

# Safe and effective vagal-nerve-stimulation for new-onset refractory status-epilepticus (NORSE) in early pregnancy

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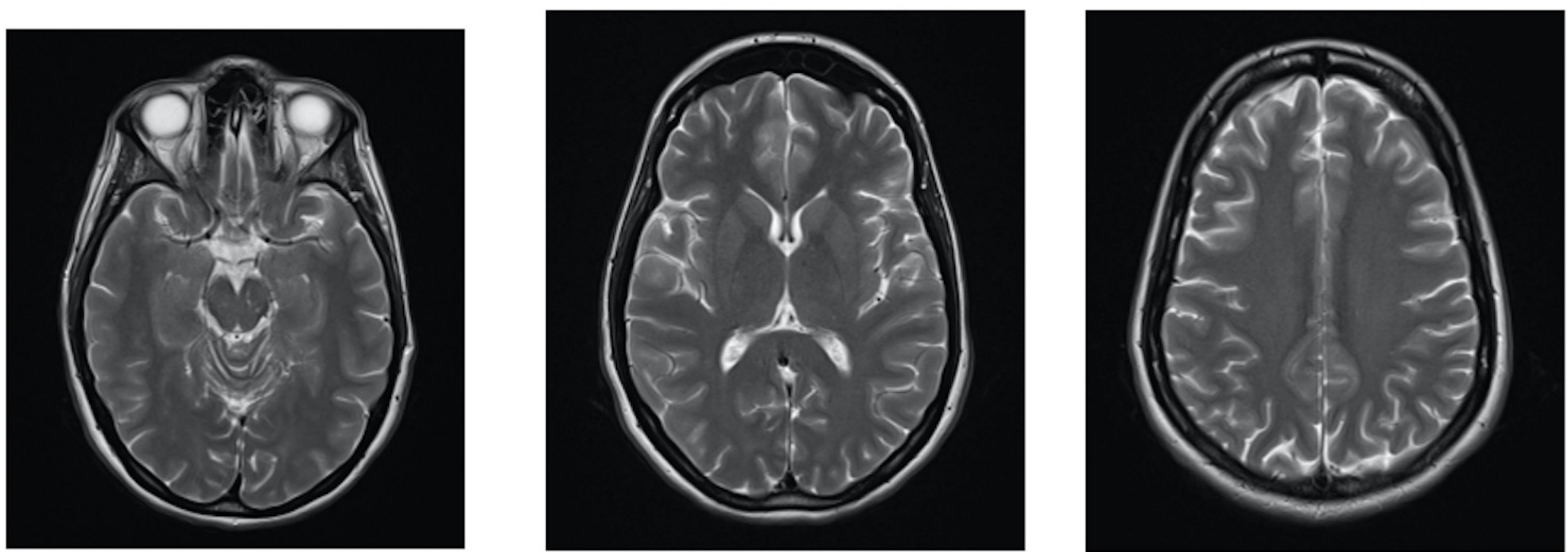
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### Objective

New-onset refractory status epilepticus (NORSE) is a rare but devastating emergency carrying a poor prognosis despite anti-seizure medication (ASM) polytherapy, which can lead to poor maternal and foetal outcomes in pregnancy. Although several treatments such as anti-seizure medications (ASMs), anaesthetic agents, immunosuppressive treatments, and neuromodulation have been suggested, consensus on optimal management is only now emerging. Management is further compounded in pregnant patients due to the teratogenicity of several anti-seizure medications (ASMs). In these patients, neuromodulation with vagal nerve stimulation (VNS) is an attractive option, as it may help avoid the use of ASM polytherapy. This is the first case-study to report the safe implantation and effectiveness of vagal nerve stimulation (VNS) during the first trimester of pregnancy to manage NORSE.

### Case-report

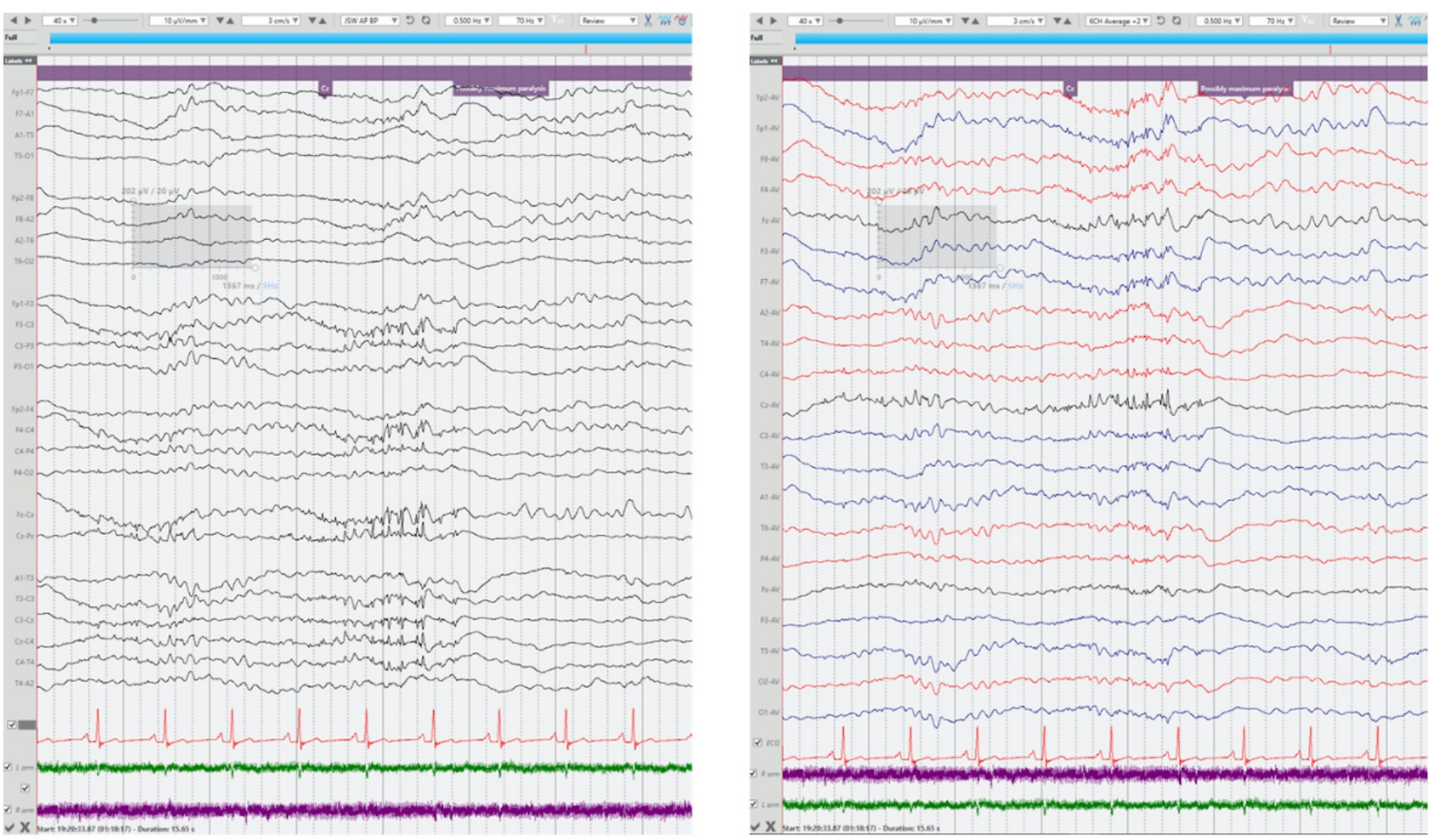
30-year old female, 5-weeks gestation presented with drug-refractory myoclonic status epilepticus, not responsive to anaesthetic agents and immunotherapy, secondary to drug overdose. Severity of seizures did not allow extubation; patient remained ventilated and sedated. VNS was implanted 26 days after seizure onset. Immediate post-operative output was 0.25mA, which was rapidly titrated up to 0.5mA the next morning, and to 0.75mA that afternoon. This was further increased to 1.0mA on 3rd day post-opera on, and to 1.25mA 7 days post-op. Myoclonic jerks diminished significantly 5 days post-op, and the patient was extubated. 20 days after VNS implantation, no myoclonic jerks were observed. There was also a notable neurological improvement including increase alertness and mobility, and ability to obey commands



Early pregnancy assessment 17 days after VNS implantation showed normal foetal heart activity, and crown-rump length. 12+3 weeks gestational age and normally-sited pregnancy were confirmed. 5 months after VNS implantation foetal ultrasound was normal, and spontaneous vaginal delivery was predicted. At 33+2 weeks gestation the patient experienced preterm premature rupture of membranes, and went into premature labour with transverse foetal lie and foetal bradycardia. The baby was delivered via Category 1B caesarean sec on under spinal anaesthesia; she was admitted to the neonatal ICU due to prematurity but was otherwise healthy (Apgar scores 3, 7, 8). Patient is also making a good obstetric recovery.

### Discussion

NORSE is challenging to manage, and treatment guidelines are only now emerging, which are further compounded in pregnancy due to ASM teratogenicity. Safety and efficacy of VNS make it a suitable treatment op on in pregnancy. Use of VNS implanted prior to conception to control epilepsy in pregnancy has been documented before, however, its acute implantation during pregnancy for NORSE has not been previously studied. Our case-report demonstrates that VNS can help control NORSE and reduce the need for ASM polytherapy and is not teratogenic.



### Conclusion

Our case-report is the first to suggest that VNS is safe and effective in pregnant patients presenting with NORSE. No teratogenicity was noted, and delivery was not significantly complicated. Future research can expand sample sizes to draw more valid conclusions; clinical practice should consider VNS in pregnant patients presenting with NORSE.

The authors declare no conflict of interest.

