INTRODUCTION AND AIMS: Chronic heart failure (HF) leads to the development of a chronic cardio-renal syndrome. Cardiac resynchronization therapy (CRT) improves the heart function of patients with HF and consequently should improve the function of the kidneys. At the same time, CRT implantation itself, with the use of a contrast agent, can lead to contrast induced nephropathy (CIN). The aim of the study was to assess the effect of CRT implantation on renal function within the first 48 hours after the procedure.

METHODS: Currently a prospective interventional study includes 48 patients with a mean age of 67.5 ± 9.6 years, 37 (77.1%) men and 11 (22.9%) females, with HF in the NYHA classes: II (n = 21; 43.7%), III (n = 24; 50%), IV (n = 3; 6.25%), and the average of ejection fraction 24 ± 6.9%. In analyzed group specified co-morbid conditions were observed: arterial hypertension (n = 38; 79.2%), diabetes mellitus type 2 (n = 24; 50%), ischemic heart disease (n = 28; 58.3%), atrial fibrillation (n = 22; 45.8%). During CRT implantation a non-ionic contrast agent (aqueous solution of jomeprol; osmolality of 726 ± 34 mOsm/kg of water) with an average dose of 72.2 ± 44.9 ml was administered. Patients initially met the criteria of chronic kidney disease (CKD) by KDIGO 2012 at stages: G1 n = 6 (12.5%); G2 n = 25 (52.1%); G3 n = 16 (33.3%); G4 n = 1 (2.1%) and A1 n = 35 (72.9%); A2 n = 12 (25%); A3 n = 1 (2.1%). Urine samples were undertaken at morning, before the procedure and then 48 hours after implantation. Following parameters were examined: albumin, neutrophils gelatinase-associated protein (uNGAL), creatinine. Based on them, urine albumin-creatinine ratio (uACR; mg/g) and the uNGAL to creatinine ratio (uNCR; ug/g) were calculated. At the same time, serum creatinine concentration was performed and eGFR CKD-EPI (ml/min/1.73m²) was calculated.

RESULTS: On admission, in the study group the average of renal function biomarkers were: eGFR = 67.5 ± 19.8; uACR = 89.4 ± 151.8; uNCR = 48.9 ± 130. At 48 hours after CRT implantation, eGFR was found to be insignificant lower (63.6 ± 21.1; p = 0.46) than before CRT implantation in all population. After the procedure in 25 (52.1%) patients with CKD G2 only, the eGFR decreased by an average of 8.1 - from 74.2 ± 16.9 to 66.1 ± 7.7 (p = 0.02). In addition, a statistically significant decline in uACR (50.4 ± 95; p = 0.0003) after CRT implantation was observed in the whole group. There were no statistically significant changes in uNCR (38.6 ± 109.2; p = 0.37) after 48 hours from procedure.

CONCLUSIONS: The CRT implantation, performed in patients with HF is not a risk factor for CIN, as evidenced by the lack of uNCR growth in the whole study group and stable glomerular filtration especially in patients with CKD G3 - G4 after the first 48 hours after procedure. Moreover, is clinically relevant for cardiovascular complications and the CKD progression prevention, that is reduction of albuminuria was evaluated instantly on the second day after the procedure.