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Case Series

Paediatrics Section

Neonatal Sequelae in Association with Maternal Autoantibodies: A Series of Three Cases

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ABSTRACT

Neonates born to mothers with autoantibody-associated syndromes may develop clinical manifestations due to transplacental transfer of maternal antibodies. These include Congenital Heart Block (CHB), cutaneous lesions, haematological abnormalities, and hepatic dysfunction. CHB remains the most serious and potentially life-threatening manifestation. The present study is a series of three neonates born to mothers with anti-Ro/SSA, anti-La/SSB, and Antiphospholipid Syndrome (APS). The clinical spectrum ranged from second-degree atrioventricular block with a structural cardiac defect to complete CHB requiring cardiology management, as well as a neonate without cardiac involvement. Growth parameters varied from Small for Gestational Age (SGA) to Appropriate for Gestational Age (AGA). This series illustrates the variability of cardiac and non-cardiac manifestations in neonates born to mothers with autoimmune conditions and emphasises the need for careful clinical monitoring and multidisciplinary care to optimise neonatal outcomes.

Keywords: Anti-Ro/SSA antibodies, Antiphospholipid syndrome, Congenital heart block, Foetal bradycardia, Neonatal lupus

INTRODUCTION

Autoantibody-associated syndromes in pregnancy represent a critical intersection between maternal autoimmune disease and neonatal morbidity. Although infrequent, these conditions are increasingly recognised due to heightened surveillance in antenatal care. Maternal anti-Ro/SSA and anti-La/SSB antibodies can traverse the placenta and give rise to neonatal sequelae [1-4]. Antiphospholipid syndrome (APS) is associated mainly with placental complications and adverse pregnancy outcomes [5]. Neonatal lupus presents with a spectrum of manifestations, including CHB, the most severe and life-threatening complication, along with cutaneous lesions, haematological abnormalities (such as anaemia and thrombocytopaenia), hepatic dysfunction, and neurological or gastrointestinal involvement [1,4,5]. Recent epidemiological data from multiple studies suggest these newborns are predisposed to prematurity and growth restriction [6-8], with rates of SGA significantly higher than the general population. Early detection through foetal echocardiography and multidisciplinary management are essential to mitigate risks and improve neonatal outcomes.

CASE SERIES

Case 1

A female neonate weighing 3.3 kg, born to a 28-year-old asymptomatic primigravida with no history of previous abortion or stillbirth, presented to the Department of Neonatology. The foetus was suspected to have CHB with a heart rate (HR) of 60/min at 35 weeks of gestation during a non-stress test. Maternal testing for anti-Ro/SSA and anti-La/SSB antibodies was performed antenatally at 35 weeks of gestation and were positive. Baby was delivered by Lower Segment Caesarean Section (LSCS) at 37 weeks of gestation in view of foetal bradycardia. The baby cried soon after birth, was pink in colour, and had good tone and reflexes. Length was 49 cm and head circumference 33 cm. In view of an HR of 52/min, the baby was admitted to the NICU. She was active, euthermic and was accepting feeds and had no skin rashes or petechiae. Laboratory investigations were normal. Her electrocardiogram (ECG) revealed a 2:1 second-degree atrioventricular block. Clinical examination revealed grade 2/6 systolic murmur. Echo showed 8 mm ostium secundum Atrial Septal Defect (ASD), with left to right shunt. No images available as per institutional policy (verbal consent obtained but no records retained). During the NICU stay, the neonate remained haemodynamically stable with persistent but well-tolerated bradycardia. She maintained adequate oxygen saturation in room air, accepted direct breastfeeding well, and showed satisfactory urine output and activity. There were no episodes of apnoea, cyanosis, worsening bradycardia, or clinical features of congestive heart failure. Laboratory investigations remained within normal limits throughout hospitalisation. The baby was discharged in stable condition on exclusive breastfeeding with advice for regular paediatric cardiology follow-up, serial ECG and echocardiographic evaluation, and monitoring for progression of atrioventricular block or development of heart failure. Based on the clinical findings, electrocardiographic features, echocardiographic evaluation, and positive maternal anti-Ro/SSA and anti-La/SSB antibodies, the neonate was diagnosed with neonatal lupus presenting with second-degree (2:1) atrioventricular block and ostium secundum atrial septal defect.

Case 2

A 2.2-kg female neonate was born to a 31-year-old mother with a history of four previous missed abortions. The mother, who had not been evaluated antenatally, was referred for safe confinement. Antenatal foetal monitoring revealed persistent bradycardia with HR of 40-45 beats per minute. The baby was delivered by LSCS at 36 weeks of gestation and cried soon after birth. Baby had good tone and reflexes. The neonate was admitted to the NICU with persistent bradycardia, with a HR of 45/min. The baby's length was 44 cm and head circumference was 34 cm. The birth weight and length

were below the third percentile when plotted on INTERGROWTH-21 charts [9]. In view of respiratory distress with an SpO_2 of 92%, oxygen was administered via an oxygen hood along with Intravenous (i.v.) fluids. ECG showed third-degree complete heart block (the ECG tracing was unavailable). Respiratory distress gradually improved by day 3 of the NICU stay. The i.v. fluids were discontinued, and feeds with expressed breast milk were initiated, followed later by direct breastfeeding. Baby continued to feed well. Laboratory investigations were normal. There were no skin rashes or petechiae. Echo showed structurally normal heart. Mother was postnatally evaluated and was found to have APS. The neonate remained haemodynamically stable and was managed conservatively with close monitoring; permanent pacemaker implantation was deferred, with follow-up arranged with paediatric cardiology. At the last available follow-up at three months of age, the neonate remained haemodynamically stable and was under regular paediatric cardiology follow-up without requirement for permanent pacemaker implantation.

Case 3

A 2.2-kg female neonate was born to a 28-year-old mother. She had not been diagnosed previously despite a history of four pregnancy losses. Please remove 'primigravida', as it conflicts with the history of four pregnancy losses. She had APS with positive IgG and IgM anticardiolipin antibodies. She was receiving oral aspirin and injectable heparin from 34 weeks of gestation. The baby was delivered at 36 weeks of gestation by LSCS and cried soon after birth. Baby was euthermic, pink in colour and had good tone and reflex. Her vitals were stable; length was 49 cm and head circumference 33 cm. Birth weight of 2.2 kg at 36 weeks corresponded to an AGA centile on INTERGROWTH-21 newborn standards [9]. Baby had physiological jaundice. Her laboratory investigations, echocardiogram, and ECG were normal. The baby was exclusively breastfed and continued to feed well. Baby had no skin rashes or other clinical complications. The neonate remained clinically stable throughout the hospital stay, tolerated exclusive breastfeeding well, and required only routine neonatal care. Physiological jaundice resolved with standard management, and no cardiac, dermatological, haematological, or neurological complications were observed. The infant was discharged in stable condition on exclusive breastfeeding with advice for routine paediatric follow-up. Long-term follow-up and serial immunological assessments could not be performed uniformly in all cases because of retrospective data retrieval, irregular follow-up, and socioeconomic and resource-related constraints.

The clinical profile, maternal characteristics, neonatal findings, ECG and echocardiographic findings, and short-term outcomes of all three cases are summarised in [Table/Fig-1].

DISCUSSION

This retrospective, single-centre series of three neonates highlights the diverse spectrum of neonatal manifestations associated with maternal autoantibody syndromes, ranging from asymptomatic presentation to second-degree and complete CHB. The common manifestations in neonates born to mothers with autoantibody-associated syndromes include cutaneous lesions, CHB, haematological abnormalities, hepatic dysfunction, and, less commonly, neurological or gastrointestinal involvement. In our series, two of the three neonates developed CHB. Maternal anti-Ro/SSA and anti-La/SSB antibodies are well-established causes of neonatal lupus and foetal CHB. These antibodies cross the placenta after approximately 16 weeks of gestation and bind to apoptotic foetal cardiomyocytes, resulting in exposure of Ro/La antigens on the cell surface. This initiates macrophage activation, complement-mediated inflammation, and cytokine release, particularly Tumour Necrosis Factor-α (TNF-α) and Transforming Growth Factor-β (TGF-β), leading to fibrosis and calcification of the atrioventricular node [10-12]. In addition, anti-Ro/SSA antibodies may directly inhibit foetal L-type and T-type calcium channels, producing early conduction abnormalities before irreversible fibrosis develops. These mechanisms explain the characteristic and often permanent conduction defects observed in neonatal lupus [1,12-14].

In contrast, APLA syndrome primarily affects pregnancy through placental vascular thrombosis, complement activation, endothelial dysfunction, and impaired trophoblast invasion, resulting in recurrent pregnancy loss, foetal growth restriction, placental insufficiency, and preterm birth rather than direct injury to the foetal cardiac conduction system [2,15]. Therefore, CHB occurring in association with isolated maternal APLA is distinctly uncommon, and its pathophysiological basis remains uncertain. Proposed mechanisms include placental ischaemia causing secondary foetal myocardial injury or immune-mediated inflammatory processes; however, none have been conclusively demonstrated.

The second case is noteworthy because the mother had APS with four previous pregnancy losses and delivered a neonate with complete CHB. Similar isolated cases have been described in the literature, including the report by Abu-Ras R et al., suggesting that this rare association may occur [8]. Nevertheless, unlike anti-Ro/SSA-mediated neonatal lupus, a definite causal relationship between APS and foetal conduction system disease has not been established. Furthermore, anti-Ro/SSA and anti-La/SSB antibodies frequently co-exist with other autoimmune disorders,

Case	Chief complaint/diagnosis	Maternal diagnosis	Maternal therapy	GA at delivery	Birth weight	Neonatal findings	ECG/Echo	Outcome
1	Persistent foetal and neonatal bradycardia due to second-degree (2:1) congenital atrioventricular block	Anti-Ro/SSA, Anti-La/SSB positive	None	37 wk	3.3 kg	HR 52/min, grade 2/6 murmur	2:1 AV block, ASD	Discharged in stable condition. Cardiology follow-up advised.
2	Persistent foetal bradycardia with respiratory distress due to congenital complete heart block	APS, H/O 4 abortions	None	36 wk	2.2 kg (SGA)	Respiratory distress, HR 45/min	Complete CHB, structurally normal heart	Discharged with advice for paediatric cardiology evaluation for possible pacing
3	Neonate born to a mother with APS; physiological jaundice with no cardiac involvement	APS (IgG, IgM +)	Aspirin + Heparin	36 wk	2.2 kg (AGA)	Physiological jaundice only	Normal	Discharged in stable condition on exclusive breastfeeding

[Table/Fig-1]: Clinical characteristics, maternal antibody profile, neonatal findings, and outcomes of the three cases included in the series.
CHB: Congenital heart block; ASD: Atrial septal defect; AGA: Appropriate for gestational age; SGA: Small for gestational age; HR: Heart rate.

including anti-phospholipid syndrome. As maternal anti-Ro/SSA and anti-La/SSB antibodies were not assessed in Case 2, occult co-existence of these antibodies cannot be excluded and remains an important limitation when interpreting this association. Consequently, the present findings should be interpreted cautiously and viewed as adding to the limited body of literature rather than establishing APS as an independent cause of CHB [8,12,14,16,17].

In cases 1 and 3, the neonates were AGA, whereas the neonate in case 2 was SGA, consistent with the recognised association between maternal autoimmune disease and impaired foetal growth [9,18]. Two neonates were delivered late preterm at 36 weeks, while one was delivered at early term at 37 weeks. Case 3 developed only physiological jaundice, which resolved with standard neonatal care, whereas no dermatological, haematological, gastrointestinal, or neurological manifestations were observed in any of the neonates. Laboratory investigations remained within normal limits in all three cases.

Management of neonatal lupus requires early recognition, multidisciplinary collaboration, and careful cardiac surveillance. Complete CHB often requires permanent pacemaker implantation depending on clinical status, whereas second-degree atrioventricular block may be managed conservatively with close monitoring and serial cardiac evaluation [11,12]. Recent evidence suggests that maternal hydroxychloroquine therapy during pregnancy may reduce the recurrence and severity of cardiac manifestations in pregnancies complicated by anti-Ro/SSA antibodies [14,15]. Long-term paediatric follow-up remains essential because maternally acquired autoantibodies usually clear over the first 6-12 months of life, although irreversible cardiac fibrosis persists in affected infants.

The present study has several limitations. It represents a small retrospective case series from a single centre, limiting generalisability. Long-term follow-up data, serial maternal and neonatal antibody titres, and intervention outcomes were not uniformly available because of retrospective data retrieval, irregular follow-up, and socioeconomic and resource-related constraints. In addition, maternal anti-Ro/SSA and anti-La/SSB antibody status was unavailable in case 2, precluding definitive attribution of CHB solely to APS. Despite these limitations, this case series contributes to the limited published literature on neonatal manifestations associated with maternal autoimmune disorders and emphasises the importance of antenatal surveillance, foetal echocardiography, multidisciplinary neonatal care, and continued postnatal follow-up.

CONCLUSION(S)

This case series highlights the diverse neonatal manifestations associated with maternal autoantibody syndromes, ranging from asymptomatic presentation to CHB with structural cardiac abnormalities. While anti-Ro/SSA and anti-La/SSB antibodies remain the principal cause of neonatal CHB, our series also describes the rare occurrence of CHB in a neonate born to a mother with APS. Early antenatal surveillance, foetal cardiac monitoring, and multidisciplinary neonatal follow-up remain essential for improving neonatal outcomes.

Ethical Approval: This study protocol underwent ethical screening by the Medical Research Board (MRB) and was formally exempted from further Institutional Ethics Committee (IEC) review under the institutional policy of Dhanalakshmi Srinivasan University (Reference No. SMCH/MRB/2026/07/001), as it was a retrospective observational study of de-identified clinical records presenting minimal risk.

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