Case Report

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Efficacy of Tranexamic Acid in Severe Pulmonary Hemorrhage in a Asphyctic Neonate

Emrah Can MD[1,*], Sahin Hamilcikan MD[1]

1. Department of Neonatology, Bağcılar Training and Research Hospital, Istanbul, Turkey
*Corresponding author: Emrah Can, MD, Department of Neonatology, Bağcılar Training and Research Hospital , Istanbul, Turkey. E-mail: canemrahcan@yahoo.com.

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Abstract
Pulmonary hemorrhage (PH) is rarely seen in neonates and generally occurs based on the pathological process as perinatal asphyxia. Additionally, hypothermia treatment can be associated with thrombocytopenia and hemorrhage in term infants. Generally, PH is severe and persistant hemorrhage can related to neonatal mortality. Sometimes, supportive therapies such as positive-end expiratory pressure (PEEP), antibiotherapy, and fresh frozen plasma may not affect PE in neonates. Tranexamic acid (TXA) is an antifibrinolytic agent that can reduce bleeding and decrease blood transfusions in pediatric surgery. In this study, a 5-year-old girl was reorted that who was presented with a 4 month history of pelvic and right lower limb pain and limping to the pediatric outpatient clinic in August 2016 at Shahid sadoughi Hospital,Yazd,Iran. In this case report, a severe PH was presented and treated with TXA. PH was reduced after administering first dose of TXA and full recovery was achieved on 3th day of therapy. No bacterial agent was observed in hemoculture result during first 72 hours and hemocoagulation was not affected with TXA administration.
Key words: Hemorrhage, Neonate, Tranexamic Acid

Introduction

Neonatal encephalopathy is a heterogeneous clinical syndrome characterized by respiratory depression and hypotony, manifested by convulsions, unconsciousness, or early neonatal period, occurring at and after gestational week 35 (1, 2). Incidence varies between 2 to 9 in 1000 live births in different series, depending on the identified condition (3). Hypoxia and acidosis may affect all organ systems, especially the brain. The respiratory system, the circulatory system, the gastrointestinal system, the central nervous system as well as the most frequently affected organ systems are emerging. Pulmonary hemorrhage (PH) developed in these cases, fluid resuscitation in the birth room and volume load resulting from increased anti diuretic hormone release, decreased production of clotting factors resulting from liver failure, increased thrombocytopenia due to increased cytokines response due to preexisting potential secretion of chorioamnionitis, or hypothermia may develop in association with each other. PH is defined by throwing out of bloody fluid from the upper respiratory region or the tracheal tube. PH is related to hemorrhage in different sites than lungs and contains a high mortality (4). Risk factors for PH include severe systemic illness, coagulopathy, and asphyxia. More than 80% of cases of serious PH occur before 72 hours of life with a median of 40 hours; however, some babies might present after 1 week of life (5). The tranexamic acid (TXA), could be a lysine analogue that blocks the conversion of plasminogen to plasmin, therefore decreasing fibrin clot breakdown and trauma (6). TXA could be a drug and is approved by the U.S.A. Food and Drug Administration for the treatment of hemorrhage in patients with hemophilia and in patients with severe menstruation (7). The potentials of TXA to decrease fibrinolysis and reduce blood transfusions have led to prophylactic, off-label use in

major surgical procedures in adults and kids (8-10). In this case report, severe PH was treated with tranexamic acid in an asphyxed term neonate.

Case report

A 31-year-old woman has delivered a term female infant with 40 weeks of gestational age. She was resuscitated in postnatal period. The infant weight was 4230 g, height 51cm, and head circumference 36 cm. Maternal antenatal history was not the risk factor for perinatal asphyxia. The case of Apgar scores were 3 point for 10 minutes and 4 for 15 minutes in postnatal life. In cord blood gas analysis, severe metabolic acidosis was detected (pH: 6.9, BE:-17). She was diagnosed with neonatal encephalopaty and underwent therapeutic hypothermia therapy. Therapeutic hypothermia was administered for 72 hours. There was severe PH inside the endotracheal tube on the 5th postnatal life. This case's anteroposterior chest graphy was shown ground glass appearance similar to respiratory distress syndrome (Figure 1). Hemorrhage was persisted despite 2 doses surfactan administration (©Survanta); therefore, fresh frozen plasma infusion and platelet transfusion were added to therapy. There was no sign of infections, metabolic, and hematologic disorders. No severe trombositopenia was seen in the hematologic test results. Peripherally blood smear evaluation was normal. The concentration of antithrombin III, fibrinogen, protein C, protein S, and factor V Leiden were normal and her parents' samples were also normal. Her mother did not have any trobocytopenia related disorder and no consanguinity was detected. Since PH was continued, we administered TXA. Before the treatment, written informed consent was obtained. We administered 10mg/kg/dose/ 2 hours via intravenous route for two days. Additionally, high PEEP via mechanically ventilation and other supported therapy were continued (cardiyocirculatory replacement therapy and monitorization). PH was reduced after administering first dose of TXA and full recovery was achieved on 3th day of therapy. No bacterial agent was observed in hemoculture result during first 72 hours and hemocoagulation was not affected with TXA administration.

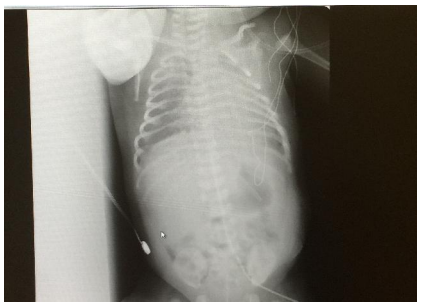

Figure 1. Chest graphy on the 5th day of life during gross PH

Discussion

TXA, a lysine analogue, is widely used to reduce blood loss in human body. Previous studies showed that TXA may be used for the prevention of bleeding associated with extracorporeal membrane oxygenation (ECMO) during surgery for congenital diaphragmatic hernia repair for term neonates. According to previous studies, TXA can reduce blood loss and hemorrhagic complications and prevent perioperative bleeding associated with cardiac surgery; however, its dosing regimen is variable and the ideal dose-response is not established yet (11-12). Optimal treatment of PH includes preservation of the hemodynamics of the baby, blood product transfusion, aspiration, oxygen support and mechanical ventilation if necessary. Mechanical ventilation with high PEEP, mean airway pressure, and high frequency oscillatory ventilation treatment are other forms of treatment. It should also be corrected if there are coagulation abnormalities. When blood loss is large, promotion of blood transfusion may be needed to maintain adequate circulating blood volume. Surfactan administration can be helpful due to surfactant inactivation after the hemorrrage. In our case, we did not have

any supported circulation because of normally blood pressure and high PEEP ventilation for tamponade PH. Surfactan therapy was administered 2 times. Thrombocyte and fresh frosen plasma were recurrently used but PH was continued. Other body areas did not show significant bleeding. A previous study on paediatric cardiac surgery demonstrated elevated sensitivity to convulsion after TCA treatment (13). We did not observe any adverse effect in the neonate during the treatment. In nutshell, we suggested TXA treatment for life-threatening and severe PH in term asphyxiated newborns.

Conclusion

Tranexamic acid (TXA) is an antifibrinolytic agent that can reduce bleeding and decrease blood transfusions in pediatric surgery. In this case report, a severe PH was presented and treated with tranexamic acid.

Conflicts of interest

The authors declare no conflict of interest.

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