

The threat in our endotracheal tubes: Phthalates

Endotrakeal tüplerdeki tehdit: Fitalatlar

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Polyvinyl Chloride (PVC) is a substance often found in medical devices and supplies. With the addition of di ethyl hexyl phthalates (DEHP), the PVC products become softer, more flexible and more transparent (1). DEHP is used in a variety of products, including but not limited to the bags containing blood, total parenteral nutrition, plasma or intravenous fluids, nasogastric and enteral nutrition tubes, umbilical catheters, respiratory masks, endotracheal tubes (ETT) and medical exam gloves. Though their long history of use in medical care, their exact impact on human health is yet to be elucidated. Furthermore, the evidence from in vitro and in vivo studies demonstrate the detrimental effects of the DEHP exposure of healthcare origin to human health. In fact, DEHP is classified as a CMR1b product, meaning that it is carcinogenic, mutagenic and toxic (2). The chemical bond between DEHP and PVC is weak, therefore, liberation of DEHP by direct contact to substances with higher temperature, such as through heated medical devices, or contact with medications, blood, or bodily fluids, is possible (3). Mutagenic effects of DEHP are reported on liver,

genital organs, kidneys, lungs and heart in animal studies (2). There are publications in the literature that DEHP is an allergen in humans (4,5). ETTs are life-saving instruments for both adults and children, and are usually produced from PVC material. The studies regarding ETT and phthalates are mostly in the neonates (6,7). Ours is a rare case of an adult experiencing allergic reaction to such materials.

Our subject, an 80-year-old man, who had undergone a hip fracture operation, and had been hospitalized for 2 months due to post-operative complications, was intubated in the ICU due to respiratory insufficiency and later developed generalized rashes which was investigated. All the possible etiology (infection, dermatological, hematological, ...) had been considered, and despite all the interventions, the rashes did not recede. The instrumentation used was evaluated, and phthalates have been spotted in the ETTs. After the switch to a new brand of ETTs without phthalates, the rashes receded dramatically.

There are studies suggesting that there is a higher amount of phthalate release from the instruments with

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prolonged use (8,9). Though the levels of phthalates liberated intraoperatively tend to be lower, longer stays especially in intensive care unit (ICU) settings pose a higher risk for exposure. Latini et al. claimed that there has been a change in color in the ETT in the case of a high-risk neonate (10). Furthermore, Morton et al. demonstrated phthalate release from the ETT to water in a laboratory study (8). In another study, a meaningful correlation between DEHP metabolites in the blood and ventilation devices including non-invasive ventilation (11).

We think that the patients are exposed to clinically significant levels of DEHP through the use of medical devices and supplies. Likewise, the fact that such equipment carry a CE stamp further concerns us. We finally would like to delineate that the medical devices and supplies must be manufactured without phthalates for safety reasons. Unfortunately, we were only able to sample one case. There is still a need for publications on this topic.

Key Words: Phthalates, endotracheal tubes, harmful effect

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