ECHOCARDIOGRAPHIC SCREENING OF HEALTHY NEONATES FOR MEASURING PULMONARY ARTERY PRESSURE

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Introduction

The transition from a fetus to a newborn is one of the most challenging physiologic adaptations occurring in human experience which is accomplished over a period of hours to days.

In some instances after birth, the newborn cannot adapt to the outside environment due to multiple reasons causing circulation conversion failure, pulmonary vascular resistance does not decline properly leading to persistent pulmonary hypertension of the newborn (PPHN).

Pulmonary hypertension is a pathological hemodynamic condition defined as an increase in pulmonary arterial systolic pressure (PASP)≥ 35 mmHg if measured by echocardiography.

Comprehensive echocardiography is highly indicated when there is a strong clinical suspicion of PPHN to make early and proper diagnosis.

Our study rationale was to screen healthy looking babies for pulmonary arterial pressure, ductus size and closure rate to set an accepted estimate for normal physiological transition time lapse.

Aim of work

The aim of our study was to evaluate dynamic changes in both pulmonary artery pressure and ductus arteriosus during the first 72 hours after birth. Besides, both systolic and diastolic function of the right ventricle were assessed during neonatal transition.

Subjects and methods

Patients:
146 neonates were studied
Inclusion criteria:
1. Gestational age: 37-42 weeks.
2. Birthweight: 2500-4000 g.

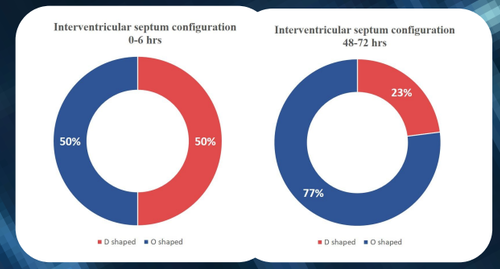
Exclusion criteria:
1. Neonates more than 6 hours of age at time of enrollment.
2. Perinatal asphyxia or hypoxia.
3. Cardiac structural abnormalities except patent foramen ovale and patent ductus arteriosus
4. Other clinically detected congenital malformations.
5. Maternal history of any chronic disease or gestational hypertension or gestational diabetes.

Methods
- Maternal history
- APGAR score
- Vitals
- Preductal and post ductal saturation
- Echocardiography: - Pulmonary Artery Systolic Pressure: using both TR jet velocity and PDA gradient - Mean Pulmonary Artery Pressure: using PR Vmax - LV eccentricity index and interventricular septum configuration - RV function: TAPSE, RV Myocardial performance index, TV E/A - LV function: EF, MV E/A

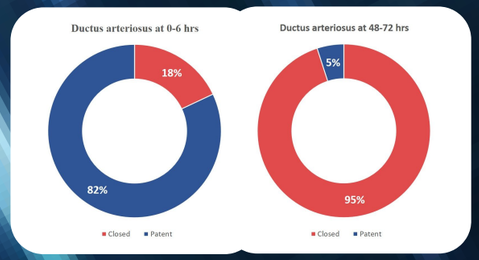
Results

Echo 0 – 6 hrs.	Mean ± SD.
RV systolic function	
TAPSE	10.18 ± 2.23
MPI	0.28 ± 0.07
RV diastolic function	
E/A TV	0.91 ± 0.30
LV systolic function	
EF	75.50 ± 7.17
LV diastolic function	
E/A MV	1.01 ± 0.25

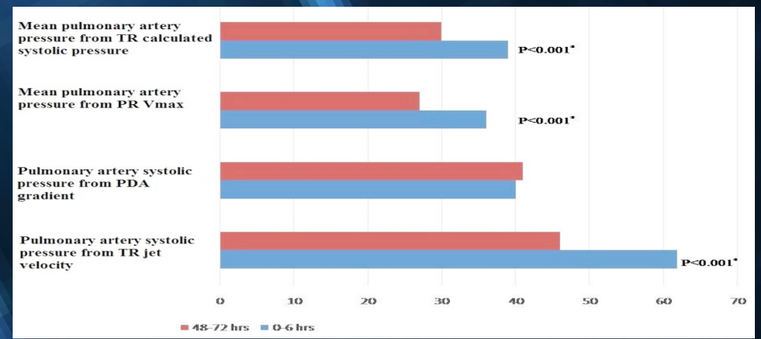
Table(1): Descriptive analysis of the studied cases according to RV and LV function (n=146)



Figure(1): Interventricular septum configuration at 0-6hrs vs 48-72 hrs



Figure(2): Incidence of ductus arteriosus at 0-6 hrs vs 48-72hrs



Figure(3): PASP and mPAP readings at 0-6 hrs vr 48-72 hrs

CONCLUSION

- Duct closure rate was 94.7% at 48-72 hours.
- Maximum PASP was 61 mmHg and dropped significantly to 46 mmHg where maximum mPAP was 39 mmHg and dropped significantly to 31 mmHg at 0-6 hrs and 48-72 hrs respectively without clinically detected distress or desaturation.
- Right ventricular global function showed significant affection between early postnatal hours versus 48-72 hours.