The effect of Aorto-Coronary Bypass (A-C Bypass) surgery was studied by exercise T1 scintigraphy (ETS). Twenty-seven patients (17 with old myocardial infarction (OMI)) 10 with no OMI were studied with pre- and postoperative ETS. Exercise was performed using bicycle ergometer and T1 was injected at exercise endpoint. Transient myocardial ischemia was quantitatively evaluated by sequential T1 activity ratio (STAR), a ratio of T1 activity in a ROI of redistribution image to that of a rest image. STAR was positively correlated with the severity of coronary stenosis and was greater in patients with positive ST changes (p < 0.05). 

A significant change in STAR was correlated with preoperative STAR (r = 0.61, p < 0.01). When patients were grouped into A group (n = 14) and B group (n = 13) by postoperative change in STAR in bypassed area: A group (STAR > 10%), B group (STAR < 10%), incidence of patients with postoperative improvement in exertional chest pain, exercise capacity, and exercise ST changes were significantly higher in group A (p < 0.05 in all parameters). These findings indicated that STAR could be an index of clinical improvement of transient myocardial ischemia after A-C Bypass surgery.

We evaluated coronary bypass surgery in 25 bypasses of 12 cases with the radiotrac isotope (RI) study. T1-201 myocardium scan and To-99m in vivo labeled RBC multigated heart pool scan were performed before and after operation. Left ventricular global ejection fraction (EF), quantitative regional EF (amplitude image of phase analysis) and cine wall motion were obtained with multigated heart pool scan. In 20 coronary bypasses to the ischemic lesions, T1-201 perfusion at rest improved and regional EF slightly improved especially in case of more than 60 ml/min bypass flow, although cine wall motion did not improve remarkably. In 11 coronary bypasses to the lesion of infarction, T1-201 perfusion at rest, regional EF and cine wall motion didn't change. In all cases, left ventricular global EF didn't significantly improve. As to estimation of aorto-coronary bypass, RI study won't be able to excel coronary angiography and CT scan in the judgement of patency of coronary bypass, but it has the advantage of estimating the improvement of cardiac function (myocardial blood flow, ventricular wall motion, etc). In conclusion, T1-201 myocardium scan and amplitude image of phase analysis of multigated scan may be useful methods in estimating aorto-coronary bypass.