

Supplemental Online Content

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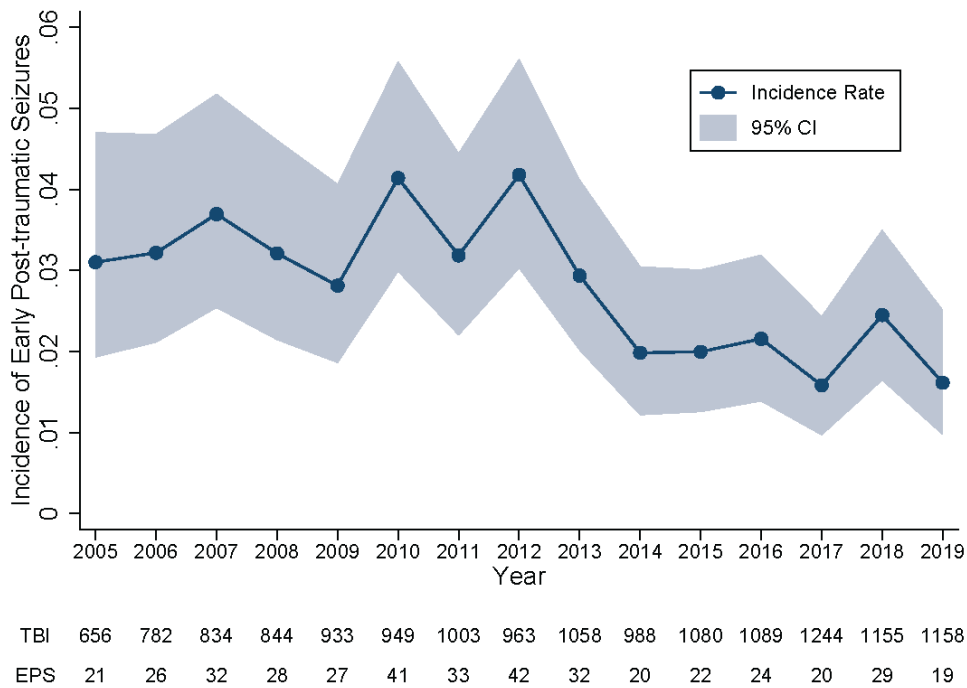
This supplemental material has been provided by the authors to give readers additional information about their work.

eMethods: Data Collection

All data was supplied by the Victorian State Trauma Outcomes Registry and Monitoring Group (VSTORM), following local ethics approval (MUHREC Project ID 18104). The VSTR is a population-based trauma registry collecting data about hospitalized patients with major trauma from all 138 trauma receiving health services within the state of Victoria, Australia (population 6.5 million people) (1). Patients are included using an opt-out process, where all eligible patients are included and provided with a letter and brochure detailing their inclusion, the purpose of the registry, and how to opt-out if they wish to do so. Verbal consent for telephone interviews are obtained at follow up. The registry has ethics approval from the Department of Health and Human Services Human Research Ethics Committee (HREC), Monash University HREC, and participating trauma-receiving hospitals. Existing registry data were used and patients were not contacted as part of this study.

eTable 1. Prevalence of EPS		
Category	N=15,152 (%)	
No EPS	14,736	(97.3)
All EPS	416	(2.7)
- Seizure	389	(2.6)
- Status epilepticus	27	(0.2)

eFigure. Incidence of Early Posttraumatic Seizures by Year from 2005-2019



eTable 2. Demographics and pre-existing illness						
Variable	No EPS		EPS		p-value	Corrected p-value [^]
	N=14,736		N=416			
Age - yrs					<0.001	
Median (IQR)	60	(35-79)	69	(44-81)		
Sex (%)					0.82	
Male	10,172	(97.3)	285	(2.7)		
Female	4,564	(97.2)	131	(2.8)		
ARIA (%)					0.36	
Urban	13574	(97.3)	382	(2.7)		
Rural	681	(97.8)	15	(2.2)		
Missing	481	(96.2)	19	(3.8)		
IRSAD quintile (%)					0.16	
1st - most disadvantaged	2,248	(97.4)	60	(2.6)		
2nd	2,119	(96.8)	71	(3.2)		
3rd	2,783	(97.7)	66	(2.3)		
4th	3,166	(97.6)	78	(2.4)		
5th - least disadvantaged	3,951	(97.0)	122	(3.0)		
Missing	469	(96.1)	19	(3.9)		
Charlson Comorbidity Index weight (%)					<0.001	
0	7,146	(98.6)	103	(1.4)	<0.001	<0.001
1	5,415	(97.2)	156	(2.8)	0.753	0.753
2+	2,175	(93.3)	157	(6.7)	<0.001	<0.001
History of alcohol misuse (%)					0.020	
No	13,019	(97.4)	352	(2.6)		
Yes	1,717	(96.4)	64	(3.6)		
History of drug misuse (%)					0.54	
No	14,423	(97.2)	409	(2.8)		
Yes	313	(97.8)	7	(2.2)		
History of mental health conditions (%)					0.71	
No	11,830	(97.2)	337	(2.8)		
Yes	2,906	(97.4)	79	(2.6)		
ARIA, accessibility and remoteness index of Australia; EPS, early posttraumatic seizure; IQR, interquartile range; IRSAD, index of relative socio-economic advantage and disadvantage.						
[^] p-values from pairwise comparisons were corrected for multiple comparisons using Holm-Bonferroni method. All p values for categories compared to those not in that category.						

eTable 3. Injury and neurosurgery characteristics						
Variable	No EPS		EPS		p-value	Corrected p-value [^]
	N=14,736		N=416			
Nature of injury (%)					<0.001	
Isolated TBI	6,228	(96.4)	234	(3.6)		
Multi-trauma	8,508	(97.9)	182	(2.1)		
Cause of injury (%)					<0.001	
Motor vehicle incident	2,165	(98.6)	31	(1.4)	<0.001	<0.001
Motorcycle	820	(98.3)	14	(1.7)	0.05	0.26
Bicycle	568	(98.1)	11	(1.9)	0.20	0.61
Pedestrian	1,081	(97.7)	25	(2.3)	0.31	0.61
Low fall <1m	6,078	(96.2)	237	(3.8)	<0.001	<0.001
High fall	1,639	(97.8)	37	(2.2)	0.15	0.61
Others	2,385	(97.5)	61	(2.5)	0.41	0.41
Nature of Head Injury (%)						
Subdural hematoma	9,018	(96.4)	340	(3.6)	<0.001	<0.001
Contusion	4,495	(97.1)	135	(2.9)	0.40	0.79
Subarachnoid haemorrhage	5,553	(96.6)	193	(3.4)	<0.001	0.002
Intraventricular haemorrhage	503	(95.8)	22	(4.2)	0.039	0.20
Epidural haematoma	2,132	(97.9)	45	(2.1)	0.036	0.22
Intracerebral haemorrhage	1,913	(97.0)	60	(3.0)	0.39	1.00
Diffuse axonal injury	700	(96.8)	23	(3.2)	0.46	0.46
Base of skull fracture	4,809	(97.9)	104	(2.1)	0.001	0.007
Vault fractures	2,641	(97.7)	62	(2.3)	0.11	0.45
AIS head					<0.001	
3	4,972	(98.8)	60	(1.2)		
4	5,402	(97.6)	134	(2.4)		
5-6	4,362	(95.2)	222	(4.8)		
Injury Severity Score (ISS)					<0.001	
Median (IQR)	21.0	(16-26)	25.0	(17-26)		
Glasgow coma scale - head injury severity (%)					<0.001	
Mild (13-15)	9,948	(97.7)	237	(2.3)	<0.001	<0.001
Moderate (9-12)	1,202	(96.1)	49	(3.9)	0.008	0.023
Severe (≤8)	2,808	(96.3)	107	(3.7)	<0.001	0.001
Missing	778	(97.1)	23	(2.9)		
Any neurosurgery (%)	2,084	(94.5)	121	(5.5)	<0.001	

Craniotomy	459	(93.1)	34	(6.9)	<0.001	<0.001
Burr hole	192	(91.4)	18	(8.6)	<0.001	<0.001
EVD/ICP	1,686	(94.5)	98	(5.5)	<0.001	<0.001
AIS, abbreviated injury scale; EPS, early posttraumatic seizure; EVD, external ventricular drain; ICP, intracranial pressure; IQR, interquartile range; TBI, traumatic brain injury.						
^p-values from pairwise comparisons were corrected for multiple comparisons using Holm-Bonferroni method. All p values for categories compared to those not in that category.						

eTable 4. Health services and vital characteristics

Variable	No EPS		EPS		p-value
	N=14,736		N=416		
Outcome hospital (%)					<0.001
Major	12,082	(82)	375	(90)	
Others	2,654	(18)	41	(10)	
Time to primary centre - hrs	n=14,384		n=403		0.003
Median (IQR)	1.62	(1.08-3.80)	1.77	(1.13-14.5)	
Time to head CT - hrs	n=12,865		n=358		0.74
Median (IQR)	3.58	(2.33-8.50)	3.58	(2.10-17.3)	
Heart rate - beats/min	n=14,249		n=401		0.71
Median (IQR)	85	(72-100)	85	(73-100)	
Blood pressure - mmHg	n=14,220		n=400		<0.001
Median (IQR)	140	(125-160)	147	(130-166)	
Hypotension - bp≤90 mmHg (%)					0.14
No	13,743	(93)	392	(94)	
Yes	477	(3)	8	(2)	
Missing	516	(4)	16	(4)	
Respiratory rate - breaths/min	n=12,939		n=359		0.75
Median (IQR)	18	(16-20)	18	(16-20)	
bp, blood pressure; CT, computed tomography; EPS, early posttraumatic seizure; IQR, interquartile range.					

eTable 5. Hospital morbidity and mortality						
Variable	No EPS		EPS		p-value	Corrected p-value[^]
	N=14,736		N=416			
ICU admission					<0.001	
No	9,324	(63)	154	(37)		
Yes	5,412	(37)	262	(63)		
ICU ventilated	n=5,412		n=262		<0.001	
No	1,129	(21)	32	(12)		
Yes	4,283	(79)	230	(88)		
ICU length of stay - days	n=5,394		n=262		<0.001	
Median (IQR)	5	(2-11)	8	(4-14)		
ICU ventilated length of stay - days	n=4,281		n=230		<0.001	
Median (IQR)	4	(1-9)	6	(2-12)		
Hospital length of stay - days	n=14,394		n=403		<0.001	
Median (IQR)	7	(4-13)	17	(9-29)		
In-Hospital Mortality*					<0.001	<0.001
No	12,416	(84)	323	(78)		
Yes	2,320	(16)	93	(22)		
Discharge destination					<0.001	
Home	5,514	(37)	36	(9)	<0.001	<0.001
Rehabilitation	5,529	(38)	232	(56)	<0.001	<0.001
Others	1,372	(9)	55	(13)	<0.001	<0.001
Missing	1	(0.01)	0	(0)		
EPS, early posttraumatic seizure; ICU, intensive care unit; IQR, interquartile range.						
[^] p-values from pairwise comparisons were corrected for multiple comparisons using Holm-Bonferroni method.						
*1 result missing for EPS group.						

eTable 6. Follow-up outcomes among patients survived the initial TBI admission and due for 24-month follow-up

Variable	No EPS		EPS		p-value [^]
	n=11,071		n=311		
Glasgow outcome scale at 24 months post-injury					<0.001
Good recovery	2,686	(24)	40	(13)	
Moderate disability	2,384	(22)	45	(14)	
Severe disability	1,765	(16)	80	(25)	
Vegetative state	21	(0.2)	3	(1)	
Deceased	1,462	(13)	68	(22)	
Unable to determine/missing	2,753	(25)	75	(24)	
PTE by 24 months post-injury					<0.001
No	1,306	(12)	10	(3)	
Yes	314	(3)	35	(11)	
Incomplete#	492	(4)	18	(4)	
Missing	8,959	(81)	260	(81)	
Use of ASM within 24 months					<0.001
No	2,335	(21)	22	(7)	
Yes	543	(5)	46	(15)	
Incomplete#	1,287	(12)	23	(7)	
Missing	6,906	(62)	220	(71)	

ASM, antiseizure medication; EPS, early posttraumatic seizure; IQR, interquartile range.

[^]p-value from complete case analysis, i.e. excluded missing or incomplete data.

#Patients did not report development of posttraumatic epilepsy or use of ASM at 6- and/or 12-month follow-up, but missing 24-month follow-up.

eReference

1. Cameron PA, Finch CF, Gabbe BJ, Collins LJ, Smith KL, McNeil JJ. Developing Australia's first statewide trauma registry: what are the lessons? *ANZ J Surg*. 2004 Jun 8;74(6):424–8.