

## Neonate with Single Ventricle: Case Report

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### Abstract

Congenital heart disease has an incidence of approximately 1 in 100 newborns and around 50% of affected children die during the first year of life if this problem is not treated or corrected. The univentricular heart is one of them, it is characterized by the presence of only one ventricular cavity. From the morphological point of view, 80% of patients present a single ventricle similar to the left ventricular cavity, separated from an infundibular outlet cavity by a bulboventricular septum. In this anomaly, the systemic and pulmonary venous blood mixes in the ventricular chamber, resulting in general hypoxia of the patient and heart failure. We present a case of a neonatal patient who was born with a single ventricle, for which he showed signs of respiratory distress and low cardiac output that led to death.

**Key words:** single ventricle; heart disease; cardiology; neonatology

### Introduction

Congenital heart disease is one of the main causes of infant mortality, with an incidence of 6-8% of live newborns. Prenatal diagnosis is possible thanks to fetal ultrasound, which has a sensitivity of 30-40%. Within congenital heart disease there are complex conditions such as univentricular heart, which has a low incidence, but a poor prognosis, which can be improved if an optimal prenatal diagnosis is made that allows, among others, adequate care and treatment. It consists of a complex cyanogenic heart disease in which there is a single ventricular cavity or main chamber equipped with an inlet sinus and a well-developed trabeculated portion that receives flow from both atria [1].

The single ventricle is characterized by the presence of a fully formed ventricular chamber, into which two atrio-ventricular valves drain blood from the vena cavae and the pulmonary veins [2].

In 85% of cases from this ventricular chamber the aorta artery is born, and in 15% of cases the pulmonary artery emerges. There is a frequent association with transposition of the great vessels and pulmonary stenosis [3].

### PRESENTATION

The case of a male neonate is presented, with the following prenatal history: a 22-year-old mother, second pregnant, who is supplemented with iron, folic acid and calcium from 20 weeks of gestation until the end of the pregnancy, undergoing medical controls complete with normal report ultrasounds.

The neonate in question was obtained by cesarean section for failed induction, with APGAR of 8 points at the first minute and 9 points at the fifth minute of life, vigorous, tachypneic and complaining, for which oxygen therapy was started by cephalic cannula and transferred to the NICU. Using the modified Ballard test, a gestational age of 39 weeks was calculated and the birth weight was 3910 grams. At three hours of life, he presented tachycardia of 190-200 beats per minute, capillary filling of 3-4 seconds, with saturation of 96%.

On physical examination, slight rib retractions were observed; On auscultation, the first sound increased in tone and second sound with non-permanent splitting, systolic ejection murmur in the meso-cordial area irradiated to the tip, grade 3, with a component of third noise and meso diastolic murmur, jumping pulse at the radial level, Active and palpable precordium.

A chest X-ray was performed where a narrow pedicle, prominent pulmonary arch, descending tip, normal right atrial arch, and pulmonary fields with increased flow were observed.

He remained in the neonatology area until special examinations were carried out. At 72 hours of life, he presented a moderate subcostal discharge and a respiratory rate of 66 per minute, with a Downes Score 2/10, requiring supplemental oxygen support with a nasal cannula at 2 liters per minute.

An echocardiogram was requested (Figure 1-4) where atrioventricular discordance was reported with the presence of a single chamber into

which both atria drain through competent valve apparatuses, dilatation of the aortic valve with dysplastic and incompetent cusps that produced moderate regurgitation jet; hypoplasia of the pulmonary valve, pulmonary trunk and branches. Atrial septal defect, large secundum ostium with large left-to-right shunt. Situs solitus, normal venous drainage, without apparent aortic coarctation. Through this examination, a single ventricle diagnosis was made.

A referral process to a pediatric heart surgery service was started at another hospital. At 92 hours of life, progressive respiratory deterioration is observed with a Downes Score 5/10, at the expense of tachypnea with 72 breaths per minute, marked subcostal retractions, pulse oximetry with a value of 82 to 90% saturation, with oxygen support for nasal cannula at 3 liters per minute, temperature of 36.1-36.4°C, irritability, periods of bradycardia of up to 60 beats per minute, central paleness and distal cyanosis.

A control echocardiogram, arterial and venous blood gases were performed, with results showing low cardiac output, and dobutamine-type inotropics were used, which improved the heart rate to 136 beats per minute and blood pressure 80/40 mm / minute. Hg, improving capillary filling and reducing oxygen consumption.

He was transferred to the cardiology surgery unit where, after two days of having undergone mechanical ventilation and the use of other vasopressor medications, he died.

## DISCUSSION

It is essential that this pathology be diagnosed early for its appropriate treatment, so that pulmonary hypertension and cardiomyopathy resulting from volume and pressure overload are avoided. Diagnosis is possible even before birth by fetal ultrasound around weeks 16 to 18 of gestation, a period in which heart defects can be detected using a 4-chamber view on two-dimensional ultrasound, which can be supported by other views with the color Doppler technique to reach a specific morphological and functional diagnosis [4].

The characteristics that are usually found in fetal ultrasound are generally the absence of the four cavities in the cross section of the thorax, observing a single ventricle with three segments, a single atrioventricular connection, with a single valve and atresia of a right and left apparatus. the size of the heart is usually normal and sometimes an accessory camera is observed. Prenatal ultrasound scan was not effective in this case, since the reports did not show pathologies, so it is advisable to emphasize the

importance of the role of the service of ultrasound in the prenatal stage [5].

The treatment of patients with univentricular heart is generally surgical, one of its main purposes being the attenuation of the impact of chronic volume overload that influences the dilation of the ventricle, hypertrophy and worsening of systolic function. Surgical management can be performed in two ways, through serial univentricularization surgeries and, on the other hand, through heart transplantation to restore biventricular circulation [6].

In conclusion, this case report brings us closer to knowing this pathology and thus being able to make an early diagnosis and timely management based on the high mortality that occurs as a result of it.

## REFERENCES

1. Andrade, P., Santos, D., Moreira, M., & Almeida, A. Ventrículo Único com Dupla Via de Entrada e Grandes Vasos Malposicionados. *Arquivos Brasileiros de Cardiologia*, 2019; 113(3), 444-446.
2. Macías, F., Garzón, H., Mafla, J., Velásquez, J., Egas, F., & Arroyo, L. I. H. Síndrome de hipoplasia del ventrículo izquierdo. *Metro Ciencia*, 2018; 26(1), 33-38.
3. Ponce, K. P. M., Garabi, S. A. P., & Tamayo, P. C. J. Evaluación ecocardiográfica del ventrículo único. *Horizontes de Enfermería*, 2017 (6), 76-91.
4. Atz, A. M., Zak, V., Mahony, L., Uzark, K., D'agincourt, N., Goldberg, D. J., & Pediatric Heart Network Investigators. Longitudinal outcomes of patients with single ventricle after the Fontan procedure. *Journal of the American College of Cardiology*, 2018; 69(22), 2735-2744.
5. Ruiz, V. M., Saenz, L., Lopez-Magallon, A., Shields, A., Ogoe, H. A., Suresh, S., & Tsui, F. R. Early prediction of critical events for infants with single-ventricle physiology in critical care using routinely collected data. *The Journal of thoracic and cardiovascular surgery*, 2019; 158(1), 234-243.
6. Rajagopalan, V., Votava-Smith, J. K., Zhuang, X., Brian, J., Marshall, L., Panigrahy, A., & Paquette, L. Fetuses with single ventricle congenital heart disease manifest impairment of regional brain growth. *Prenatal diagnosis*, 2019; 38(13), 1042-1048.



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