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Medical Memoranda

Screening Test for High Serum Salicylate Levels

Brit. med. J., 1964, 1, 1686

The differential diagnosis of coma is a pressing problem to the casualty department. Too often an inexperienced clinician has to make a diagnosis without adequate laboratory services. A simple and reliable screening test for salicylate intoxication would be of great assistance to the clinician. We describe here an investigation into the use of "phenistix" strips as a screening test for high levels of serum salicylate.

Rupe and Free (1958) showed that phenistix gave a colour reaction with salicylate. Johnson, Free, and Free (1962) described a series of cases of aspirin poisoning in children, in which phenistix strips were used to detect salicylates, both in urine and in plasma. They obtained a colour reaction with sera in which the salicylate level was greater than 20 mg./100 ml.

Salicylates are bound to the plasma proteins and at low concentrations this binding is almost complete. Sodium salicylate is 92% bound to the plasma proteins at a level of 5.8 mg./100 ml. Phenistix strips will react only with free salicylate, and it would appear that at about 20 mg./100 ml.

Results of Test				
Sample	Serum Salicylates (mg./100 ml.)	Phenistix Colour		
		No Colour	Faint Mauve	Strong Mauve
1	0	+		
2	1	+		
3	5	+		
4	9	+		
5	10	+		
6	10	+		
7	14	+		
8	15	+		
9	20		+	
10	33		+	
11	44		+	
12	50			+
13	75			+
14	89			+

the plasma-protein-binding mechanism is saturated and sufficient free salicylate is present. Trinder's (1954) ferric-chloride/mercuric-chloride method acts as a hydrolysing agent and a colour developer.

Patients.—These were cases of aspirin overdosage admitted to the casualty department over the past 12 months. Sera were also tested from four cases receiving salicylate therapy.

Methods.—The serum salicylates were estimated by Trinder's method. The phenistix strips were dipped into separated serum, not whole blood, and the colour was read immediately. This was graded as mauve or dense mauve.

Results.—These are given in the Table. It will be seen that a definite mauve colour is developed between 15 and 20 mg./100 ml. Case 14 drank oil of wintergreen (methyl salicylate), with a fatal outcome. A lumbar puncture had been performed, and, on testing, the cerebrospinal fluid gave a mauve colour with phenistix strips; the salicylate level was found to be 29 mg./100 ml.

In aqueous solution phenistix will detect salicylate levels down to 2.5 mg./100 ml.

COMMENT

These results support the findings of Johnson *et al.* (1962) and suggest that phenistix can detect high serum-salicylate levels, and are of use in the diagnosis of salicylate poisoning.

The different sensitivity of phenistix to salicylate in plasma and aqueous solution is due to the protein-binding. The interpretation of phenistix strip colours in cerebrospinal fluid must be made in this light, in view of the low level of protein in cerebrospinal fluid.

We would like to thank Dr. G. Walker, of Miles-Ames Research Laboratories, for the supply of "phenistix."

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