Journal of
Blood Disorders & Transfusion

Sadaka, J Blood Disorders Transf 2014, 5:4
DOI: 10.4172/2155-9864.1000e113

Editorial Open Access

Traumatic Brain Injury and Preinjury Antiplatelet Use: Is Platelet Transfusion Helpful?

Farid Sadaka*

Mercy Hospital St Louis/St Louis University, Critical Care Medicine/Neurocritical Care, USA

Keywords: Traumatic brain injury; Traumatic intracranial hemorrhage; Antiplatelet use; TBI

Traumatic brain injury (TBI) is a major source of death and severe disability worldwide. In the USA alone, this type of injury causes 290,000 hospital admissions, 51,000 deaths, and 80,000 permanently disabled survivors [1,2]. Antiplatelet use in patients with head injury and intracranial hemorrhage (ICH) has been associated with increase in hematoma growth and worse outcomes compared with patients without preinjury antiplatelet use [3-5]. Aspirin and clopidogrel are the most commonly prescribed antiplatelet drugs [6]. There seems to be a prevailing thought that platelet transfusion in these patients can restore platelet function, and this can in turn lead to limited hematoma growth and thus improved outcomes [7].

Most of the studies were retrospective in nature and primary outcome was in hospital mortality. Five main retrospective studies have been done. One study reported higher in hospital mortality for patients with platelet transfusion (relative risk, 2.42; 95% confidence interval, 1.2-4.9) [3]; another showed a lower mortality rate for patients receiving platelet transfusion (relative risk, 0.21; 95% confidence interval, 0.05-0.95) [4]. Three studies did not show any statistical difference in mortality rates between the patients who did and patients who did not receive platelet transfusion [8-10]. All these studies have major limitations. In addition to retrospective nature of the studies, they did not control for major confounding variables, none included other pertinent outcomes like progression of hematoma size or mortality from neurologic injury, and there was no mention of timing of transfusion in relation to the time of injury. Only one study [10] evaluated neurologic outcome in addition to in hospital mortality; none of the other studies did. One prospective trial enrolled 28 patients with traumatic ICH on daily high-dose (325 mg) aspirin therapy [11]. Outcomes were progression of ICH and need for neurosurgical intervention. All patients received one pack of apheresis platelets. Blood samples were collected before and 1 hour after platelet transfusion. Platelet function was assessed using Verify Now Platelet Function Assay, and a cutoff of greater than 550 aspirin reaction units was used to define functioning platelets. There was no difference in the progression of ICH (37.5% vs. 30%, p=0.7) or neurosurgical intervention (12.5% vs. 15%, p=0.86) between patients with functioning platelets and non-functioning platelets after platelet transfusion. This study is limited by the small number of patients, lack of a control group (patients who did not get platelet transfusion), and the transfusion of only 1 unit of apheresis platelets (the effect of more than one unit on platelet function was not assessed) [12].

There is inadequate evidence at this point to support the routine transfusion of platelets in TBI patients on preinjury antiplatelet therapy. In addition to the above limitations, we are still not sure if platelet function will always recover with transfusion, how many units may be needed to attain full recovery, and if full platelet function recovery is even necessary for clinical improvement. Large prospective studies are warranted to assess the dose dependent effect of platelet transfusion on outcomes in patients with TBI and history of antiplatelet use, controlling for severity of injury and all possible confounding variables.

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***Corresponding author:** Farid Sadaka, Mercy Hospital St Louis/St Louis, University, Critical Care Medicine/Neurocritical Care, 621 S. New Ballas Rd, suite 4006B, St Louis, MO 63141, USA, Tel: 314-251-6486; Fax: 314-251-4155; E-mail: farid.sadaka@mercy.net

Received February 01, 2014; **Accepted** February 17, 2014; **Published** February 22, 2014

Citation: Sadaka F (2014) Traumatic Brain Injury and Preinjury Antiplatelet Use: Is Platelet Transfusion Helpful? J Blood Disorders Transf 5: e113. doi: 10.4172/2155-9864.1000e113