Case report

HOW "FAST" READING OF PRENATAL CARDIAC DIAGNOSIS MAY BADLY INFLUENCE THE NEONATAL MANAGEMENT - CASE REPORT FROM TERTIARY CENTER IN 2015 AND LITERATURE REVIEW

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Abstract

Complains about prenatal diagnoses usually touch late diagnosis, missed diagnosis or uncomplete diagnosis.

Prenatal diagnose provides usually important information for parents, obstetrician and neonatologist. Successful perinatal care is based on a good cooperation of the perinatal team. This time we present a peculiar situation when improper reading of prenatal diagnosis had caused a lot of troubles for the patient, parents and hospital staff.

Key words: *prenatal diagnoses, misinterpretation, I-TGA, d-TGA*

CASE REPORT

35-year old prima gravida, pregnant with unrelated partner, occupation teacher. At 17 weeks of gestation infection of the urinary tract with vaginal discharge, treated with Furaginum, followed with Amoxicillinum + Clavulanian acid with Nystatinum due to lack of improvement. Otherwise healthy. Father of child is treated with Indapamid due to hypertension. Family history revealed miscarriage in the gravida's mothers past.

The ultrasound data are summed up in Table 1.

Screening scan at 11,3 hbd showed a single pregnancy with NT 1,3 mm, CRL 52 mm, negative PAPP-A. At 20,1 weeks LV > RV disproportion and widening of the aorta, in comparison to the pulmonary trunk, were observed. Examination at 25,5 weeks confirmed the disproportion in the three vessel view in the mediastinum. At 26 weeks patient was referred to our tertiary center for further evaluation of congenital malformations.

First examination in our Department took place at 26 weeks of gestation. During US and ECHO exam cystic lesions in the left lung were detected (Fot. 1) and mild regurgitation of the aortic valve. No shift in the mediastinum nor heart were observed. In the second examination at 27 weeks, disproportion of the large vessels was still observed, other abnormalities had subsided. FO was patent, with a slender, long valve in the left atrium. The predominance of the left ventricle was described as mild with a slightly prolapsing mitral valve.

The third examination, at 34 weeks of gestation, revealed once more multiple small cysts in the left lung. The mediastinum was described as atypical. FO valve was long and aneurysmal. The fetus was otherwise well. The examining physician put forward a suspicion of I-TGA.

The forth ECHO at 38 weeks of gestation was different: Restrictive FO was observed, with right-to-left shunt, with v max of 75 cm/s. Pulmonary valve diameter 0,73 cm, aortic valve 0,8 cm. For the first time hypertrophy of the heart muscle was noted, with the intraventricular septum width up to 0,8 cm. Also the heart axis was incorrect. Monophasic flow through the tricuspid valve was observed. Increased flow in the MCA up to 71

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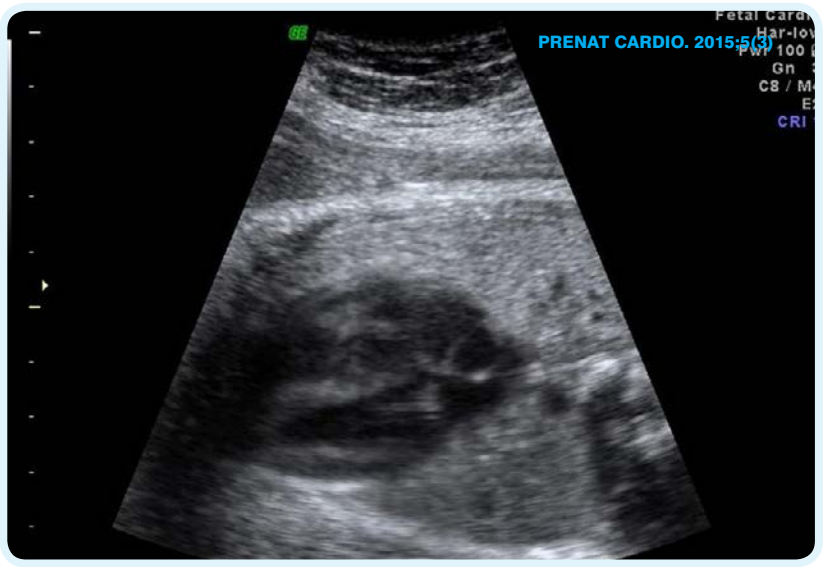


Fot. 1. Prenatal scan of the fetal chest and 4 chamber view

cm/sek, with PI 1,73 (UMB A PI 0,94). This time cysts in both lungs were visible. Close monitoring in the hospital and caesarian section were recommended.

9 days later a baby girl was born via caesarian section, weighing 3050g and received 9/9 Apgar points. Due to a misinterpretation of the prenatal diagnosis (TGA instead of l-TGA + restrictive FO), Prostin was administered and continued until the 3rd day of postnatal life. Due to periodic decrease in saturation parameters (70-75% with passive oxygen therapy with FiO2 0,3), CPAP with IFD/SIPAP was introduced with FiO2 0,6, with no satisfactory effect. On the 2nd day of life newborn was transferred to Neonatal Intensive Care Unit, where she was intubated and mechanically ventilated. Because of the low saturation parameters and a suspicion of pulmonary hypertension, therapy with iNO was introduced. Saturations around 85% were achieved with mechanical ventilation with FiO2 0,21. Control echocardiography revealed lack of obvious features of pulmonary hypertension and the iNO therapy was ceased. Chest X rays performed in 1st, 2nd, 3rd and 4th day of life didn't reveal any cystic lesions (Fot. 2). Angio CT of the chest, performed on 6th day of postnatal life, showed cystic lesions in the left lung, radiologically suggesting CCAM type II (Fot. 3). No other anomalies in the lungs were noted by the radiologist.

On day 12 baby girl was in good clinical condition, with no respiratory problems, on room air with saturation 85-90%. She was transferred to Pediatric Cardiology Department and her echo exam showed mild myocardial hypertrophy, slightly wider left ventricular outflow tract and ascending aorta in comparison with right ventricular outflow tract, but otherwise normal heart anatomy.

She was discharged home on the 37th day of postnatal life for outpatient monitoring in good clinical condition.

DISCUSSION

Misinterpretations of prenatal ultrasound are rarely subject of scientific publications. It was described in case of dilated coronary sinus, which was overdiagnosed as an atrio-ventricular canal [1] or in case of subarachnoid cyst versus hydrocephalus [2]. (Table 2)

Presented case shows the importance of proper reading of the prenatal ultrasound by neonatologists.

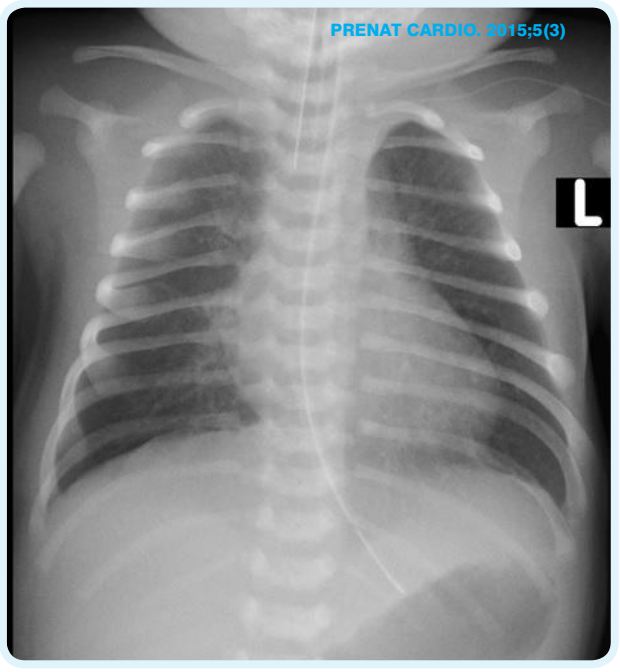
Summarizing the unusual course of the 2nd half of pregnancy (Table 1) in a fetus with normal heart anatomy described in mid gestation and some functional abnormalities, the abnormal lung tissue was detected and observed since 26 weeks of gestation. In the third trimester due to myocardial hypertrophy, the question was raised about the possibility of ventricular inversion… so called l-TGA (Table 4), however in subsequent echo examination

Week of gestation	11,3	20	25	26	27	34	38
US	NT 1,3mm, CRL 52mm						
Biometry	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Aortic regurg.				YES	No	No	
4chamber		LV>RV	LV>RV		LV>RV		
Mediastinum		Ao > PA	Ao > PA		Ao > PA		Ao > PA
SEP		2,5 mm		3 mm			8 mm
FO					Long Fo valve	Long FO valve	Restrictive FO, long aneurysmal valve
Lung				Multiple small cystic lesions in the left lung	No cysts ?	Multiple small cystic lesions in the left lung	Multiple small cystic lesions in both lungs

Table 1. Summarizing data from prenatal US & ECHO evaluation

Authors, Journal, Year	False diagnosis	Correct diagnosis
Park JK, Taylor DK, Skeels M, Towner DR.	Atrioventricular canal	Dilated coronary sinus
"Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology." 1997		
Pilu G, De Palma L, Romero R, Bovicelli L, Hobbins JC. "Journal of ultrasound in medicine" 1986	Hydrocephalus	Arachnoid cyst
Altug N1, Danisman AN.	Twin gestation	Single gestation with mirror artifact
"Early human development" 2013		
Ahn H, Hernández-Andrade E, Romero R, Ptwardhan M, Goncalves LF, Aurioles-Garibay A, Garcia M, Hassan SS, Yeo L.	Echogenic focus in the heart	False tendon
"Fetal diagnosis and therapy" 2013		
Garnier S, Maillet O, Haouy S, Saguintaah M, Serre I, Galifer RB, Forgues D, Guibal MP, Allal H, Sabatier E, Kalfa N.	Mesoblastic nephroma	Intrarenal neuroblastoma
"Journal of pediatric surgery" 2012		

Table 2.



Fot. 2. Postnatal chest X ray with no anomalies

the fetal heart anatomy once again was described as normal. Close to term restriction of the foramen ovale was an indication for elective cesarean section.

ECHO examination in this case, as well as in the case of another CCAM reported in 2012 [10], was used not only to assess the heart's structure, but also to monitor functional changes in the developing fetus, which may have been a result of lesions in the lungs.

The newborn baby in a couple of hours presented with respiratory insufficiency. The neonatal team due to inadequate reading of the prenatal diagnosis focused on the cardiac problems, making an interpretation as d-TGA malformation. Therefore Prostin infusion i.v. was started and emergency pediatric cardiologist counseling was arranged for planned cardiac catheterization and/or cardiac surgery. Because the heart malformation was ruled out it was considered a false positive prenatal cardiac diagnosis.

Chest X-ray did not reveal any major abnormalities. As parents of the newborn baby were confused about the differences between prenatal and postnatal diagnoses a special meeting with them and the perinatal team was arranged on the 3rd day of postnatal life. The differences between l-TGA and d-TGA were explained to the parents and several images from prenatal evaluation with fetal lung abnormalities were presented.

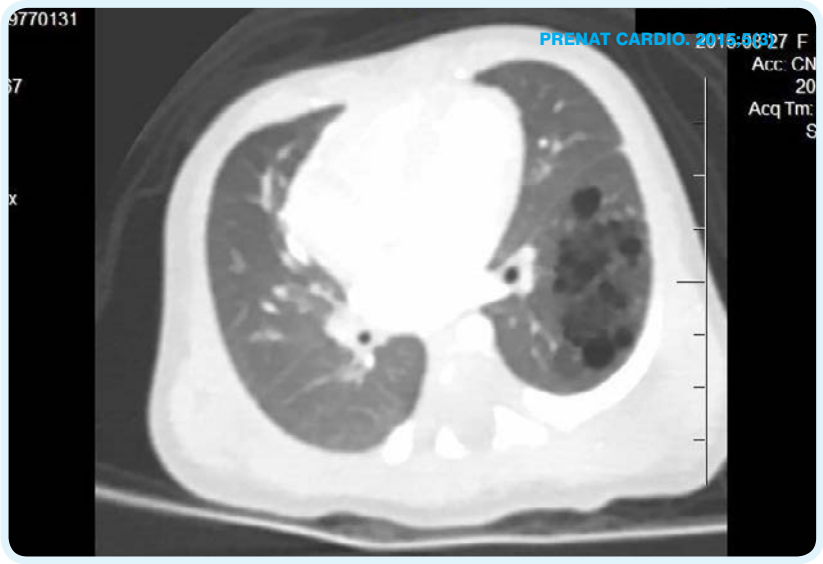
On day 6 angio CT was performed confirming prenatal diagnosis with abnormal unilateral lung tissue on the left side. The baby was on oxygen and room air with saturation 80% in stable condition.

We present this unusual case to remind that the only diagnostic modality in case of prenatal lung anomalies during the postnatal period is the CT for neonate and not X-ray.

It is also important to remember that there are different types of transpositions….

In difficult cases it is important for neonatologists to spend time to analyze not only written reports but also the freeze frames and cine loops of the prenatal ultrasound evaluation.

Effectiveness of prenatal ultrasound and perinatal management relies on the good cooperation between medical staff. (Table 3) Establishing an efficient communication platform between prenatal cardiologists, obstetricians and neonatologists should be our main area of focus- to guarantee the best possible, complex and interdisciplinary care for our patients. This necessity has been underlined several times, also in Prenatal Cardiology by professor Kornacka [9] in 2013. She emphasized the fact, that neonatologist should be informed about the prenatal diagnosis soon, preferably just after 22nd week



Fot. 3. CT of the chest at 5th day of postnatal life. Courtesy Dept of Radiology, Polish Mother's Memorial Hospital

According to Errors in prenatal diagnosis[3] we've faced three types of errors in this perinatal management:	
Error type	Example
Diagnostics	failure to act on results of monitoring or testing
Treatment	avoidable delay in treatment, inappropriate (not indicated) care
Other	Failure of communication.

Table 3.

Chambers' diversification	Morphologically right ventricle: muscles heading from the tricuspid valve through the ventricle, sticking distally. Morphologically left ventricle: muscles stick to the side wall.
Tricuspid valve	Improper placement and the structure of the valve
Heart's situation	Dextrocardia in 25% of cases

Table 4. L-TGA diagnosis in the four chamber view- tips for echocardiographists [7,8]

of pregnancy - knowing in advance about a problematic patient allows planning and organization of proper care for the future newborn and his parents.

Maybe this case should motivate us to investigate the way we present results of our prenatal examination? Or maybe interdisciplinary meetings on weekly (monthly?) basis are required in tertiary and teaching centers for better understanding and interpretation of different prenatal features? Undoubtedly, there's always room for improvement.

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Gulczyńska E: neonatologist, work with the manuscript,
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