



Plenary Session I (cont.)

10

LOW D-DIMER PREDICTS THE ABSENCE OF INTRACRANIAL HEMORRHAGE IN PEDIATRIC BLUNT HEAD TRAUMA

Simone Langness, MD¹, Jonathan Halbach, DO², Erin Ward, MD¹, Julie Robles, BS¹, Katherine Davenport, MD³, Stephen Bickler, MD³, Karen Kling, MD³, Julia Grabowski, MD⁴, Timothy Fairbanks, MD³.

¹UC San Diego, San Diego, CA, USA, ²Naval Medical Center, San Diego, CA, USA, ³Rady Children's Hospital, San Diego, CA, USA, ⁴Lurie Children's Hospital, Chicago, IL, USA.

Purpose:

Pediatric blunt head trauma (BHT) accounts for nearly 600,000 emergency room visits annually and rapid evaluation for intracranial hemorrhage (ICH) is essential. Head computer tomography (CTH) remains the gold standard for ICH workup yet judicious use must be exercised to avoid excessive radiation exposure. Current screening algorithms rely on subjective data and an objective element may prove an important addition. We aimed to determine if quantitative D-dimer could aid in the detection of ICH following BHT and thus limit unnecessary CTHs.

Methods:

We performed a retrospective review of all patients presenting within 6 hours of BHT to our Level I pediatric trauma center from 2011-2013. Patient who underwent evaluation with both CTH and plasma D-dimer level were included. Clinically relevant ICH (cICH) was defined as ICH requiring neurosurgical intervention, prolonged intubation/hospitalization or causing death.

Results:

Of the 526 patients evaluated, ICH was identified in 24% with cICH comprising half. D-dimer correlated with injury severity. Average D-dimer value was significantly higher in the cICH group (4077 pg/ μ L) compared to ICH, skull fracture or non-injury groups (3557, 2458 and 1489 pg/ μ L respectively, $p < 0.0001$). At low D-dimer values, the likelihood of ICH and cICH were greatly diminished (Figure 1) and no patient with cICH had a D-dimer < 750 pg/ μ L. Table 1 illustrates the negative predictive value (NPV) and CTHs avoided if D-dimer were incorporated into a screening algorithm.

Conclusion:

In this study, a low plasma D-dimer value accurately predicted the absence of intracranial hemorrhage for pediatric patient with blunt head trauma. Incorporating D-dimer into current diagnostic algorithms may significantly limit the number of unnecessary head CTs performed in this population.

Plenary Session I (cont.)

Negative Predictive Value of D-Dimer for Evaluation of ICH						
ALL Glasgow Coma Scale Scores	ICH (N)	ICH NPV	cICH (N)	cICH NPV	Avoided CTH (N)	Percentage of BHT Patients
D-Dimer <100	0	100%	0	100%	97	18.4%
Dimer <500	4	97.8%	0	100%	177	33.7%
Dimer <750	6	97.2%	0	100%	209	39.7%
Dimer <1000	8	96.2%	1	99.6%	232	44.1%
Glasgow Coma Scale Score 14-15	ICH (N)	ICH NPV	cICH (N)	cICH NPV	Avoided CTH (N)	Percentage of BHT Patients
D-Dimer <100	0	100%	0	100%	82	17.8%
Dimer <500	4	97.8%	0	100%	158	34.2%
Dimer <750	6	97.2%	0	100%	189	40.9%
Dimer <1000	8	96.2%	0	100%	211	45.7%

Figure 1

Distribution of Injuries for Various D-Dimer Levels

