# Increased mercury load in protein A immunoadsorption

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**Background.** Immunoadsorption is an adsorption technique for extracorporeal removal of circulating autoantibodies in autoimmune diseases such as myasthenia gravis and Guillain-Barre syndrome. To prevent microbial growth during storage the protein A columns are primed with thiomersal containing toxic ethylmercury which could be released during the immunoadsorption treatment and potentially result to its accumulation and toxicity. To reduce a thiomersal-related mercury release during immunoadsorption treatment we introduced a modified rinsing solution containing N-acetylcysteine which is avid mercury scavenger.

**Methods.** Thirteen patients were treated by 17 protein A immunoadsorption treatments and 3 venous blood samples were collected immediately before and after each session. Whole blood mercury levels were measured by atomic absorption spectroscopy and ethylmercury levels by atomic fluorescent spectroscopy. According to the manufactrurer's recommendations we used 600 mg of N-acetylcysteine to rinse the mercury from protein-loaded columns before each immunoadsorption treatment.

**Results.** Following protein A immunoadsorption ethylmercury levels increased from 0.148 ± 0.402 ng/g to 2.026 ± 1.944 ng/g ($p < 0.001$) and whole blood mercury increased from 2.447 ± 3.065 ng/g to 14.613 ± 16.922 ng/g ($p = 0.01$). Post-treatment values of whole blood mercury exceeded upper safety level of 5 ng/g in all 17 immunoadsorption treatments but no patient developed clinical signs of mercury toxicity. In one patient immunoadsorption treatment was repeated within 7 days and the results of serial determinations of blood mercury levels are shown in the table:

| | Ethylmercury (ng/g) | | Whole blood mercury (ng/g) | |
|---|---|---|---|---|
| | Before IA | After IA | Before IA | After IA |
| Day 0 | 0.13 ± 0.03 | 1.35 ± 0.12 | 0.49 ± 0.06 | 76.8 ± 5.6 |
| Day 1 | 0.17 ± 0.00 | 0.10 ± 0.02 | 8.14 ± 1.24 | 19.4 ± 0.6 |
| Day 2 | 0.05 ± 0.00 | 0.09 ± 0.00 | 9.57 ± 0.80 | 11.8 ± 0.9 |
| Day 3 | 0.03 ± 0.00 | 0.08 ± 0.01 | 6.96 ± 0.09 | 8.52 ± 0.39 |
| Day 7 | 1.69 ± 0.00 | 4.23 ± 0.12 | 5.54 ± 0.32 | 9.04 ± 0.48 |

Data are presented as means ± standard deviation. IA – immunoadsorption.

**Conclusions.** The results of our study showed that whole blood mercury and ethylmercury levels were increased during the immunoadsorption treatments, suggesting mercury release from thiomersal-primed columns even with addition of N-acetylcysteine to the rinsing solution. Mercury release was more pronounced at the beginning of serial immunoadsorption treatments which indicates that mercury exposure might depend on the storage time of protein A columns containing thiomersal priming solution.