

POSTER PRESENTATION

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Effect of 5-aminolaevulinic acid on postoperative lactate levels in patients undergoing surgery for malignant brain tumours

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Introduction

5-aminolaevulinic acid (5-ALA) is a natural precursor of haemoglobin. Exogenously administered 5-ALA can lead to intracellular accumulation of fluorescent porphyrins in malignant tissues, such as glioblastoma. 5-ALA is increasingly used to improve tumour visualisation and enable more optimal resection of malignant gliomas. *In vitro*, 5-ALA can cause oxidative damage to rat liver mitochondria. *In vivo*, rats exposed to 5-ALA developed increased lactate levels; possibly because inhibition of oxidative metabolism [1]. Univariate data also suggested an effect of 5-ALA in neurosurgical patients [2]. Since lactate levels are widely used to monitor patients, we performed multivariate analysis on the impact of 5-ALA on lactate levels.

Objectives

Assess the relation of preoperative 5-ALA on postoperative systemic lactate levels in patients undergoing surgery for malignant brain tumours.

Methods

In an observational study in a cohort of neurosurgical patients who underwent resection of a suspected malignant glioma and were postoperatively admitted to our ICU, we compared lactate levels between patients who received 5-ALA preoperatively (5-ALA group) and those who did not (control group). The decision to use 5-ALA was at the discretion of the neurosurgeon and was based on the specific tumour characteristics on preoperative imaging. If fluorescent-guided resection was scheduled, the patient received 20 mg/kg of 5-ALA (Gliolan, Medac,

Germany) orally 2 hours before the induction of anaesthesia. All patients received high-dose dexamethasone. Peri- and postoperative lactate and glucose levels were routinely obtained during the ICU stay in all included patients in this study using a point-of-care analyzer blood gas analyser.

Results

From 2007 to 2014 we included 350 patients aged 56 ± 14 , 60% males. 89 patients (25%) received 5-ALA. These patients were older than controls (62 ± 8 vs. 53 ± 15 ; $p < 0.001$); duration of operation did not differ between the control and 5-ALA groups (NS). On day 0 the mean maximum lactate in the 5-ALA vs control groups was 2.83 ± 1.34 vs 2.47 ± 1.24 mmol/L ($p = 0.02$). On the first postoperative day the lactate levels were similar. Multivariate analysis showed that age ($p = 0.02$), duration of operation ($p = 0.04$) and glucose ($p < 0.001$), but not 5-ALA ($p = 0.43$) were related with lactate.

Conclusions

5-ALA use was only univariately associated with increased postoperative lactate levels. MV-analysis, strongly points to a central role of hyperglycemia, as was recently also observed after cardiac surgery [3].

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