clearance of immune complexes by massive leukocytic infiltrations (2).

Parish (3) reported that bacterial antigens, immunoglobulins and complements were demonstrated in lesions of spontaneous cutaneous vasculitis preceded by streptococcal pharyngitis. Antibodies produced against bacterial polysaccharides proved to belong to the IgM class (4). The present findings, such as the deposition of IgM antibodies, the former streptococcal infection with high ASO titre, and positive skin reactions to streptococcal antigens, therefore, strongly suggest that streptococcal antigens may also play an important role in the pathogenesis of the vasculitis of this case. But mechanisms for the formation of sterile subcorneal pustules of acute generalized pustular bacterid still remain obscure.

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Cutaneous Eruptions and Intrauterine Contraceptive Copper Device

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Abstract. In the course of 6 months, 1888 intra-uterine contraceptive devices (IUCD) were inserted in a public clinic for contraception. In 10 of the women the IUCD subsequently had to be removed because of skin complaints. Four of these women as well as 3 out-patients of the Department of Dermatology, The Finsen Institute, who had been fitted with an IUCD were tested for metal allergy with closed patch tests and intracutaneous tests. None of the women was allergic to copper. One woman was allergic to nickel, which could be traced in minimal amounts in the copper wire of the IUCD, though causal connection between nickel in the IUCD and the skin symptoms is believed to be unlikely.

Key words: Intra-uterine contraceptive device; Copper; Nickel; Contact dermatitis; Internal provocation

Cutaneous allergic reactions to copper are extremely rare. However, in 1972 Barranco (1) reported a case of eczematous dermatitis caused by internal exposure to copper in an intra-uterine contraceptive copper device (IUCD) and in 1977 Forch, Kästner & Wagner (5) reported a second case. Both cases were verified by patch testing. In several cases of cutaneous eruptions in IUCD-using women, attention has been drawn to the IUCD as a possible cause of the dermatitis or of progression in a pre-existing skin disease, but final proof has constantly been lacking (2, 3, 6).

In order to estimate the practical significance of IUCD in skin diseases, we have conducted tests for metal allergy over a period of 6 months in IUCD-using women having skin complaints.

The IUCD

The copper in the IUCD's used in Denmark is quite pure and any contamination to the copper, for example in Gravigard® (Searle) which contains 115 mg copper with a surface area of 200 mm² does not exceed 0.01 % according to the registration specifications.

On request the manufacturer reported a nickel content of 0.00032–0.00038 % in the copper wire in the IUCD. Spectrographical analyses of nine copper wires from IUCD's as performed at NKT Metals, confirmed these figures, even though a certain fluctuation was found—as is

Table I. *Approximate amounts of copper and nickel in turnover, intracutaneous tests, and daily release from intra-uterine copper device*

	Copper	Nickel
Daily absorption (Cu) or excretion in urine (Ni), μg	800	1.5
Amount of metal found in intracutaneous tests, μg	2	10
Amount of metal in intracutaneous tests, which may elicit type IV reaction, μg	$\frac{1}{2}$[a]	10^{-3}[a]
Maximum amount of metal released daily from copper device, μg	90	9×10^{-4}

[a] Provided the concentrations in references 4, 9 and 10 refer to weight of metal (g) per ml solution.

to be expected in electrolytically purified copper. The maximum nickel content—found in one of the nine IUCDs—was 0.001%.

Furthermore, the IUCD consists of a poly-propylene frame containing 10% barium sulphate and a poly-propylene withdrawal cord.

MATERIAL AND METHOD

Thirteen IUCD-using women with skin complaints or inexplicable progression or recalcitrance in a skin disease were registered during 6 months at the Department of Dermatology, The Finsen Institute (3 individuals) and at the clinic for contraception, Svendborggade, Copenhagen (10 individuals). At this institution in the same period 1888 IUCDs were inserted. However, 6 of these 10 women were not able to participate in the investigation.

The remaining 7 women were investigated clinically for skin manifestations and exposed to a standard patch test tray—which includes nickel sulphate, cobalt chloride and potassium dichromate—as well as closed patch tests with copper sulphate 2.5% and 5% in petrolatum.

Five of the women were tested intracutaneously with copper culphate 0.02 ml diluted 10^{-4} (4) and 4 of them with potassium dichromate 0.05 ml diluted 10^{-5} and potassium dichromate, nickel sulphate and cobalt chloride 0.1 ml diluted 10^{-4} (9, 10). 0.1 ml isotonic saline was used as a control.

RESULTS

None of the women showed positive delayed allergic reactions to copper sulphate 2.5% and 5% in petrolatum, either as patch tests or as intracutaneous tests. One woman showed positive allergic reactions to lanolin and rubber and a toxic reaction to copper sulphate 5%. In 6 of the 7 women the IUCD was removed because of the skin symptoms, in all cases with a certain positive effect on the skin disease, varying from clearing in the course of several days, to a gradual but incomplete regression in the course of months.

In 4 women, dermatological diagnoses not implicating the IUCD were established (acne vulgaris, perioral dermatitis, allergic contact dermatitis (lanolin, rubber), dermatophytosis). One woman with hand eczema developing 8 months after insertion of an IUCD was found allergic to nickel sulphate. For another in whom an itching papulo-urticarial eruption developed 4–5 weeks after insertion, regressing immediately after removal of the IUCD, no final dermatological diagnosis could be made. In one woman the course of the skin disease ruled out the IUCD as a cause of the dermatitis.

DISCUSSION

We found no proof for IUCD-provoked or -aggravated dermatitis in this investigation. For ethical reasons no re-exposure was performed. However, it should be mentioned that one woman with skin complaints diagnosed as perioral dermatitis re-exposed herself, resulting in aggravated skin complaints.

Two theoretical questions arise

1. Do negative patch tests and negative intracutaneous tests for delayed reactions definitely rule out an internal provocation with metals as an etiological factor in a skin eruption, considering the differing routes of administration, the various possible proteins which render the metal a whole antigen, and the different concentrations of the antigen at the sites of application?

2. Is the minimal amount of nickel in the IUCD of any importance—especially in nickel-sensitive women?

As an approach to these questions we have tabulated (Table I) the daily ingestion of copper and absorption as measured by urinary excretion of nickel (8), the amounts of copper and nickel in the intracutaneous tests in present investigation, the amounts of copper and nickel which, according to reports in the literature, have elicited in intracutaneous tests local delayed reactions in rather sensitive individuals (4, 9, 10), and daily maximal release of copper and nickel from the IUCD, calculated for the first weeks following insertion since the amount of metal released declines subsequently (7).

From these figures, it seems unlikely that even markedly nickel-sensitive women would develop allergic nickel dermatitis as a result of the insertion of an IUCD.

Cutaneous allergic reactions to the metal in the IUCD are believed to be very rare and of a minor practical significance.

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The Wasserman, Kline and VDRL Reactions in Routine Syphilis Serodiagnosis

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Abstract. The WR, Kline and VDRL reactions were compared in 496 cases of syphilis. The VDRL was significantly more sensitive than both WR and Kline.

Key words: Syphilis; WR; Kline; VDRL

In Sweden lues is a rare disease, with approximately 300–400 new cases reported each year (6). The clinical diagnosis of syphilis is often difficult. Therefore diagnosis is mostly based on tests determining serum antibodies. In routine work, nontreponemal tests are used for screening. To increase the sensitivity, combinations of tests are often used, such as Wassermann's reaction (WR) and floccular tests, e.g. Meinicke, RPR, Kline, VDRL. The use of test combinations, however, is laborious in routine work. The ideal for syphilis screening is one or few tests with high sensitivity.

The aim of the present investigation was to compare the sensitivity of the Wassermann reaction and the two floccular tests (Kline and VDRL) used in our laboratory and, if possible, to omit one of the tests.

MATERIALS AND METHODS

Between 1976 and 1978, 261954 serum samples were sent in to the Bacteriological Laboratory for syphilis screening. All samples were routinely analysed with the WR and

Table 1. *Comparison between the Kline and VDRL reactions in 496 patient sera*

	Kline				
VDRL	−	±	+	++	+++
−	6	9	2	1	0
±	35	30	9	6	0
+	18	29	35	3	0
++	8	11	32	34	7
+++	6	7	10	54	144