EDITORIAL

Can Screening Prevent Poor Outcomes Following Blunt Cerebrovascular Injury?

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Dissections of the carotid and vertebral arteries caused by severe trauma can lead to devastating strokes, often in accident-prone young patients where personal and socioeconomic consequences are enormous.[1] Routine screening for cerebrovascular injury in blunt trauma patients has been advocated[2], the hope being that early detection allows preventative treatment. Increased availability of sophisticated and fast vascular imaging makes screening possible and attractive[3-5], but it still remains to be proven, in this efficacy-driven era, whether or not such screening improves outcomes. Despite these reports detailing the efficacy and accuracy of screening paradigms, the fundamental question remains: Does detection and treatment of asymptomatic dissections prevent strokes or result in an excess of treatment-related hemorrhagic complications? The controversy is compounded by a lack of understanding of the natural history of asymptomatic dissections and a lack of consensus on the most appropriate treatment.

While key questions remain unanswered, the article by Wei et al[6] in this issue of the Journal provides insight into how this debate is playing out in Canadian trauma centres. Blunt trauma patients with a risk factor for carotid or vertebral dissection were screened using computed tomographic angiography (CTA) at St, Michael's Hospital (Toronto, Ontario). Vascular injury was found in 27 of 222 patients (12.2%) while a related stroke occurred in four (15%) of these affected patients. Conservative management was selected for 41% of affected patients primarily due to a hemorrhagic injury contraindicating anticoagulation or antiplatelet therapy. Of note, three of the four strokes occurred early - prior to diagnosis and consideration of treatment. Only one patient presented with a delayed stroke despite receiving anticoagulants. This information is interesting and helpful, but our fundamental question remains.

Definitive evidence would require randomly allocating patients between screening paradigms: selective CTA screening versus no screening. If screening is beneficial, the number needed to screen to prevent one poor outcome or stroke could be determined. Conversely, if screening increases the relative number of poor outcomes due to excessive treatment-related complications, this would also be captured. Unfortunately, such a study would be difficult to undertake due to the practical challenges associated with a randomized trial in critically ill trauma population, and also due to ethical constraints. Although evidence is lacking, many physicians would object to withholding a screening test in patients randomized to the control group. Consequently, we are left with retrospective analysis of databases, which often preclude definitive conclusions.

The study by Wei et al[6] highlights these challenges. We do not know the incidence of traumatic dissection, stroke and poor neurological outcome among the trauma patients who had negative CTAs or those who were not screened. Of patients with a detected vascular injury, only 60% received treatment. It is tempting to simply compare the outcomes in this group with those treated conservatively. The primary problem is that the treated patients were selected, and may be more likely to harbor a high-risk vascular injury. Although there may be similar high-risk patients in the conservative group, treatment may have been contraindicated due to an intracranial hemorrhage. In this scenario, it would difficult to separate which injury was causally related to a poor neurological outcome. These challenges could be partly addressed with appropriate statistical matching and adjustment, however a large repository of prospective high quality data would be required. This could only be achieved in a prospective multicentre study. As with many areas of neurology and neurosurgery, Canada is ideally positioned to undertake such an investigation.

In the meantime, we must manage these patients weighing carefully the risks and benefits of any intervention. The data from this study suggest that conservative management is a strong option, particularly when the vascular injury is mild and/or the patient has a significant contraindication to treatment. In the treatment of spontaneous cervical arterial dissection, the relative efficacy of acetylsalicylic acid versus anticoagulation has been debated.[7-9] A reasonable approach might be to prescribe acetylsalicylic acid for mild – small intimal flap, non-flow limiting – asymptomatic dissections. Anticoagulation could be reserved for more significant injuries – extensive or flow limiting dissections. Endovascular treatment consisting of stenting the dissection open is an option in patients where there is severe and flow-limiting extracranial stenosis associated with ongoing neurological events despite anticoagulation. Intracranial dissections with subarachnoid hemorrhage as well as traumatic fistula with significant orbital symptoms or cortical venous reflux generally require endovascular occlusion. Although thrombolysis is generally contraindicated in the setting of significant trauma, the option of mechanical endovascular stroke treatments should also be considered for patients presenting within four to six hours of symptom onset.

Clinical decision making in the face of minimal evidence is often necessary in the clinical practice of neurosurgery and neurology. Indeed, screening for vascular injuries is likely occurring at many institutions across Canada, requiring such decisions to be made. In this regard, Wei et al[6] should be commended for setting an example. If this type of screening and its attendant decisions are occurring then we share a responsibility to record and learn from this nascent experience.

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