CERULOPLASMIN IN EXPERIMENTAL OVARIAN TORSION/DETOSSION

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Introduction: Ceruloplasmin is a protein that has antioxidant properties [1, 2]. This characteristic is due to the capacity of ceruloplasmin to bind myeloperoxidase [3] and also to the possibility to convert the ferrous iron to ferric form [2-4], and in this manner to avoid Fenton reaction that produce a very reactive oxygen species as •OH (hydroxyl radical), that may damage cells components [2].

Ovarian torsion is a gynecological emergency. The treatment first implies the detorsion of the torsioned anexa, but reperfusion can aggravate the initial injuries due to oxidative stress [5]. We suppose that ceruloplasmin with its antioxidant properties may help the organ not to be damaged during the process of reperfusion.

The aim of our research was to examine ceruloplasmin levels variations in the serum samples of female rats which were exposed to different ovarian torsion/detorsion models. The Ethics Committee of the “Nicolae Testemitanu” State University of Medicine and Pharmacy, Republic of Moldova approved our study protocol.

Materials and methods.

Seventy healthy female rats (Rattus albicans), weighing approximately 180-265 grams, were divided into seven experimental groups (n = 10): Group 1: The rats underwent no intervention. Group 2: The sham group: The rats underwent only laparotomy. Experimental group 3: The rats were exposed to ovarian torsion for 3 hours (ischemia). Group 4: The rats were exposed to ovarian torsion for 3 hours and 1 hour simple reperfusion. Group 5: The rats underwent 3 hours ischemia and 1 hour controlled “on-off” reperfusion. This technique of reperfusion was performed by opening and closing the clips that were placed on the ovarian annexes in 10 seconds intervals, “on-off“, for 120 seconds, and then continued reperfusion up to 1 hour. Group 6: The
rats were exposed to ovarian torsion for 3 hours and 24 hours reperfusion. Group 7: The rats underwent 3 hours ischemia and 24 hours “on-off “ controlled reperfusion.

Ceruloplasmin levels were determined in blood serum samples by Colb V.G. and Camishnicov V.S. method (1982) [6].

The results were analyzed by Welch’s ANOVA with Games-Howell post hoc test.

Results.

Differences in ceruloplasmin levels registered in our torsion, torsion/detorsion groups were statistically insignificant (p>0.05) compared to control group. Statistically significant high levels of ceruloplasmin were registered in experimental groups compared to no-intervention group. This result indicates that our intervention determines the activation of the processes that increase concentration of ceruloplasmin in blood samples.

The prospects for further research.

Being an acute phase protein synthesized by the liver, ceruloplasmin levels were supposed to be statistically significant higher in torsion, torsion/detorsion groups compared to sham group. We suppose that ceruloplasmin was consumed during antioxidant protection of cells exposed to ischemia/reperfusion. Further research are required.

References:

2. GUTTERIDGE, John MC. Inhibition of the Fenton reaction by the protein caeruloplasmin and other copper complexes. Assessment of ferroxidase and radical scavenging activities. Chemical-biological interactions, 1985, 56.1: 113-120.

Accepted for printing on 12 Dec 2017