Neonatologist-performed echocardiography in congenital heart disease screening : A Tunisian experience

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Introduction

Echocardiography is an important tool for early diagnosis of congenital heart disease (CHD) in newborns. When there is not a paediatric cardiologist on site, a preliminary echocardiogram performed by the neonatologist can be useful especially in sick newborns.

The aim of this study was to evaluate frequency of CHD detected by neonatologist-performed echocardiography in a Tertiary Neonatal Care Centre in Tunisia.

Patients and Methods

- Prospective study in a tertiary Neonatal Intensive Care Unit (NICU) in Monastir (Tunisia) from April 2015 to December 2017.
- Inclusion criteria:
 - High-risk newborns (maternal diabetes mellitus and polymalformative syndrome).
 - Symptomatic newborns (cyanosis, murmur, arrhythmia, signs of circulatory shock, clinical signs of heart failure, and abnormal pulses in upper and/or lower extremities).
 - Prenatal diagnosis of CHD.
 - Persistent pulmonary hypertension and patent ductus arteriosus were excluded of the study.
- Echography: ALOKA prosound α 6.
- The findings of echocardiography were confirmed by a pediatric cardiologist in case of cardiac abnormalities.
- Data collection was performed from patient records.
- Data was captured and analyzed using SPSS software.

Results

A total of 1046 echocardiographic studies were performed by 2 neonatologists trained in pediatric echocardiography.

One hundred and fifty nine exams showed abnormalities (15%).

The most frequent diagnosis was atrial septal defect (n=62) followed by ventricular septal defect (n=51) (Table 1).

Forty six major CHD (29%) were diagnosed and managed in the neonatal period. Tetralogy of fallot, atrioventricular septal defects, transposition of great arteries, interrupted aortic arch and double outlet right ventricle were found in 5.6%, 3.8%, 3.1%, 3.1% and 3.1% respectively. (Table 2).

Table1: Left to right shunt pathologies

	Number
ASD	62
VSD	51
Total	113

Figure 1

Figure 2

Figure 3

Table 2: Major congenital heart diseases

	Number
Tetralogy of Fallot (Figure 1)	9
AVSD (Figure 2)	6
Transposition of great arteries (Figure 3)	5
Interrupted aortic arch	5
Double outlet right ventricle	5
Pulmonary atresia without VSD	3
Abnormal pulmonary venous return	3
Coarctation of the aorta	3
Pulmonary atresia with VSD	2
Left heart hypoplasia	2
Common arterial trunk	1
Single ventricle	1
Single atrium	1
Total	46

Discussion

This study has confirmed the importance of echocardiography in neonatology. In fact, its realization in the most serious patients was of a considerable contribution since with the diagnosis of the cardiac pathology and its type, some specific therapies could be quickly started.

Efforts have thus been made in the early diagnosis of congenital heart disease in our department since an echocardiography was performed as soon as clinical suspicion arose.

The impact of early disease management on mortality has been confirmed in our work since the lethality by cardiac pathology decreased from 44% in 2014 to 27% in 2017.

The setup of an early diagnosis protocol as established in our department is all the more important as antenatal diagnosis is rarely realized in our country. In fact, certain pathologies should have been identified during pregnancy such as the transposition of large vessels and univentricular hearts.

The benefit of an antenatal diagnosis has clearly been demonstrated in several studies and especially in the optimization of the disease management and the reduction of intraoperative mortality.

Conclusion

Early detection through newborn screening potentially can improve the outcome of CHD.

In low income countries, such as Tunisia, where antenatal detection of these malformations is still poor and paediatric cardiologist not many, neonatologists should be encouraged to learn the skill and to develop guidelines for clinical practice in order to improve neonatal care.