High serum lactate level in cranial meningioma resection: A case report

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1. Introduction

Elevated serum lactate during surgery could be a warning sign of an increased risk of morbidity [1]. We report a case of self-limiting serum lactate rise that occurred during a large cranial meningioma resection with no sequelae.

2. Presentation of case

A 33 year old man was admitted to our hospital complaining of a constant headache for 10 months. On examination he had no focal neurological signs or symptoms. As pain was not controlled by conventional analgesia his general practitioner arranged for an MRI.

The MRI Brain showed a large right frontal lobe mass lesion measuring 5.8 × 5 cm, in keeping with a meningioma (Fig. 1).

Prior to surgery he had a normal pulse and blood pressure. The patient received propofol 230 mg, fentanyl 100 μg, and 10 mg of vecuronium at induction of anaesthesia. Anaesthesia was maintained using nitrous oxide and oxygen, isoflurane (2–4% inspired concentration), and vecuronium for neuromuscular blockade.

The patient underwent right frontal craniectomy in the supine position. Styker neuronavigation system was used in the surgical planning. Simpson grade 1 resection was achieved under microscope assistance. Surgery duration was five hours and total blood loss was 1200 ml. He was transfused with 250 ml of red blood cells during the second half of the surgery. His fluid balance was 3350 ml positive, with 4750 ml in and 1400 ml out.

During the surgical resection the patient had serial arterial blood gas (ABG) analysis which showed an increase in the lactate concentration to 7 mmol/l intraproactively (normal range 0.3–1.3 mmol/l) (Fig. 2). The pH remained normal to slightly alka-lotic during the same period. The mean arterial blood pressure (MAP) averaged 80 mm Hg and the average heart rate was 70 beats per minute. The patient’s cardiovascular condition remained stable during surgery (Fig. 3) and no other signs of sepsis were observed.

Following surgery, the patient was transferred to the recovery room where his vitals remained stable. Gradually his serum lactate level declined and returned to the preoperative levels five hours post-operatively.

The patient recovered well and no further episodes of rising serum lactate were recorded. He was discharged on the fifth post-operative day.

The histopathological diagnosis was ‘atypical meningioma, World Health Organization (WHO) Grade II’.
3. Discussion

The normal range of serum lactate is between 0.3 and 1.3 mmol/l [2]. The serum lactate concentration depends on the balance between lactate production and metabolism [3]. The rise in serum lactate level can be associated with metabolic acidosis in patient with systemic hypo-perfusion [4]. A perioperative rise in both serum lactic acid and pH has been previously reported in a patient during meningioma surgery, however, this differs from our case as our patient was never acidic [5].

Generally meningiomas are highly vascular tumours that attract blood supply from the arteries of the bone and dura [6]. Time-depandent proton spectra has previously demonstrated that elevated serum lactate indicates tissue ischemia in the initial 24 h post-meningioma embolization [7].

Fig 2. Chart illustrates peri-operative serum lactate levels.

The combined effects of anaesthesia with transient episodes of reduced general flow state may contributed to serum lactate increase, but our patient did not experience global hypoxia. Therefore we concluded that unidentified regional tissue ischemia, during meningioma resection, was responsible for the serum lactate increase. Our patient’s perioperative elevation of serum lactate level can likely be attributed to the deprivation of the blood supply to the highly vascular meningioma during surgical resection. The decline in blood lactate levels 5 h postoperatively was an indicator that this phenomenon was transient and reversible.

Transient elevation of serum lactate levels during meningioma resection was observed in our patient, but their significance remains unknown. We presume that serum lactate accumulation in the perioperative period of a large meningioma resection can be self-limiting and harmless. This should be distinguished from the states in which high serum lactates levels predicts a grave outcome [8].

4. Conclusion

A rise in serum lactate level occurred during a large cranial meningioma resection in a patient with a stable cardiovascular status. The blood lactate levels gradually returned to the preoperative levels within five hours post-operatively and was not associated with adverse outcomes. We feel that reversible, subacute serum lactate levels elevation should not be assumed to predict a patient’s morbidity and mortality.

Conflict of interest

None declared.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy
Fig 3. Patient intraoperative anaesthetic monitoring chart.

of the written consent is available for review by the Editor-in-Chief of this Journal.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author’s contributions

AK: drafted and designed the manuscript and participated in surgery; MAM: drafted and reviewed the Literature for previous cases; AEK: coordinated surgery and grammatical review; UO: Data collection, OD: Data interpretation, DO: participated in surgery and reviewed the manuscript; CL: performed the final review. All authors read and approved the final manuscript.

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