

## Blunt Cerebrovascular Injury (BCVI): Rare Entity with Dangerous Implications

Künt Serebrovasküler Yaralanma:Tehlikeli Etkilere Sahip Nadir Bir Olgu

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### ABSTRACT

Blunt cerebrovascular incidents (BCVI) is an uncommon occurrence amounting only up to 1% in most trauma registries. Even with a screening protocol, the documented incidence is just up to 2.7%. Despite a rare occurrence, the risk of complication related to BCVI can be devastating especially stroke. An untreated BCVI leads to 10-40% risk of developing stroke which can be fatal. The overall mortality was 59%, and 80% of that death is attributed to BCVI. We report a case who presented with traumatic neck injury subsequently diagnosed with BCVI. The presentation, diagnosis and therapy are discussed.

**Key Words:** Injuries, blunt, trauma, cerebrovascular

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### ÖZET

Künt serebrovasküler olaylar (BCVI), çoğu travma kayıtlarında yalnızca % 1'e kadar çıkan nadir bir durumdur. Tarama protokolüyle bile, belgelenen insidans sadece % 2.7'ye kadar çıkabilir. Nadir bir olgu olmasına rağmen, BCVI ile ilişkili komplikasyon riski, özellikle inme için yıkıcı olabilir. Tedavi edilmemiş bir BCVI % 10-40 ölüm riski taşır ve ölümcül olabilir. Genel mortalite % 59 olup, ölümlerin % 80'i BCVI'ye atfedilmiştir. Travmatik boyun yaralanması ile başvuran, daha sonra BCVI tanısı alan bir olguyu sunuyoruz. Bu olguda, tanı ve tedavi tartışılmıştır.

**Anahtar Sözcükler:** Yaralanmalar, künt, travma, serebrovasküler

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### INTRODUCTION

Blunt cerebrovascular incident (BCVI) is an uncommon condition associated with polytrauma patients. The consequence of a missed or neglected disease may lead to the incidence of an infarct (1). The reported case remains scarce within the literature. This lack of published cases causes difficulty in the approach and management of this uncommon condition. Most centres use a standard diagnosis classification. However, the compliance and treatment differ due to the local resources and availability of experts. Screening for BCVI in all trauma patient is shown to be not cost-effective and impractical. Hence, the diagnosis much depends on suspicious trauma mechanism and clinical judgement.

### CASE REPORT

A 23-year-old man had an alleged motor vehicle accident (car versus lorry). He presented with a right-sided neck hematoma. The swelling was not pulsating and measures around 4cmx4cm in size. There was no loss of consciousness. There were no other significant injuries. Physical examination found a swelling of the right anterior triangle of the neck. His lungs air entry was regular. Abdominal exams were unremarkable. No evidence to suggest any neurological deficit or injury to the great vessels was found.

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CTA of the neck vasculature showed a non-opacified right common carotid after the bifurcation extending till the intracranial segment. The Circle of Willis and posterior communicating vessels are patent. There was no evidence of any infarct (Figure 1,2).



**Figure 1.** There was no opacification of the right common carotid after the bifurcation (white arrow showing the proximal part of the common carotid). Other vasculature is effectively opacified



**Figure 2.** The proximal part of the right common carotid is seen transected with no opacification beyond the bifurcation (white arrow)

We started him on aspirin and discharged with no disease progression. He was seen in the clinic after five weeks. There was no neurological deficit or ischaemic features. Repeat CTA did not show any recanalisation. However, he remains asymptomatic.

## DISCUSSION

Although BCVI is a rare occurrence, the inherent risk of developing stroke can be devastating. The overall mortality in previous articles is between 31-59% with more than 80% attributed directly from BCVI (2).

The awareness of such pathology remains limited among neurosurgical and trauma surgeons, which lead to underdiagnosed and underreported cases. Most episodes are seen accidental during the examination of other potential injuries. Early identification and treatment is the mainstay of BCVI approach to reduce any infarct incidence (3,4). Screening for BCVI in a traumatic patient will mitigate underreported cases (5,6). However, due to the cost-effective and limited resources, most centres in Malaysia does not advocate a routine screening for BCVI (6). At the time of writing, CTA is performed selectively following an in-house guideline adopted from published evidence.

Fabian et al. found a significant association between blunt carotid trauma in cases with an injury to the anterior neck (41%), equivocal signs between neurological examination and CT brain (34%), evidence of neurological manifestations upon admission (43%) and Horner's syndrome (9%) (6). In a recent paper, the Eastern Association for the Surgery of Trauma suggested a screening guide which includes injuries to the cervical spine, maxillofacial and unexplained neurological deficits and significant traumatic brain injury.

Cerebrovascular angiogram remains the gold standard for BCVI diagnosis. A selective angiogram will give surgeons a clear picture of the extent of the injury and patency of the Circle of Willis. A patent Circle of Willis is imperative to ensure perfusion on the contralateral site. However, the high technical challenges and inherent risk of angiogram have made CTA a more popular choice of diagnosis, especially in centres with no interventional radiologist (7). Modern CTA has shown a better sensitivity in detecting BCVI compared to conventional angiogram making it a suitable initial investigation modality (8). Biffi et al. first describe the grading system for BCVI management which remains the standard in guiding the treatment option. He found that two-thirds of mild intimal injuries (grade I) healed without any surgical intervention with 70% of dissections or hematoma (grade II) progressed despite heparin therapy. In pseudoaneurysm cases (grade III), endovascular stenting showed great success with 89% resolution. Recanalization was not seen in most early grade IV injury with poor outcome in transected cases (grade V) (9).

The compliance towards recommended treatment is not practical especially those in places with limited resource and transfers difficulty. Nevertheless, it is reasonable to have a consult from the neurological or vascular before commencing any treatment. Treatment timing should balance between the presence of any bleeding, traumatic head injury or other intraabdominal injuries. Antithrombotic are the mainstay treatment of BCVI with no difference between aspirin or heparin. However, caution should be exercised between the timing of therapy initiation and usage in multiply injured patients.

Our patients had a grade IV injury with no neurological deficit and patent Circle of Willis on CT. We started him on antithrombotic and discharged home after two weeks. Although a repeat CTA did not show any recanalisation, he remains asymptomatic with no complication.

## CONCLUSION

BCVI is an uncommon and least recognised condition in trauma patients. However, it is essential to be aware and equip with the necessary knowledge to identify and provide the best treatment.

## Conflict of interest

No conflict of interest was declared by the authors.

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