

NT-pro BNP after Fontan Anastomosis: Early versus Late Post-operative Value

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Introduction: NT- proBNP has become a diagnostic marker for the diagnosis aiding prognosis and therapeutic guidance of cardiac conditions in adults. However, its assessment remains limited in congenital cardiology, particularly in patients with univentricular heart physiology who underwent total cavopulmonary connection (TCPC) where long-term prognosis is greatly related to ventricular function.

Aim: To evaluate the NT- proBNP serum level after TCPC and seek a possible correlation with clinical and laboratory monitoring.

Methods: A retrospective study was initiated on all TCPC patients born after 1991. Demographic, anatomical and echocardiography data were collected for all subjects following the early post-operative period. Routine biochemical data including NT-proBNP were similarly collected. Routine NT-proBNP screening for these patients was initiated in our institution in 2008. NT –proBNP z –score was calculated based on our published equation from healthy children.

Results: Of a total of 46 patients who completed TCPC, 5 died post-operatively. All remaining 41 subjects had available NT-proBNP beyond the immediate post operative period and constituted the study population. Mean TCPC age was 4.8 ± 1.1 years, with a mean follow-up of 6.24 ± 5.0 years. Serum NT-proBNP level was significantly elevated during the first post-operative year (Z-score 1.9 ± 1.17) compared to mid-term follow-up (3-5 years) (Z-score 1.23 ± 0.72), $p = 0.03$. Mean NT-proBNP Z-score increased in the subsequent years to 1.6 ± 1.1 ($p = 0.21$ v.s. year-1 post TCPC, and 0.06 v.s. mid-term). Z-scores >2.0 were associated with a lower serum albumin (39.2 ± 3.3 v.s. 44.4 ± 4.4 mg/dl; $p=0.04$), but not with other laboratory tests. There were however no identifiable predisposing clinical factors (i.e., ventricular morphology, age), preoperative hemodynamic data (e.g., PVRi, mean pulmonary artery pressure, Nakata index), surgical specifics (type of TCPC, presence of fenestration, pacemaker implantation), or postoperative events.

Conclusions: The TCPC postoperative year is marked by a significant increase in the levels of NT-proBNP. This is probably related to an adaptation period to the uni-ventricular physiology assuming a full cardiac output. The observation does not seem to vary between left and right dominant ventricular anatomy, neither did it correlate with various parameters. The NT- proBNP improved in the mid-term follow-up.