

LETTER TO THE EDITOR

Dental metal allergy is not the main cause of palmoplantar pustulosis

Editor

Metal allergy as a possible cause of palmoplantar pustulosis (PPP) is a controversial issue,^{1–6} and in particular, there is insufficient evidence that removal of dental metal leads to resolution of PPP. This study involved 257 PPP patients (86 male and 171 female, 20–78 years old) who underwent patch testing for metal allergy between 2000 and 2014 at Niigata University Medical and Dental Hospital. Patients who had suffered repeated eruptions of non-infectious pustules on the palms and soles were diagnosed as having PPP. Arthralgia was observed in 21% of the patients, and 75.1% (193 patients) had a history of smoking.

We performed patch testing using our dental metal series (Table 1). The reagent was placed on a Patch Tester TORII® (Torii Pharmaceutical Corporation, Tokyo, Japan) or Finn Chamber® on Scanpor® tape (SmartPractice, Phoenix, AZ) and affixed to the back of the patients as a closed patch for 48 h. Reading of reactions was performed based on the International Contact Dermatitis Research Group (ICDRG) criteria.⁷

We used the PPPASI⁸ as a score for evaluating the severity of PPP rash. Patients with a post-treatment PPPASI score of 0 were judged to have ‘recovered’, those with scores below 1/4 of the baseline score at the initial visit and no pustule development as ‘remarkably improved’, those with scores of 1/4 to below 1/2 of the baseline score as ‘improved’ and those with scores of 3/4 to below 2-fold the baseline score as ‘unchanged’.

Positive reactions to metal allergens were observed in 138 of the 257 patients (53.7%; Table 1). Using electron probe microanalysis (EPMA-1610, Shimadzu, Kyoto, Japan),⁹ we analysed the metals in the oral prostheses of 105 of the 138 patients who showed positive reactions in patch tests for metal allergens. In 64 (61%) of those patients, the oral prostheses had metal allergens that elicited positive reactions in patch testing. For 24 patients, we removed these allergens from their prostheses, but none of them showed resolution of the symptoms (Fig. 1). Nineteen of 24 patients (79.1%) were judged to have ‘remarkably improved’ or ‘improved’ (Fig. 1), although 16 of them had undergone treatment of focal dental infections simultaneously with removal of their dental metal. Only 3 of 19 patients had no dental infections. These three patients had nickel allergy, and Ni was detected in their prostheses. Among 24 patients, we judged 2 to be ‘unchanged’, despite the removal of their dental metals. As shown in Fig. 1, dental metals were not removed in 23 cases. In

Table 1 Results of patch testing for metal allergens

Allergen	Concentration (Supplier)	Number positive	Number tested	Positivity rate (%)
Nickel sulphate (Ni)	2.5% pet. (Brial)	47	257	18.3
Chloroplatinic acid (Pt)	0.5% aq. (Torii)	43	257	16.7
Potassium dichromate (Cr)	0.5% aq. (Torii)	36	257	14.0
Palladium chloride (Pd)	1.0% pet. (Trolab)/1.0% aq. (Torii)	32	257	12.5
Cobalt chloride (Co)	1.0% pet. (Brial)/1.0% pet. (Trolab)	31	257	12.1
Gold sodium thiosulphate (Au)	0.5% pet. (Brial)/0.25% pet. (Trolab)	27	257	10.5
Mercuric chloride (Hg)	0.05% aq. (Torii)	13	257	5.1
Stannous chloride (Sn)	1.0% aq. (Torii)	10	257	3.9
Iridium chloride (Ir)	1.0% aq. (Torii)	8	257	3.1
Zinc chloride (Zn)	0.5% pet. (Torii)	6	257	2.3
Manganese chloride (Mn)	0.5% pet. (Torii)	3	257	1.2
Indium chloride (In)	1.0% aq. (Torii)	3	257	1.2
Copper sulphate (Cu)	1.0% aq. (Torii)	1	257	0.4
Silver bromide (Ag)	2% pet. (Torii)	1	257	0.4
Aluminium chloride (Al)	2.0% aq. (Torii)	0	257	0
Petrolatum		0	257	0
Distilled water		0	257	0

N = 257.

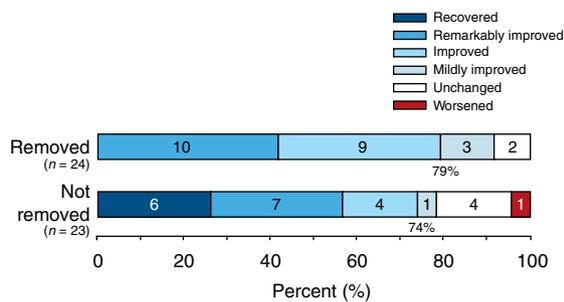


Figure 1 Outcomes of patients who did or did not undergo removal of dental metals. Patients with a post-treatment PPPASI score of 0 were judged to have ‘recovered’, those with scores below 1/4 of the baseline score at the initial visit and no pustule development as ‘remarkably improved’, those with scores of 1/4 to below 1/2 of the baseline score as ‘improved’, those with scores of 1/2 to below 3/4 of the baseline score as ‘mildly improved’, those with scores of 3/4 to below 2-fold the baseline score as ‘unchanged’, and those with scores of 2-fold or greater were considered to have ‘worsened’. There was no significant difference in treatment outcomes better than ‘improved’ between the patients who did and did not undergo metal removal from prostheses ($P = 0.674$).

this group, six patients were judged to have ‘recovered’, and all of them had received treatment for dental focal infection. There was no significant difference in treatment outcomes rated better than ‘improved’ between the patients who did and who did not undergo removal of metal from their prostheses ($P = 0.674$).

A correlation between metal allergies and PPP has been reported previously.^{1–4} These reports indicated that the symptoms of PPP disappeared after removal of dental metals. In the present study, to assess the effectiveness of removing dental metals, we needed to rule out the possibility of treating focal dental infections simultaneously with metal removal. Removal of dental metals or dietary restriction imposes a burden on patients.

In conclusion, we consider that even if metal patch test results are positive, the presence of any focal dental infections should be investigated, rather than immediately removing any dental

metal. However, for patients with Ni allergy, we consider that dietary metal restriction is worth trying.

This study was granted approval by the Niigata University Graduate School of Medicine Ethics Committee.

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