Boletim Hemorreologia nº 4/2002
Pista: Bolet-5

ACETYLCHOLINESTERASE ENZYMATIC INHIBITION BY VELNACRINE MALEATE AND ITS EFFECT ON HEMORHEOLOGICAL PROPERTIES IN DIFFERENT PATHOLOGIES

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INTRODUCTION

Velnacrine Maleate (MV) inhibits the acetylcholinesterase (AChE) enzymatic activity in a reversible way. Being this enzyme in contact with the remaining erythrocyte membrane elements, it would be possible, modula-ting its activity, to modify the fluidity and consequently to influence the functional level of another membrane proteins.

The aim of this work was to study the repercussion of membrane protein activity inhibition on erythrocyte membrane fluidity and other hemorheological properties.

POPULATION AND METHODS

The studied **population** consisted of 30 men donors, divided in 3 groups of 10 elements each, according to their pathology: Control (C) group, Insulin Dependent Diabetes Mellitus (IDDM) group and Chronic Renal Failure (CRF) group. (Table I)

The adopted method is presented in the next organisational Tables

All tubes were incubated 30 minutes

Determination of:

- **AChE enzymatic activity** *(Ellman' spectrophotometric method modified by Kaplan'*);
- **Erythrocyte aggregation** *(Myrenne agregometer*);
- **Plasma osmolality** *(Osmomat 030 osmometer);*
- **pH** *(Copenhagen ABL^{TM} 500 Radiometer);*
- **Hydrophobic erythrocyte membrane fluidity** *(fluorescence polarization DPH).*

Data analysis was performed using Student t-test (α=0.05).

RESULTS

Initial AChE enzymatic activity values (279.2 U/m/mg Hb) are higher in

IDDM group than the remaining groups (Fig. 1).

The VM inhibitory action was confirmed on this study ($p \leq 0.0001$), being of 95% in control group and 93% in both IDDM and CRF groups, (Fig. 2).

It was attended a significant decrease ($p \leq 0.05$) on erythrocyte aggregation values in all the studied groups under influence of VM, (Fig. 3).

Initial osmolality values are different when compared among groups. Both chronic insufficient renal ($p \leq 0.0001$) and diabetic type I ($p \leq 0.01$) groups had higher osmolality initial values than control group, (Fig. 4).

No statistical variations were observed in pH values.

DPH initial values of CRF group are lower than control group ones ($p \leq 0.01$), (Fig. 5).

CONCLUSIONS

In this "*in vitro*" study we verified a high percentage of AChE inhibition by VM which meaning an enzyme-inhibitor (EI) complex formation suggesting the hypothesis that this EI complex should be in the origin of the hemorheological variations verified (even in membrane fluidity), not only in healthy donors as well as in IDDM and CRF people.

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TABLE 1

Characterization of the studied population C group: Healthy men; IDDM group: 130 ± 10 mg/dL of blood glucose values (fasting); CRF: Blood samples were collected before the regular intermittent haemodialysis

Population	N	Age (*Years old*)	Hemoglobin (*g/L*)	Hematocrit (%)
Control (C) Group	10	43 ± 2	14.1 ± 1.2	41.3 ± 3.2
Insulin Dependent Diabetes Melitus (IDDM) Group	10	53.2 ± 12	13.6 ± 1.4	40.8 ± 3.8
Chronic Renal Failure (CRF) Group	10	60.9 ± 5.1	11 ± 1.7	33.6 ± 5.02

Fig. 1 – Velnacrine Maleate effect on AChE enzymatic activity (C: Control group; IDDM: Insulin Dependent Diabetes Mellitus; CRF: chronic renal failure); ($p \leq 0.0001$)

Fig. 2 – Erythrocyte AChE enzymatic inhibition by Velnacrina Maleato. (C: Control group; IDDM: Insulin Dependent Diabetes Mellitus ; CRF: chronic renal failure); ($p \leq 0.0001$)

Fig. 3 – Velnacrine Maleate effect on erythrocyte aggregation (C: Control group; IDDM: Insulin Dependent Diabetes Mellitus; CRF: chronic renal failure); ($p \leq 0.05$)

Fig. 4 – Velnacrine Maleate effect on osmolality (C: Control group; IDDM: Insulin Dependent Diabetes Mellitus ; CRF: chronic renal failure)

Fig. 5 – Velnacrine Maleate effect on erythrocyte membrane fluidity (C: Control group; IDDM: Insulin Dependent Diabetes Mellitus; CRF: chronic renal failure)