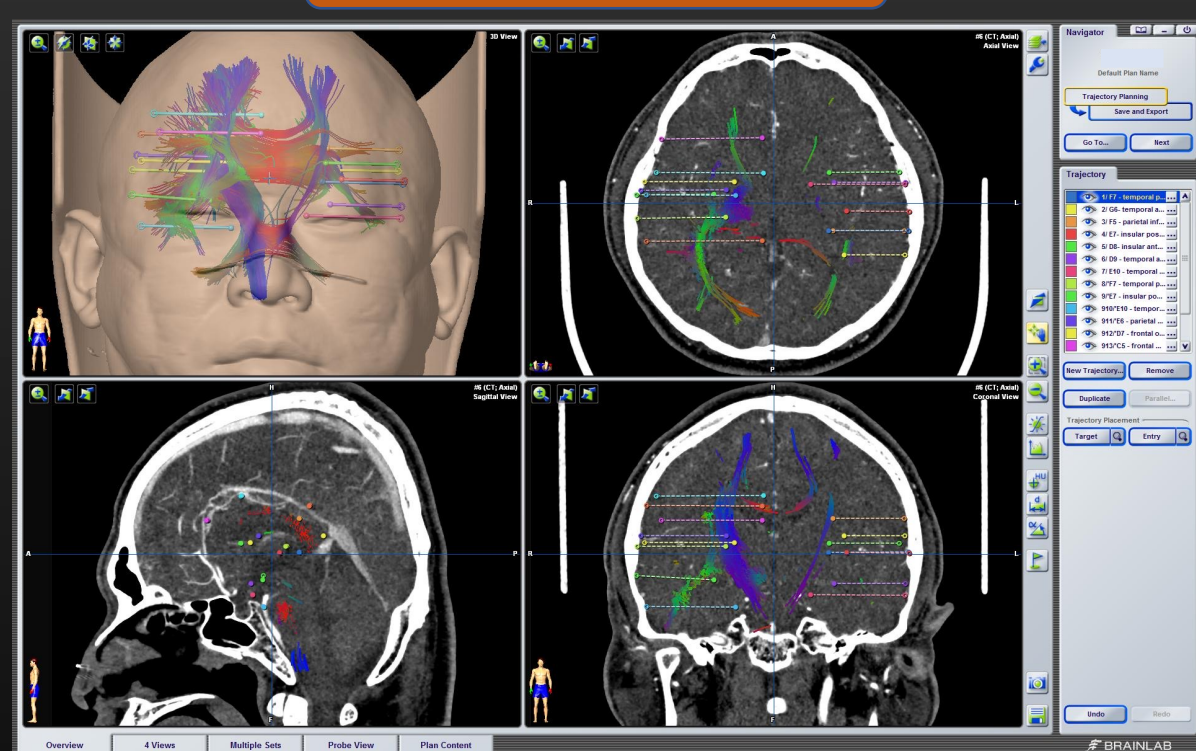
In view of discordant non-invasive workup, invasive SEEG was considered.

Phase 1 workup

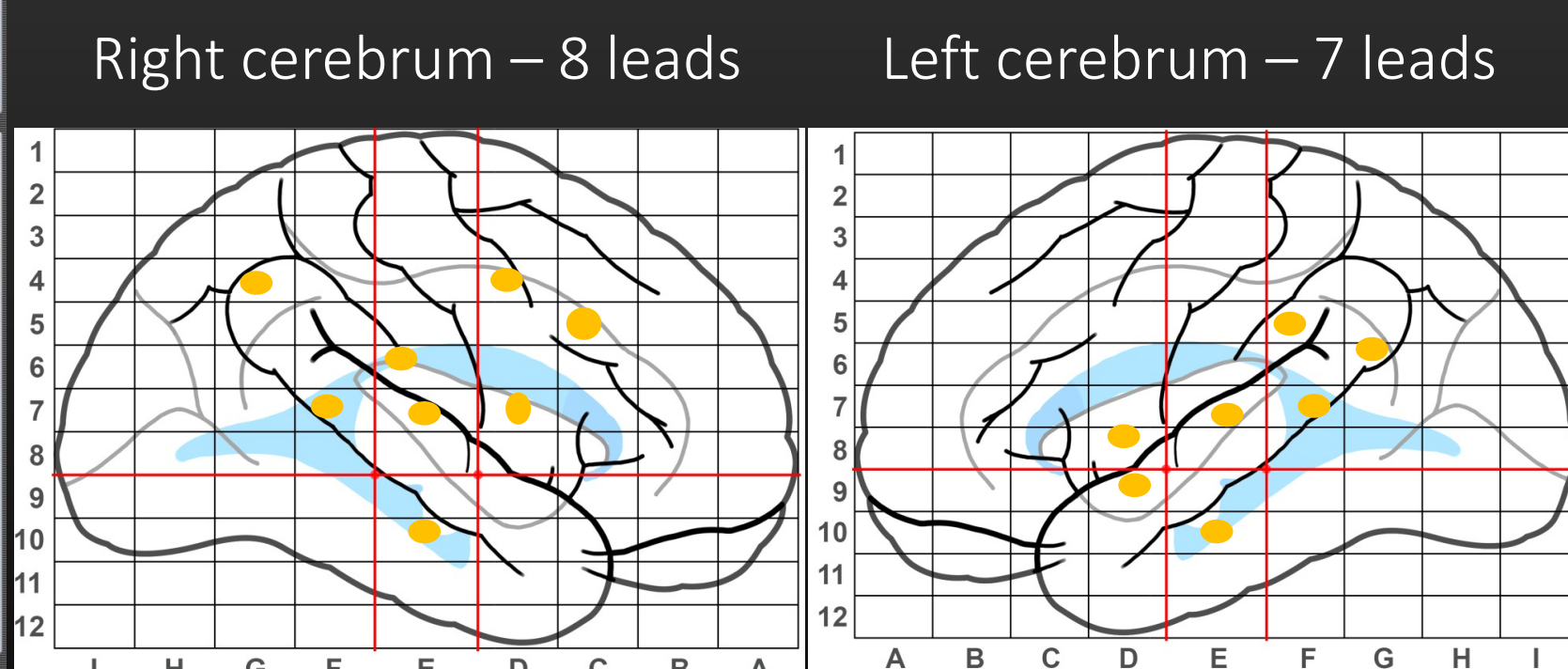
Our preimplantation differential diagnoses of EZ

- 1) Right frontal lobe as it was the most symptomatogenic one;
- 2) Right temporal discharge as it preceded the right frontal discharge;
- 3) Left temporal discharge as it transmitted via insula and posterior commissure to the right side.

Brainlab planning



Schematic diagram of 15 SEEG leads position

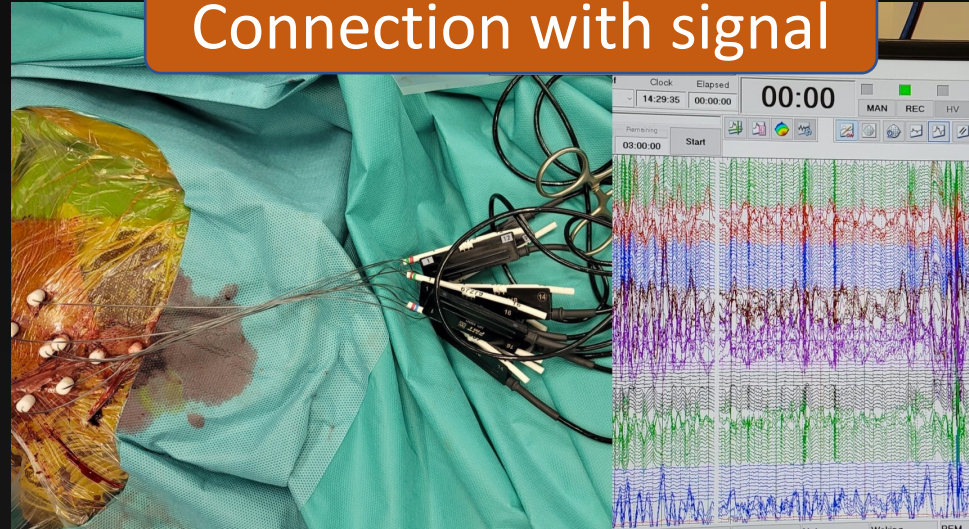


Bilateral SEEG implantation under frameless navigation guidance was performed. 15 electrode leads were implanted according to the SEEG implantation map.

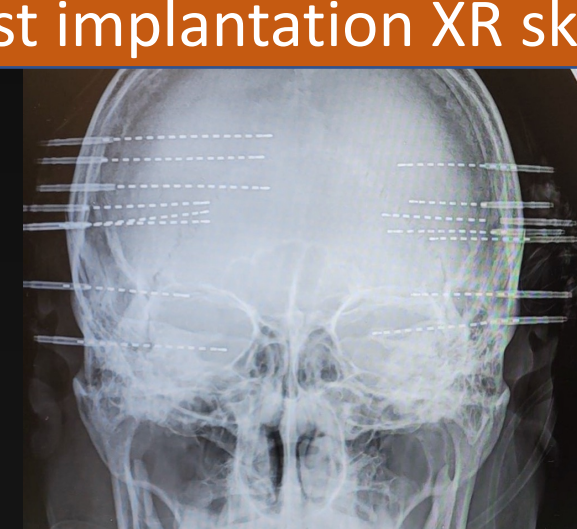
Varioguide



Connection with signal

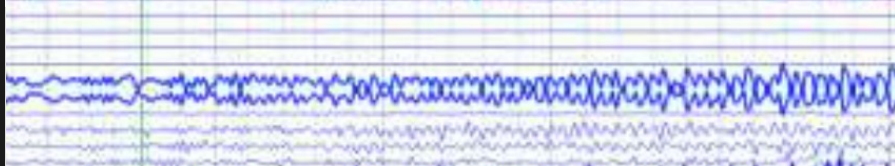

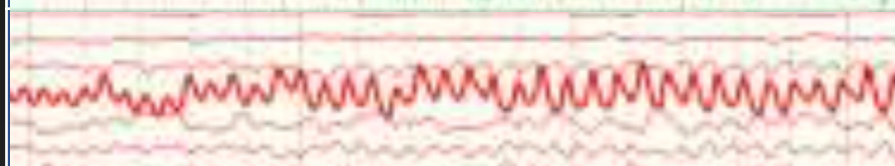
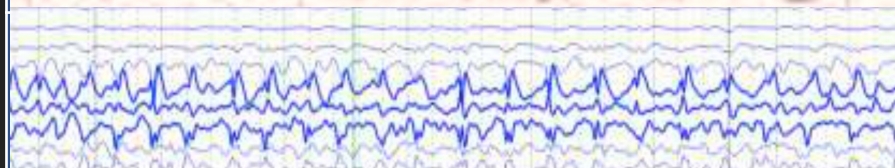
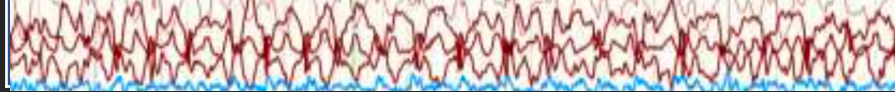


Post implantation XR skull



Phase 2 workup

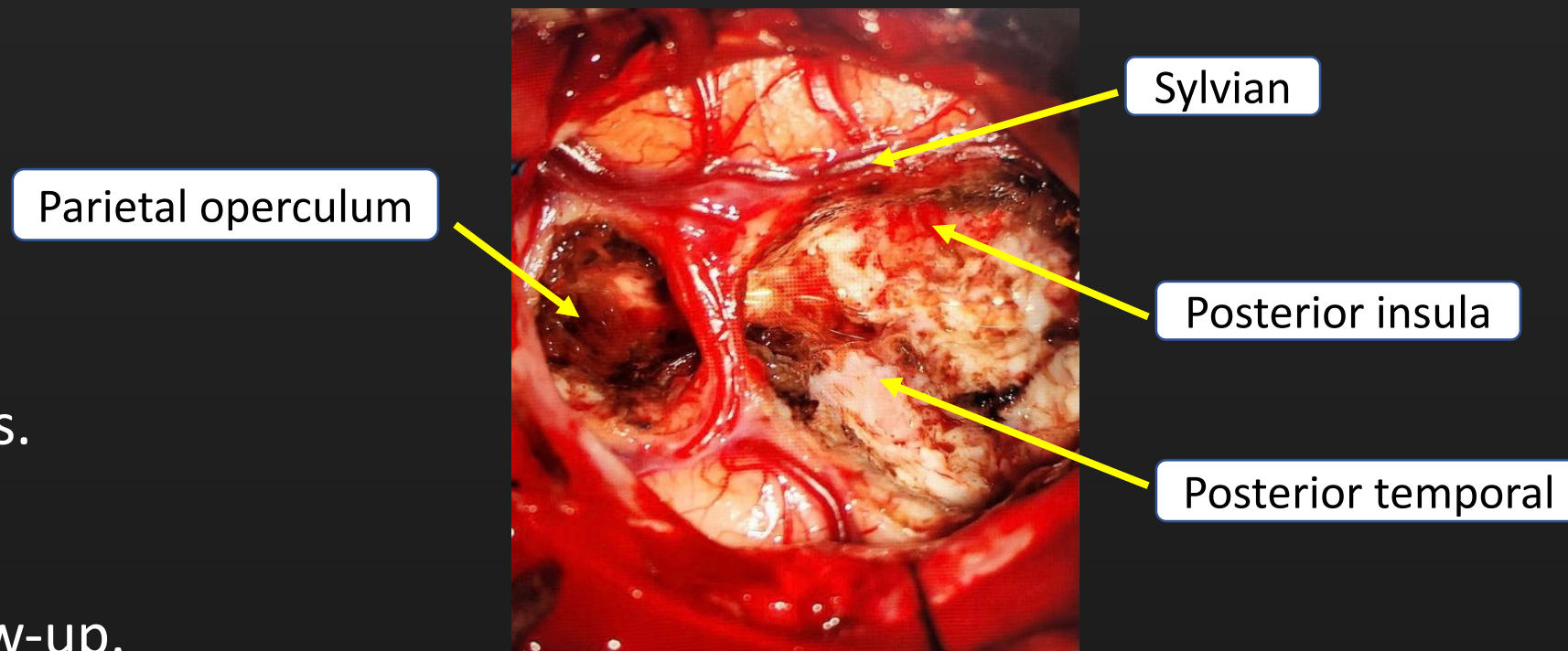
More than 10 seizure attacks were recorded.

SEEG	Localization	Semiology
	Right parietal operculum	Cephalic Aura
Superficial		
	Right posterior temporal lobe	
Superficial		
	Right posterior Insula	Ictal deaf Staring
Deep		
	Left temporal angular gyri	Left hand/facial clonic
Superficial		
	Left posterior temporal lobe	Head L versive
Superficial		

Post-implantation hypothesis

The likely EZ was right parietal operculum, right posterior insula and posterior temporal lobe, with the transmission of epileptic discharge to left temporal lobe and right frontal lobe causing the symptoms.

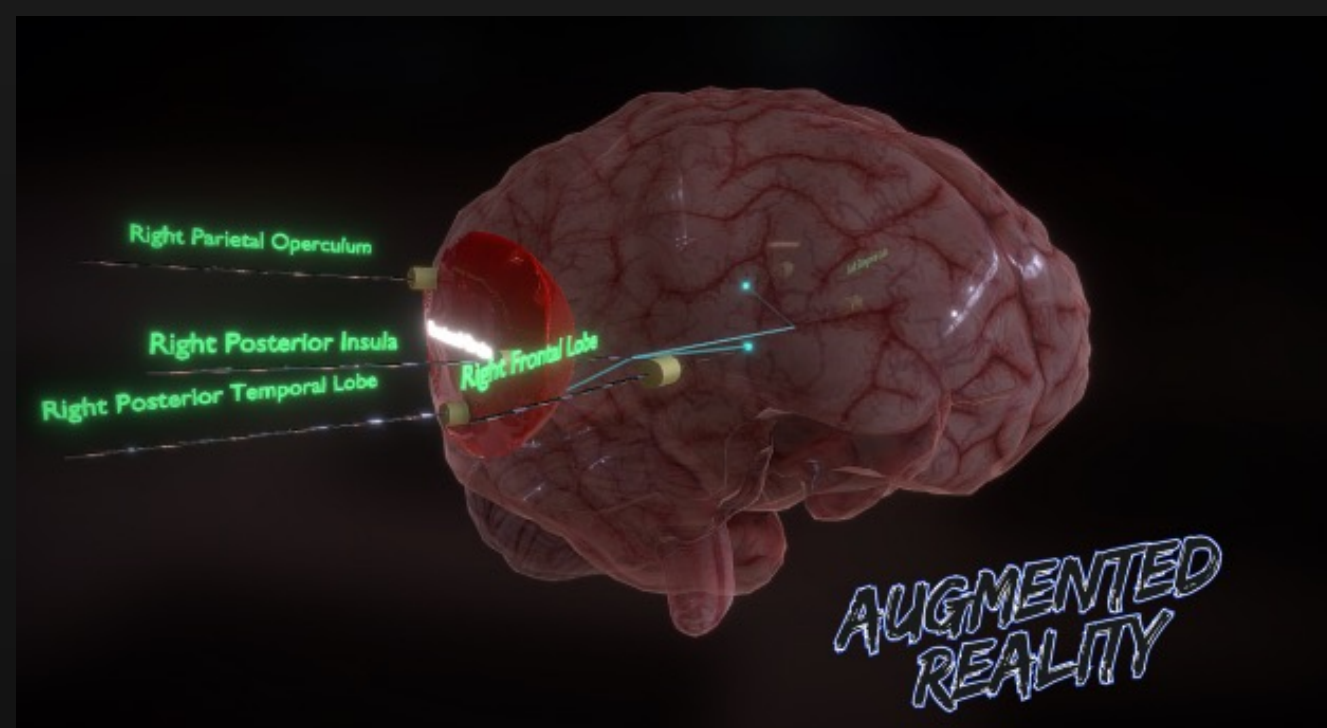
EZ excision



Outcome

No more seizure noted in the last follow-up.

AR Demonstration and Animated 3D Model of Epileptic Discharge and Excised Zone



AR demonstration



Animated 3D Model

Conclusion

SEEG is useful in EZ delineation when workup for non-lesional refractory epilepsy is inconclusive. Good outcome might be achieved with resection surgery guided by SEEG findings.