

Chronic haemodynamic disturbances in neurointensive care: First description

Sir,

Cardiovascular changes are frequently observed complications in neurosurgical patients and may be attributed to Cushing's reflex, brainstem manipulations and other neurogenic reflexes.¹ Although many haemodynamic instabilities result from obvious directly handling or stimulation of particular nerve or brain region; however, we have reported a case in which indirect cause contributed the severe haemodynamic disturbances in our patient.

A middle-aged patient with severe head injury (GCS < 8) patient admitted to intensive care unit for ventilatory support and further management. He had lacerated wound over right parietal bone and developed scalp abscess on third day of admission in ICU. MRI showed deep lacerated wound and culture of wound revealed fungal growth. Both plastic surgeon as well as neurosurgeon decided to debride the wound. The full-thickness debridement was done and small craniotomy was done on RT parietal region. Surgeon did vacuum-assisted closure (V.A.C) and set a negative pressure of 100 mm Hg. Two days later, patient started to develop intermittent bradycardia (HR < 45/min) with (BP 80/60 mm Hg) followed by arrhythmias including bigeminy, ventricular premature beat and wide complex ventricular tachycardia. Fluid boluses, lignocaine 1 mg/kg, and ionotropic support (nor adrenaline infusion) were given. Arterial blood gas analysis, 2 D-Echo, X-ray chest, and CT scan were done but all investigations were in conclusive. To rule out reverse coning, we stopped the negative pressure suction and all of a sudden haemodynamic disturbances subsided. The rest of the management remained the same with antibiotics, mechanical ventilation and alternate day dressing without negative suction.

The VAC system has been shown to promote wound healing and facilitate graft viability.² However, it can produce catastrophic haemodynamic disturbances in neurosurgical patients. Few cases highlighted the immediate postoperative bradycardia due to use of subgaleal negative pressure drain to avoid extradural haematoma.^{3,4} However, our case highlights chronic haemodynamic consequences of VAC dressing in head injury patient. In our case negative pressure applied indirectly transmitted through dura and gradually produced stretching of nerves and in turn caused reverse herniation. Dura is innervated by meningeal branch of the fifth nerve. Dural stimulation has been reported to

incite trigeminal cardiac reflex (TCR) and may produce similar symptoms such as hypotension and bradycardia but manifestation of wide array of arrhythmias point towards reverse herniation.⁵ In addition, dural stretch can produce TCR; however, very late haemodynamic changes in this patient rule out TCR as a probable diagnosis. The reversal of haemodynamic disturbances after removal of negative suction also suggests our hypothesis.

In conclusion, although the role of V.A.C dressing is proven to effective for wound healing in many areas of body but certainly the head region imposes greatest risks of haemodynamic instability, hence, need greater caution for its use and with vigilant haemodynamic monitoring.

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REFERENCES

1. Agrawal A, Timothy J, Cincu R, Agarwal T, Waghmare LB. Bradycardia in neurosurgery. *Clin Neurol Neurosurg* 2008;110:321-7.
2. Andrews BT, Smith RB, Goldstein DP, Funk GF. Management of complicated head and neck wounds with vacuum-assisted closure system. *Head Neck* 2006;28:974-81.
3. Karamchandani K, Chouhan RS, Bithal PK, Dash HH. Severe bradycardia and hypotension after connecting negative pressure to the subgaleal drain during craniotomy closure. *Br J Anaesth* 2006;96:608-10.
4. Toshniwal GR, Bhagat H, Rath GP. Bradycardia following negative pressure suction of subgaleal drain during craniotomy closure. *Acta Neurochir (Wien)* 2007;149:1077-9.
5. Lv X, Li Y, Jiang C, Wu Z. The incidence of trigeminocardiac reflex in endovascular treatment of dural arteriovenous fistula with onyx. *Interv Neuroradiol* 2010;16:59-63.

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