Duplication of LDH-1 in a Patient Receiving Multiple Transfusions

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The existence of multiple molecular forms of lactic dehydrogenase is well documented and five isoenzymes have been demonstrated (1, 2). Differences in the concentration of the individual isoenzymes has diagnostic significance in diseases of heart (3, 4), liver (5), striated muscle (6), and red blood cells (7). Fujimoto et al. (8) have shown additional bands between LDH-1 and -2 and between LDH-2 and -3 in a patient with esophageal carcinoma with hepatic secondary deposits. They concluded that the bands were produced by the tumor cells and represented an altered form of the M subunit, which produced a set of hybrids with the normal H subunit.

We present a patient with a duplication of LDH-1 band that appeared during massive transfusions of plasma products.

Case History

The patient was a severely affected hemophilia aged 14 years. He sustained a rupture of the left ureter with a massive retroperitoneal hematoma as a result of a crushing injury. Surgery was undertaken under cover of "cryoglobulin precipitate," which is a crude concentrate of antihemophilic factor made by the cold precipitation of human plasma (9). This therapy was continued for 30 days to permit healing of the wound and resorption of the hematoma. Cryoglobulin precipitate from 1,500 donors was used in this patient.

Methods

Electrophoretic separation of lactate dehydrogenase (LDH; L-lactate:NAD oxidoreductase, EC 1.1.1.27) isoenzymes was carried out on cellulose acetate and zones of activity were made visible by incubating the strips in contact with (2 g/dl) agar, Tris-buffered to pH 8.4 and incorporating, per liter, 100 mmol of lactate, 1.5 mmol of NAD, 66 μmol of phenazine methosulphate, 500 μmol of thiazolyl tetrazolium and 6 μmol of semicarbazide hydrochloride.

On the 15th day after the patient's admission it was noted that the fastest anodal migrating isoenzyme (LDH-1) showed two distinct bands. This splitting of the LDH-1 zone was demonstrable until the 19th day after admission and was also shown when hydroxybutyrate or glycerate was substituted for lactate. No formazan dye was produced in this position in the absence of hydroxy acid substrate. The phenomenon was reproducible in the specimens affected. Simultaneous electropherograms of sera obtained on the 14th, 15th, 19th, and 20th days are shown in Figure 1.

During this period the plasma LDH levels were between 700–1000 U/liter.

Following a suggestion by Professor J. H. Wilkinson, we progressively decreased the quantity of serum subjected to electrophoresis but a similar

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Received May 8, 1971; accepted May 17, 1971.
Fig. 1. Cellulose acetate electrophoresis of LDH isoenzymes

1, Day 14; 2, day 15; 3, day 19; 4, day 20

splitting of the LDH-2 band, the most prominent, could not be demonstrated.

It is likely that the additional band was not an artefact, but represented an abnormal H subunit present in one more of the transfused plasmas.

References