ORIGINAL ARTICLE

Analysis of 157 Cases of Congenital Heart Disease

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ABSTRACT

Background and Objectives: Congenital heart disease is primarily an abnormal anatomical structure characterized by the formation disorder or abnormal development of the heart and macrovessels during embryonic development, or the failure to close the channels that should be automatically closed after birth (it is normal in the fetus). To study the clinical analysis of congenital heart disease in children. **Methods:** 157cases of congenital heart disease in our hospital from January 2015 to 2018 were selected as the observation objects. All the test indexes of the children met the diagnostic criteria. **Results:** If untreated it not only affects the circulation function but also causes the growth and development retardation. Heart failure, arrhythmia could be found. Moreover, Pulmonary hypertension infective endocarditis was found. Screening is an effective tool for preventing the incidence rate. **Conclusion:** An early diagnosis will lead to appropriate treatment and management.

Key words: Congenital heart disease, incidence rate, screen

INTRODUCTION

Congenital heart disease (CHD) is the most common birth defect in neonates, and it is also one of the important causes of neonatal death. Above all, it is a serious threat to children's health.[1] The disease is caused by cardiac and vascular disorders during embryonic development, resulting in abnormal morphology, structure, and function.[2] In the past 4 years, 157 cases of CHD and 137 cases of other digestive tract malformations were investigated in babies born in our hospital. Born in our hospital, the incidence of CHD is the highest, which is consistent with the most common congenital malformations of fetuses and newborns in China.[3] In this paper the data presented was collected from newborns suffering from CHD and hospitalized in our hospital from 2015 to 2018. The data were collected and analyzed to provide relevant information for the prevention and treatment of CHD.

DATA AND METHODS

Object

From 2015 to 2018, there were 5587 hospitalized children in neonatal pediatrics of Shenmu Hospital.

Inclusion criteria

The age of term infants was ≤28 days, and the corrected gestational age of premature infants was within 28 days after 40 weeks. The repeated hospitalization of the same child was counted as one person-time.

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Diagnostic criteria

The results of cardiac color Doppler ultrasound were used as the diagnostic basis. The diagnosis was carried out according to the International Classification of Diseases (ICD-10). VSD: Q21.000, ASD: Q21.000, PDA: Q25.000, AVSD: Q21.200, TOF: Q21.300, TGA: Q20.302, PHT: I27.000, ECD: Q21.207.

Methods

Children with antenatal diagnosis or suspected CHD were diagnosed by echocardiography as children with an antenatal diagnosis or suspected of CHD with murmur. In lung diseases, in addition to shortness of breath and cyanosis of skin, chromosome abnormalities were considered, persistently below the target value (94%), which should be taken notice that heart disease was not ruled out.

RESULTS

General information

A total of 5587 newborns were admitted from 2015 to 2018, including 2998 males and 2589 females. The gestational age was 32 weeks–41 weeks, the birth weight was 1.3 times 5.5 kg, and the age was 10 min–27 days after birth. There was no significant difference between 87 males (55.41%) and 70 females (44.59%), $P > 0.05$ with CHD. The youngest age is 10 min after birth and the maximum is 27 days.

The incidence of CHD from 2015 to 2018 was as follows: 3.08%, 2.30%, 2.31%, and 3.60%

The incidence of CHD in all newborns born in our hospital is about 8 per thousand [Figure 1].

Classification of CHD [Table 1 and Figure 2]

An atrial septal defect is the most (28.7%), ventricular septum defect (22.3%), patent ductus arteriosus (13.4%), atrial septum defect complicated with patent ductus arteriosus (8.3%), and atrial septum defect complicated with ventricular septum defect (7.6%). Tetralogy of Fallot is the most common type of complex CHD. The other 2 cases were pulmonary atresia, ventricular septum defect, aortic straddling, patent ductus arteriosus, ventricular level, and bilateral shunt at the atrial level. There were 2 cases of complete endocardial pad defect, double outlet of the right ventricle, transposition of the great artery with pulmonary artery stenosis, and partial abnormal pulmonary vein drainage. Transposition of great artery complicated with atrial septum defect and patent ductus arteriosus was found in 1 case. Ectopic pulmonary

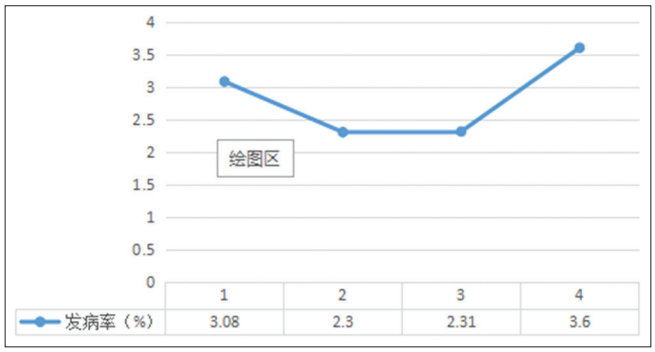

Figure 1: The incidence of congenital heart disease in the hospital in 2015–2018

Table 1: Composition of various congenital heart diseases

Type of defects	Number of samples	Constituent ratio (%)
ASD	45	28.7
VSD	35	22.3
PDA	21	13.4
ASD+PDA	13	8.3
AVSD	12	7.6
AVSD+PDA	6	3.8
PDA+PHT	5	3.2
TOF	5	3.2
PHT	3	1.9
VSD+PDA	3	1.9
PA+VSD	2	1.3
LASAN	2	1.3
ECD	2	1.3
ASD+PHT	1	0.6
TAPVD	1	0.6
TGA	1	0.6
Total	157	100%

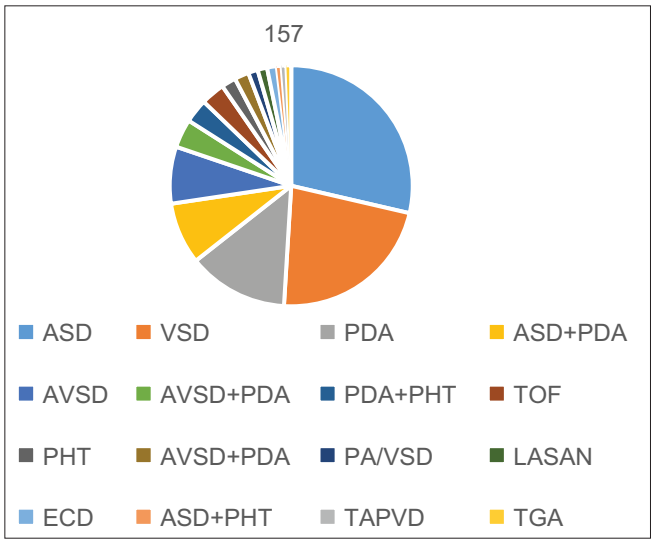

Figure 2: Composition of all kinds of congenital heart disease

Table 2: Distribution of congenital heart disease from 2015 to 2018 (data shown in %)

Type of defects	2015	2016	2017	2018	Total
ASD	9 (30.0)	11 (28.9)	7 (23.3)	18 (30.5)	45 (28.7)
VSD	5 (16.6)	12 (31.5)	2 (6.7)	16 (27.1)	35 (22.3)
PDA	2 (6.6)	6 (15.7)	5 (16.7)	8 (13.6)	21 (13.4)
ASD+PDA	4 (13.3)	1 (2.6)	5 (16.7)	3 (5.0)	13 (8.3)
ASD+VSD	2 (6.6)	4 (10.5)	3 (10.0)	3 (5.0)	12 (7.6)
ASD+VSD+PDA	0 (0.0)	0 (0.0)	5 (16.7)	1 (1.7)	6 (3.8)
PDA+PHT	1 (3.3)	1 (2.6)	0 (0.0)	3 (5.0)	5 (3.2)
TOF	2 (6.6)	2 (5.3)	0 (0.0)	1 (1.7)	5 (3.2)
PHT	1 (3.3)	0 (0.0)	1 (3.3)	1 (1.7)	3 (1.9)
VSD+PDA	1 (3.3)	0 (0.0)	2 (6.7)	0 (0.0)	3 (1.9)
PA+VSD	1 (3.3)	0 (0.0)	0 (0.0)	1 (1.7)	2 (1.3)
LASAN	1 (3.3)	0 (0.0)	0 (0.0)	1 (1.7)	2 (1.3)
ECD	1 (3.3)	1 (2.6)	0 (0.0)	1 (1.7)	2 (1.3)
ASD+PHT	1 (3.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.6)
TAPVD	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.7)	1 (0.6)
TGA	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.7)	1 (0.6)
Total	30 (100)	38 (100)	30 (100)	59 (100)	157(100)

Table 3: Distribution of other birth defects in hospitalized newborns from 2015 to 2018 (data are shown in %)

Birth defects	2015	2016	2017	2018	Total
Digestive tract malformation	0 (0.0)	14 (28.0)	9 (24.0)	6 (22.2)	29 (21.2)
Multiple finger deformity	4 (17.4)	5 (10.0)	10 (27.0)	5 (18.5)	24 (17.5)
Chromosome abnormalities	3 (13.0)	5 (10.0)	7 (18.9)	5 (18.5)	20 (14.6)
Laryngeal stridor	6 (26.1)	4 (8.0)	3 (8.1)	3 (11.1)	16 (11.7)
Cheilopalatognathus	2 (8.7)	2 (4.0)	1 (2.7)	3 (11.1)	8 (5.9)
Tracheoesophageal fistula	1 (4.3)	3 (6.0)	0 (0.0)	2 (7.4)	6 (4.4)
Wryneck	1 (4.3)	1 (2.0)	1 (2.7)	1 (3.7)	4 (2.9)
Urinary malformation	0 (0.0)	2 (4.0)	1 (2.7)	1 (3.7)	4 (2.9)
Congenital spina bifida	1 (4.3)	0 (0.0)	1 (2.7)	0 (0.0)	2 (1.5)
Biliary atresia	0 (0.0)	1 (2.0)	0 (0.0)	1 (3.7)	2 (1.5)
Choanal atresia	2 (8.7)	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.5)
Congenital dilatation of colon	1 (4.3)	1 (2.0)	0 (0.0)	0 (0.0)	2 (1.5)
Abnormal development of corpus callosum	1 (4.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.7)
Dura mater bulge	0 (0.0)	1 (2.0)	0 (0.0)	0 (0.0)	1 (0.7)
Other	1 (4.3)	11 (28.0)	4 (10.8)	0 (0.0)	16 (11.7)
Total	23 (100)	50 (100)	37 (100)	27 (100)	137 (100)

vein drainage complicated with atrial septum defect was found in 1 case.

The incidence of CHD year by year [Table 2]

The Distribution of congenital heart disease was monitored for consecutive years starting from 2015 to 2018 and the data has been shown in percentage [Table 2].

The outcome of CHD 7 cases died, two cases died after operation

All of them were complex CHD. There were 2 cases of tetralogy of Fallot and 1 case of pulmonary atresia, ventricular septum defect, aortic straddling, patent ductus arteriosus, ventricular level, and bilateral shunt at atrial level. There were 2 cases of complete endocardial pad

Congenital heart disease	Definition
Criticals	Surgical treatment will be required within 28 days of birth or will result in a death or a serious impact on the prognosis, including left-heart dysplasia syndrome, complete transposition of the great arteries and off-break of the aortic arch, and partial aortic coarctation, aortic stenosis, and pulmonary valve stenosis, tetralogy of Fallot, pulmonary atresia with ventricular septal defect, and total anomalous pulmonary vein drainage.
Serious	It is not critical but needs intervention or surgical treatment from 1 month to 1 year after birth; otherwise, it will die or seriously affect the prognosis of congenital heart disease. It includes aortic coarctation, aortic valve stenosis, pulmonary valve stenosis, tetralogy of Fallot, pulmonary atresia with ventricular septum defect, complete abnormal pulmonary venous drainage, and other types of congenital heart disease, such as ventricular septum defect with large shunt, patent ductus arteriosus, and so on
Make sense	It does not belong to critical or serious congenital heart disease, but needs close follow-up, including small patent ductus arteriosus, small atrial septum defect, small ventricular septum defect, mild abnormal blood flow of pulmonary artery branch, and so on
Insignificance	There were the following problems at birth, but there were <6 months old, including small patent ductus arteriosus, communication between small atrium (closed foramen ovale/atrial septum defect), small muscle ventricular septum defect, and mild abnormal blood flow of pulmonary artery branch

※Critical and severe congenital heart disease is collectively referred to as severe congenital heart disease

defect, double outlet of right ventricle, transposition of great artery with pulmonary artery stenosis, and partial abnormal pulmonary vein drainage. One case of transposition of the great arteries was combined with atrial septal defect, and the patent ductus arteriosus was not closed. One case of ectopic pulmonary vein drainage complicated with atrial septum defect. The cause of death was heart failure complicated with cardiogenic shock in 2 cases. Post-operative death occurred in 2 cases: Ectopic pulmonary vein drainage with atrial septum defect and tetralogy of Fallot in 1 case, respectively. The rest of the children's families gave up treatment to die; the cause of death is unknown.

Other birth defects from 2015 to 2018, 137 cases of other birth defects were found

The first three of them were digestive tract malformation (21.2%), multiple finger deformity (17.5%), and chromosome abnormality (14.6%) [Table 3].

DISCUSSION

CHD is the most common birth deformity in the neonatal period. The incidence of CHD in China is on the rise.[4] CHD is a serious congenital malformation, which is one of the causes of infant death. The prevalence of CHD in children with CHD is 4.7%~10%[5], the incidence of our hospital is about 8%, which is consistent with the foreign report. The most common atrial septum defects (28.7%), ventricular septum defects (22.3%), patent ductus arteriosus (13.4%), atrial septum defect complicated with patent ductus arteriosus (8.3%), and atrial septum defect complicated with ventricular septum defect (7.6%) were the most common in our hospital. Tetralogy of Fallot is the most common type of complex CHD. Complex CHD, that is, severe CHD, is the main cause of death.

If the severe CHD is not diagnosed and effectively treated in time, the life can be threatened by the complications such as severe hypoxia, pneumonia, and heart failure; and the delay diagnosis can lead to circulatory failure of the child, even horribly, the shock and the acidosis will affect the stability of the vital signs of the child. Moreover, the mortality of the surgery is increased. Therefore, intrauterine screening and early identification after birth are important measures to improve the prognosis of children with severe CHD.

According to Ewer grade of severity of CHD,[6] CHD can be divided into four types: Critical, serious, meaningful, and meaningless.

The incidence of CHD in our hospital has been on the rise in the past 2 years. Analysis of reasons is as follows: (1) The improvement of the ultrasound examination rate of the heart: Two years ago, clinicians did not know enough about CHD, some of them did not have cardiac murmur and missed diagnosis. With the opening of "two-child policy," the proportion of high-risk pregnant and lying-in women increased, the guidance of eugenics and eugenics guidance antenatal diagnosis and the continuous popularization of ultrasound technology improved the screening of CHD, (2) improvement of ultrasonic technology, and (3) the increased incidence of CHD is related to social understanding. The prior non-standard examination and prevention, such as the intrauterine infection series, is not attached importance; the pregnancy is not focused on prevention, does not produce the test on time, and the diabetic mother's baby is obviously increased and other factors.

Because CHD already exists at birth, because of hemodynamic changes before and after birth, the clinical symptoms are atypical and easy to be confused with other systemic diseases, especially misdiagnosed as septicemia, septic shock, and so on. It was found that 50% of the children died of CHD within 4 weeks after birth and 79.7% died within 1 year of life.[7]

CONCLUSIONS

Attention should be paid to the prevention of CHD and the screening of severe CHD. It was found that the risk factors of neonatal CHD were old pregnant mother, cold or fever, early pregnancy medication, passive smoking, poor reproductive history, exposure to noise, radiation, newly decorated living room, diabetes mellitus during pregnancy, and keeping pets.[8] Therefore, it is necessary to strengthen the health education, attach importance to pre-pregnancy test, early abnormality, early intervention, improve its resistance, and prevent early-stage virus infection. Pay attention to the influence of the surrounding environment on pregnancy; special needling is passive smoking, noise, radiation, and so on. It is important to pay attention to the gestational diabetes mellitus in subjects during regular examination in pregnancy. Moreover, the diagnosis level of the B-ultrasound doctor is improved and the sense of responsibility is enhanced. In the case of severe CHD, it can be found that the intra-uterine transport, timely intervention and the reduction of the mortality rate can be found. For clinicians, it is necessary to be familiar with the clinical manifestations of severe CHD, identify it in time, and avoid misdiagnosis. All newborns born in our hospital have been screened for CHD by cardiac murmur auscultation and percutaneous oxygen saturation monitoring to detect, diagnose, and intervene early, so as to reduce mortality and improve the prognosis and quality of life of children. However, the clinical relaxation of the examination of the heart ultrasonic examination is the first to find the CHD, and the accuracy rate is higher, its specificity and sensitivity need to be further studied and summarized.

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