Asystole following craniotomy closure: Yet another complication of negative-pressure suctioning of subgaleal drain

INTRODUCTION

The placement of a negative pressure (NP) subgaleal drain to allow evacuation of possible bleeding is a common practice following craniotomy. Although it is deemed safe, it may have potential for deadly complications.\(^1,2\) We encountered asystole in two neurosurgical patients during application of NP suction to the subgaleal drain. Such an event following craniotomy closure has not been known. Although the cause–effect mechanism for the occurrence of asystole is yet to be elucidated, its clinical consequence can be disastrous and anaesthesiologists must be vigilant enough to manage such an event promptly.

A 60-year-old male patient with acute subarachnoid haemorrhage was scheduled to undergo clipping of left middle cerebral artery bifurcation aneurysms under general anaesthesia. The intraoperative course was uneventful. Following clipping of the aneurysmal neck and haemostasis of the surgical site, the duramater was closed in a watertight manner. The bone flap was secured with sutures. A subgaleal drain was placed before scalp closure. Following skin closure, the subgaleal drain was connected to a Romovac (Romsons Scientific and Surgical Industries Pvt. Ltd., India) 800 cm\(^3\) capacity vacuum apparatus with moderate NP to facilitate drainage of any collected blood. The heart rate at this juncture was 46 beats per minute and blood pressure (BP) was 151/81 mmHg. This was followed by sudden asystole [Figure 1]. The NP Romovac apparatus applied to the subgaleal drain was immediately removed and intravenous atropine 0.6 mg was administered. The heart rate and BP returned...
to normal within 15 s. ECG morphology was normal and no ST segment changes were seen. Following completion of dressing, the suction was reapplied without any NP and the drainage was allowed under gravity. His heart rate remained stable subsequently.

A similar incidence of asystole was observed in a 60-year-old male patient scheduled for clipping of anterior communicating artery aneurysm. Immediately just before the connection of subgaleal drain to the Romovac with moderate NP, ECG showed normal sinus rhythm with pulse rate of 77 beats per minute. The BP then was 116/70 mmHg. Later, the patient abruptly developed P-wave asystole that progressed to sinus arrest [Figure 2]. The NP Romovac apparatus applied to the subgaleal drain was immediately removed. The heart rate and BP returned to normal within few seconds. On reapplication of moderate NP to the subgaleal drain, the heart rate decreased from 74 to 40 beats per minute. Therefore, the NP was withdrawn. The Romovac apparatus was then applied without any NP. The patient subsequently remained haemodynamically stable.

There exist reports of bradycardia following application of NP suction to the subgaleal drain.\textsuperscript{[3,4]} Even a brain lesion described as “pseudo-hypoxic brain swelling” has been observed with the use of subgaleal NP drainage leading to non-awakening and dramatic neurological deterioration after uneventful neurosurgical procedures.\textsuperscript{[2]} However, asystole as a complication of NP suction drain in neurosurgical patients has not been described in the literature. Notably, unlike reports by previous authors,\textsuperscript{[1-4]} in our first patient, pre-existing bradycardia could be a risk factor for asystole following application of NP to the subgaleal space. Also, our second patient responded to disconnection of NP to subgaleal space without need for any pharmacological intervention. Moreover, on reconnection of NP, there was only bradycardia. Whether severe intracranial hypotension and/or trigeminocardiac reflex was the underlying mechanism is uncertain,\textsuperscript{[3-5]} but it is possible that the reflex fatigues with repetitive stimulation, resulting in less dramatic presentation subsequently.

In the presented scenario, there are few important issues that need to be emphasized. Firstly, the anaesthesiologists must be extremely vigilant during NP application to the subgaleal drain. Secondly, the presence of decreased heart rate should warrant the avoidance of application of NP to the subgaleal area. Instead, in such a scenario, the blood should be allowed to drain only under gravity along with strict cardiovascular monitoring.

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