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Comparative Study between Three Solutions for Cardioplegia in Pediatric Cardiac Surgery: Histidine-Tryptophan-Ketoglutarate (HTK) Solution, Blood Cardioplegia and Crystalloid (St. Thomas) Cardioplegia

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Abstract

Background: Cardioplegia is the solution used to arrest and protect the heart during aortic cross-clamping. Crystalloid and blood cardioplegia are both widely used in clinical practice. Custodial-HTK solution is an intracellular cardioplegic solution containing histidine, tryptophan and ketoglutarate.

Aim: we compared the myocardial protective effects of 3 types of cardioplegia solution: The histidine–tryptophan– ketoglutarate (HTK) solution, blood and St.Thomas cardioplegia in pediatric cardiac surgery.

Settings and Design: This study design was a prospective randomized controlled double blinded clinical study.

Patients and Methods: 60 children aged 3-10 yrs of either sex who underwent elective cardiac surgery for acyanotic heart diseases using cardiopulmonary bypass were randomly allocated to three groups each one 20 patients: Group A received HTK cardioplegia. Group B received blood cardioplegia. Group C received St, Thomas cardioplegia. Hemodynamic parameters, duration of CPB, aortic cross clamping and the whole surgical duration, mechanical ventilation duration and the length of ICU stay were measured. Venous blood samples were collected for measurement of cardiac marker proteins (CK-MB) and troponin (t). Uses of inotropic support were also recorded.

Statistical Analysis Used: one-way ANOVA test and Chi-square test were used. Results: The main findings in our results were that troponin (t) levels were not statistically significant different among the study groups except that recorded 24 h, with the highest level was in the group (B) and the lowest one in the group (C). CK-MB levels also were not statistically significant

different among the study groups except that recorded after 12 h the highest one in group (C) and the lowest one in group (B).

Conclusion: Single dose of cold HTK cardioplegia in pediatric cardiac surgery is as effective as multiple doses of cold blood and crystalloid (St.Thomas) cardioplegia in protecting the myocardium.

Keywords: Cardioplegia; Myocardial protection; Pediatric cardiac surgery