

Patch tests with potassium dichromate removed after 24 and 48 hours

EDWARD RUDZKI, ZDZISŁAW ZAKRZEWSKI, GRAŻYNA PROKOPCZYK AND ANNA KOZŁOWSKA

Department of Dermatology and Department of Applied Pharmacy,
Warsaw School of Medicine, Warsaw, Poland

The rate of release *in vitro* of four potassium dichromate concentrations (0.5, 0.1, 0.05 and 0.01 %) was determined. In the course of 24 h, 90.1-97.5 % was released of the total $K_2Cr_2O_7$ amount in 48 h. Out of 30 patients positive to 0.05 % dichromate when the patch test was done routinely, 29 were also positive when the patch was removed after 24 h. The effect of the earlier removal of the patch test was also noted in seven other patients, when results of tests with lower dichromate concentrations were taken into account.

Key words: Chromium concentrations in patch testing – patch test removed after 24 and 48 hours – release of dichromate from soft paraffin *in vitro*.

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Some dermatologists claim that patch tests may be removed after 24 h and not after 48 h as is generally practiced (Hannuksela & Pirilä 1976). Removal of the patches after 24 h makes it easier for subjects resident in distant places. In order to investigate the effects of such earlier removal on the results, two investigations were performed:

1. Release of the dichromate from the bases *in vitro* after 24 and 48 h was determined.
2. Patients were tested with several dichromate concentrations and the patches were removed after 24 and 48 h.

Materials and Methods

The investigations were performed on 30 patients in whom standard testing had confirmed sensitivity to 0.5 % $K_2Cr_2O_7$. Eight patch tests were applied to these subjects, two with 0.5, two with 0.1, two with 0.05,

and two with 0.01 % dichromate, applied symmetrically on each side of the back. White soft paraffin was used, because with this vehicle more reproducible results of $K_2Cr_2O_7$ release *in vitro* were obtained. The four patches on the left side were removed after 24 h and those on the right after 48 h. The results were read after 24, 48, 72 and 96 h. Dichromate release *in vitro* was estimated in a cell dialysis apparatus (Mutimer et al. 1956). The method is based on an exchange through a semi-permeable membrane of $K_2Cr_2O_7$ on distilled water. The semi-permeable membrane was Cuprofan®: P.T. – 150 (Bernberg AG, Uptel, West Germany) with a pore size of 23 Å, 11 – 13 μ m thick and previously soaked in distilled water. After being filled with 10 g of the base, the apparatus was placed in a thermostat at 37° C. The solution containing the chromate release was removed for analysis from the apparatus after 24 and 48 h. The

chromium content was determined colorimetrically after the addition of diphenylcarbazide in acetone (Lange 1956) and by atomic absorption spectrophotometry (Rubeńska & Moldan 1967).

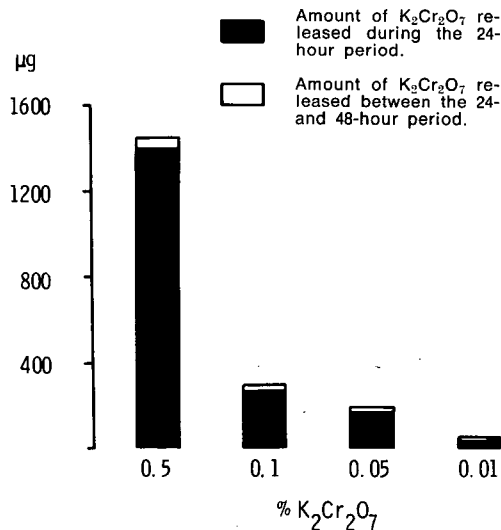
Results and Discussion

In vitro investigations demonstrated that most of the potassium dichromate is released from white soft paraffin in the course of the first 24 h (Table 1). When 0.5 % $K_2Cr_2O_7$ was used, the portion released after 24 h was 90.1 %. With 0.1, 0.05 and 0.01 % dichromate it was 90.0, 97.5 and 92.6 % respectively. Thus the difference in the amount of Cr_6 present on the surface of the epidermis when the patch is removed after 24 and 48 h is not large. It is not known to what degree the result of the patch test depends on this amount.

All 30 patients were positive to 0.5 % $K_2Cr_2O_7$ in white soft paraffin when the test patches were removed after 48 h; 29 were also positive when the patches were removed after 24 h. Only one patient (Z.J.) was persistently negative when the patch was removed after 24 h. When removed after 48 h, it was at first also negative, but was doubtful ($\pm$) after 72 h and was positive after 96 h.

Greater differences between the results of tests removed after 24 and 48 h were noted when all four dichromate concentrations were taken into account. They were equal in 22 patients and seven (with the exception of Z.J.) showed some differences. In the 22 subjects with identical reactions to all four concentrations when the patches were removed after 24 and 48 h, the lowest $K_2Cr_2O_7$ concentration eliciting skin reaction was 0.5 % for seven patients, 0.1 % for seven and 0.05 % for eight patients. Of the seven subjects reacting differently, six were positive to 0.05 % $K_2Cr_2O_7$ when the patch was removed after 48 h and only positive to

Table 1. Amount of chromium released from white soft paraffin with 0.5, 0.1, 0.05 and 0.01 % $K_2Cr_2O_7$ concentrations



0.1 % when the patch was removed after 24 h. The respective concentrations which evoked analogous reactions in the seventh patient were 0.01 and 0.05 %. These data indicate that the patch tests with dichromate removed after 24 h are rather sensitive.

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Address:

Dr. Edward Rudzki
Department of Dermatology
Warsaw School of Medicine
Warszawa Koszykowa 82a
Poland

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