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Case-control study on personal hygiene and breast cancer risk

The use of antiperspirants with aluminium salts and its relation to breast cancer

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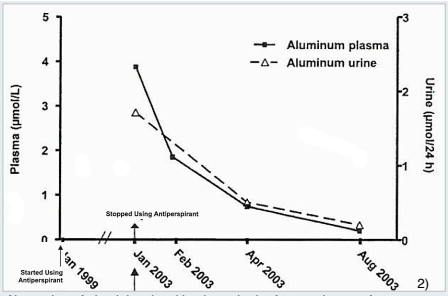
Background :

Can underarm antiperspirants cause breast cancer (1) ?

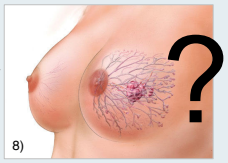
Antiperspirants are used frequently to an area next to the breast and contain aluminium salts. Aluminium -compounds could be absorbed by the skin (2) or enter the body through lesions. Through the use of antiperspirants aluminium levels of blood plasma and urine are increased (2).

Furthermore aluminium could cause estrogen-like (hormonal) effects (3,4) and these effects are related to breast cancer (4, 5).

But until now, studies on antiperspirants containing aluminium salts and their effect on breast cancer have shown conflicting results.



Absorption of aluminium by skin, through the frequently use of antiperspirants (2) and its detection in plasma and urine.



Hypothesis

We hypothesize that the long-term use of antiperspirants containing aluminium salts causes breast cancer.

We assume that female patients with breast cancer have regularly used hygiene products with aluminium compounds.
Whereas patients without any breast cancer have used less or no hygiene products with aluminium compounds.

We also hypothesize that breast tissue of patients with breast cancer reflects higher aluminium levels than tissue of healthy women.

Methods

Study part I:

Questionnaire on risk factors and Al – exposure

History of antiperspirant use will be compared between a group of 262 female breast cancer patients aged 20–85 years (n=131, cases) and age-matched controls (n=131, controls) without breast cancer.

A personal interview will be performed on:

- individual hygiene
- aluminium exposure
- other risk factors:
  - life-time estrogen exposure
  - diet
  - physical activity
  - smoking
  - alcohol

The study questionnaire is partly based on the MARIE study of the German Cancer Research Centre (6).

Study part II:

Aluminum measurement of breast tissue

Case group:
Patients with breast cancer that need breast surgery because of malign diagnosis.

Control group:
Patients (without any history of breast cancer) that will undergo a breast reduction surgery.

Breast tissue will be collected for determination of aluminium amount with atomic absorption spectroscopy (AAS) as described in Exley et al. (7).

If possible, one breast specimen will be sampled in the breast quadrant close to the axilla and one specimen in a quadrant away from the axilla.

These patients will also be interviewed with the same study questionnaire.

Statistical Analysis

Study Part I: Standard techniques for case control studies will be applied including multivariate regression modeling. For continuous variables t-tests or Mann-Whitney U tests, for categorical variables chi-square tests will be used. Variables that are univariately significant in these tests will be selected for multivariate analysis in logistic regression modelling. Adjusted Odds ratios and their 95% confidence intervals will be estimated.
Study Part II: A two-sided Mann-Whitney U test will be used to compare aluminium content between the study groups. In addition, the aluminium content of the samples will be correlated with the self reported aluminium exposure (questionnaire data) and the breast cancer outcome using linear and logistic regression analyses.

Ethical considerations
The proposed study has been approved by the ethics commission of the University of Innsbruck.

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MEDIZINISCHE STATISTIK INFORMATIK GESUNDHEITSÖKONOMIE

References:
1. Jones J. Can rumors cause cancer? Journal of the National Cancer Institute 2000; 92(18):1469–1471.
2. Guillard et al. Hyperaluminemia in a woman using an aluminum-containing antiperspirant for 4 years. The American Joural of Medicine 2004; 117(12): 956-9.
3. Darbre PD. Underarm cosmetics and breast cancer. Journal of Applied Toxicology 2003; 23(2):89–95.
4. Darbre PD. Aluminium, antiperspirants and breast cancer. Journal of Inorganic Biochemistry 2005; 99 (9):1912–1919.
5. Sappino AP, Buser R, Lesne L, Gimelli S, Béna F, Belin D, Mandriota SJ. Aluminium chloride promotes anchorage-independent growth in human mammary epithelial cells. J Appl Toxicol. 2012 Mar;32(3):233-43.
6. Slanger, T., Mutschelknaus, E. J., Kropp, S., Braendle, W., Flesch-Janys, D., and Chang-Claude, J. Test-retest reliability of self-reported reproductive and lifestyle data in the context of a German case-control study on breast cancer and postmenopausal hormone therapy.TAnnals of Epidemiology 2007 Dec;17(12):993-8.
7. Exley C, Charles LM, Barr L, Martin C, Polwart A, Darbre PD. Aluminium in human breast tissue. J Inorg Biochem. 2007 Sep;101(9):1344-6.
8. http://www.haz.de/Nachrichten/Wissen/Dossiers/Klinikfuehrer/Klinikschwerpunkte/Brustkrebs-ist-heilbar-prinzipiell.
9. http://ais.badische-zeitung.de/piece/00/d3/5e/c1/13852353.jpg.