CRITICAL CONGENITAL HEART DISEASES DIAGNOSED DURING NEONATAL PERIOD

Kiymet Celik¹, Ozgur Olukman¹, Timur Mese², Sertac Arslanoglu¹, Sebnem Calkavur¹

¹ Dr. Behcet Uz Children Hospital, Departments of Neonatology
² Dr. Behcet Uz Children Hospital, Departments of Pediatric Cardiology

Introduction: Congenital heart disease is the most common congenital major defect. Approximately 28% of all congenital anomalies are congenital heart diseases. Most of the congenital heart diseases are mild lesions and do not require intervention. However, 15-20% of congenital heart diseases are critical and require intervention in the neonatal period. Critical congenital heart diseases (CCHD) are defined for cases requiring surgery and/or catheterization during the first year of life. CCHD is a condition with high mortality and morbidity. Although, the data for mortality in developing countries are insufficient, the mortality rate of CCHD in developed countries is between 15-25%. Along with both diagnostic and surgical technical innovations, improvement in postoperative care contributes to the reduction of mortality in these patients. In addition, prenatal diagnosis reduces the mortality and morbidity in these patients by providing the center of the birth, postnatal preparation, resuscitation and care planning. In this study, we aimed to evaluate the data of newborns diagnosed as CCHD in order to provide a clinical foresight.

Materials-Methods: Between January 2013-June 2016, 81 infants were diagnosed as CCHD. 15 infants were referred to other centers for surgery. In our hospital, because of admission to the Neonatal Intensive Care Unit and lack of delivery room, patients were referred from other centers or performed by outpatient clinic. All patients were referred from another unit and hospitalized. Patients who did not require any intervention, only patients undergoing diagnostic angiography, and patients referred to another center at any time during admission were excluded from the study. The patients were diagnosed by echocardiographic evaluation. Patient data were recorded retrospectively. Patients' birth week, birth weight, sex, type of delivery, time of diagnosis (day), cause of hospitalization, hospitalization of blood gas and preductal arterial saturation values (SpO₂), requirement of mechanical ventilation (MV), diagnoses, prostaglandin E1 and inotrop treatment requirements, duration of oxygen and MV, presence, type and duration of central catheters, presence of surgery/angiography, length of hospital stay and mortality rates were recorded for the remaining 66 patients.

Results: Among 66 infants 22.7% (15) were aortic coarctation, 15.1% (10) were pulmonary atresia/stenosis, 12.1% (8) were aortic stenosis and 9% (6) were transposition of the great arteries. Mean oxygen saturation at admission was 90±11.2%. Need for mechanical ventilation was 33.3% (22), prostaglandin E1 was 56.1% (37), positive inotrope was 74.2% (49). While 53% (35) of infants underwent angiography, an invasive procedure during angiography was performed in 28.8% (19) of infants and 66.7% (44) of infants underwent surgery. Fiftysix percent (37) of infants were discharged from hospital and the total mortality rate was 43.9% (29). Low oxygen saturation at admission, need for prostaglandin E1 and inotrope was found to be closely associated with mortality (p=0.019, p=0.004, p=0.049). Mortality was significantly high in infants diagnosed in the first 3 days of life (p<0.001). No relationship could be demonstrated between other variables and mortality.

Table 1: Clinical data

	n(%)
Arterial saturation values (SpO ₂)	90±11.2
Support of respiratory	
None	28(42.4)
Oxygen support	16(24.2)
Need for mechanical ventilation	22(33.3)
Need for prostaglandin E1	37(56.1)
Inotrop treatment requirements	49(74.2)
Type of central catheters	
Umbilical catheter	5 (7.6)
Femoral catheter	12 (18.2)
Subclavian catheter	15 (22.7)
Femoral+subclavian catheter	6 (9.1)
Umbilical +another central catheter	10 (15.2)
Duration of central catheters	17.5 (1-65)
Duration of mechanical ventilation	13 (1-226)
Angiography	35 (53)
Operation	44(66.7)
Length of hospital stay	28 (2-227)

Table 2. Distribution of the patients by diagnosis

	n	%
Aortic coarctation	15	22.7
Pulmonary atresia	8	12.1
Valvular aortic stenosis	8	12.1
Transposition of the great arteries	6	9
Pulmonary stenosis	5	7.5
Transposition of the great arteries + Double outlet right ventricle	5	7.5
Hypoplastic left heart syndrome	3	4.5
Double outlet right ventricle	3	4.5
Patent ductus arteiosus	4	6
Truncus arteiosus	2	3
Tetralogy of Fallot+ pulmonary artery hypoplasia	2	3
Tricuspid atresia	1	1.5
Aorticopulmonary window	1	1.5
Aortic arch anomaly	2	3
Total anomalous pulmonary venous drainage	1	1.5
Total	66	100

Table 3: Comparison of demographic characteristics, clinical data who were discharged and the subjects who were lost

	Discharced (37)	Exitus (29)	P value
Gestation age (week)	37 ±2	37±3	0.69
Birth Weight (g)	2986±713	2954±772	0.68
Delivery type			0.9
C/S	25 (37.9)	20(30.3)	
Vaginal	12(18.2)	9 (13.6)	
Gender			0.96
Male	27	21	
Female	10	8	
Time of diagnosis (day)	6 (1-21)	3(1-30)	0.002
Hospitalization of arterial saturation values (SpO ₂)	92±8	86±13	0.009
Prostaglandin E1 treatment requirements	%22.7	%33.3	0.004
Inotrop treatment requirements	%36.4	%37.9	0.049
Duration of mechanical ventilation	14 (2-539)	10(1-226)	0.21
Duration of catheter	19 (2-57)	13.5(1-65)	0.39
Length of hospital stay	41 (4-119)	15 (2-227)	0.056

Conclusion: CCHD is a group of diseases with high mortality and morbidity. In this study we found that mortality rates are significantly high in infants who are diagnosed in the first 3 days of life requiring intensive medical support. Therefore we'd like to emphasize that prompt intervention is crucial for these infants.