Recognition and Management of Intraoperative Autonomic Dysreflexia

Thomas Lyford¹, Katherine Borowczyk¹, Simon Danieletto¹ and Ruan Vlok^{1,2*}

¹School of Medicine Sydney, University of Notre Dame Australia, Australia

²Wagga Wagga Rural Referral Hospital, Australia

*Corresponding author: Vlok R, School of Medicine Sydney, University of Notre Dame Australia, Australia, Tel: 411388932; E-mail: vlokr@outlook.com.au

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Abstract

As the life expectancy of patients with spinal cord injuries continues to rise, consideration needs to be given to the implications of this condition in the surgical setting. Autonomic Dysreflexia is a medical emergency and has been described as the most common complication in patients with spinal cord injuries undergoing general surgery. As such, review of the literature was conducted to identify clinical features suggestive of intraoperative Autonomic Dysreflexia and methods for management of this potentially lethal condition.

Keywords: Autonomic Dysreflexia; Pathophysiology; Blood pressure; Clinical signs

Introduction

Spinal cord injury (SCI) is a serious and common medical condition. As life expectancies of patients with SCI continue to increase, more patients are likely to require continued medical and surgical care. As such, consideration needs to be given to the implications of SCI in the perioperative setting [1]. A potentially life threatening complication of SCI is Autonomic Dysreflexia (AD), which may occur in up to 90% of patients with upper thoracic and cervical cord injuries [2-4]. Two observational studies have noted that AD is the most common complication in patients with SCI undergoing general surgery [5,6]. Despite its prevalence and potentially serious complications, many healthcare practitioners still lack an adequate understanding of the condition [7].

Pathophysiology of Autonomic Dysreflexia

AD most commonly occurs in patients with spinal cord lesions at or above the level of T6 [8]. AD results from a loss of descending inhibitory spinal signals to sympathetic ganglia,

leading to sympathetic over-activity in the presence of noxious stimuli [9]. The release of sympathetic mediators such as noradrenaline results in significant vasoconstriction, leading to skin pallor below the level of the SCI and significant hypertension [9]. This hypertension is sensed in baroreceptors in the aortic arch and carotid bodies, leading to reflex bradycardia, flushing and sweating above the level of the SCI [9]. This flushing is likely to be the mechanism for the profound headaches experienced in AD [9]. Potential causes of death in AD include intra-cerebral haemorrhage and myocardial ischaemia [2,3].

Signs of intraoperative Autonomic Dysreflexia

Surgery is an important trigger for AD to be aware of [5,6]. As such, clinicians need to monitor patients intraoperatively for signs of AD. These signs include:

- An increase in arterial pressure greater than 20-30 mmHg [10].
- Bradycardia, tachycardia, heartblock or sinus arrest [9,11].
- Skin pallor with blanching and piloerection below the level of the SCI [9,11].
- Skin flushing and sweating above the level of the SCI [12].
- Neurological complications such as seizures [11].
- Respiratory complications such as acute pulmonary oedema [13].

When monitoring blood pressure in patients with SCI, it is important to note that patients with high thoracic or cervical SCI have a resting arterial blood pressure approximately 15-20 mmHg lower than able-bodied counterparts [8]. As such a dysreflexic episode may be noted by a gross increase in resting blood pressure of 20-30 mmHg [10].

Management of intraoperative Autonomic Dysreflexia

The management of AD consists of pharmacological and non-pharmacological methods. Non-pharmacological management of Autonomic Dysreflexia.

- The removal of AD triggers, including stopping the surgery and decompression of hollow viscus. This may entail drainage of the bladder or removal of the endoscopic.
- Positioning the head of the bed up, to induce orthostatic hypotension.

Pharmacological management of Autonomic Dysreflexia

- Deepening of general anaesthesia. This may involve a bolus of propofol or increasing the inhalational agent.
- Increase the FiO2 until the episode has resolved.
- Treat arrhythmias accordingly with beta blockers, anticholinergics or advanced cardiac life support antiarrhythmics.
- Administer a rapid onset, short acting vasodilator e.g., nicardipine or nitroglycerine.

If the episode does not resolve rapidly with management, or if the episode recurs, an arterial line should be placed to monitor fluctuations in blood pressure [11]. It is also important to be aware of the patient's medication history. As SCI has a significant effect on erectile function, it is important to be aware of the serious pharmacological interactions of medications for erectile dysfunction in the PDE 5 Inhibitor family and glyceryl trinitrate [9,14].

Conclusion

Autonomic dysreflexia is commonly triggered by surgical procedures in patients with high SCI. Due to its potentially life threatening complications, it is important to be aware of the clinical features of AD in the intraoperative period when the patient may be unable to communicate effectively. Clinical signs to be aware of include an increase in blood pressure, dysrhythmias, skin pallor and blanching below the level of the injury and flushing above. Management of intraoperative Autonomic dysreflexia involves immediately stopping the surgery and decompressing hollow viscus, as well as positioning the head of the bed up. Pharmacological management involves deepening general anesthesia and administering rapid onset, short acting vasodilators.

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