OUTCOME OF POSTOPERATIVE INTENSIVE CARE UNIT AFTER PEDIATRIC CARDIAC SURGERY IN CAIRO UNIVERSITY PEDIATRIC HOSPITAL

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ

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Abstract

Objective: To measure the in-hospital mortality and complications after cardiac surgery at the postoperative pediatric cardiac surgical Intensive Care Unit, (Abo El Reesh pediatric hospital), Cairo university.

Methodology: Our study included a total of **952** patients admitted to the Cardiac Intensive Care Unit (CICU), Children's Hospital, Cairo University during the 3 years period between April 2011 to April 2014. Retrospective observational analysis of the data of the patient's records was done.

Results: from a total of 952 patients; males (53.9%), females (46.1%). Age of patients in current study ranges from 4 days to 13 years, including neonates 39 (4.1%), infants 696 (73.1%) and children 217 (22.8%**)**. procedures were either closed (39.6%) or open (59.1%). The incidence of morbidity was (57.6%), mortality was (30%), and (26.6%) were sent immediately back home after the operation. The most common procedure in our study is PAB followed by VSD Closure, BT shunt then Total repair of TOF and the least done procedure is (HLHS repair) procedure.

Conclusion: Mortality was encountered in 286 patients (30%). Morbidity was found in 548 patients (57.6%)**,** the most common complications were infections particularly VAP followed by respiratory complications followed by cardiovascular complications. Risk factors for mortality were the high RACHS-1 level, prolonged bypass time, prolonged ICU stay, younger age group. The

commonest procedure in our study was PAB followed by VSD closure, followed by BT shunt then total repair of Fallot tetralogy (TOF) then PDA closure**.** In the current study HLHS repair (only one case performed) had the worst outcome with 100% mortality followed by arterial switch operation with 64% mortality followed by CAVC repair with mortality 48%, DORV repair and ASD closure had zero mortality.

Keywords:

1. **Pediatric cardiothoracic surgery**
2. **ICU**
3. **RACHS-1**
4. **Mortality rate**
5. **Morbidity.**

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List of Abbreviations

aO2 gradient:	**alveolar-arterial oxygen gradient**
ABC score:	**Aristotle Basic Complexity Score**
ACC score:	**Aristotle Comprehensive Complexity Score**
ACTH:	**Adrenocorticotrophic hormone**
AKI:	**Acute kidney injury**
ARF:	**Acute renal failure**
ASD:	**Atrial septal defect**
AUC:	**Area Under the Curve**
AVM:	**Arteriovenous malformation**
AV :	**Atrio-ventricular**
Ca2:	**Calcium**
BT shunt:	**Blalock-Taussig shunt**
cAMP:	**Cyclic adenosine monophosphate**
CDC. :	**Centers for Disease Control and Prevention**
cGMP:	**Cyclic guanosine monophosphate**
CHD:	**Congenital heart disease**
CHDs:	**Congenital heart diseases**
CICU:	**Cardiac intensive care unit**
Co.A:	**Coarctation of the aorta**
CO:	**Cardiac output**
CoA:	**Coarctation of aorta**
CPB:	**Cardiopulmonary bypass**
DIC:	**Disseminative intravascular coagulopathy**
DO2:	**Delivered oxygen**
DAI:	**Device associated infection**
EAT:	**Ectopic atrial tachycardia**
EACTS:	**European Association for Cardio-Thoracic Surgery**

ECG:	**Electrocardiogram**
ECMO:	**Extracorporeal membrane oxygenation**
ET-1:	**Endothelin-1**
HAIs	**Healthcare-associated infections**
HFNC:	**High-flow nasal cannula**
HLHS:	**Hypoplastic left heart syndrome**
ICD-CM:	**International classification of diseases-clinical modification**
IL:	**Interleukin**
ICU:	**Intensive care unit**
iNO:	**Inhaled nitric oxide**
IO arrest :	**Intraoperative arrest**
JET:	**Junctional ectopic tachycardia**
LCOS:	**Low cardiac output syndrome**
LOS :	**Length of hospital stay**
LV:	**Left ventricle**
MOSF:	**Multiple organ system failure**
MRI:	**Magnetic resonance image**
NIV:	**Noninvasive ventilation**
NO:	**Nitric oxide**
OPSI:	**Overwhelming postsplenectomy infection**
OR:	**Operating Room**
PAB:	**Pulmonary artery banding**
PAH:	**Pulmonary artery hypertension**
PCICU:	**Pediatric cardiology intensive care unit**
PDA:	**Patent ductus arteriosus**
PDE5:	**Type V cGMP-specific phosphodiesterase;**
PGE:	**Prostaglandin**
PGI2:	**Prostacyclin**

PICU:	**Pediatric intensive care unit**
PRISM:	**Pediatric Risk of Mortality Score**
PVC:	**Polyvinylchloride**
PVR:	**Pulmonary vascular resistance**
Qp:	**Pulmonary perfusion**
Qs:	**Systemic perfusion**
RA:	**Right atrium**
RACHS-1:	**Risk adjustment of congenital heart surgery-1**
ROC curve:	**Receiver Operating Characteristic curve**
RV:	**Right ventricle**
SRS:	**Systemic Inflammatory Response**
SMC:	**Smooth muscle cell**
STS:	**Society of Thoracic Surgeons**
STS-EACTS:	**Society of thoracic surgeons-European association of cardiothoracic surgery**
STAT :	**The Society of Thoracic Surgeons (STS)–European Association for Cardio-Thoracic Surgery(EACTS) mortality categories**
TAPVR:	**Total anomalous pulmonary venous return**
TGA:	**Transposition of great arteries**
TNF:	**Tumor necrosis factor**
TOF:	**Tetralogy of fallot**
TPN:	**Total parenteral nutrition**
TxA2:	**Thromboxane A2**
UTI:	**Urinary tract infection**
VAP:	**Ventilator acquired pneumonia**
VO2:	**Venous oxygen**
VSD:	**Ventricular septal defect**

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INTRODUCTION

Postoperative care of pediatric cardiac patients has evolved dramatically over the past two decades, with significant improvement in survival. These improvements are attributable, at least in part to improvements in diagnostic modalities, surgical techniques, cardiopulmonary bypass (CPB) support, anesthetic management, postoperative care, and the use of extracorporeal life support to manage postoperative refractory shock **(Knowles RL et al., 2012).**

Despite an overall increase in complexity, mortality has decreased in both short-term and long-term follow-up. Several factors have contributed to this improvement in outcome, including advances in prenatal and preoperative evaluation and diagnosis, anesthetic and intraoperative management, and standardized approaches to postoperative care. For example, recent advances in the surgical and perioperative management of congenital heart disease in neonates have allowed early primary repair of cardiac lesions, such as tetralogy of Fallot with results comparable to delayed repair **(Ofori-Amanfo & Cheifetz, 2013).**

The growing implementation of multidisciplinary clinical care teams with expertise in cardiac surgery, critical care, cardiology, cardiac anesthesia, neonatology, electrophysiology, nursing, respiratory care, pharmacology, and nutritional support have had a positive impact on the care delivered to these complex patients. The development of these dedicated teams along with improved

outcomes in premature and low-birth-weight infants have changed the demographics of patients managed in pediatric cardiac ICUs **(Padley JR et al., 2011).**

Recent improvements in facilities in paediatric intensive care units (ICUs) have increased the survival rates among children suffering from congenital heart diseases (CHD),including those suffering from the more complex conditions. The patient's course after a successful heart surgery depends on such diverse factors as the severity of the CHD, age and condition of the patient before surgery, events in the operating room, and the quality of postoperative care **(Roodpeyma S. et al., 2013).**