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Neonatal Lupus and Complete Atrioventricular Block: Case Report in Mexico

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Authors' contributions

This work was carried out in collaboration among all authors. Author CEAA collected the case data and was involved in writing the manuscript. Authors JCMM and HIFL were involved in writing and editing the manuscript. Authors ANGBG and CMGS wrote the discussion and participated in literature searches. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Aims: To describe a case of neonatal lupus and complete atrioventricular block in Mexico.
Presentation of case: A 38 years old pregnant patient at 28 + 6 weeks of gestational age, diagnosed with systemic lupus erythematosus six years ago, under treatment with hydroxychloroquine and prednisone, this was suspended eight months prior to pregnancy; and resumed at week 20 of gestational age. The ultrasound scan showed alive fetus, female, polyhydramnios and bradycardia. Fetal echocardiography confirmed complete atrioventricular block, without organic and structural alterations at the cardiac level. Furthermore, the immunological panel reports, positive anti-Ro antibodies. At week 33 of gestational age, the patient was admitted to the obstetric emergency room, through colic type pain and 4 cm dilation of the cervix. Alive newborn got vaginally with a weight of 1,990 g, a height of 43 cm and APGAR 8-9. Echocardiography confirmed congenital complete third degree atrioventricular block; without structural abnormalities.
Discussion: Patients with systemic lupus erythematosus, are more likely to have complications during pregnancy. Neonatal lupus is a rare disorder with an incidence of 1:10,000 - 1:20,000

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newborns. This is caused by the transplacental passage of maternal autoantibodies anti-SSA / Ro and/or anti-SSB / La. Besides Atrioventricular block is a complication of neonatal lupus, occurring in approximately 2% of newborns of mothers who have SSA or SSB antibodies. The most interesting finding is that 20% fetal mortality has been for this cause.

Conclusion: The described case is important for its rarity. Besides, the imaging findings and immunological panel emphasized the relevance about complete and adequate evaluation of the fetus, in the context of a mother with systemic lupus erythematosus.

Keywords: Anti-SSA/Ro; congenital heart disease; maternal health; perinatal health; systemic autoimmune diseases.

1. INTRODUCTION

Systemic lupus erythematosus, is a chronic multisystemic and autoimmune disease that, mainly affects women of childbearing age. The clinical picture may have symptoms such as, skin rashes, arthritis, serositis, vasculitis and renal, hematologic, neurologic, pulmonary, and cardiac manifestations [1,2]. It is important to consider that, the occurrence of this disease in women of childbearing age is decisive for the pregnancy to be possible, achieving successful obstetric resolutions in most cases, while still being considered a high-risk situation [1,2].

On the other hand, pregnancy can trigger the occurrence or to influence the degree of clinical manifestation of systemic lupus erythematosus, affecting gestation in the same way. Different studies have shown, the risk of onset ranges between 25% and 65% during pregnancy, with a high rate of complications, including preeclampsia, pregnancy loss, and intrauterine growth retardation, in contrast to the rest of the population [3,4]. The most common complication is preterm delivery, which can occur in approximately 33% of patients [5].

Neonatal lupus is a rare disorder with an incidence of 1:10,000 - 1:20,000 newborns, mainly in the female sex, bring about by the transplacental passage of maternal anti-SSA / Ro and / or anti-SSB / La autoantibodies, whose manifestation is generally in the second trimester of gestation, that causing cutaneous and hematological alterations mostly [6,7,8].

Additionally, the most serious complication of complete congenital heart block in neonatal lupus, has an incidence of 1-2% in newborns of mothers with SSA or SSB antibodies [1,2,6,7], associated with 20% fetal mortality [9]. Therefore, complete congenital cardiac block is produced by a fetal lesion of the cardiac conduction tissue, causing an alteration in the transmission of atrioventricular impulses [10,11]. The conduction system, remains normal until the existence of an inflammatory reaction and irreversible fibrosis, due to the existence of maternal anti-SSA / Ro and / or anti-SSB / La antibodies [12]. The aim of this paper is to describe a case of neonatal lupus and complete atrioventricular block in Mexico.

2. PRESENTATION OF CASE

A 38 year old pregnant, 28 + 6 weeks gestational age. She had 4 pregnancies of which, 2 lived and one of the births was by caesarean section. She did not have allergies and drugs addiction. The patient goes to the high-risk pregnancy for surveillance and control of pregnancy, and systemic lupus erythematosus, which was diagnosed six years ago and she received hydroxychloroquine and prednisone treatment, which was suspended eight months prior to pregnancy. The first prenatal visit was at 20 weeks gestational age, with folic acid and ferrous fumarate intake. Starting treatment with hydroxychloroquine (200 mg / 24 h) and prednisone (5 mg / 24 h). There were no apparent complications.

Ultrasound examination showed, a single viable fetal age of 28 + 6 weeks of gestational age; estimated fetal weight of 1.296 g at the 52nd percentile; normoinserted placenta compatible with maturity grade I - II of Grannum; three-vessel umbilical cord; 9.7cm amniotic fluid with single larger bag; and amniotic fluid index of 30 cm, which corresponded to polyhydramnios. The fetal echocardiogram displayed situs solitus, 45 º cardiac axis, normal four chamber section, atrioventricular and ventriculoarterial agreement, and normal valve insertion. In conclusion, a female fetus with morphology within normality, polyhydramnios and fetal heart rate with persistent bradycardia of 51 beats per minute (Fig. 1a). For what it was done a fetal echocardiograph, confirming the diagnosis of

complete atrioventricular block, by fetal P-R interval of 1,222 milliseconds (Fig. 1b) and there were not organic and structural alterations were observed at the cardiac level.

The immunological panel indicate, negative for antibodies: anticardiolipin IgG (3.22 GPL / mL); anticardiolipin IgM (2.0 MPL / mL); anti-La negative (6.45 U / mL). Anti-Ro antibodies were positive (147.62 UR / mL). Blood chemistry, hematic biometry, and general urinalysis were found to be within normal limits. Therefore, the diagnosis of pregnancy of 28 + 6 weeks of gestation, systemic lupus erythematosus and third degree congenital atrioventricular block, treatment with dexamethasone (4 mg / 24 h) was began orally, and weekly monitoring.

At week 33 of gestational age, the patient went to the obstetric emergency department due to colicky pain in the hypogastrium, radiating to the lumbar region. Upon admission, the cervix was dilated by four centimeters, and 80% effacement with Lee's +1 station product. She was admitted

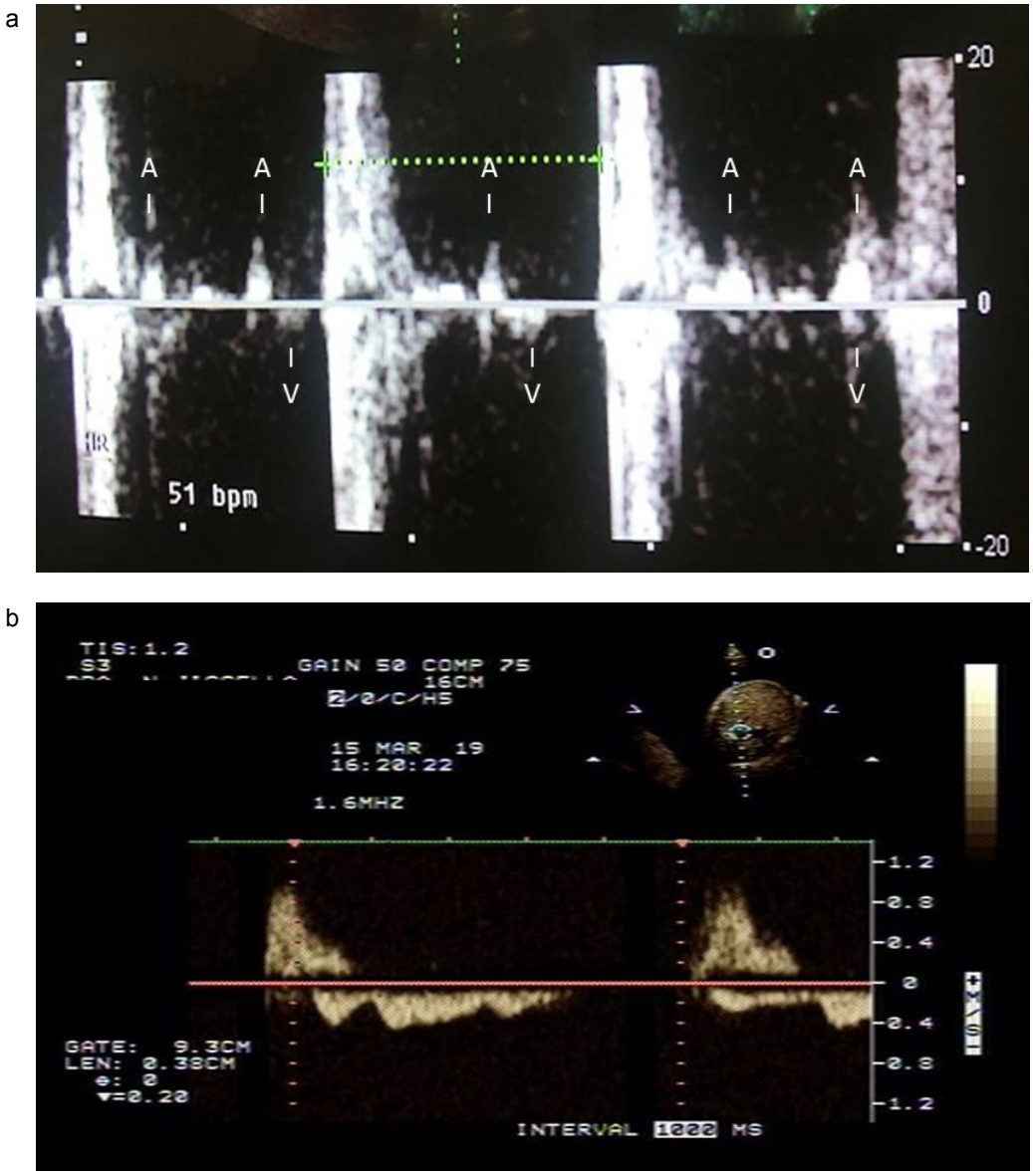

Fig. 1. Pulsed-wave Doppler US with a fetal heart rate of 51 beats per minute; A, atrial; V, ventricular. (a); fetal P-R interval of 1,222 milliseconds confirms the diagnosis of complete congenital atrioventricular block (b).

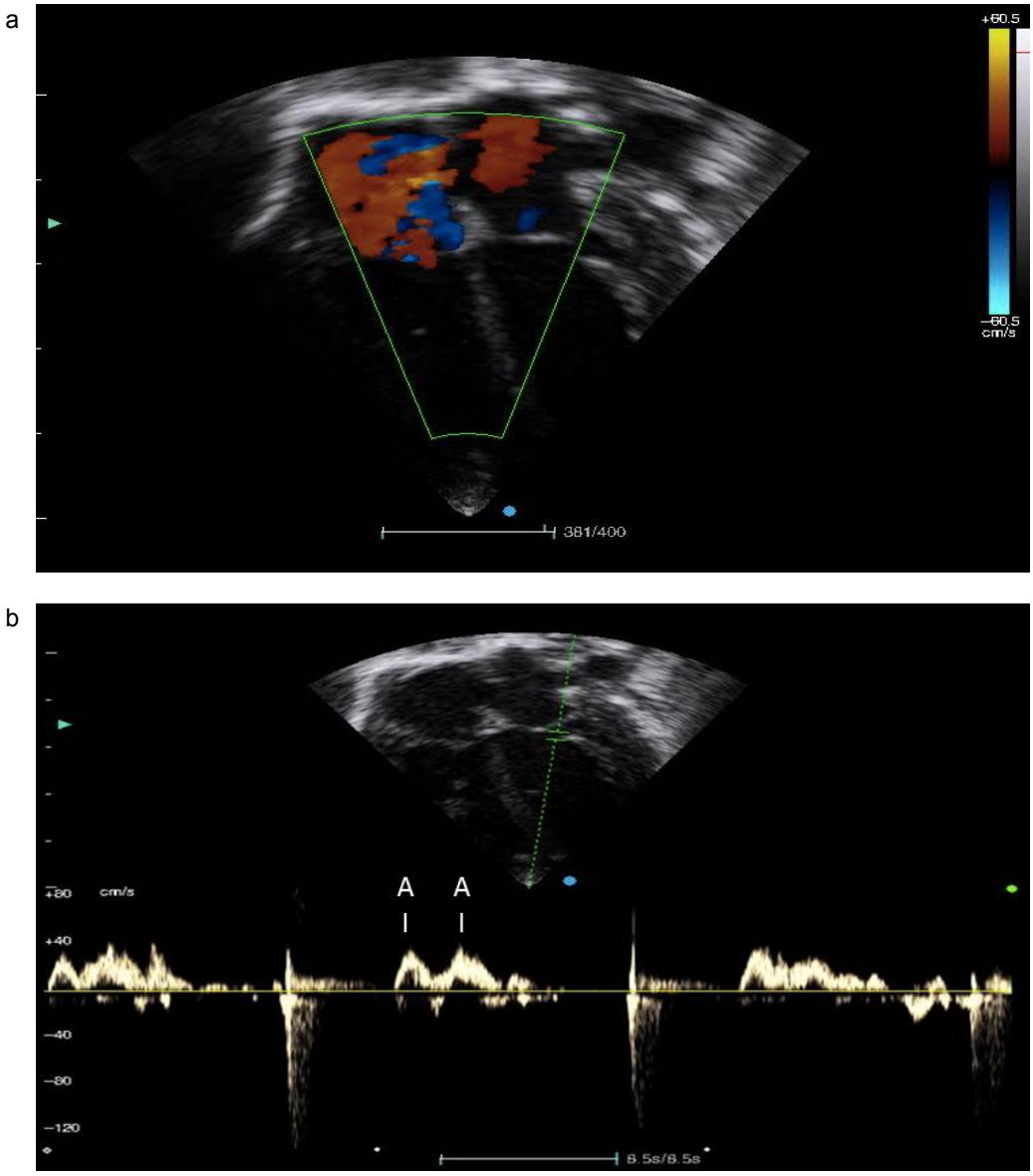

Fig. 2. Fetal echocardiography, with evidence of four cardiac chambers without observed structural alterations (a); the newborn's PR interval of 8,500 milliseconds confirms the diagnosis of complete congenital atrioventricular block; A, atrial. (b).

to the tochosurgery area for fetal surveillance, with no indication to uterine inhibition. She presented spontaneous rupture of the membranes, with vaginal obstetric resolution six hours after admission. Alive newborn was obtained, female, weight 1,990 g, height 43 cm, and APGAR 8-9. Echocardiography of the newborn was performed, it did not have structural abnormalities (Fig. 2a), corroborating third degree congenital ventricular atrium block with a PR interval of 8,500 milliseconds (Fig. 2b). In the first 24 hours, the newborn showed respiratory distress and hypotension, hence, it was initiated invasive mechanical ventilation and she sent to a third level pediatric unit. An evaluation was carried out and it was decided to implant a programmed ventricular unicameral epicardial pacemaker with a heart rate of 120 beats per minute and a threshold of 0.9. The control echocardiogram showed a unicameral pacemaker with ventricular demand, with a structurally healthy heart and adequate

biventricular function. The evolution of the newborn until the last report has been satisfactory.

3. DISCUSSION

Systemic lupus erythematosus is a multisystemic, inflammatory, chronic, autoimmune disease of unknown etiology, which is more frequent in women of childbearing age [13], so it is common for a pregnancy to occur [14]. Pregnancy under these conditions has a high risk, due to complications such as, preeclampsia, premature delivery, pregnancy loss, and intrauterine growth restriction [1]. Preterm delivery is the most frequent adverse outcome, occurring in almost 50% of pregnancies [15] coinciding with this case report.

Systemic lupus erythematosus, increases the risk of neonatal lupus, being a temporary condition (6-8 months after birth) [15], and characterized by different clinical manifestations such as skin rash, hematological and / or alterations. In addition, liver diseases which are usually transient, however, the most serious condition is congenital atrioventricular block, which may be permanent [16,17] as it was in the presented case.

The pregnancies exposed to anti-Ro and anti-La antibodies increased the risk to develop lesions (fibrosis) in the developing fetal cardiac conduction pathway, which can lead to permanent damage. The incidence of congenital atrioventricular block is estimated at 2% of carriers of these antibodies, with recurrence rates between 16-20% after the first event. Congenital atrioventricular block is associated with fetal mortality by more than 20%. It estimated that nearly 70% of newborns with this condition will require the insertion of a pacemaker [14]. In the reported clinical case, the newborn required a pacemaker.

The diagnosis of congenital atrioventricular block made with ultrasound measurement of the interval between the onset of atrial contraction (P wave of the ECG) and the onset of ventricular contraction (R wave of the ECG), with normal values being 90-150 milliseconds [14]. This case presented the PR interval of 1,222 milliseconds and positive anti-Ro antibodies.

The two dimensional echocardiography could identify anatomical malformations and assess ventricular systolic function. The M mode assesses cardiac function by placing it on a longitudinal axis of the heart, passing through the atrium, ventricle, and valves; in complete atrioventricular block, AV dissociation is observed with an atrial beat at a normal or high rate, and a regular ventricular beat at low rates. Pulsed Doppler assesses cardiac function showing the fast-flow mitral valve that is the hallmark of atrial contraction; slow flow (ventricular bradycardia) is observed at the outlet of the aorta. The atrium exhibits a regular contraction; if it is very rapid or irregular, it suggests an atrial tachyarrhythmia associated with a complete block. The atrial rate has been described to between 96 to 400 beats per minute and the ventricular rate between 40 to 80 beats per minute [18].

The management protocols and follow up were weekly, in order, to identify and prevent fetal complications. In addition, maternal administration of fluorinated corticosteroids and beta agonists has demonstrated fetal survival benefits, with dexamethasone (4-6 mg / 24 h) being the usual treatment [15], as it was administered to the patient in this case report.

Prevention strategies and treatment options in congenital atrium ventricular block are under evaluation yet. However, a retrospective case control study, it showed a decrease in its frequency with fetuses exposed to hydroxychloroquine [16]. In this case, the suspension of treatment for eight months was a risk factor. Several studies suggest that hydroxychloroquine may decrease the probability of congenital atrioventricular block in fetuses at risk of neonatal lupus [19,20], that is, in fetuses with positive anti-Ro / La antibodies or mothers that have this disease.

The plasmapheresis and intravenous gamma globulin, are prevention and treatment alternatives that they have the purpose to reduce maternal autoimmune antibody levels and lower placental transmission. Treatment with plasmapheresis in anti-SSA / SSB antibody-positive women prior pregnancy has shown that it reduces the risk of complete atrioventricular block. The administration of intravenous gamma globulin has not demonstrated conclusively therapeutic efficacy in complete atrioventricular block [18].

A recent alternative for the treatment of complete atrioventricular block is the percutaneous implantation of a micro or miniaturized

pacemaker, which regulates the heart rhythm between 100-110 beats per minute. Minimally invasive pericardial pacemakers undoubtedly represent a viable option for the correction of the complete atrioventricular block in the fetus and newborn [18].

4. CONCLUSION

The paper has showed the central importance of Neonatal Lupus due to its strangeness. The imaging findings and immunological panel enhance the understanding of a complete and adequate evaluation of the fetus when his mother has systemic lupus erythematosus. Finally, it is suggested to continue with this research to provide alternatives that improve maternal and perinatal health.

CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this case report and accompanying images.

ETHICAL APPROVAL

The research work was examined and approved by the hospital research and ethics committee.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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