

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.

ACKNOWLEDGEMENT

We wish to thank Erik Hjortboe, chemical engineer at N.K.T. Metals, for performing a spectrographical analysis of the copper wires, and J. G. Searle Ltd. and Schering Corp. for providing IUCDs and internal documentation.

REFERENCES

1. Barranco, V. P.: Eczematous dermatitis caused by internal exposure to copper. *Arch Dermatol* 106: 386, 1972.
2. Ehrström, C.: Metallallergi vid kopparspiral. *Läkartidn* 70: 1850, 1973.
3. Ehrström, C.: Ytterligare fall av metallallergi. *Läkartidn* 70: 2310, 1973.
4. Epstein, S.: Cross-sensitivity between nickel and copper. *J Invest Dermatol* 25: 269, 1965.
5. Forck, G., Kästner, H. & Wagner, H.: One case of allergic reaction due to copper-T. Second International Symp Contact Derm, Elsinore, March 1977.
6. Forsbeck, Margit & Wahlberg, J. E.: Metallallergi vid kopparspiral (I). *Läkartidn* 70: 2309, 1973.
7. Hagenfeldt, Kerstin: Intrauterine contraception with copper-T device. Effect on trace elements in the endometrium cervical mucus and plasma. *Contraception* 6: 37, 1972.
8. Kaaber, K., Veien, N. K. & Tjell, J. C.: Low nickel diet in the treatment of patients with chronic nickel dermatitis. *Br J Dermatol* 98: 197, 1978.
9. Markussen, P. V.: Intradermal test using cobalt chloride. *Acta Dermatovener (Stockholm)* 43: 472, 1963.
10. Markussen, P. V.: Comparison of intradermal test and patch test using nickel sulfate and formaldehyde. *J Invest Dermatol* 40: 263, 1963.

Received April 30, 1979

Gerda Frentz, M.D.
Department of Dermatology
The Finsen Institute
Strandboulevarden 49
DK-2100 Copenhagen Ø
Denmark

The Wasserman, Kline and VDRL Reactions in Routine Syphilis Serodiagnosis

Elisabeth Berntsson and Peter Larsson

Department of Clinical Bacteriology, Institute of Medical Microbiology, University of Göteborg and the Bacteriological Laboratory, Göteborg, Sweden

Received May 15, 1979

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, non-treponemal 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, 261 954 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

VDRL	Kline				
	–	±	+	++	+++
–	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

Table II. Comparison between the WR and VDRL reactions in 496 patient sera

VDRL	Wassermann (WR)								
	—	anti compl. ^a	weak positive	1/7.5 ^b	1/15	1/30	1/60	1/120	≥1/240
—	7	1	8	0	0	1	0	1	0
±	60	0	12	3	3	0	1	0	1
+	51	3	24	3	3	0	1	0	0
++	27	3	31	16	8	5	2	0	0
+++	13	6	29	12	18	18	30	28	67

^a Anticomplementary activity.^b Positive in serum dilution.

Kline tests (National Bacteriological Laboratory, Stockholm, Sweden) and VDRL test (Behringwerke, Marburg, W. Germany). Positive sera were analysed with confirmatory test for syphilis (TPI, FTA-abs) (1, 2, 4, 7). The results of the WR, Kline and VDRL reactions were registered for each patient. Sera positive in one or more of the screening tests and with a positive confirmatory test were studied. After omitting duplicates, sera from 496 patients were included in the study.

The χ -square and Kolmogorov-Smirnov two-sample tests were used for statistical calculations (5).

RESULTS AND COMMENTS

The results of the two floccular reactions, Kline and VDRL, were compared (Table I). Significantly more sera were positive when using the VDRL vis-à-vis the Kline reaction ($p < 0.001$).

The results of the VDRL reaction compared with the WR showed significantly more positive sera with the former test, as seen in Table II ($p < 0.001$).

In 12 cases the VDRL was negative and the Kline reaction positive. In another 6 cases the VDRL was negative and the WR was positive. The clinical data of these 18 patients were studied. In 5 of the patients early syphilis was found, whereas for 12 patients the disease had been treated years ago. The remaining patient was a newborn baby with antibodies passively transferred from the mother.

In the present work we found that the VDRL was significantly more sensitive than both the WR and Kline reactions. For legal reasons according to Swedish and International regulations the WR must be maintained (3). Furthermore, the WR is very suitable for supervising the effect of treatment of syphilis.

Thus if simplification of syphilis screening is desirable, one of the floccular reactions should be omitted. If the results of the Kline reaction were deleted from the present material, only seven out of

the 496 (1.5%) positive sera would have been missed. Only one of those was a case of early syphilis.

We conclude that one floccular reaction, such as the VDRL, is sufficient for most routine screening of syphilis, but when the diagnosis of syphilis is suspected the WR should be added.

REFERENCES

1. Deacon, W. E., Lucas, J. B. & Price, E. V.: Fluorescent treponemal antibody absorption (FTA-ABS) test for syphilis. *J Am Med Assoc* 198: 624, 1966.
2. Hunter, E. F., Deacon, W. E. & Meyer, P. E.: Improved FTA test for syphilis, the absorption procedure (FTA-ABS). *Public Health Rep* 79: 410, 1964.
3. Kungl. Med. Styr. cirkulär 25 Sept. 1961 (MF no. 93).
4. Nelson, R. A., Jr & Mayer, M. M.: Immobilization of *Treponema pallidum* in vitro by antibody produced in syphilitic infection. *J Exp Med* 89: 369, 1949.
5. Siegel, S.: *Non-parametric Statistics*, 127 pp. McGraw-Hill, New York, 1956.
6. *Statistical Abstract of Sweden*, p. 297. National Central Bureau of Statistics, Stockholm, 1978.
7. Wood, R. M.: Tests for syphilis, 341 pp. *In* *Manual of Clinical Immunology* (ed. N. R. Rose & H. Friedman). Am Soc Microbiology, Washington, 1976.