

LETTER TO THE EDITOR

Interpreting cobalt blood concentrations in hip implant patients – let us not, yet, skip the uncertainty factor

To the Editor:

We read with interest the article “Interpreting cobalt blood concentrations in hip implant patients” by Paustenbach et al. We agree with the authors that it is important to determine a cobalt blood concentration toxicity threshold for patients with cobalt containing Metal on Metal (MoM) prostheses.

Based on an extensive review of the literature (not including hip implants patients) and the application of a biokinetic model the same authors established “no” and “lowest observed adverse effect levels” (NOAEL and LOAEL) for cobalt-induced organ dysfunction.¹ The bio-kinetic model was used to convert oral doses to blood cobalt concentrations when blood cobalt concentrations were not available. The blood cobalt concentration of 300 µg/L in the present article, below which no “biological important systemic adverse effect” is expected, originates from this review. Originally, when translating these findings to patients with cobalt containing MoM prostheses (with a different exposure scenario), an uncertainty factor of 3 was introduced to the 300 µg/L blood cobalt concentration. According to the authors, this factor should adequately account for the fact that persons in the studies that lead to this threshold were exposed for less than one year.² They stated that “it might be useful to monitor implant patients for signs of hypothyroidism and polycythemia starting at a cobalt blood concentration above 100 µg/L”.

In the current article, this uncertainty factor has disappeared. What evidence is there (with a time difference of only 6 months between these articles!) to support this increase from 100 to 300 µg/L? In contrast there are MoM hip implant case reports describing potentially cobalt-related health effects at cobalt blood concentrations in exactly this range and the reported health effects not only included hypothyroidism but also neurologic and cardiac signs.³ We agree with Paustenbach et al. that it is difficult to build a case on case reports, as there may be many confounding factors. However, “jumping” from 100 to 300 µg/L as the guidance blood cobalt concentration and limiting potential systemic effects to hypothyroidism and polycythemia may be premature and not justified. While cobalt-induced hypothyroidism and polycythemia are reversible, this does not always seem to be entirely the case with the neuro- and cardiotoxic effects.

We believe it is important to collect more evidence through systematic follow-up of these patients, with early identification of patients at risk for cobalt-induced dysfunction. Asymptomatic patients with cobalt blood concentrations above 100 µg/L should undergo thorough diagnostic testing for systemic cobalt-induced adverse effects (including, of course, the functioning of the hip

implant), as well as obvious all symptomatic patients, irrespective of their blood cobalt concentration. An unexpected high increase in blood cobalt concentration is definitely a serious sign and an indication for follow-up.⁴ In the end Paustenbach et al. may be correct with their 300 µg/L, but today, this threshold is not yet well-founded.

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Declaration of interest

The authors report no declarations of interest. The authors alone are responsible for the content and writing of the paper.

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