

Spurious hyperkalaemia and hyponatraemia in a patient with thrombocythaemia

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SYNOPSIS Changes in serum potassium and sodium during blood clotting in a patient with thrombocythaemia are described. In such patients falsely high results for potassium and falsely low results for sodium may be obtained.

In 1958 Hartmann, Auditore, and Jackson reported high serum potassium values in cases of thrombocythaemia. They ascribed this to the release of potassium from platelets on clotting, and coined the term 'spurious hyperkalaemia'. Wills and Fraser (1964) reported analogous cases of spurious hyperkalaemia due to breakdown of leucocytes when blood from patients with leukaemia was allowed to stand before separation of the plasma. The object of this paper is to report a case in which there was spurious hyperkalaemia and hyponatraemia in association with thrombocythaemia.

MATERIAL AND METHODS

A 76-year-old man, A.B., was found on admission to have a serum potassium level of 6.9 mEq. per litre. The red cell count was 3.6×10^6 per c.mm., the white cell count 28,000 per c.mm., and the platelets 3.18×10^6 per c.mm. Since this serum potassium result was unexpectedly high, and in view of the findings of Hartmann *et al.* (1958), the plasma potassium level was determined on a sample of heparinized blood. This was found to be 4.2 mEq. per litre and it was concluded that the discrepancy of 2.7 mEq. per litre was due to release of potassium from the platelets on clotting. To study the changes in sodium and potassium concentrations during clotting, a sample of blood was taken from A.B. and divided into seven parts: six were allowed to clot in glass tubes at room temperature (24°C.) and the seventh was prevented from clotting by the use of heparin. Taking the plasma values obtained from the heparinized sample, which was separated within 15 minutes of being taken, as the plasma sodium and potassium *in vivo*, the increase in potassium and decrease in sodium concentration in the serum with time were observed by separating the sera from the clots at intervals of up to two hours after the blood was taken and estimating the sodium and potassium concentrations with the AutoAnalyzer (Snodgrass,

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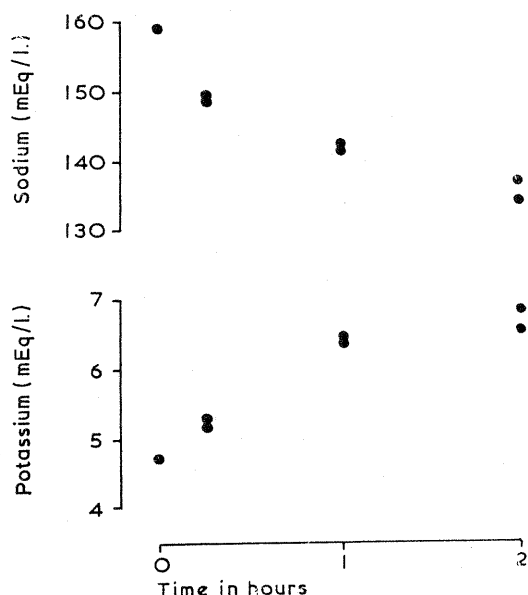


FIG. 1. Changes in serum sodium and potassium levels on clotting in a patient with thrombocythaemia compared with the level in plasma separated immediately.

Fuwa, and Hviid, 1962). The results are shown in Figure 1. The serum potassium increased with time, reaching a value 2.1 mEq. per litre above the initial value after approximately two hours. The serum sodium concentration decreased, reaching a value 22 mEq. per litre below the initial value after two hours.

DISCUSSION

The main point to be noted is that as well as the increase in serum potassium with time a decrease in serum sodium occurred. Thus not only the potassium estimation but also the estimation of sodium may be widely in error when serum is used instead of plasma for electrolyte determinations in thrombocythaemia.

Pfleiderer, Otto, and Hardegg (1959) reported a difference between plasma and serum potassium in seven normal men. They found that the serum potassium exceeded the plasma potassium by between 0.57 and 0.87 mEq. per litre. Further experiments on serum and plasma in this laboratory have confirmed a difference between plasma and serum potassium, but have failed to establish any significant difference between plasma and serum sodium.

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