Critical illness-related corticosteroid insufficiency in cardiogenic shock

Editor—Haemodynamic instability after reperfusion in cardiogenic shock (STEMI) shares common features with septic shock (e.g. reversible myocardial dysfunction and vasopoplegia). As in septic shock, a critical illness-related corticosteroid insufficiency (CIRCI) may be one of the mechanisms involved. Treatment of this state in septic shock improves patient outcome. In this report, we describe the case of a patient who presented in CS associated with CIRCI. Corticosteroid replacement with hydrocortisone allowed weaning of norepinephrine (NE) and recovery.

A 42-yr-old male with a history of dyslipidaemia and active smoking complained of constrictive chest pain after physical exertion (fencing). Brought to the emergency department by his wife, the patient suffered a cardiac arrest with ventricular fibrillation (VF). Cardiopulmonary resuscitation (CPR) was initiated and five external electrical shocks were necessary to reduce VF. ‘No flow’ and ‘low flow’ lengths were 0 and 15 min, respectively. During CPR, tracheal intubation was performed. Sedation with midazolam and sufentanil was initiated while spontaneous circulation was recovered. The first ECG in sinus rhythm showed an ST-elevation in precordial leads (V1–V6, D1, aVL). Loading doses of aspirin and prasugrel were administered and a bivalirudin infusion was started. Epinephrine infusion (0.1 μg kg⁻¹ min⁻¹) was mandatory to maintain a mean arterial pressure of 65 mm Hg. The patient underwent thrombectomy and angioplasty of the left anterior descending coronary artery 45 min after cardiac arrest. Epinephrine was discontinued on transfer to the intensive care unit. Therapeutic hypothermia (33°C) for 24 h and NE/dobutamine infusions were initiated. Physical examination was unremarkable. Laboratory values, haemodynamic data, and echocardiographic findings are summarized in Table 1. All microbiological assays remained negative. Three days after rewarming, NE was still necessary to maintain a mean arterial pressure of 65 mm Hg despite optimal volume status. Total serum cortisol was 8.3 μg dl⁻¹, suggesting an adrenal insufficiency. Thus, hydrocortisone infusion (50 mg four times daily) was started allowing NE withdrawal 36 h later. Neurological outcome was excellent and the patient was transferred to the ward on Day 7. Hydrocortisone was tapered on Day 9. Daily doses of 10 mg ramipril and 5 mg bisoprolol were reached on Day 20 with good haemodynamic tolerance. Hypothalamic–pituitary–adrenal axis testing was performed 1 month later and showed no adrenal insufficiency. We describe herein a case of CIRCI after CS. The patient was ‘steroid responsive’, defined as haemodynamic stability without arterial pressure support within 24–48 h of steroid replacement. The patient did not carry a diagnosis of primary adrenal insufficiency, suggesting an adrenal insufficiency. Thus, hydrocortisone infusion (50 mg four times daily) was started allowing NE withdrawal 36 h later. Neurological outcome was excellent and the patient was transferred to the ward on Day 7. Hydrocortisone was tapered on Day 9. Daily doses of 10 mg ramipril and 5 mg bisoprolol were reached on Day 20 with good haemodynamic tolerance. Hypothalamic–pituitary–adrenal axis testing was performed 1 month later and showed no adrenal insufficiency.

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insufficiency before admission nor have any symptoms consistent with primary adrenal insufficiency. The patient had not been treated with corticosteroids in the months preceding the event nor was he diagnosed with a primary insufficiency after recovery.

Inflammatory activation after reperfusion is a well-described specific mechanism amplifying the CS syndrome. As described in septic shock, inflammatory cytokine production in stress conditions is one of the mechanisms leading to CIRCI. This syndrome has been described in certain subsets of critically ill patients but never in CS. We believe it is likely that CIRCI is under-diagnosed in CS patients leading to worse outcome. Further studies could be designed to assess this issue.

**Declaration of interest**
None declared.

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**Sometimes the best is the enemy of the good**
Editor—We read with great interest the article by Dango and colleagues about two techniques of loco-regional anaesthesia for pain relief after thoracotomy. We consider the study well conducted and agree on the importance of identifying an adequate treatment of postoperative pain, not only for ethical reasons, but also to reduce the incidence of postoperative complications. However, we do not believe that the use of combined intrathecal and paravertebral block (PVB) is the answer.

Based on our experience and on the previous literature, we think the PVB provides adequate analgesia, with pain scores comparable with thoracic epidural analgesia (TEA). The main advantage of PVB is that this technique is safer, with a superior side-effect profile (hypotension, nausea, urinary retention) and a lower chance of a serious spinal cord injury from infection or spinal cord haematoma. Furthermore, PVB can be performed in all those cases in which TEA is contraindicated by, for example, coagulopathies or pre-existing neurological diseases. All these positive aspects cease to exist when, together with PVB, intrathecal opioids are administered.

In a prospective study on 95 patients conducted by Richardson and colleagues in which TEA and PVB were compared, the PVB proved to be superior in terms of pain score at rest and after cough, there was lower use of morphine, better respiratory function and oxygenation, reduced neuroendocrine response, and lower rate of postoperative hypotension. Davies and colleagues conducted a very interesting meta-analysis of 10 studies concluding that PVB and TEA are similar in terms of pain score, postoperative need for morphine, and hospital stay. Nevertheless, the PVB proved to be related to a lower incidence of respiratory and haemodynamic complications. A study by Mason and colleagues on the intrathecal use of morphine and sufentanil for post-thoracotomy analgesia, provided good results in the first 24 postoperative hours, reducing the need for morphine, but did not affect spirometry data if compared with the control group. The frequent and only complication in this study was urinary retention. On the other hand, Varassi and colleagues experimented with intrathecal administration of fentanyl observing early respiratory depression.

For all these reasons, we consider it is reasonable to conclude that combined PVB and intrathecal analgesia should not be regarded as a safe and effective technique, having demonstrated that PVB alone can provide a satisfactory analgesia and that intrathecal use of opioids exposes the patients to a higher risk of urinary retention and early respiratory depression, especially in elderly patients. We strongly believe that ‘doing better’ does not necessarily mean adopting the most complicated technique, but doing what is ‘best’ for the patient. We should concentrate on simplifying safe and repeatable techniques: sometimes the best is the enemy of the good.

**Declaration of interest**
None declared.

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