

**Lower activity value of antithorombin reflects comprehensive cardiac stress in infants before Glenn**

*Hamamichi Y., Kanagawa N., Higano R., Toyokawa T., Tanaka T., Narita J., Kawazu Y., Inamura N., Kayatani F., Iwai S., Kawata H., Kishimoto H.*

*Osaka Medical and Research Institute for Maternal and Child Health, Osaka, Japan*

Background: Antithorombin (AT), which is produced in liver, is activated on vascular endothelial cells. Activity of AT (AT-activity) drops in serious conditions, such as hepatic disorder, myocardial infarction. However, there are no reports about relation between AT-activity and cardiac stress in congenital heart disease. High cardiac stress frequently subsists in infants before Glenn. We predicted lower AT-activity existed in pre-Glenn infants because of high cardiac stress. We attempted to identify clinical presentation in pre-Glenn infants with lower AT-activity. Methods: Between 2004 and 2013, 56 pre-Glenn infants aged from 2 months to 6 months were studied. Cardiac catheterization was performed with Glenn in view. Venous blood samples for analysis of AT-activity were obtained before surgery. We defined lower AT-activity (n=21) as AT-activity levels 80% or below, which is lower limit of normal in our hospital. Cardiac performances and clinical data which would influence lower AT-activity were determined. Results: The ratio of patients with lower AT-activity in each first strategy classified by form of pulmonary artery (PA) was as below: 70% in bilateral-banded PA; 67% in ductus arteriosus-relaying PA; 35% in shunted PA; 22% in native-stenotic PA; 0% in trunk-banded PA. After multiple logistic regression analysis lower AT-activity was independently associated with odds ratio of 13.0 (p=0.022) for early age ( $\leq 0.30$ years), 9.9 (p=0.02) for high levels of brain natriuretic peptide ( $\geq 100$ pg/dl), 8.9 (p=0.028) for low levels of protein concentration ( $\leq 5.4$ g/dl), 6.2 (p=0.048) for increased cardiothoracic ratio ( $\geq 0.60$ ). In univariate analysis lower AT-activity was related to pulmonary flow or systemic flow relaying on ductus arteriosus and high levels of gamma-glutamyl transpeptidase (R-square=0.65). Lower AT-activity was no significant association with each parameter which was measured in cardiac catheterization. Conclusion: Discrete cardiac performances were not related to lower AT-activity respectively in pre-Glenn infants. However, cardiomegaly, high concentration of brain natriuretic peptide and hepatic involvement were associated with lower AT-activity. These factors indicate cardiac stress is strong on the whole. Explanatory coefficient of these factors for lower AT-activity was relatively high. We could use lower AT-activity as method of picking up high cardiac stress comprehensively in pre-Glenn infants.