ROS biomarkers in patients on chronic hemodialysis

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It is generally accepted that the uremic state of patients with end-stage renal disease is highly pro-inflammatory and pro-oxidant. Moreover, the contact with the dialyzer's membrane activates the leucocytes and further increases the inflammation and oxidative stress. Therefore, numerous approaches have been proposed for reduction of oxidative stress in hemodialysed patients, from antioxidant therapy through diet rich in natural antioxidants to the improvement of dialyser's membrane.

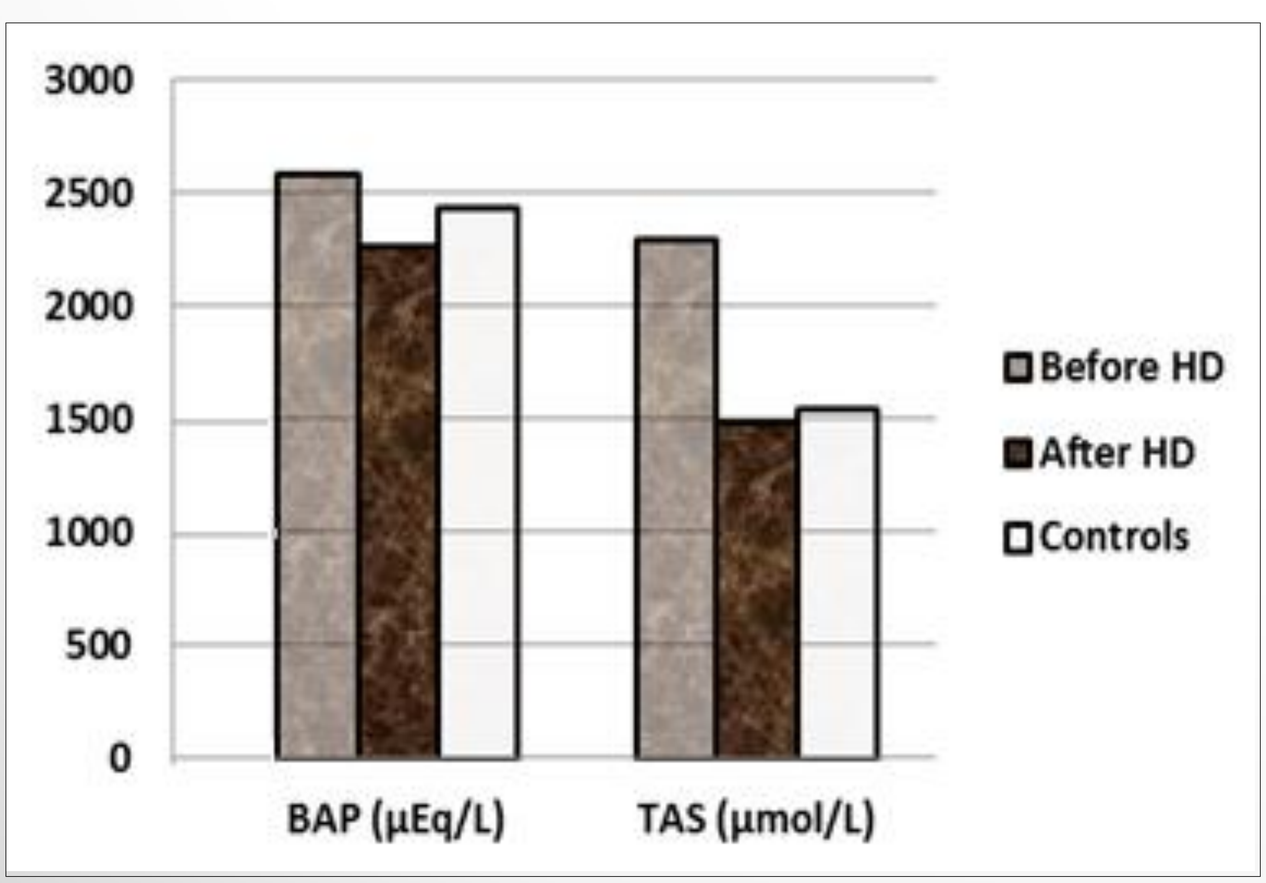
The changes in the oxidative status of hemodialysed patients, which resulted from above mentioned interventions, as well as from a single hemodialysis session itself, were assessed by different methods, some of them similar to those included in our study.

We present here a comparison of two methods for assessment of total plasma antioxidants, which provides a new insight into the past and future studies of oxidative stress research, especially in chronically hemodialysed patients.

BAP: This assay is based on the ability of a colored thiocyanate-derived substrate, which contains bounded Fe3+ ions, to discolor when Fe3+ ions are reduced to Fe2+. The intensity of discoloration is assessed photometrically, by measuring the absorbance at 505 nm, and the amount of reduced ferric ions is calculated. The results of the test are expressed as μEq ferric ions reducing antioxidants per L of sample.

TAS: This method is based on the reduction of colored ABTS radical to colorless reduced form by the antioxidants which are present in the sample. The absorbance is measured at 660 nm. The method is calibrated with the vitamin E analog known as Trolox Equivalent, and the results are expressed in μmol/L.

Patients before hemodialysis had significantly higher **BAP** values compared to the healthy controls ($p<0,01$). As a result of the hemodialysis session the average BAP value dropped with 12,6% ($p<0,001$ when compared to the values before hemodialysis). The BAP values measured after the hemodialysis were significantly lower than those of healthy controls ($p<0,01$).



When measured by the **TAS** assay, patients before hemodialysis again had higher values of total antioxidants than controls, but the difference showed higher statistical significance: $p<0,001$. As a result of the hemodialysis session the average TAS value decreased more (35,2%) than that of BAP ($p<0,001$ when compared to the values before hemodialysis). The TAS values measured after the hemodialysis were lower than those measured in healthy controls, but this difference was not statistically significant.