

Letter to the editor:

HEPATOTOXICITY OF ANESTHETIC GASES

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Dear Editor,

Recently, Masoud Neghab and colleagues published an article about liver enzymes in operating room personnel exposed to anesthetic gases (Neghab et al., 2020). In the United States about 200,000 health care workers may be exposed to anesthetic gases (OSHA, 2000). Possible adverse effects discussed in the context of exposure to anesthetic gases are hepatotoxicity (Safari et al., 2014; Nicoll et al., 2012; Iaizzo et al., 1990) and nephrotoxicity (Jafari et al., 2018). Neghab and colleagues studied 52 exposed and 52 non-exposed individuals (Neghab et al., 2020). The exposed subjects showed relatively high mean urinary concentrations of 176 ppm, 5.0 ppm and 15.0 ppm nitrous oxide, isoflurane and sevoflurane (Neghab et al., 2020). The authors report statistically significant increases in the liver enzymes aspartate aminotransferase, alanine aminotransferase and glutathione-S-transferase α as well as the kidney damage marker kidney injury molecule-1 compared to non-exposed individuals. It should, however, be considered that the exposure associated increase of liver enzymes was small. For example, aspartate aminotransferase increased from 19.8 ± 11.8 in non-exposed to 24.8 ± 13.2 U/L in exposed individuals (Neghab et al., 2020). The corresponding activities for alanine aminotransferase were 20.8 ± 14.7 and 29.8 ± 20.7 , respectively.

Currently, numerous studies are performed to study hepatotoxicity *in vitro*, e.g. using primary human hepatocytes (Godoy et al., 2013; Albrecht et al., 2019; Gu et al., 2018; Grinberg et al., 2014, 2018). In animal models often the toxic solvent CCl₄ (Hoehme et al., 2010; Ghallab et al., 2016) or acetaminophen (Ghallab et al., 2019; Leist et al., 2017) are used to study hepatotoxicity. In human liver diseases as well as in animal studies with experimental, e.g. cholestatic liver damage, a much higher increase of liver enzymes is observed (Ghallab et al., 2019; Vartak et al., 2016; Jansen et al., 2017) compared to the present study (Neghab et al., 2020). The authors of the present study (Neghab et al., 2020) critically discuss if the very small increase of liver enzymes is of pathophysiological relevance or if it can be compensated without consequences. The work of Neghab and colleagues represents a valuable contribution to the long-standing question if occupational exposure to anesthetic gases causes an increased risk of hepatotoxicity. Further analyses of exposed individuals are required and a specific focus should be given to studies with a long-term follow-up to learn if operating room personnel exposed to anesthetic gases has an increased risk to develop chronic liver diseases.

Conflict of interest

The author declares no conflict of interest.

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