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Evaluation of the hypothesis that viral meningitis can mimic abusive head trauma

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Background

- Viral meningitis (VM) has been proposed to mimic abusive head trauma (AHT)
- Comparing VM and AHT across presenting features will evaluate this theory
- Hypothesis: *VM will differ significantly from AHT in historical and clinical presenting features*
- Objectives: Compare VM to AHT proxy group across demographic, HPI and clinical domains. Compare both groups to SDH only

Objectives/Methods

- Retrospective, case-control study of subjects < 24 months old
- VM subjects: CSF positive for PeV, EV or HSV
- Subjects with CAP consultation had SDH identified by CT or MRI brain
- Concomitant suspicious injuries (CSIs) used to categorize SDH subjects into "AHT proxy" and "SDH only" groups

Results – Demographics Domain

- N = 397 VM subjects, 118 AHT proxy subjects and 35 SDH only subjects
- AHT and SDH only subjects were significantly older than VM subjects
- AHT subjects were more likely to be male, minority race and publicly insured than VM subjects

Results – History Domain

Characteristics	VM, n (%)	AHT proxy, n (%)	SDH only, n (%)	OR AHT vs VM (95% CI)	OR SDH only vs VM (95% CI)	OR SDH only vs AHT (95% CI)
Seizure	9 (2.3)	43 (36.4)	5 (14.3)	24.7 (11.6 - 52.8)	7.2 (2.3 - 22.8)	0.3 (0.1 - 0.8)
Mental status change	5 (1.3)	78 (66.1)	16 (45.7)	152.8 (58.5 - 399.7)	66.0 (21.9 - 199.3)	0.4 (0.2 - 0.9)
Decreased tone	5 (1.3)	20 (16.9)	3 (8.6)	16.0 (5.7 - 43.7)	7.4 (1.7 - 32.2)	0.5 (0.1 - 1.7)
Apnea	4 (1.0)	20 (16.9)	5 (14.3)	20.1 (6.7 - 60.0)	16.4 (4.2 - 64.2)	0.8 (0.3 - 2.4)
Difficulty breathing	6 (1.5)	31 (26.3)	1 (2.9)	23.2 (9.4 - 57.4)	1.9 (0.2 - 16.4)	0.1 (0.01 - 0.6)

- Symptoms of neurologic compromise common in AHT and SDH only subjects
- AHT (OR 322.5 [121.0-859.3]) and SDH only subjects (OR 485.2 [63.8-3686.5]) were significantly more likely than VM subjects to have a history of no fever
- AHT and SDH only subjects were more likely to have vomiting than VM but less likely to have other ill symptoms

Results – Clinical Domain

- Higher odds of intubation (OR 62.4 [18.8-207.1]), witnessed seizure (OR 10.2 [3.9-26.8]) in AHT subjects compared to VM
- Significantly higher odds of intubation (OR 12.3 [2.4-63.5]) in SDH only subjects compared to VM
- VM subjects more likely than AHT and SDH only subjects to have a clinical fever
- SDH only subjects less likely to be intubated and have witnessed seizure than AHT

Conclusions

- Viral meningitis is not supported as a mimic of abusive head trauma
- AHT subjects are more ill appearing than VM
- SDH subjects are more similar to AHT subjects than VM subjects in historical features
- Certain combinations of features have a high PPV for abuse