Metal release from hip implant: clinical experience with N-acetyl-cysteine as potential complexing agent in two cases

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Disclosure
No financial interest
No conflict of interest
No commercial relationship

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Background

- **Safety concerns** regarding wear and corrosion of Co/Cr hip implant → need for
  - products recall, public alert
  - hip implanted patients evaluation and f-up for local and systemic toxic effects

- **However**
  - only few reports of systemic toxicity from hip implant have been described
  - regulatory agencies focused mainly on orthopaedic and imaging evaluation

- **In particular**
  - minor attention is focused on toxicological management
  - debated data on chelation approach (i.e. which chelation, when to treat)
  - no experience in asymptomatic patients with elevated metal blood levels

Objectives

- **To describe**
  → 2 MOM hip-implanted patients with
    - mildly elevated blood cobalt levels and
    - absence of systemic manifestations of cobaltism
  → in which therapy with NAC decreased Co/Cr blood levels
Results

Case 1
- 67 ys old male
- MOM implant in 2009
  - Type: DePuy ASR XL
- High blood metals in 2012
  - Co $\rightarrow$ 16.06 mcg/L
  - Cr $\rightarrow$ 7.22 mcg/L
- oral NAC in nov 2014

Case 2
- 81 ys old female
- MOM implant in 2007
  - Type: DePuy ASR
- High blood metals in 2012
  - Co $\rightarrow$ 20.24 mcg/L
  - Cr $\rightarrow$ 4.25 mcg/L
- oral NAC in Apr 2014
Discussion and conclusions

Despite a **toxic threshold** for systemic cobaltism is not reported
- severe toxicity have been related to very high blood Co levels > 100 mcg/mL
- however hearing loss and ocular toxicity have been anecdotally associated with lower Co blood levels (> 20 mcg/L)

**Chelation in MOM hip-implanted** patients have been anecdotally reported for
- EDTA (1 case), dimercaprol (1 case), DMPS (2 cases)
- severely high Co/Cr blood levels
- patients with systemic manifestations of Co toxicity

Moreover, potential adverse effects may result from these chelating agents

- *In vitro* and *in vivo* experimental studies have evidenced that **thiol groups in NAC** may provide complexing sites for Cobalt and Chromium and enhance metal elimination through tetrathiolates coniugates formation

**In our two cases**
- slightly elevated blood cobalt levels in asymptomatic patients represented a reasonable condition to treat with a safe and easy to administer complexing agent
- oral NAC resulted a well tolerable and useful complexing agent able to increase Co and Cr renal excretion