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CASE REPORT

Neonatal outcomes after oral administration of antenatal corticosteroid: A case report

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Abstract The use of antenatal corticosteroids is associated with reduction in morbidity and mortality rates in preterm delivery. A 34 year-old pregnant woman, gravida 2 para1, was planned for elective cesarean section at 36 weeks of gestation as ultrasound study showed intrauterine growth retardation. She has idiopathic thrombocytopenia and anemia, with suspected hypoplastic anemia. Due to mother's low platelet count, antenatal intramuscular corticosteroids injection was avoided. Instead, oral dexamethasone was given for fetal lung maturity. Baby's Apgar score at 1-min and 5-min was 9 and 10, respectively. The baby girl did not develop respiratory distress syndrome. She had mild transient tachypnea of newborn that needed only mild respiratory support with nasal cannula in room air.

1. Introduction

The antenatal maternal administration of corticosteroids has been known for years to reduce morbidity and mortality rates in preterm delivery. Risks of neonatal death and respiratory distress syndrome (RDS) are reduced by 31% and 44%, respectively, after a single course of antenatal corticosteroids. Furthermore, neonatal complications such as intraventricular hemorrhage, necrotising enterocolitis, and systemic infection within first 48 h of life are also reduced (Roberts and Dalziel, 2006; Miracle et al., 2008).

The Royal College of Obstetrics and Gynecology (RCOG) recommends antenatal corticosteroids to all women at risk of preterm birth up to 34 + 6 weeks of gestation, as well as to

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all women for whom an elective cesarean section is planned prior to 38 + 6 weeks of gestation. The most extensively studied regimens to prevent RDS are betamethasone 12 mg for two doses 24 h apart and dexamethasone 6 mg for four doses 12 h apart, both given intramuscularly (Royal College of Obstetricians and Gynaecologists, 2010).

Intramuscular route of administration of medications is contraindicated when there is an extremely elevated risk of bleeding (Surbek et al., 2012; Betamethasone, 2010). Although intravenous antenatal corticosteroids can be given, their clinical efficacy has not been studied, while the oral administration is relatively obsolete (Surbek et al., 2012). In the only randomized trial comparing antenatal intramuscular dexamethasone with oral dexamethasone, RDS rate was similar between the two groups, whereas higher rates of sepsis and intraventricular hemorrhage reported in infants of mothers who received oral dexamethasone (Egerman et al., 1998; Hodnett, 1999).

There are limited data about the optimum route of administration for antenatal corticosteroids, when intramuscular route is not favorable. This case report presents our experience with the use of antenatal oral dexamethasone for a woman with idiopathic thrombocytopenia (ITP) and the neonatal outcomes.

2. Ethical consideration

This is a retrospective case description report. A waiver of informed consent and ethical approval were obtained from Hamad Medical Research Center, Hamad Medical Corporation, Qatar.

3. Case description

3.1. Mother

A 34 year-old pregnant woman, presented to the emergency department with labor like pain at 35 + weeks of gestation. She is gravid 2 para 1 with previous uncomplicated normal vaginal delivery. She is a case of ITP and anemia, with suspected hypoplastic anemia, received blood transfusion during this pregnancy and currently on iron supplement, otherwise she is healthy. She denies smoking and alcohol intake. She was admitted to hospital as threatened preterm labor and to put her delivery plan.

Her recent anemia workup on admission showed low hemoglobin (Hgb) level (7.1 g/dl) and low platelet count (27×10^3/μl, platelet estimation in P.B smear 30×10^3/μl). The hematologist ordered 2 units of blood and IVIG at a dose of 0.5 g/kg/day for 4 days. Hemoglobin level after 6 h of transfusion increased initially to 8.3 g/dl; then dropped to 7.8 g/dl when rechecked again after IVIG completion, while platelet count remained around the same 22×10 * 3/μl. One day after, the day before delivery, Hgb 8.6 g/dl, platelet 25×10^3/μl with P.B smear 33×10^3/μl.

During current hospitalization, ultrasound with Doppler study showed a 5 weeks lag in growth with no growth in fetal abdominal circumference since last two weeks scan. Accordingly, diagnosis of intrauterine growth retardation (IUGR) was made.

The mother and family were counseled regarding mode of delivery and risk associated, with avoidance of operative vaginal delivery that is associated with increased hemorrhagic risk to fetus. They opted for an elective cesarean section, which was scheduled at 36 weeks of gestation.

No amniocentesis was done to check for fetal lung maturity as it is not part of the routine practice at our hospital. RCOG guideline recommends antenatal corticosteroids for preterm elective cesarean section. Dexamethasone tablets were administered orally instead of the intramuscular injection. The administered oral dose was 8 mg every 12 h for total of 4 doses, and the last dose was completed about 3:30 h before the surgery. The blood and blood products were transfused as per the hematologist orders.

3.2. Baby

A baby girl was born to a 34 year-old multigravida mother, with ITP and antenatal ultrasound that revealed IUGR. Baby was born at 36 weeks of gestation with weight 2235 g. The 1-min and 5-min Apgar scores were 9 and 10, respectively.

At age of 1-h, baby had mild grunting which was controlled with incubator care with supplemental oxygen 2 L/min for one hour in the postnatal ward. Again at age of 6-h, baby developed mild respiratory distress with mild grunting and retraction and was admitted to neonatal ward.

On examination in the neonatal intensive care unit (NICU), the baby was still grunting, and chest examination revealed equal air entry bilaterally, with mild subcostal retraction. Heart sounds were normal, without murmurs, and the remainders of systemic examinations were normal for her gestational age. Oxygen saturation in room air was 94–95%, while the respiratory rate 64/min, temperature 36.6 °C, heart rate 148/min, and blood pressure 65/35 mmHg. Baby was suspected to have Transient Tachypnea of Newborn (TTN) and kept under nasal cannula 2 L flow/min in room air for one day and gradually weaned and discontinued on the third day. Baby developed neonatal jaundice on the second day of life and needed phototherapy for two days. Baby's general condition improved on the second day and feeding was started and gradually increased to full feed by third day of life and the baby was discharged home on the fourth day of life. Her chest X-ray showed features suggestive of TTN and the complete blood counts and serum electrolytes were normal, and blood culture was negative (Table 1).

4. Discussion

This case report presents our experience with the use of antenatal oral dexamethasone for fetal lung maturity and the neonatal outcomes. The intramuscular administration of corticosteroids comprises the international, evidence-based standard, where the intravenous and oral routes are neglected. We preferred to void the use of intramuscular injection to avoid the associated risk of hematoma, as the patient had a low platelet count (22×10^3/μl).

There is no enough understanding for the clinical efficacy of intravenous antenatal corticosteroids, as it has not been evaluated in studies (Surbek et al., 2012). Oral route of antenatal corticosteroid has been evaluated in one study. Pregnant women (n = 170) at high risk for preterm delivery between 24 and 33 weeks' gestation were prospectively randomized to receive either 8 mg oral dexamethasone or 6 mg intramuscular

Table 1 Baby laboratory data.

Date	Reference range – age adjusted	8 h of age	20 h of age	22 h of age	32 h of age	44 h of age
Complete blood counts						
Hematocrit (%)	45 – 65	58.0				
Hemoglobin (g/dl)	14 – 22	20.8				
Platelet ($\times 10^3/\mu l$)	100 – 450	146				
White blood cells ($\times 10^3/\mu l$)	10 – 26	13.8				
Neutrophils ($\times 10^3/\mu l$)	4 – 14	9.7				
Lymphocytes ($\times 10^3/\mu l$)	3 – 8	2.2				
Monocytes ($\times 10^3/\mu l$)	0.5 – 2	1.7				
Eosinophils ($\times 10^3/\mu l$)	0.1 – 1	0.0				
Basophil ($\times 10^3/\mu l$)	0.02 – 0.1	0.03				
Serum electrolytes and others						
Glucose (mmol/L)	3.2 – 6.1	3.8	4		4.9	
Sodium (mmol/L)	135 – 145		141		146	141
Potassium (mmol/L)	3.7 – 5.9		6.4[a]		4.3	4.5
Chloride (mmol/L)	96 – 110		106		109	103
Calcium (mmol/L)	2.1 – 2.64		1.88		1.91	2.3
Urea nitrogen (mmol/L)	1.1 – 6.1		7.2		3.9	
Serum creatinine (μmol/L)	44 – 80		55		52	
Albumin (g/L)	27 – 43		33		36	
Total bilirubin (mmol/L)	0 – 87		114	158	142	122
Direct bilirubin (mmol/L)	13 – 29				21	
C-reactive protein (mg/l)	< 5		23			
Blood culture				Negative		
Blood gas analysis						
Type of specimen (capillary)						
Fraction of inspired oxygen	–	21%	21%	21%	21%	21%
pH	7.35 – 7.45	7.31	7.29	7.34	7.36	7.34
Partial pressure of carbon dioxide (mmHg)	35 – 45	44.1	53	46	43	42
Partial pressure of oxygen (mmHg)	50 – 70	52.2	48	49	49.2	62
Bicarbonate (mmol/L)	20 – 24	20.7	18.7	22.8	22.6	22.2
Base excess	−4 to +4	−4.3	−5	−1.1	−1.9	−2.1

[a] Sample was slightly hemolyzed, and degree of hemolysis most likely has increased potassium result by 0.3 mmol/L.

dexamethasone, both every 12 h for 4 doses and repeated weekly until 34 weeks' gestation or until delivery if occurred earlier. The main outcome was neonatal RDS. At 39% enrollment (170 patients), the study was discontinued after a blinded review of available outcomes. RDS frequency was similar between the oral group (34.3%) and intramuscular group (29.8%), $p = 0.53$. Infants of women who received oral dexamethasone had higher rates of sepsis (10.1% vs. 1.2%, $p = 0.01$) and intraventricular hemorrhage (10.1% vs. 2.4%, $p = 0.04$), compared to intramuscular group. There is no ready pharmacokinetic explanation for the observed differences between the two routes. Accordingly, the study concluded that until clear evidence exists, the oral administration cannot be recommended (Egerman et al., 1998; Hodnett, 1999).

In this case report, the neonatal outcomes after oral administration of antenatal corticosteroid showed mild TTN which may be seen in babies born by cesarean section. The baby needed only mild respiratory support with nasal cannula in room air for few days. The baby had mild jaundice, with no other neonatal complications. Baby did not develop respiratory distress syndrome due to surfactant deficiency and this might be due to improvement in lung maturity contributed by the positive effect of the oral corticosteroids, as the baby was delivered at 36 weeks of gestation by elective cesarean section.

In conclusion, this case report shows that antenatal oral corticosteroid was effective in preventing respiratory distress syndrome in a baby born at near term by elective cesarean section.

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References

Betamethasone [Internet]. U.S. National Library of Health. Available from: http://dailymed.nlm.nih.gov/ May 2010 (cited 22.05.14).

Egerman, R.S. et al, 1998. A randomized, controlled trial of oral and intramuscular dexamethasone in the prevention of neonatal respiratory distress syndrome. Am. J. Obstet. Gynecol. 179 (5), 1120–1123.

Hodnett, E., 1999. Antenatal oral dexamethasone for neonatal respiratory distress syndrome increased neonatal morbidity. Evid. Based Nurs. 2, 73.

Miracle, X. et al, 2008. Guideline for the use of antenatal corticosteroids for fetal maturation. J. Perinat. Med. 36 (3), 191–196.

Roberts, D., Dalziel, S., 2006. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database Syst. Rev. 19 (3), CD004454.

Royal College of Obstetricians and Gynaecologists (RCOG). Antenatal corticosteroids to reduce neonatal morbidity and mortality. Green-Top Guideline No 7. 2010.

Surbek, D. et al, 2012. Antenatal corticosteroids for fetal lung maturation in threatened preterm delivery: indications and administration. Arch. Gynecol. Obstet. 286 (2), 277–281.