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TECHNICAL NOTE

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Stability of carbohydrate deficient transferrin (CDT) in stored blood samples

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Abstract The alcoholism marker CDT was determined on 257 blood samples 1–2 days after the blood samples were taken and again after storage for 7 months at +4 °C. The differences between the pairs of CDT values were so large that the determination of CDT after long term storage of the blood sample has no evidential value.

Key words Alcoholism marker · CDT · Stability

Introduction

CDT (carbohydrate deficient transferrin) has become one of the most efficient markers of chronic alcoholism [1–3]. A daily consumption of more than 60–80 g ethanol over a period of 7 days results in increased levels [4, 5]. In cases of suspected driving under the influence of alcohol, the determination of the BAC (blood alcohol concentration) usually has priority. Only after obtaining the results of this test and possibly by comparison with the results of clinical tests can alcoholism be suspected and a CDT determination can be demanded. Although the manufacturer of a relevant test kit (Pharmacia & Upjohn Diagnostics Uppsala) warns against delayed performance of the test it is frequently used because the test per se works. We have tested the applicability of delayed CDT tests in a random series of blood samples containg alcohol.

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Material and methods

A total of 257 randomly selected native blood samples all containing positive ethanol concentrations were investigated for CDT twice. The first investigation was performed 1–2 days after sampling and the second after a storage period of 7 months. The series of samples investigated was part of a larger series of samples which were routinely taken and investigated in 1996 in cases of suspected drunken driving.

The blood samples were centrifuged and stored at +4 °C and centrifuged again for the second investigation. After the storage period the serum samples were sometimes slightly hemolysed. The determination was carried out according to the manufacturers in-

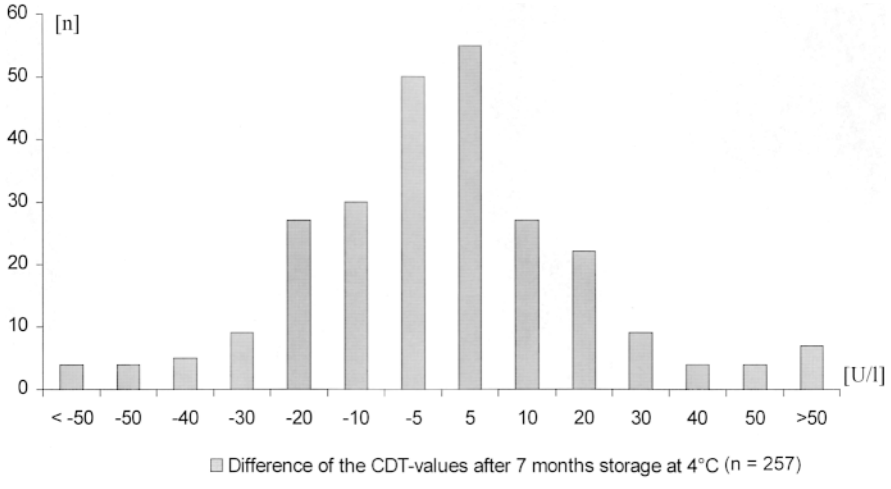

Fig. 1 Distribution of differences between the CDT values in fresh samples and after 7 months storage at 4 °C

Table 1 Comparison of CDT values in fresh samples (CDT_1) and after 7 months storage (CDT_2) and the corresponding BAC

	BAC (‰)	CDT_1 (U/l)	CDT_2 (U/l)	CDT_2–CDT_1 (U/l)
Increased	0.88	24	395	+ 371
	0.03	23	107	+ 84
Stable	2.49	27	26	– 1
	0.66	15	15	± 0
Decreased	2.07	266	60	– 206
	0.97	54	18	– 36

structions (Pharmacia & Upjohn Diagnostics AB, CDTest) and is based on an ELISA technique after separation of the different isoforms with micro anion exchange columns [6].

Results and discussion

The differences between the pairs of CDT values obtained for each sample showed a wide variation (Fig. 1). The distribution type is nearly Gaussian and increases as well as decreases in the values have very similar distributions and magnitudes. From these results (Table 1) it can be seen that all three situations, i.e. increased, decreased or stable CDT values, can occur with low, intermediate or high BACs. There is no prediction possible. Two mechanisms seem to be responsible: (1) Degradation of the side chain resulting in an increase of the deficient variant and (2) degradation of the whole protein leading to a decrease of detectable CDT. Both degradation paths seem to be possible with comparable magnitudes.

We therefore strongly warn against delayed application of the CDT test. The CDT test must either be performed on fresh samples or small aliquots (200 µl) of the serum must be kept frozen (–20 °C). The latter strategy can be taken automatically, i.e. depending on the BAC.

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