

Does Prophylactic Use of Dexamethasone Have a Role in Reducing Post Extubation Stridor and Reintubation in Children?

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ABSTRACT

All children aged from 4 weeks to <5 year, were intubated for at least 48 hours [n=51] during 6 months. Data of the patients treated with DEX (0.5 ml/kg every 6 hours for 3 doses, beginning 6-12 hours prior to extubation) (n=30) were compared with control patients (who had not received medication) (n=21). The DEX and control groups were similar in age *i.e.*, mean ages of DEX group were 16.85±14 months, and that of control group were 19.02 ± 19 months, mean duration of intubation and mechanical ventilation in DEX group was 5.17 ± 4.58 days, and that in control group was 3.98 ± 3.60 days. There was no significant difference between DEX and control group in the incidence of postextubation stridor [17% (5/30) vs. 10% (2/21); *p* = 0.5] and the reintubation rate [7% (2/30) vs. 10% (2/21); *p* = 0.7]. Our data revealed that the prophylactic use of dexamethasone in planned extubation of high risk children were not effective. [*Indian J Pediatr* 2009; 76 (5) : 555-557] E-mail: ali.saleem@aku.edu

Key words : Dexamethasone; Extubation; Stridor

Endotracheal intubation (ETI) is one of life saving procedure frequently performed in intensive care units (ICU). It can be used with or without mechanical ventilation.¹ All invasive procedures having some hazards, thus airway mucosal ulceration, inflammation and airway edema can occur and may cause post extubation stridor (PS)¹ and may lead to reintubation.² Reintubation not only causing longer hospital, ICU and ventilator courses but are also associated with high cost,² risks of nosocomial infections and inpatient hospital burden. Young ages mainly first four years of life, duration of intubation and trauma related to Endotracheal intubations are frequently associated with reintubation following extubation.³ the relative risk of PS can be as high as 69%,⁴ while 10 - 22% for reintubation.^{3,5}

Corticosteroids because of their anti-inflammatory action are used to prevent PS. Some studies found it helpful^{2,6,7} in prevention of PS while other doesn't.^{8,9} Literature with adult age group supports preventive action of steroids in planned extubation only.^{1,10} Certain factors have been identified for this disagreement *i.e.*, age, inclusion criteria, setting and

duration of ETI, use and duration of steroids.² We evaluated a subset of high risk patients < 5years of age, intubated for > 48 hours, undergoing their first elective extubation in an intensive care unit setting. The objective was to determine whether dexamethasone is effective in the prevention of postextubation airway obstruction in these young children.

MATERIAL AND METHODS

The study was conducted in pediatric ICU of The Aga Khan University hospital, Karachi. We performed a case – control retrospective chart review. The cases were patients aged between 4 weeks and < 5 years who were intubated and mechanically ventilated for at least 48 hours during last six months. We used the controls and match on age with cases. Patients, who were recently treated with glucocorticosteroids, or dexamethasone prescription other than defined, patients intubated for laryngotracheal disease and patients who had a history of failed extubation due to upper airway obstruction were excluded from analysis. Dexamethasone treatment was defined as a "dexamethasone dose of 0.5 mg/kg every 6 hours for 3 doses, beginning 6-12 hours prior to extubation". We compared with controls who did not receive dexamethasone or any other steroid prior to extubation. Descriptive analysis of means and standard

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deviation were performed on age and hospital stay, while chi-square test was performed by using *p* value of <0.05 as significant. Study was approved by ethical review board of the university.

RESULTS

In our six months study period, 51 children were admitted and fulfilled our study criteria *i.e.*, remained intubated and mechanically ventilated for > 48 hours. The dexamethasone and control groups did not significantly differ in the demographic characteristics, which were presented in Table 1. Male was predominant gender in our study *i.e.*, 33 out of 51. Duration of intubation and mechanical ventilation in dexamethasone group was 5.17 ± 4.58 days while in control group it was 3.98 ± 3.6 days.

TABLE 1. Demographic Data and Results of Study Population

Variables	Cases (n = 30)	Control (n = 21)	p value
Age (mos)	19±19	16.8±14	ns
Duration of intubation (days)	5. ± 4.58	4 ± 3.6	ns
Post extubation stridor	17 %	10 %	0.5
Reintubation	7%	10%	0.7

The incidence of PS was 17% (5/30) in DEX group and 10% (2/21) in control group (*p*= 0.5). The rate of reintubation was 7% (2/30) in the DEX group and 10% (2/21) in control group (*p*=0.7).

Overall there was no significant difference in the incidence of PS and the rate of reintubation between these two groups.

No patients developed significant hyperglycemia, gastrointestinal bleed or new infections in DEX group during the treatment.

DISCUSSION

In the present study the incidence of post-extubation stridor was higher in dexamethasone receiving group as compared to controls. Most of the randomized double blind studies on ventilated patients in intensive care units showed that corticosteroids fail to prevent the occurrence of post-extubation laryngeal edema,^{9, 11-13} although it was previously postulated that the regimens used in these negative trials were incorrect.¹⁰ we did not define patients as high risk or low risk on the basis of disease severity, which could change the results, as high risk patients as mentioned in literature are higher chances of reintubation. But the disease severity along with prolonged intubation was found as major risk factor (*i.e.*, congenital heart disease) in most studies.¹⁴ while

some other reasons would be multifactorial, upper airway obstruction, pulmonary insufficiency, cardiac dysfunction, neurological impairment, poor muscle strength, and excess sedation.¹⁵

The reintubation was low in dexamethasone group as compared to control group but it was not statistically significant. The present study showed that dexamethasone was of no benefit in preventing stridor after routine intubation but it decreases the rate of reintubation in children hospitalized in PICU. These results are comparable with the study done by Tellez *et al* (Table 2) in which he found that there was no statistical difference in incidence of post-extubation stridor in the two group *i.e.*, placebo and dexamethasone. Although Anne *et al* (Table 2) showed that dexamethasone was effective in preventing both postextubation stridor and reintubation. Our data revealed that the prophylactic use of corticosteroids in planned extubation of children for the prevention of postextubation stridor and reintubation is still controversial and unwarranted.

TABLE 2. Comparison of Similar Pediatric Studies

Study	Post extubation stridor (Placebo %/ Drug %)	Re-intubation (Placebo %/ Drug %)
Tellez <i>et al</i>	30/21	5/12
Anne <i>et al</i>	87/45	22/0
Ingrid <i>et al</i>	24/0	16/0
Our study	10/17	10/7

CONCLUSION

Our data revealed that the prophylactic use of dexamethasone in planned extubation of high risk children were not effective.

Limitation: Our study carried few limitations like retrospective in nature, small-sample size and single-center experience.

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