Presented at International Congress of the European Association of Poisons Centres and Clinical Toxicologists 2016 – Madrid, Spain

Published in Clin Toxicol 2015,54:430-431

139. Metal-on-metal hip joint prostheses: a retrospective case series investigating association of systemic toxicity with serum cobalt and chromium concentrations

James Ho[a], Paul Wax[b], Jerrold B. Leikin[c], John R. H. Archer[a], David M. Wood[d],Paul I. Dargan[d], and Jeffrey Brent[e]
[a]Clinical Toxicology, Guy's and St Thomas' NHS Foundation Trust and King's Health Partners, London, UK; [b]Southwestern School of Medicine, University of Texas, Dallas, USA; [c]Medical Toxicology, Pritzker School of Medicine, Chicago, USA; [d] Clinical Toxicology, Guy's and St Thomas' NHS Foundation Trust and King's Health Partners and Faculty of Life Sciences and Medicine, King's College London, London, UK; [e] Toxicology Associates, University of Colorado, Denver, USA

Objective: There has been increasing interest in the potential for toxicity associated with metal-on-metal (MoM) hip prostheses. We describe patients referred for outpatient clinical toxicology assessment of potential toxicity related to MoM prostheses.

Case Series: A retrospective review of patients with MoM hip joint prostheses from a specialist outpatient clinical toxicology service in London, UK and, the US Toxicology Investigator's Consortium (ToxIC) database. Thirty-one cases were identified (17 US, 14 UK); 8 (25.8%) had bilateral MoM prostheses; 3 (9.7%) had bilateral prostheses, of which one was MoM; 20 had unilateral MoM prostheses. All 31 had cobalt concentrations recorded (median peak cobalt concentration 10.0 [IQR 3.8–32.8] mcg/L); chromium concentration was recorded in 25 cases (median peak chromium concentration 6.9 [IQR 3.7–18.7] mcg/L). There was no difference in median concentration between those with unilateral and bilateral MoM for cobalt (10.0 [IQR 2.5–51.4] versus 10.2 [IQR 5.9–18.1] mcg/L; p ¼ 0.73) or chromium (9.1 [IQR 3.4–22.0] versus 6.7 [IQR 5.1–7.2] mcg/L; p ¼ 0.47). Twelve had joint magnetic resonance imaging (MRIs), of whom two (16.7%) had metallosis without correlation with cobalt/ chromium concentrations (Fisher's exact test; p ¼ 0.45 and p ¼ 0.18, respectively). The most commonly reported symptoms were lethargy/malaise and hearing loss (both reported by 9 (29.0%) individuals) (Table 1); the presence of symptoms did not correlate with cobalt/chromium concentrations. Three (9.7%) patients were diagnosed with significant systemic cobalt toxicity: median peak serum cobalt concentration (164.8 [IQR 87.6–630.4] mcg/L) was greater than those without this diagnosis (8.7 [IQR 2.8–18.1] mcg/L), but was not statistically significant (p ¼ 0.056).

Table 1. Frequency of clinical features by cobalt/chromium concentration in patients with metal-on-metal hip joint prostheses.

		Below median concentration*		Above median concentration*		*p*-value (Fisher's exact test)	
Clinical features	Number	Co	Cr	Co	Cr	Co	Cr
Numbness/ paraesthesia	5 (16.1%)	1	0	4	2	0.33	0.48
Weakness/ paralysis	3 (9.7%)	0	0	3	2	0.22	0.48
Peripheral neuropathy	2 (6.5%)	1	1	1	0	1.00	1.00
Lethargy/ malaise	9 (29.0%)	4	5	5	2	1.00	0.37
Hearing loss	9 (29.0%)	5	5	4	1	1.00	0.15
Tinnitus	8 (25.8%)	4	1	4	2	1.00	1.00

*Median peak cobalt (Co) concentration 10.0 mcg/L; median peak chromium (Cr) concentration 6.9 mcg/L

Conclusion: In these patients with potential toxicity related to MoM prostheses, although there was a high prevalence of reported symptoms, only three (9.7%) had significant cobalt toxicity. Symptoms did not correlate with peak cobalt/chromium concentrations and whilst cobalt/chromium concentrations were higher in those with systemic toxicity this difference was not statistically significant.