

EVALUATION OF RENAL FUNCTION RESERVE IN HEALTHY VOLUNTEERS AND CKD PATIENTS BY DOPAMINE INFUSION

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Objectives:

It is generally accepted to use amino acid solutions or protein load to establish renal function reserve (RFR). Oral meat production could have different amount of protein and electrolytes and give different response type; moreover sodium could increase tubular-glomerular feedback mechanism. Thus, protein loading methods not only expensive, but may give false results. It is known, that other vasodilating factors could be used for RFR investigation, one of them is dopamine.

Methods:

Two groups of subjects were studied: 41 healthy volunteers (26,8 ± 6,7 years old, BMI 21,5 ± 2,9 kg/m², GFR 109 ± 21,7 ml/min/1,73m²) and 20 patients with hypertension and gout with CKD 3-4 stage (40,7 ± 9,9 years old, BMI 26,3 ± 4,6 kg/m², GFR 48,9 ± 14 ml/min/1,73m² by MDRD). To establish RFR we assessed baseline serum creatinine and patients were asked to urinate. Then patients collected urine during two 1-hour periods. In first period patients drink 200 ml of water, during second period they were infused dopamine 3 mkg/kg/min with same water amount. Creatinine clearance (CrCL) was calculated during both periods. RFR was calculated from usual formula: $RFR(\%) = \frac{CrCL_2 - CrCL_1}{CrCL_1} \times 100$

Figure 1

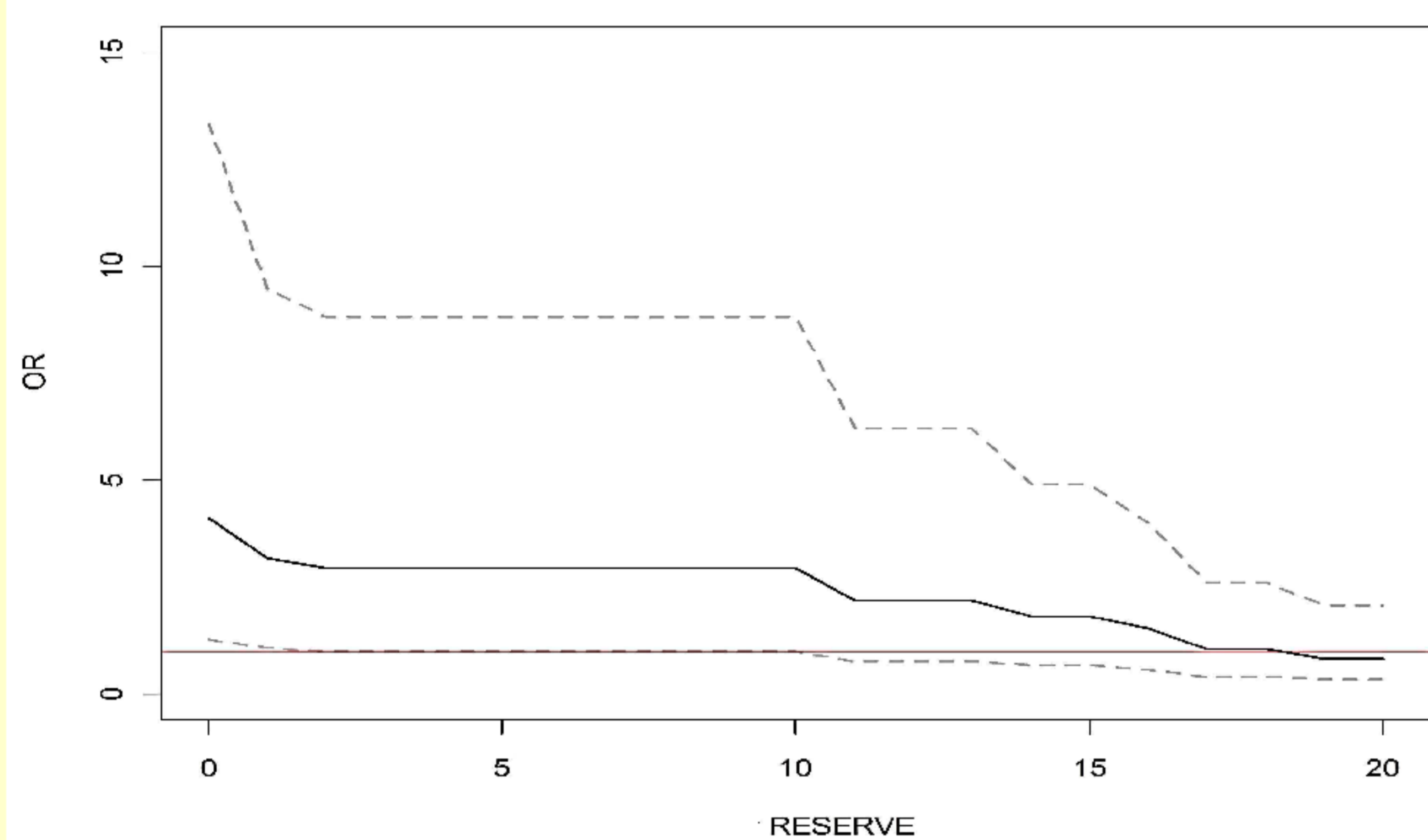
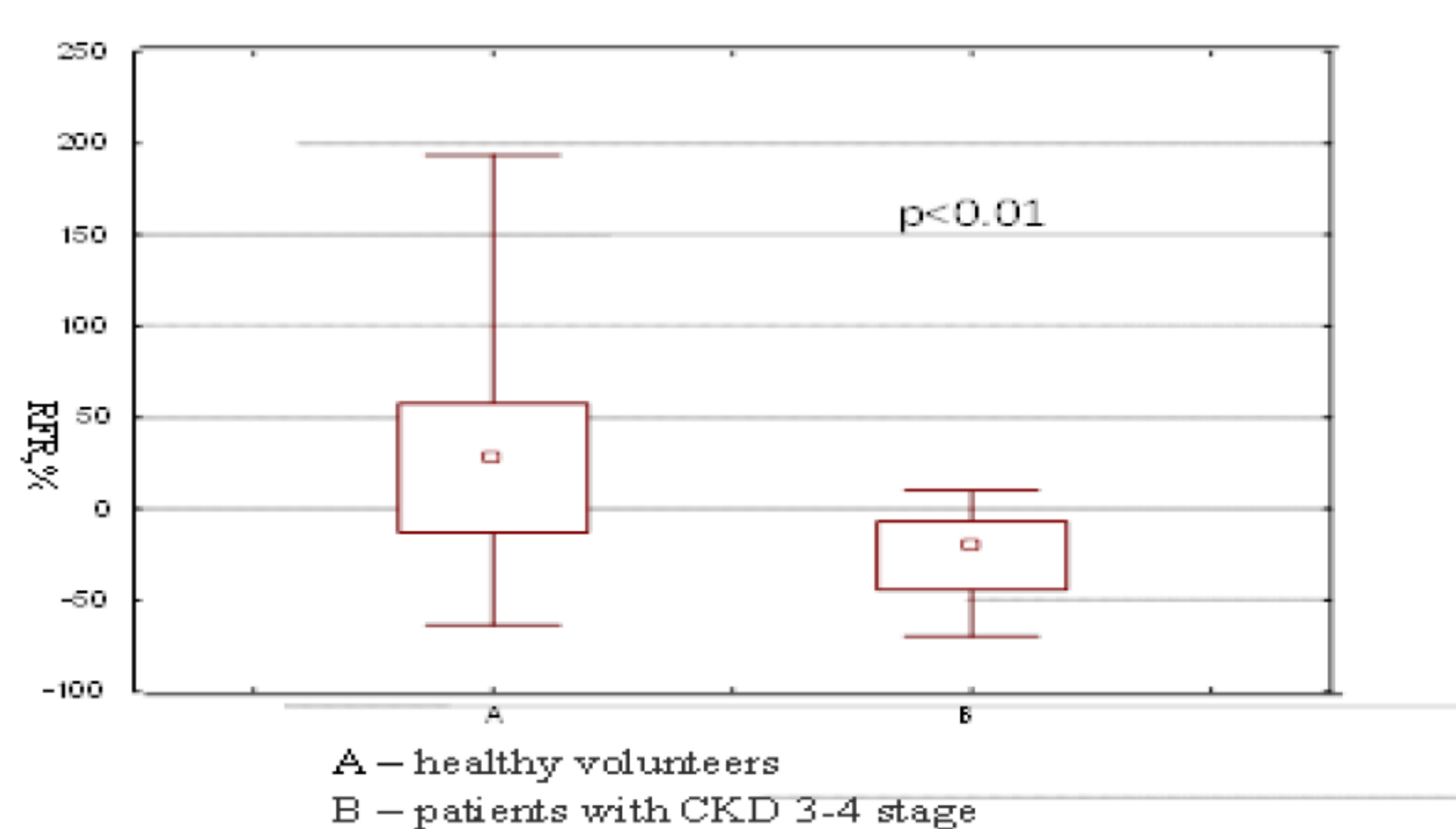


Figure 2



Results:

Dopamine load didn't show side effects in patients, but nausea in some volunteers with low arterial blood pressure. After dopamine load in healthy people minute diuresis has grown from 3,98 ± 3,61 to 6,13 ± 4,4 ml/min/1,73m², GFR increased from 109 ± 22,7 to 305 ± 117,2 ml/min/1,73m²; accordingly RFR was 43,6 ± 67% (95% CI 22,6 – 64,6). In CKD patients RFR didn't increase, contrary decreased in most cases - 19,8 ± 27% (95%CI (-31,9) - (-7,8)) (fig.2)

To establish normal value of RFR we have compared different normal values of RFR: 5, 10 and 15%. Statistical analysis has showed, that in any of this normal values odds ratio to have normal RFR more large in healthy persons ($p = 0,001$), but the 10% value is best one (fig.2), with specificity 90,2%, +LR 90,2, OR 9,2.

Conclusions:

Dopamine infusion test is harmless. Test has showed positive result in healthy volunteers and significantly lower result in patients with renal insufficiency. Low dose dopamine load test could be advised to evaluate RFR.

