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Case Report

A Neonate with Multiple Causes of Apparent Life-Threatening Event (ALTE): A Case Report

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ABSTRACT

Apparent life-threatening event (ALTE) is a major cause of neonatal emergency visits. In this paper, we presented the case of a three-day-old neonate with multiple indications of ALTE. The patient was referred to the emergency department due to a cyanotic attack before admission. The neonate woke a few hours after breastfeeding and turned blue while crying, which was resolved spontaneously within a few seconds. During ALTE, moderate hypotonia was observed in the neonate, while the physical examination was not remarkable. Primary sepsis workup and electrolyte measurement were performed, the results of which were mostly within the normal limits, with the exception of low levels of calcium, magnesium, and vitamin D. Moreover, the infant had primary hypothyroidism and received treatment with intravenous antibiotics initially accompanied by magnesium and calcium for a few days. Treatment continued with vitamin D and levothyroxine, and the neonate was discharged from the hospital in good overall condition without further ALTE episodes. All infants must be evaluated in terms of common indications of ALTE, such as electrolyte imbalance. In addition, other probable causes of ALTE should be investigated through obtaining a detailed medical history and proper physical examination. According to the literature, neonates are likely to present with more than one manifestation of ALTE.

Keywords: Hypocalcemia , Hypothyroidism, Apparent Life-Threatening Event, Newborn

Introduction

Apparent life-threatening event (ALTE) is a major cause of neonatal emergency visits (1), which is defined as episodes of apnea, color change, altered muscle tone, choking or gagging; these episodes might appear highly alarming to the observer (2). Various etiologies have been proposed for ALTE, including gastrointestinal disorders, electrolyte imbalance, infectious diseases, metabolic disorders, and central nervous system involvement (2-5). In this paper, we presented the case of a neonate with multiple causes of ALTE.

Case report

A three-day-old male neonate was referred to the emergency department due to a cyanotic attack before admission. At midnight (nearly two hours after breastfeeding), the infant woke and turned blue while crying, which was resolved spontaneously within a few seconds. During ALTE, moderate hypotonia was observed in the neonate without choking, gasping or apnea. He was in the prone position in his mother's lap, and the parents stated that since the ALTE episode was quite brief, they did not take any action to terminate it. Neonate had no history of regurgitation, fever, recent upper respiratory tract infection, and close contact with ill individuals. Moreover, the parents reported no trauma, and the cyanotic attack was not repeated.

The neonate had been born via cesarean section due to cephalopelvic disproportion after the spontaneous, uneventful pregnancy of a nulliparous woman (age: 26 years), which was accompanied by no adverse events during or after delivery. Additionally, parents of the neonate were not consanguineous, and the mother had received levothyroxine therapy for hypothyroidism during the past 10 years.

At the emergency department, the infant was alert and in good condition, with pink skin color, spontaneous breathing, and 98% SPO_2 while breathing in room air. Therefore, he was admitted in the neonatal intensive care unit in order to receive further evaluation. Results of the physical examination were as follows: respiratory rate: 38 breath/min, heart rate: 110 beats/min, blood pressure: 64/51 mmHg, and axillary temperature: 37°C. Other indices of the infant were determined,

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as follows: body weight: 3.6 kg (z-score: 0.5), head circumference: 37 cm (z-score: 2), and length: 51 cm (z-score: zero). With the exception of a 2/6 systolic murmur with maximum intensity in the left sternal border during heart auscultation, physical exami-nation of the neonate was not remarkable.

Results

Primary laboratory evaluation of the neonate consisted of blood culture, complete blood cell count, and measurement of C-reactive protein, blood glucose, routine electrolytes (natrium, potassium, calcium, magnesium, and phosphorus), blood urea nitrogen, creatinine, and arterial blood gas.

According to our findings, almost all the laboratory results of the neonate were within normal limits, with the exception of low calcium and magnesium levels (Table 1). On the other hand, electrocardiogram showed prolonged QTc (0.55), and a secundum atrial septal defect with good cardiac function was detected in the echocardiogram. However, the defect was insignificant and required no intervention.

Table 1. Laboratory findings on admission

Parameters	Result	Parameters	Result
CBC		Biochemical evaluation	
White blood cell	6480/mm^3	Blood glucose	66 mg/dl
Neutrophil	44%	Na	145 mmol/L
Lymphocyte	31%	K	4.2 mmol/L
Monocyte	16%	BUN	6 mg/dl
Hemoglobin	14.2 g/dl	Creatinine	0.9 mg/dl
Platelet	361000/mm^3	Calcium	7 mg/dl*
		Phosphorus	6 mg/dl
CRP	0.2 mg/dl	Magnesium	0.6 mg/dl*
		ABG	
		PH	7.34
		HCO3$^-$	17 mEq/L
		PCO2	30 mmHg

CBC: complete blood count ; WBC: white blood cell; CRP: C-reactive protein; ABG: arterial blood gas; BUN: blood urea nitrogen; K: Kalium (Potassium); Na: Natrium
*abnormal measures

In this study, we mostly investigated hypocalcemia, which was indicative of normal parathyroid hormone level and low vitamin D concentration (Table 2). Moreover, thyroid function test of the infant was extremely abnormal, compatible with primary hypothyroidism (Table 2). Thyroid scan with technetium-99mm revealed no activity in the anatomical location of the thyroid gland (Figure 1).

In the chest roentgenogram, thymus shadow was relatively small, while the lung parenchyma and heart size were normal. Additionally, knee X-ray estimated the bone age of the patient at nearly 36 weeks with no evidence of rickets. Brain ultrasound, which was performed by a pediatric radiologist, and electroencephalography were not remarkable.

Table 2. Complementary laboratory findings

Parameters	Reference values	Result
TSH (mIU/ml)	1.7-9.1	>100*
T3 (ng/dl)	100-740	90*
T4 (µg/dl)	11.8-22.6	3.2*
Thyroglobulin (ng/ml)	2-50	5
PTH (pg/ml)	15-65	49
25-OH vitamin D (ng/ml)	30-50	3.5*

PTH: parathyroid hormone; T3: triiodothyronine; T4: thyroxine; TSH: thyroid-stimulating hormone
*abnormal results

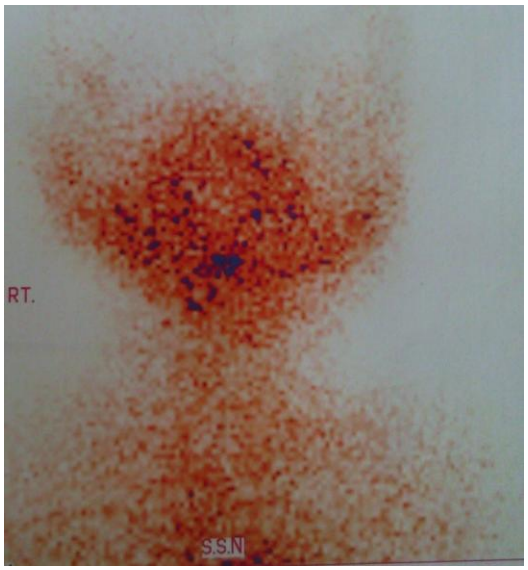

Figure1: thyroid scan with technrtiume 99 was perform wich was revealed no activity in the anatomicalsite of the thyroid gland.

Initially, the infant received treatment with intravenous antibiotics, and the therapy continued with magnesium, calcium, and supplementary vitamin D for a few days.

Afterwards, levothyroxine treatment was commenced at an appropriate dosage, and plasma levels of magnesium and calcium returned to normal. As such, intravenous administration of calcium and magnesium discontinued gradually within a few days, as well as the antibiotics due to negative blood culture.

During the admission, the neonate had good overall condition, and cyanosis or apnea did not occur again. Therefore, he was discharged from the hospital and prescribed with levothyroxine and vitamin D drops.

Discussion

In the literature, various etiologies have been

proposed for ALTE (2, 3, 5-8), which are mainly classified as infectious diseases, metabolic disorders, electrolyte imbalance, neurological dysfunction, gastroesophageal and cardiovascular abnormalities, and drugs in some cases.

In the present article, we described the case of a neonate with multiple indications of ALTE. Since hypocalcemia is a common cause of ALTE, measurement of serum calcium concentration is highly recommended in the evaluation of these patients (9, 10).

Hypocalcemia and hypovitaminosis D have been frequently reported in cultures with special clothing. In a study, Waseem et al. (11) presented the case of a nine-month-old female infant with ALTE secondary to hypocalcemia and rickets. Furthermore, Mosalli et al. (12) described the case of a 44-day-old neonate with ALTE due to hypocalcemia and vitamin D deficiency. The aforementioned studies were conducted on Arabian patients with inadequate sun exposure of mothers and infants. On the other hand, Davies and Gupta (4) reported the case of a breast-fed infant with hypocalcemia, which occurred due to maternal vitamin D deficiency. Investigation of these patients is critical, and in case of abnormal results, treatment of the mother and neonate with complementary vitamin D should be prioritized.Hypomagnesemia is considered a rare cause of ALTE, which should be evaluated in these patients (2).

Teran-Perez et al. reported that nearly half of the studied infants (43%) with congenital hypothyroidism had central sleep apnea, which improved with hormonal replacement therapy (13). Furthermore, Romaneli et al. (6) assessed one patient with ALTE and hypothyroidism. In the current study, hypothyroidism could not be considered as a definite cause of ALTE. Although most neonates in Iran are screened for congenital hypothyroidism on days 3-5 after birth, in cases like our patient, symptoms may manifest before neonatal screening or preparation of results. As such, performing the thyroid function test on neonates with a family history of thyroid disorders and ALTE is of paramount importance.

Conclusion

For infants presenting with ALTE, it is recommended that in addition to the evaluation of common indications other probable causes of ALTE be investigated by obtaining a detailed medical history and conducting physical examination.

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Conflicts of interests

No conflicts of intrests

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