

Supplementary Table 1. Demographics and clinical characteristics of the patients.

	Sex/Age	Prodrome	CSF WBC	CSF Protein	EEG at admission	Brain MRI/CT at admission
Patient 1	M/23	3 days headache, 1 day fever	0	56	BiPLEDS	Left hippocampal swelling, diffuse cortical swelling, leptomeningeal enhancement
Patient 2	M/20	4 days fever, headache, myalgia, cough, sputum	24 (P:2, L:14, O:8)	49	BiPLEDS	WNL
Patient 3	F/27	15 days headache, nausea, vomiting, 1 day fever	35 (L:28, O:6)	15	PLEDS, left temporal areas, bifrontal rhythmic delta	Brain CT: diffuse atrophy
Patient 4	F/38	2 days URI symptom	3 (L:2, O:1),	9	Right temporal rhythmic sharp waves	WNL
Patient 5	F/45	none	20 (P:10, L:10)	18.9	GPEDS	WNL
Patient 6	M/59	none	73 (P:84, L:16)	36	BiPLEDS	Bilateral temporal high signal intensity
Patient 7	F/39	2 days fever, myalgia	N/A	N/A	PLEDS, right temporal areas	Bilateral mesial temporal high signal intensity
Patient 8	M/18	3 days headache, fever	6 (P:4, L:2)	77.8	GPEDS	Diffuse cortical swelling, leptomeningeal enhancement
Patient 9	F/38	7 days URI symptom	3 (L:2, O:1)	9	Right temporal rhythmic sharp waves	WNL
Patient 10	F/57	5 days fever, chill, nausea, vomiting	6 (P:4, L:2)	77.8	GPEDS	Diffuse cortical swelling, leptomeningeal enhancement

Abbreviations: M: male; F: female; URI: upper respiratory infection; CSF: cerebrospinal fluid; WBC: white blood cells; P: poly-mononuclear leukocyte; L: lymphocyte; O: others; EEG: electroencephalography; BiPLEDS: bilateral independent periodic lateralized epileptiform discharges; PLEDs: periodic lateralized epileptiform discharges; GPEDS: generalized periodic epileptiform discharges; MRI: magnetic resonance imaging; CT: computed tomography; WNL: within normal limits.

Supplementary Table 2. Detailed seizure characteristics, MDPB treatment, and outcome.

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Seizure type	Convulsive, Non-convulsive	Convulsive, Non-convulsive	Convulsive, Non-convulsive	Convulsive	Convulsive, Non-convulsive	Convulsive	Convulsive	Convulsive	Convulsive, Non-convulsive	Convulsive, Non-convulsive
STESS total score	2	4	3	4	4	3	4	3	3	4
Admit mRS	5	5	4	5	5	5	5	5	4	5
Duration of status before MDPB (days)	35	6	19	19	16	7	15	60	46	8
Duration of anaesthetics before MDPB	31	5	16	5	14	4	14	54	36	2
Anaesthetics before MDPB	Pentobarbita, Ketamine	Midazolam	Midazolam, Thiopental	Midazolam, Thiopental	Midazolam, Thiopental	Midazolam	Midazolam, Pentobarbital , ketamine	Midazolam, Thiopental	Midazolam, Thiopental	Midazolam, Propofol
AED before MDPB	DPH, LEV, TPM, CZP	LEV, TPM, OxCBZ, VPA, DZP	DPH, PB, VPA	DPH, PB, CBZ	DPH, PB	LEV, OxCBZ, VPA, TPM	LEV, PB, TPM, CZP	DPH, CBZ, TPM, VPA	LEV, TPM, OxCBZ, PGB	LEV, OxCBZ, DPH, TPM
PB use before MDPB (serum level)	No	No	Yes (48.2)	Yes (20.5)	Yes (N/A)	No	Yes (53.4)	No	No	No
GCS at MDPB initiation	2	5	4	3	3	5	2	4	2	4
EEG at MDPB initiation	Ictal discharges	Ictal discharges	GPEDS	Burst suppression	GPEDS	Ictal discharges	Burst suppression	Ictal discharges	Burst suppression	GPEDS
PB loading dose (mg/kg) x times	30x1, 10x5	40x1, 30x1, 20x3, 10x3	10x2	15x1, 10x1	20x2	15x1	40x1, 20x1, 10x1	30x1, 10x1	20x1, 10x7	30x1

Max 24-hr cumulative dose (mg/kg)	29.5	60.2	30	18	30	95.7	73.1	36.8	40.4	88.2
Max serum level (µg/ml)	82.2	174	111	>80, exact level not checked	116.9	314.6	195.8	115.8	151.5	353.7
Days to wean anaesthetics after MDPB	0	0	0	12	4	0	6	0	2	4
Other AEDs during MDPB	LEV, LCM, PGB, RFM, DZP	LEV, TPM, OxCBZ, PGB, LCM	CBZ, DPH	OxCBZ, VPA, TPM	OxCBZ, TPM, DPH	LEV, ZNS, LZP, CZP	OxCBZ, TPM, PGB	VPA, DPH	LEV, OxCBZ, TPM, PGB, LCM, CBZ	LEV, OxCBZ, TPM, PGB, VGB
No. days from MDPB to initial SE control	20	41	31	15	11	6	30	29	N/A	N/A
Other treatments	IVIG, IVPD, Rituximab	IVIG, IVPD	none	none	none	none	none	none	IVIG, IVPD, Rituximab	IVIG, Oral Pd, hypothermia
Total length of MDPB (days)	14	45	24	19	84	11	46	60	59	53
Intubation	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)	O (Before HDBP)
Tracheostomy	Yes, removed	Yes	Yes	Yes, removed	Yes	Yes	Yes	Yes	Yes	Yes
Regain self-respiration	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Pressor	DA, NE	None	DA, Dobuta	DA	DA, Dobuta	DA	DA, NE	None	None	DA, NE
Other complications	line infection, pneumonia	pneumonia, UTI, ileus	UTI, ileus	ileus, line infection, rhabdomyolysis	UTI, ileus	Pneumonia, Ileus, LFT ↑	Fungaemia, Bacteraemia, Sepsis, LFT ↑ drug eruption	MRSA pneumonia, Fungal UTI, Septic shock	Pneumonia, UTI, CDAD, Atelectasis	Septic shock, AKI, Fungaemia, LFT ↑ pneumonia, bacteraemia
ICU length of stay	24	30	90	33	58	57	292	18	46	54

Total length of hospitalization	73	165	99	68	384	58	292	62	154	54
Initial SE control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Final seizure outcome	Successful therapy	Successful therapy	Successful therapy	Successful therapy	Successful therapy	Withdrawal seizure	Withdrawal seizure	Death during treatment	Initial failure	Initial failure
mRS at discharge	3	4	5	1	5	5	6	6	5	6
Discharge GCS	14	10	6	15	9	3	3	3	3	3
AED at discharge	LEV, LCM, PGB, RFM, DZP	PB, LEV, TPM, OxCBZ, PGB, LCM,CBZ	CBZ, DPH, PB	PB, OxCBZ, VPA, TPM	PB, DPH, OxCBZ, TPM	PB, LEV, DPH, CBZ	N/A	N/A	PB, LEV, DPH, TPM, PGB, LCM, CBZ	N/A
PB dose at discharge	0	10	4	1.8	4.5	22.9	N/A	N/A	5.5	N/A
Disposition	Rehabilitation facility	Rehabilitation facility	Nursing home	Home	Nursing home	Other hospital	Death	Death	Nursing home	Death
Reasons for death							Sepsis, fungal pneumonia	Septic shock, multiorgan failure		Sepsis, fungaemia
GCS at 3 months	15	15	Unknown	15	11	Unknown	3	3	5	3
mRS at 3 months	2	4	Unknown	1	5	Unknown	6	6	5	6
AEDs after discharge	LEV, LCM, PGB, RFM, DZP	PB, LEV, TPM, OxCBZ, PGB, LCM,CBZ	Unknown	PB, OxCBZ, VPA, TPM	PB, OxCBZ, TPM	Unknown	N/A	N/A	PB, LEV, DPH, TPM, PGB, LCM, CBZ	N/A
PB dose after discharge (mg/kg)	0	7.2	Unknown	1.8	2	Unknown	N/A	N/A	5.5	N/A
Seizure freedom after 3 months of follow-up	No (1 CPS/week)	No (1CPS/week)	Unknown	No (1SPS/week)	No (2SPS/week)	Unknown	Deceased	Deceased	No (2 CPS/day)	Deceased

Abbreviations: N/A: not applicable; SE: status epilepticus; MDPB: megadose phenobarbital; PB: phenobarbital; mT: mesial temporal; HSI: high signal intensity; WNL: within normal limits; AED: antiepileptic drugs; DPH: phenytoin; LEV: levetiracetam; TPM: topiramate; LCM: lacosamide; OxCBZ: oxcarbazepine; PGB: pregabalin; CBZ: carbamazepine; VPA: valproic acid; RFM: rufinamide; DZP: diazepam; CZP: clonazepam; LZP: lorazepam; ICU: intensive care unit; mRS: modified Rankin Scale;

GCS: Glasgow Coma Scale; DA: dopamine; Dobuta: dobutamine; NE: norepinephrine; UTI: urinary tract infection; LFT: liver function test; MRSA: methicillin-resistant *Staphylococcus aureus*; CDAD: C-difficile associated diarrhoea; AKI: acute kidney injury; CPS: complex partial seizure; SPS: simple partial seizure.

Supplementary Table 3. Summary of MDPB treatment cases in refractory or super-refractory status epilepticus reported in the literature.

Reference	No. of patients	Age	SE type (seizure type)	Aetiology (ILAE classification)	Max 24-hr cumulative dose (/day)	Maximum serum level ($\mu\text{g/ml}$)	MDPB duration	Adverse effect	Seizure outcome	Mortality
Crawford <i>et al.</i> , 1988	48	Newborn-13 years	RSE (convulsive)	Acute symptomatic 81%, Remote symptomatic 4%, Progressive CNS disorder 12.5%, Unknown 2%	120 mg/kg	344 (70-344)	0-48 days	MV 80%, Pressor 26%	SE control 98%	9/48 (19%)
Wilmshurst <i>et al.</i> , 2010	16	9 days-169 months	RSE (convulsive)	Acute symptomatic 75%, Unknown 25%	80 mg/kg	283	Loading, once or twice	MV 50%, Hepatic dysfunction 37.5%	SE control 69%	N/A
Chua <i>et al.</i> , 1999	14	15-76 years	RSE (11 convulsive, 3 non-convulsive)	Acute symptomatic 50%, Remote symptomatic 14%, Unknown 36%	20,000 mg	307.5	4-20 days	Pressor 57%	SE control 100%	5/14 (21%)
Tiamkao <i>et al.</i> , 2007	10	16-86 years	RSE (convulsive)	Acute symptomatic 60%, Progressive CNS disorder 20%, Unknown 20%	140 mg/kg	218.34	N/A	None	SE control 70%	5/10 (50%)
Tiamkao <i>et al.</i> , 2013	6	33-90 years	RSE (5 convulsive, 1 non-convulsive)	Acute symptomatic 83.3%, Progressive CNS disorder 16.7%	960 mg	255.55	Loading, once or twice	None	SE control 50%	1/6 (17%)
Wang <i>et al.</i> , 2011	5	14-38 years	RSE (convulsive)	Acute symptomatic 100%	2,400 mg (1200-2400)	134 (96-134)	24-100 days	MV 100%, Pressor 40%, Arrhythmia 100%, Rash 60%, Hepatic dysfunction 100%	N/A	0
Lee <i>et al.</i> , 2005	3	7-9 years	SRSE (convulsive)	Acute symptomatic 100%	80 mg/kg (70-80)	>1,000	2-4 months	MV 100%, Pressor 100%, Ileus 67%	SE control 100%	0

Mirski <i>et al.</i> , 1995	1	18 years	SRSE (convulsive)	Acute symptomatic	3,000 mg	290	>7 weeks	MV, Pressor, Septic shock	SE control	0
Bausell <i>et al.</i> , 2011	1	29 years	SRSE (convulsive)	Acute symptomatic	1,400 mg	151.5	4 months	Pulmonary embolism, bowel oedema, hyperammonaemia, hepatomegaly, hepatitis, extremities contracture, critical illness neuromyopathy	SE control	0

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Supplementary figure legends.

Figure S1: Clinical course of the patients.

Dotted red line indicates initial control of status epilepticus.

Y axis (left): daily dose of ~~Phenobarbital~~ phenobarbital (mg/kg/day) or Glasgow coma scale.

Y axis (right): serum phenobarbital level (µg/mL).

Black triangle: ~~Phenobarbital~~ phenobarbital loading.

A: Patient TS 2: successful MDPB treatment.

B: Patient TS 8: death during MDPB after initial control of SE.

C: Patient TS 6: withdrawal seizure due to rapid tapering of MDPB.

D: Patient TS 9: initial MDPB failure.

