ULTRASOUND DIAGNOSTIC CRITERIA OF TAUSSIG-BING ANOMALY IN FETUS

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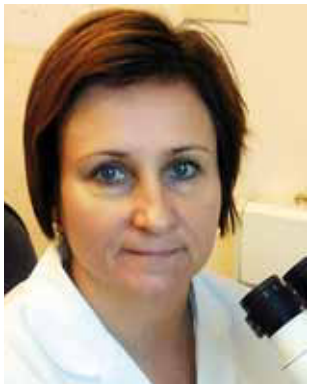

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INTRODUCTION

Diagnose Taussig-Bing anomaly it is a very important and difficult for prenatal ultrasound. We wont to discuss some important aspects of this problem.

Lev and Anderson defined doble outlet of right ventricle (DORV) as «all of one great artery and 50% or more of the other artery must arise from the RV» [1].

The basis for their hypothesis is that, during conus malrotation changes in position of anterior portion of the muscular interventricular septum and differential conus absorption lead to such malposition of the great artery relations [4].

The anatomical variations of DORV are classified on the basis of:

1. the relationship between the VSD and the great arteries.

a) DORV with sub-aortic VSD;
b) DORV with sub-pulmonary VSD;
c) DORV with doubly-commited VSD;
d) DORV with non-committed VSD.

2. The position of the great arteries in relation to each other at the valvular level [2, 3].

Taussig-Bing anomaly is one type of double outlet right ventricle and based congenital heart defects with a transposition of the great arteries (TGA) and a subpulmonary ventricular septal defect (VSD) [Fig. 1]. This cardiac disease has been first described by Helen Taussig and Richard J.Bing in 1949 [5].

Characteristic features of the first heart described by Taussig and Bing include:

1. origin of the aorta from right ventricle;
2. aorta to the right of the pulmonary artery (side by side);
3. pulmonary artery in its approximately normal position and overbidding a VSD;
4. muscule poller (defined as outlet septum) separating the origin of the two great vessels.

MATERIAL

A total of 321 fetal echocardiograms were obtained during an period between 2015–2016 years from with a prenatal diagnosis of DORV. 104 of these cases were Taussig-Bing anomalies.

All cases usually were diagnosed during the first echocardiography from 14 to 34 weeks gestation. Our prenatal cohort was verified by postnatal ultrasound and autopsy.

Ultrasound criteria of T-B anomaly is a large subpulmonary anterior malalignment VSD and side-by-side position of the great arteries with an aortic valve on the right side of the pulmonary valve with both vessels predominantly arising from the right ventricle [Fig. 2].

In Taussig-Bing anomaly, the VSD and the sub-aortic region by an infundibular septum, which extends from the interventricular septum to the anterior wall of the RV. Hypertrophy of the septum and the posterior limbus of the trabeculae can lead to a significant sub-aortic obstruction.

This is important part of prenatal ultrasound of Taussig-Bing anomaly was diffdiagnosis with transposition of great arteries (TGA) and sub-pulmonary VSD [Fig. 1, 3].

TGA includes atria-ventricular concordantion and ventriculo-arterial discordantion.

The anatomical variations of TGA are classified on the basis of:

e) Simple version;
f) TGA with sub-aortic VSD;
g) TGA with sub-pulmonary VSD;
h) TGA with doubly-commited VSD.

We were interested TGA with sub-pulmonary VSD.

Ultrasound diffdiagnosis Taussig-Bing anomaly and TGA with sub-pulmonary VSD

For T-B anomaly: 50% or more of the PA must arise from the right ventricle, the most frequently the great arteries were positioned side by side or rarely aorta is anterior and right sided, the overriding of the pulmonary valve in the trabecular region of the ventricular septum.

For TGA with sub-pulmonary VSD: 50% or more of the PA must arise from the left ventricle", the most frequently aorta is anterior and right sided and rarely the great arteries were positioned side by side.

According to autopsy the specific criterias of anomaly T-B versus TGA with subpulmonary VSD were:

1. distance between aorta and mitral valve more then 1,3;
2. conus septum in 1,5 less versus normal;
3. prevailing relationship aorta and pulmonary truncus is "side by side"
4. mitral-pulmonary discontinuity

Unfortunately, it was impossible to visualize mitral-pulmonary discontinuity in utero.

DISCUSSION

DORV is a heterogeneous group of conus arteriosus malformations. "All of one great artery and 50% or more of the other artery must arise from the right ventricle".

The basis for their hypothesis of conus malrotation, changes in position of anterior portion of the muscular interventricular septum and differential conus absorption lead to such malposition of great artery relations.

The basic condition of DORV is the presence of mitral-similar contact.

The basis of fetal ultrasound diagnosis of T-B anomaly were:

— the relationship aorta and pulmonary truncus;
— degree offset (overbidding) of great arteries, especial pulmonary truncus for time of gestation
— location and size of VSD.

The optimal transabdominal fetal ultrasound diagnosis of Taussig-Bing anomaly can be performed at 16 to 22 weeks of pregnancy.

Definition of fetal Taussig-Bing anomaly was attempted from multiple scan planes including four-chamber, long-axis of left ventricle and right ventricle, short axis of great arteries, aortic arch and ductal arch views.

Doppler color flow mapping and pulsed Doppler interrogation were used to facilitate identification of great vessel relationship, location and size of VSD.

Postnatal examination of this CHD must be by postnatal echocardiography, angiography, surgery or autopsy.

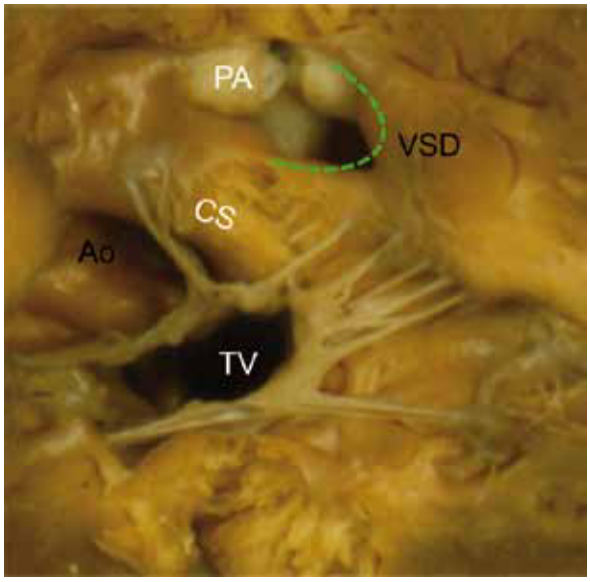

Fig. 1. *Taussig-Bing anomaly: double outlet right ventricle with a transposition of the great arteries and a sub-pulmonary ventricular septal defect.*
VSD — ventricular septal defect, PA — pulmonary artery, TV — tricuspid valve, Ao — aorta, CS — conus septum.

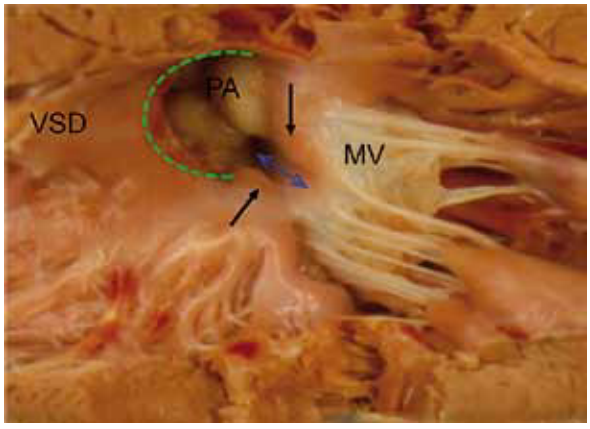

Fig. 3. *TGA and VSD type "malalignment". Right –side deviation of conus septum and a sub-pulmonary ventricular septal defect.*
VSD — ventricular septal defect, PA — pulmonary artery, MV — mitral valve, Black arrows — segments of sub-pulmonary conus, blue arrow — fibrous mitrale-aortic contact (MV-PA).

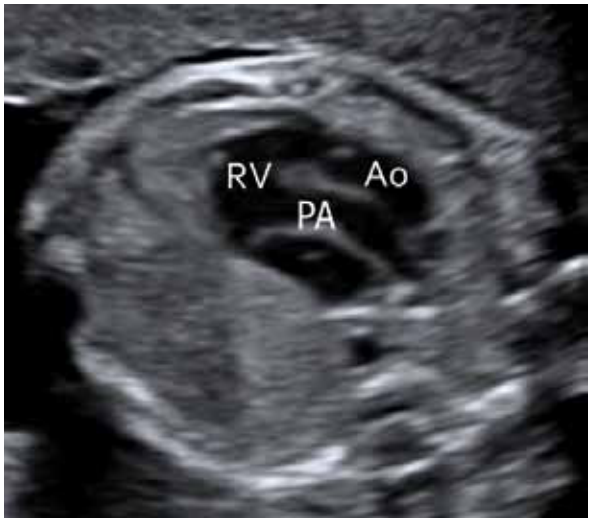

Fig. 2. *Taussig-Bing anomaly: double outlet right ventricle with a transposition of the great arteries at fetus, 20 weeks of gestation.*
PA — pulmonary artery, Ao — aorta, RV — right ventriule.

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