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VARIATION OF SOME ENZYMES ACTIVITIES ALAT, ASAT, LDH - IN HYPERBARIC CONDITIONS

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Abstract: *This paper presents the variation of the ALAT, ASAT and LDH enzymes activities in the serum of ten divers, registered before and after 51 metres depth dive. It was notified a growth over the upper normal value of the ALATat three of the divers and of the ASAT at two of the divers after the dive.*
Concerning the LDH level, it varied within the normal limits at nine divers, except for one whom there were registered higher values.
Keywords: *hiperbaric conditions, hepathic citolisis,membranara permeability, HELIOX respiratory compound*

INTRODUCTION

The ALAT and ASAT transaminazes are found both in mitocondries and in the soluble phase of the cytoplasma. They catalysethe following chemical reaction:

Alamina +cetaglutaric acid=piruvic acid+glutamic acid

Asparic acid+cetaglutaric acid=oxalil acetic+glutamic acid

The normal values both for ASAT and ALAT enzymes are lower than 37u/l.

The ALAT value rises significantly in severe viral or toxic hepatic diseases, indicating the hepatic cytalysis, and it grows moderately in chromic hepatitis and .... The ASAT value presents significant growths in myocardic stroke, severe viral hepatitis, muscular distrophy and in pectoral angina. LDH catalyses the interconversion reaction of the pyruvat and lactat in the presence of the piridivic coenzymes: lactic acid+NAD=piruvic acid+NADH+H The normal values are within 225-450U/L at 37^C. Higher levels of the LDH are encountered in chronic hepatitis and pancreatitis, myocardic stroke as well as in the state of shock and musculature hypoxy.

The intense physical effort causes an important blood stream growth capable to stimulate the enzymes within the damaged musculature in the circulatory torrent.

MATERIALS AND METHODS

The ten divers serums were analysed by means of biochemical semiautomatic analyser-STAT FAX, from the DIAMEDIX medical firm. For ALAT determination it was used a kinetic method without fosfat piridoxal. Reagent nr.1 is represented by L-alamina and reagent nr.2 consists of 2-oxaglutarat.

Both reagent nr.1 and nr.2 must be brought at the working temperature before the testing begins. The working temperature was 37^C and the wave lenght used was of 340nm. In ASAT determnation it was used a U.V. test that has the following reaction basis:

L-aspartat+2-oxoglutarat-glutamat+oxaloacetat+NADH+H-L-malat+NAD

Reagent nr.1 was L-aspartat and reagent nr.2 was 2-oxoglutarat. For LDH determinationit was used a U.V. method which has the following reaction basis:

Piruvat+NADH+H=lactat+NAD

Reagent nr.1 consists of TRIS and reagent nr.2 is represented by NADH sublayer.

The values ALAT before diving

P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
15	29	17	13	10	30	16	33	18	14
P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
24	16	20	18	19	14	25	15	28	25

The values ALAT after diving

P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
19	38	23	18	16	39	24	42	26	32
P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
29	23	27	24	25	20	31	21	34	33

The values ASAT before diving

P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
12	26	13	11	9	27	14	29	16	11
P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
22	14	17	15	18	12	22	13	24	22

The values ASAT after diving

P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
17	38	18	16	15	38	19	40	21	17
P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
27	21	25	23	29	21	30	19	35	31

The values LDH before diving

P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
230	238	246	267	325	334	305	341	253	362
P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
226	294	312	281	326	372	287	329	346	257

The values LDH after diving

P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
270	285	291	302	357	470	346	483	294	390
P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
283	305	353	316	345	393	326	379	381	284

RESULTS AND COMMENTS

The ALAT dosage indicated normal values at the ten divers when entering the hyperbar chamber, and a signficant growth at three of the divers after the submerge. ASAT registered increased values at ten of the divers after the 51 metres alive. This illustrates the fact that the hypoxy determined an enzymatic serum activity growth and it caused the cytalises fenomenom at the liver level.

The proteic hepatic synthesis was slightly affected during the undertaken activities. It was also noticed that LDH values were incresed at only one diver, due to the striated muscular hypoxy and to the intense physical effort.

CONCLUSIONS

The ALAT and ASAT dosage can be used throngh kinetic tests, for tracing the moderate injuries of the intensity at divers. Maintaining these enzymes within the normal limits during an activity in the hyperbar environment may suggest an effictive protective tehnology for the divers organism.

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