East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN 2617-4421 (Print) | ISSN 2617-7188 (Online) |
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-2 | Issue-9| Sept -2019 | DOI: 10.36349/EASJMS.2019.v02i09.015

Letter to the Editor

Propofol Triggers Respiratory Failure in Adult M.3243a>G Carriers

Finsterer J, MD, PhD

[1]Krankenanstalt Rudolfstiftung, Messerli Institute, Vienna, Austria

*Corresponding Author
Josef Finsterer, MD, PhD

Keywords: mtDNA, mitochondrial, stroke-like lesion, cerebral MRI, stroke-like episode.

In a recent article, Pan *et al.*, reported about a 52yo male with acute respiratory failure after anaesthesia with propofol for gastroscopy and colonoscopy as the initial manifestation of the m.3243A>G variant (Pan, X. *et al.*, 2019). We have the following comments and concerns.

We do not agree with the notion that acute respiratory failure was the initial manifestation of the m.3243A>G variant. The index patient underwent anaesthesia with propofol prior to gastroscopy and colonoscopy and experienced an adverse reaction to this agent. Anaesthesia was followed by a prolonged recovery period of 40min after anaesthesia (Pan, X. *et al.*, 2019). The patient was also hypoxemic after awakening (Pan, X. *et al.*, 2019). During the following days he repeatedly developed shortness of breath, which eventually deteriorated to respiratory failure 8 days after anaesthesia. Propofol is mitochondrion-toxic (Finsterer, J., & Frank, M. 2016) and should be used with caution or avoided in patients with a mitochondrial disorder (MID). Mitochondrion-toxicity of propofol has been documented in a number of MIDs patients (table 1) (Mtaweh, H. *et al.*, 2014; Kawagoe, I. *et al.*, 2013; Vollmer, J. P. *et al.*, 2018; Parness, J. *et al.*, 2014; Savard, M. *et al.*, 2013; Ishiguro, M. *et al.*, 2006; Gozal, D. *et al.*, 2006; & Jacobs, T. F. *et al.*, 2004). Even respiratory distress and failure triggered by propofol has been reported earlier (table 1) (Jacobs, T. F. *et al.*, 2004).

Table 1. Patients with a mitochondria disorder who were reorted to have developed adverse reactions to propofol

Age	Sex	MID	Adverse reaction	REFERENCE
Child	np	MELAS	Neurologic deterioration, cardiovascular compromise	Mtaweh, H. *et al.*, 2014
50yo	F	CPEO	Ventricular fibrillation, cardiac arrest	Kawagoe, I. *et al.*, 2013
19yo	F	ud	Propofol infusion syndrome	Vollmer, J. P. *et al.*, 2018
37yo	F	PRMID	Propofol infusion syndrome	Parness, J. *et al.*, 2014
27yo	F	PRMID	Propofol infusion syndrome	Savard, M. *et al.*, 2013
21yo	M	ME	Prolonged respiratory depression	Ishiguro, M. *et al.*, 2006
Np	Np	LS	Transient desaturation	Gozal, D. *et al.*, 2006
Np	Np	LS	Acute respiratory failure	Jacobs, T. F. *et al.*, 2004

F: female, m: male, ud: undetermined, PRMID: POLG1-mutation related MID, ME: mitochondrial encephalopathy, LS: Leigh syndrome, np: not provided

Furthermore, the patient is reported to have developed weakness of limb muscles 6 months prior to acute respiratory failure and he had reduced tendon reflexes on admission. Additionally, the index patient was of short stature (165cm), a frequent manifestation of a MID and present presumably long before age 52y. Thus, acute respiratory failure cannot be the initial manifestation of the MID in the index patient but rather short stature and limb muscle weakness with exercise intolerance, since at least half a year prior to the adverse reaction to propofol.

Quick Response Code

Journal homepage:
http://www.easpublisher.com/easjms/

Article History
Received: 24.08.2019
Accepted: 05.09.2019
Published: 19.09.2019

A further shortcoming of the study is that no heteroplasmy rates of the m.3243A>G variant were provided. Knowing heteroplasmy rates in various tissues is crucial to assess the pathogenicity of the variant, to determine if the skeletal muscle was truly the most affected tissue, and to provide profound genetic counselling.

We do not agree that the index patient's condition was not inherited (Pan, X. *et al.*, 2019). Since 75% of the mtDNA variants are maternally inherited (Poulton, J. *et al.*, 2017) and the mother of the index case deceased suddenly it is conceivable that the mother had cardiac or cerebral involvement and died from arrhythmias, acute heart failure, or from a seizure.

Missing in this report is a prospective investigation for multisystem involvement. MIDs are usually multisystem diseases, particularly MELAS. Search for multisystem involvement is crucial as it may determine the outcome of MIDs in general. Particularly missing is echocardiography, EEG, and long-term ECG recordings. Thorough cardiac and cerebral work-up is indicating in the light of the sudden death of the patient's mother.

Interesting is that the patient recovered partially. It should be more thoroughly discussed if recovery was due to the cocktail applied or spontaneous. Beneficial effects of components of such cocktails has been documented, such as for thiamine in thiamine-responsive Leigh syndrome, for coenzyme-Q in primary coenzyme-Q deficiency, and for idebenone in LHON.

Overall, this interesting case shows that propofol may trigger deterioration of axial myopathy, being misinterpreted as initial manifestation of MELAS. The family history needs to be taken thoroughly, heteroplasmy rates need to be provided, and in patients with suspected MID, propofol should be given with caution. The toxic effect of propofol in MIDs can be explained by its impairment of various mitochondrial pathways.

REFERENCES

1. Pan, X., Wang, L., Fei, G., Dong, J., Zhong, C., Lu, J., & Jin, L. (2019). Acute respiratory failure is the initial manifestation in the adult-onset A3243G tRNALeu mtDNA mutation: a case report and the literature review. Frontiers in neurology, 10, 780.
2. Finsterer, J., & Frank, M. (2016). Propofol Is Mitochondrion-Toxic and May Unmask a Mitochondrial Disorder. J Child Neurol, 31, 1489-94.
3. Mtaweh, H., Bayır, H., Kochanek, P.M., & Bell, M.J. (2014). Effect of a single dose of propofol and lack of dextrose administration in a child with mitochondrial disease: a case report. J Child Neurol, 29, NP40-6.
4. Kawagoe, I., Odoh, M., Koh, K., Takada, T., & Inada, E. (2013). A case of intraoperative cardiac arrest in a patient with mitochondrial encephalomyopathy undergoing lung resection. Masui. The Japanese journal of anesthesiology, 62(4), 431-434.
5. Vollmer, J. P., Haen, S., Wolburg, H., Lehmann, R., Steiner, J., Reddersen, S., ... & Fallier-Becker, P. (2018). Propofol related infusion syndrome: ultrastructural evidence for a mitochondrial disorder. Critical care medicine, 46(1), e91-e94.
6. Parness, J., Savard, M., & Turgeon, A.F. (2014). Propofol-related infusion syndrome heralding a mitochondrial disease: case report. Neurology, 82, 461.
7. Savard, M., Dupré, N., Turgeon, A.F., Desbiens, R., Langevin, S., & Brunet, D. (2013). Propofol-related infusion syndrome heralding a mitochondrial disease: case report. Neurology, 81, 770-1.
8. Ishiguro, M., Hashimoto, K., Hayakata, Y., Fukunaga, S., & Seo, N. (2006). Prolonged respiratory depression after fentanyl administration in a patient with mitochondrial encephalomyopathy. Masui. The Japanese journal of anesthesiology, 55(1), 73-75.
9. Gozal, D., Goldin, E., SHAFRAN-TIKVA, S. I. G. A. L., Tal, D., & Wengrower, D. (2006). Leigh syndrome: anesthetic management in complicated endoscopic procedures. Pediatric Anesthesia, 16(1), 38-42.
10. Jacobs, T. F., Plasschaert, F. S., Bossuyt, G. P., Szegedi, L. L., & Herregods, L. L. (2004). Anaesthesia for a patient with Leigh's syndrome undergoing surgery for scoliosis. Acta Anæsthesiologica Belgica, 55(1), 57-60.
11. Poulton, J., Finsterer, J., & Yu-Wai-Man, P. (2017). Genetic counselling for maternally inherited mitochondrial disorders. Molecular diagnosis & therapy, 21(4), 419-429.