Utility of Platelet Sensitivity Assays in Traumatic Brain Injury



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Introduction

There are 1 million traumatic brain injuries in U.S. adults each year (1). With one-fifth of U.S. adults and half of those over age 65 taking daily aspirin, history of anticoagulation use is vital information in patients admitted with TBI (2). Furthermore, there is a 4-5 fold higher risk of mortality in head trauma patients on preinjury anticoagulation (3). A sizeable minority of patients on antiplatelet medications are nonresponders. Recent cardiac literature estimates 28% of patients on aspirin, 21% on clopidogrel, and 6% on both are nonresponders (4,5,6,7). At our institution patients with history of antiplatelet medication and head trauma with intracranial hemorrhage on CT are transfused single donor platelets. By identifying nonresponders, the morbidity and cost of platelet transfusions may be avoided. We sought to identify whether the implementation of a commercially available platelet sensitivity assay at a level I trauma center can provide information that can direct patient care, improve patient safety, and reduce health care costs.

Methods

A retrospective review of a prospective database was performed for all patients with traumatic intracranial hemorrhage on head CT admitted from September 2010 through July 2011. VerifyNow platelet sensitivity assays were performed and results recorded. 550 aspirin reaction units and greater were considered aspirin nonresponders, and less than 10% inhibition on the P2Y12 assay were considered clopidogrel nonresponders. Patients with documented antiplatelet use were transfused regardless of their assay results. The number of patients with platelet inhibition and number of single donor platelet units transfused were recorded.

Results

124 patients were admitted with TBI over 10 months, and all patients had platelet sensitivity assays performed. 57 patients were reported to be on antiplatelet agents. Our nonresponder rates were 27% for aspirin and 50% for clopidogrel. Of the 10 patients on both aspirin and clopidogrel, 0% were nonresponsive to aspirin only, 60% were nonresponsive to clopidogrel only, and 10% were nonresponsive to both (see Table 1).

There were no adverse effects from platelet transfusions. 22 units of single donor platelets were transfused in non-responders. The fiscal value of these 22 units was 8800 dollars.

12% of patients (8/67) not taking aspirin or clopidogrel showed platelet inhibition on the aspirin assay. Of these patients, 1 was taking excessive doses of ibuprofen (>2g/day), 4 were chronic alcoholics, 2 suffered from myeloproliferative disorders, and the history of 1 patient could not be confirmed. There were no false positives for the clopidogrel assay.

Table 1					
			Published	# of	
		Our	Non-	Transfusions	
		Non-responder	responder	to Non-	
Group	n	Rate	Rate*	responders	Cost
Asa only	45	27%	22%	11	\$4,400
Clopidogrel only	2	50%	28%	3	\$1,200
Asa + Clop	10	**	6%	8	\$3,200
Neither	67				

 * 10% (1/10) nonresponsive to both, 60% (6/10)
 Nonresponder to clopidogrel (includes the 1 nonresponder to both), 0% nonresponder to aspirin and responder to clopidogrel

Conclusions

The VerifyNow assay is a quick, inexpensive method to test platelet function in patients with traumatic intracerebral hemorrhage and may result in improved patient safety and reduced healthcare costs by identifying patients with inhibited platelet function.

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