EFFECT OF PRE-TREATMENT WITH ORAL SUPEROXIDE DISMUTASE ON SERUM MARKERS OF KIDNEY AND ENDOTHELIAL INJURY IN PATIENTS UNDERGOING PLANNED RADIOLOGICAL INVESTIGATIONS WITH INTRAVENOUS CONTRAST MEDIUM ADMINISTRATION

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OBJECTIVES

-Contrast-induced nephropathy (CIN) is a complication of radiologic tests with iodine contrast media (CM) infusion.

- CM can lead to an acute kidney injury (AKI) and endothelial injury mediated by increased oxidative stress.

- *Superoxide dismutase (SOD)* is the crucial component of antioxidant defense.

Hypothesis: the administration of SOD can prevent the occurrence of AKI.

AIM

Evaluation of the effect of oral SOD administration on serum markers of kidney and endothelial injury in patients undergoing planned radiological investigations with intravenous CM administration

METHODS

- Randomized double-blind placebo-controlled study
- 43 hospitalized patients (n=43, 19 M and 24 F, mean age 80±7 years, BMI 31.3±6.9 kg/m2), $eGFR_{CKD-EPI}$ <60 ml/min.
- Planned radiological investigation with i.v. infusion of 79±16 ml of iohexol
- Randomization to a 7-day oral administration of SOD (n=23, 10 M and 13 F) or placebo (n=20, 9 M and 11 F).
- Dose of drug: 500 mg orally bioavailable vegetable SOD (Glisodin) per day or placebo respectively
- Treatment period: 4 days before and 3 days after CM
- Oral fluids for routine CIN prophylaxis in all patients
- Blood tests: serum creatinine, cystatin C, lipids, CRP, NGAL, ICAM-1, and vWF-1 at baseline and 24 and 48 hours after iohexol administration

Inclusion criteria:
The patients undergoing planned radiological investigations (computed tomography) with intravenous CM administration, eGFR<60 ml/min

Exclusion criteria:
Psychiatric disorders; lack of compliance; celiac disease; pregnancy or lactation; hypersensitivity to CM (anaphylactic shock, pulmonary edema, myocardial infarction or other emergencies with necessity of radiological tests); AKI; ESRD with need of dialysis treatment; UTI or other acute inflammation; CRP >5 mg/l; previous use of CM in 7 days prior to randomization; previous use of N-acetylcysteine, metformin, NSAIDs, theophylline or ascorbic acid in 48 hours prior to study involvement; chronic administration of nephrotoxic drugs

RESULTS

Table 1. Laboratory parameters assessed during the study in all study group

	baseline	**48 hours after CM**
ICAM-1[ng/ml]	981.32±645.51	1033.82±631.19
cystatin C [ng/ml]	969.37±389.24	1047.52±581.36
vWF [mU/ml]	56.4±8.43	55.95±7.3
NGAL [pg/ml]	478.92±240.94	500.69±272.31
hsCRP [mg/l]	0.07±0.03	0.07±0.03
creatinine [mg/dl]	1.52±0.28	1.40±0.29, p=0.06
urea [mg/dl]	62.39±16.43	52.77±13.58, p<0.05

- decrease of mean estimated GFR (serum cystatin and creatinine-based) from 74±30 to 70±33 ml/min 48 hours after CM in placebo group
- unchanged GFR in the patients treated with SOD (82±27 vs. 80±29 ml/min)
- withought differences in all study group and between groups in the changes in serum vWF, ICAM-1 and NGAL after CM administration (Table 1, 2)
- increase of high-sensitivity CRP from 0.07±0.03 to 0.09±0.03 mg/l (p=0.02) after 48 hours following the CM administration
- significant difference in hsCRP between treatment groups (0.06±0.04 mg/l in SOD group vs. 0.09±0.03 mg/l in placebo group, p=0.01) 48 hours after CM (Table 2)

Table 2. Laboratory parameters assessed during the study in SOD and placebo group

	baseline- SOD group	**baseline- placebo group**	**48 hours after CM in SOD group**	**48 hours after CM in placebo group**
ICAM-1[ng/ml]	851.9±493.47	1130.12±771.72	1007.53±597.95	1064.05±681.82
cystatin C [ng/ml]	923.27±346.21	1022.39±436.57	963.29±387.67	1144.38±744.73
vWF [mU/ml]	57.1±7.26	55.47±9.71	56.15±7.71	55.73±6.98
NGAL [pg/ml]	475.6±219.49	482.73±269.28	489.03±237.89	514.11±313.11
hsCRP [mg/l]	0.07±0.03	0.07±0.03	0.06±0.04	0.09±0.03 (p=0.02 vs baseline), p=0.01 vs SOD group
creatinine [mg/dl]	1.55±0.31	1.48±0.25	1.43±0.28 (p=0.04 vs baseline)	1.44±0.31
urea [mg/dl]	63.07±16.72	61.6±16.48	51.82±13.24 (p=0.01 vs baseline)	53.85±14.23

CONCLUSIONS

The study did not confirm the effect of oral superoxide dismutase administration on renal and endothelial injury induced by iodine-based contrast medium.

REFERENCES:

1. Pissani A, Sabbatini M, Riccio E et al. Effect of a recombinant manganese superoxide dismutase on prevention of contrast-induced acute kidney injury. Clin Exp Nephrol 2014; 18:424-31.
2. Nakajima S, Ohsawa I, Nagata K et al. Oral supplementation with melon superoxide dismutase extract promotes antioxidant defences in the brain and prevents stress-induced impairment of spatial memory. Behav Brain Res 2009; 200:15-21.
3. Cloarec M, Caillard P, Provost JC et al. GliSODin, a vegetal sod with gliadin, as preventative agent vs. atherosclerosis, as confirmed with carotid ultrasound-B imaging. Eur Ann Allergy Clin Immunol 2007; 39: 45-50.
4. Vouldoukis I, Conti M, Krauss P et al: Supplementation with gliadin-combined plant superoxide dismutase extract promotes antioxidant defences and protects against oxidative stress. Phytother Res 2004; 18:957-962.
5. Varizi ND, Dicus M, Ho ND. Oxidative stress and dysregulation of superoxide dismutase and NADPH oxidase in renal insufficiency. Kidney Int. 2003; 63:179-85.

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