

## Nickel, Atopy, Irritant Reactivity and Statistical Pitfalls

Sir,

In a recent publication we learn from Elsner & Burg that "irritant reactivity is a better risk marker for nickel sensitization than atopy" (2). The authors found an increased irritant reactivity in nickel-sensitized patients after treatment with sodium lauryl sulfate. In contrast, the Erlangen atopy score revealed no difference between nickel-sensitized and non-sensitized patients. Although this finding may be supported by some other studies (e.g. 6, 3, 8), it has been shown that nickel allergy is increased in patients with atopic dermatitis – 45% versus 19% in the Erlangen study (1), or conversely, that atopy is increased up to 51% in nickel-sensitized patients (versus 33% in the control group) (5).

The divergent results and the conclusions drawn by Elsner & Burg may be due to a statistical artifact and a misconception of the Erlangen atopy score. Elsner & Burg have calculated the means of the atopy score of the nickel-positive and the nickel-negative group ( $6.0 \pm 1.3$  and  $5.3 \pm 0.5$ ). As the atopy score is graduated on a rank scale (like good marks or bad marks at school) and not on an interval scale (like meter and gramme), the application of the arithmetic mean is not possible. Instead, the median is determined. But even this procedure is questionable: a patient with an atopy score value of e.g. 9 is not less atopic than a patient with a value of 10; the value represents nothing more than the probability of being atopic, if certain criteria are fulfilled. In the same way values between e.g. 0 and 4 do not indicate "very weak atopic diathesis" but (with a very high probability) "no atopic diathesis". So the atopy score is not a measure of degree (i.e. of disease severity) but a diagnostic tool. The arithmetic mean is not appropriate to describe the "central tendency" of the atopy score. Therefore, the conclusion of the article (as presented in the title) is not supported by the data. To answer the question if atopic diathesis is a risk marker for nickel sensitization, a clear-cut distinction between patients with high atopy score values ("atopics") and low values ("non-atopics") is necessary. If confirmed, the measurement of irritant reactivity may be valuable in predicting the risk of nickel sensitization, but the diagnosis of atopic diathesis remains indispensable for preventive counselling in occupational dermatology (7, 4).

### REFERENCES

1. Diepgen TL, Fartasch M, Hornstein OP. Evaluation and relevance of atopic basic and minor features in patients with atopic dermatitis and in the general population. *Acta Derm Venereol* (Stockh) 1989; Suppl 144: 50–54.
2. Elsner P, Burg G. Irritant reactivity is a better risk marker for nickel sensitization than atopy. *Acta Derm Venereol* (Stockh) 1993; 73: 214–216.
3. Fedler R, Strömer K. Nickel sensitivity in atopics, psoriatics and healthy subjects. *Contact Dermatitis* 1993; 29: 65–69.
4. Meyer J. Dermatologische Eignungsuntersuchungen bei Bewerbern medizinischer Heilberufe – Ein Beitrag zur Prophylaxe von Berufsdermatosen. *Dermatol Monatsschr* 1992; 178: 503–505.
5. Motolese A, Truzzi M, Seidenari S. Nickel sensitization and atopy. *Contact Dermatitis* 1992; 26: 274–275.
6. Nielsen NH, Menné T. Nickel sensitization and ear piercing in an unselected Danish population. *Contact Dermatitis* 1993; 29: 16–21.
7. Steinebrunner B, Schwanitz HJ. Dermatologische Berufseingangsuntersuchung für Fechtberufe. *Allergologie* 1992; 15: 433–435.
8. Ullmann S, Przybilla B, Enders F, Pöschl C, Uberla K. Atopy and nickel contact allergy (NCA). *Allergologie* 1992; 15: 145 (Abs. 738).

Received November 2, 1993

Axel Schnuch, MD, IVDK/Department of Dermatology, University Hospital Göttingen, D-37075 Göttingen, Germany.

### In response to the Letter by Schnuch

We thank Dr. Schnuch for his skilful comments on our study, and we do accept his criticism of the method of calculating an arithmetic mean for a rank variable such as the Erlangen atopy score. However, the results and conclusions of our study are not based on an arithmetic mean. We were well aware of the fact that no information about the distribution of this variable in the study population was available, and we therefore appropriately investigated the difference in atopy score between nickel-sensitive and non-sensitive subjects with the non-parametric U-test for non-paired samples.

Secondly, Dr. Schnuch proposes not to use the atopy score as is but to make a clear-cut distinction between patients with high and low values. Following the recommendation of Diepgen et al. and judging atopy as probable when an atopy score of  $> 10$  is present, we recalculated our data and again found a higher percentage of atopics in the nickel-sensitive group compared to the population of non-sensitives; however, the difference was not significant (chi-squared test,  $p = 0.27$ ).

As mentioned in our paper, the lack of significance of the association between atopy and nickel sensitivity may be due to the lower sample size of our study compared to previous investigations. There can be no doubt, however, that according to our data irritant reactivity predicts nickel sensitization better than atopy as indicated by the atopy score. Preventive counselling in occupational dermatology is a completely different topic, and we agree with Dr. Schnuch that the diagnosis of atopic diathesis is indispensable in this situation.

Peter Elsner, MD, Günter Burg, MD, Department of Dermatology, University of Zurich, Gloriastrasse 31, 8091 Zurich, Switzerland.