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5-2021

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Danielle Horton

Tanya Burrell

James Anderst

Lyndsey Hultman

Mary Moffatt

See next page for additional authors

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Authors

Danielle Horton, Tanya Burrell, James Anderst, Lyndsey Hultman, Mary Moffatt, Henry T. Puls, and Rangaraj Selvarangan

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

Danielle Horton MD; Tanya Burrell MD; Mary Moffatt MD; Henry Puls MD; Raj Selvarangan PhD; James Anderst MD MS

Children's Mercy Hospital Kansas City

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