Betamethasone Effects on The Baby's Lungs with Indications of Premature Birth

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ABSTRACT

The high rate of infant mortality in developing countries is one of the biggest concern in health problem. One of the causes of infant death is respiratory distress syndrome. In this study, The methodology used in there is a randomized clinical trial with a comparison between the betamethasone administration with placebo. Clinical outcomes were obtained on lung cell maturation rates in preterm infants 34 weeks 0 days to 35 weeks 5 days.

Keyword: Betamethason, Premature, Lung

BACKGROUND

The mortality rate of Infant death in developing countries is high, including Indonesia. This is caused by improper management and Treatment. In some cases that cause high infant mortality rates are respiratory distress syndrome, intraventricular hemmorage, necrotizing enterocollitis, and various types of infectious diseases.[1] Respiratory distress syndrome is breathing disorder cause by underdeveloped lung's cell in premature birth, where the bronchus is not well developed, also the lack of surfactant to keep the lung from collapsing.[2]

METHODOLOGY

The methodology used to write this scientific poster is using a systematic review from the results of research that has been done before. The study was conducted in a randomized clinical trial.[2]

RESULT

Table 1. Primary Outcome.[2]

Table 2. Neonatal Respiratory Outcomes.*

Outcome	Betamethasone (N=1427)	Placebo (N=1400)	Relative Risk (95% CI)	P Value
	no. (%)			
Primary outcome†	165 (11.6)	202 (14.4)	0.80 (0.66–0.97)	0.02
CPAP or high-flow nasal cannula for ≥2 continuous hr	145 (10.2)	184 (13.1)	0.77 (0.63–0.95)	0.01
Fraction of inspired oxygen of ≥0.30 for ≥4 continuous hr	48 (3.4)	61 (4.4)	0.77 (0.53–1.12)	0.17
Mechanical ventilation	34 (2.4)	43 (3.1)	0.78 (0.50–1.21)	0.26
ECMO	0	0	NA	NA
Stillbirth or neonatal death ≤72 hr after birth	0	0	NA	NA
Severe respiratory complication‡	115 (8.1)	169 (12.1)	0.67 (0.53–0.84)	<0.001
CPAP or high-flow nasal cannula for ≥12 continuous hr	93 (6.5)	147 (10.5)	0.62 (0.48–0.80)	<0.001
Fraction of inspired oxygen of ≥0.30 for ≥24 continuous hr	20 (1.4)	34 (2.4)	0.58 (0.33–1.00)	0.05
Need for resuscitation at birth§	206 (14.5)	260 (18.7)	0.78 (0.66–0.92)	0.003
Respiratory distress syndrome	79 (5.5)	89 (6.4)	0.87 (0.65–1.17)	0.36
Transient tachypnea of the newborn	95 (6.7)	138 (9.9)	0.68 (0.53–0.87)	0.002
Apnea	33 (2.3)	37 (2.6)	0.88 (0.55–1.39)	0.57
Bronchopulmonary dysplasia	2 (0.1)	9 (0.6)	0.22 (0.02–0.92)¶	0.04
Pneumonia	6 (0.4)	13 (0.9)	0.45 (0.17–1.19)	0.10
Surfactant use	26 (1.8)	43 (3.1)	0.59 (0.37–0.96)	0.03
Composite of respiratory distress syndrome, transient tachypnea of the newborn, or apnea	198 (13.9)	249 (17.8)	0.78 (0.66–0.93)	0.004
Pulmonary air leak	5 (0.4)	6 (0.4)	0.82 (0.25–2.68)	0.74

Table 2. Secondary Outcome.[2]

Table 3. Other Secondary Neonatal Outcomes.*

Outcome	Betamethasone (N=1427)	Placebo (N=1400)	Relative Risk (95% CI)	P Value
Neonatal death — no. (%)	2 (0.1)	0	NA	0.50
Mean (±SD) birth weight — g	2637±480	2654±484		0.32
Birth weight in <10th percentile — no. (%)	255 (17.9)	220 (15.7)	1.14 (0.96–1.34)	0.13
Gestational age at delivery — no. (%)				0.10
≤34 wk 6 days	193 (13.5)	213 (15.2)		
35 wk 0 days to 35 wk 6 days	394 (27.6)	386 (27.6)		
36 wk 0 days to 36 wk 6 days	609 (42.7)	568 (40.6)		
37 wk 0 days to 38 wk 6 days	202 (14.2)	185 (13.2)		
≥39 wk 0 days	29 (2.0)	48 (3.4)		
Necrotizing enterocolitis — no. (%)	0	1 (0.1)		
Proven neonatal sepsis — no. (%)	9 (0.6)	11 (0.8)	0.80 (0.33–1.93)	0.62
Grade 3–4 intraventricular hemorrhage — no. (%)	2 (0.1)	0		
Composite of respiratory distress syndrome, intraventricular hemorrhage, or necrotizing enterocolitis — no. (%)	81 (5.7)	90 (6.4)	0.88 (0.66–1.18)	0.40
Hypoglycemia — no. (%)†	343 (24.0)	210 (15.0)	1.60 (1.37–1.87)	<0.001
Median time until first feeding (IQR) — hr	5.5 (1.4–24.7)	9.9 (1.7–29.1)		0.004
Feeding difficulty — no. (%)	211 (14.8)	223 (15.9)	0.93 (0.78–1.10)	0.40
Hyperbilirubinemia — no. (%)	167 (11.7)	140 (10.0)	1.17 (0.95–1.40)	0.15
Hypothermia — no. (%)	132 (9.3)	112 (8.0)	1.16 (0.91–1.47)	0.24
Admission to intermediate care nursery or NICU — no. (%)				
Any duration	596 (41.8)	629 (44.9)	0.93 (0.85–1.01)	0.09
Duration ≥3 days	470 (32.9)	518 (37.0)	0.89 (0.80–0.98)	0.03
Median length of hospital stay (IQR) — days	7 (4–12)	8 (4–13)		0.20

DISCUSSION

Intramuscular injection of betamethasone in singleton pregnant women diagnosed with a birth premature in 34 weeks 0 days to 35 weeks 5 days are clinically proven to help the maturationlung cell in premature infants is based on primary outcome. According to schimmer et al, betamethasone will improve the bronchial smooth muscle response toward catecholamines.[3]The National Institutes of Health and The American College of Obstetricians and Gynecologists recommends administration of betamethasone 2 times with a dose of 12 mg with a 24 hours Interval, but the injection should be observed because if the excessive injection will have side-effects that interfere with the maturation of the adrenal glands and disturbing the infant weight.[3][4]

CONCLUSION

The use of betamethasone in singleton pregnant women with high risk of premature birth at week 34 weeks 0 days to 35 weeks 5 days helps the maturation of lung cells in premature infants. However, for the benefits gained from betametasonin the premature infants at childhood regarding the likelihood of a lung distress further research is needed.

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