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Evaluation of reverse remodeling in Right Ventricle Hypertrophy using PA debanding model rat

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Introduction: The investigation for right ventricular reverse remodeling is critical for maintaining of the long-term right heart function, and deciding the right timing to release the pulmonary artery stenosis. To clarify this problem, we create a PA debanding model rat to evaluate the reverse remodeling in RV by repetitive hemodynamic evaluation, and electron micrography.
Design/Methods: PA debanding model rats were surgically generated by pulmonary artery banding using SD rats. UCG was performed at 2 weeks' post-operative period. Then rats with an RV-PA PG over 80 mmHg, and either a flat interventricular septum underwent re-thoracotomy and removed the band. UCG measurements were determined again at 4 weeks' post-operative period. The rats with evidence of RV-PA PG under 60mmHg were included to estimate more further studies. The level of LC3, and p62 were measured by Western blotting. Thus, we examined the morphology of the mitochondria by electron microscopy, which revealed the presence of damaged mitochondria with degraded cristae and mitochondrial membranes, whereas damaged mitochondria appeared to be partially restored. The comparison performed between PA debanded (G-db; n=18), just PA banding for 2 (G-2w; n=12) or 4 weeks (G-4w; n=18).
Results: There were significant increases in RV cardiac output derived from UCG in the G-db. Median survival time in G-db was significantly longer than PA banding (29.8±5.1 days vs 17.1±2.9 days; $P<0.01$). RV weigh,and %fibrosis of G-db was significantly inhibited at 4wks compared with G-4w, but no significant difference with G-2w. Both LC3A/B, and p62 expressions were reduced in the G-db compared with G-4w. The rate of fibrosis in RV was significantly lower in the G-db compared with G-4w, but without significance compared with G-2w. Damaged mitochondria ratio was reduced in G-db compared with G-4w.
Conclusions: A release of RV obstructive lesion is important to inhibit progress of fibrosis. The progress of fibrosis, and mitochondrial dysfunction were inhibited by the amelioration of the RV hypertrophy, but developed fibrosis was not restored. The myocardial damage estimated from the LC3, and p62 accumulation improved following reverse remodeling which is amelioration of the right ventricular hypertrophy.