

Outcome of surfactant therapy in a tertiary referral centre in Sri Lanka

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Abstract

Objective To assess the outcome of surfactant therapy at a tertiary referral centre in Sri Lanka

Design, setting and method All babies treated with surfactant at Sri Jayewardenepura General Hospital during 2007 were included in the study. Data on weight, maturity, age of ventilation, age of surfactant therapy, ventilator settings before and after surfactant, arterial blood gas results before and after surfactant, details regarding pneumothorax and pulmonary haemorrhage, duration of ventilation and chronic lung disease at 28 days, 3 months, and 6 months were collected. Data analysis was done according to maturity groups.

Results Forty eight babies had surfactant therapy during the study period. The commonest indication was hyaline membrane disease (HMD) in prematures (45), followed by meconium aspiration syndrome (03). According to maturity, 22 (46%) were in 28-33+ weeks, followed by 12 (25%) in <28 weeks, 11 (23%) in 34-36+ weeks and 3 (6%) were >37 weeks (mature). Only 6 (12%) babies in 34-36+ weeks had transient hypoxia. None of them developed pneumothorax. Four (8%) had features suggestive of pulmonary haemorrhage 12-48 hours after surfactant replacement therapy. Four (8%) babies had chronic lung disease at 28 days of age and two of them were in babies <28 weeks. The reduction in oxygen requirements was seen within 6 hours of therapy in 7/12, 18/22, 6/11 in <28, 28-33+ and 34-36+ weeks babies respectively and in 12-24 hours in babies >37 weeks. There were 14 deaths comprising 5/12 of babies <28 weeks, 5 /22 of 28-33+ weeks, 4/11 of 34-36+ weeks. Duration of ventilation varied among the survivors; 5/7 babies of <28 weeks needed >10 days of ventilation whereas 10/17 of 28-33+ weeks needed <10 days of ventilation.

Conclusions Reduction in oxygen requirement was seen within 6 hours of surfactant therapy in 65% of babies. Only 16% of babies who had surfactant therapy developed complications such as pulmonary haemorrhage and chronic lung disease. Duration of ventilation varied according to the maturity of the baby.

Introduction

Respiratory failure secondary to surfactant deficiency is a major cause of morbidity and mortality in preterm infants. Surfactant therapy substantially reduces mortality and respiratory morbidity for this population¹. Secondary surfactant deficiency also contributes to acute respiratory morbidity in late-preterm and term neonates with meconium aspiration syndrome, pneumonia/sepsis, and perhaps pulmonary haemorrhage; surfactant replacement may be beneficial for these infants¹. Single and multicentre randomized controlled trials have shown that the use of surfactant replacement in preventive or treatment modes has been safe and efficacious^{2,3,4}. Overall benefits in the first 24 hours are improvement in oxygenation and a reduction in ventilatory pressure. The longer term effects are a reduction in pneumothoraces, periventricular haemorrhage, bronchopulmonary dysplasia and death⁵. So far no studies have been done in Sri Lanka regarding outcome of surfactant therapy.

Objective

To assess the outcome of surfactant therapy at a tertiary referral centre in Sri Lanka.

Method

All babies treated with surfactant at the Sri Jayewardenepura General Hospital during 2007 were included in the study. The first author collected all the data by a pretested questionnaire, and entered the details of the selected babies. These included: date of delivery, parity, maturity, birth weight, age at ventilation, clinical symptoms, ventilator settings and arterial blood gases before surfactant therapy, age of first dose of surfactant, details of any baby with

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features of pulmonary haemorrhage, details of babies with pneumothorax, ventilator settings and arterial blood gases after surfactant therapy according to time intervals (<6hrs, 6-12hrs, 12-24hrs). This information was entered daily. The first author followed these babies at 28 days, 3 months and 6 months to see whether they were having any respiratory symptoms and signs. These details were obtained by directly examining babies and by using clinic records.

Results

Forty eight babies were given surfactant therapy during the study period. The commonest indication was HMD in prematures (45 babies). The other indication was meconium aspiration syndrome (3 babies). According to maturity, 12 (25%) babies were <28 weeks of gestation, 22 (46%) 28-33+ weeks, 11 (23%) 34-36+ weeks, and 3 (6%) 37 weeks or greater.

Only 6 (12%) babies in 34-36+ week group had transient desaturations. There were no cases of pneumothorax in the study group. Four (8%) babies had features suggestive of pulmonary haemorrhage. One of them was from the <28weeks group, one from the 28-33+ weeks and two from the 34-36+ week group. All of them developed signs within 12-48 hours of surfactant therapy.

Reduction in oxygen requirements was seen within 6 hours of surfactant therapy in 7/12, 18/22, 6/11 in <28, 28-33+ and 34-36+ weeks babies respectively and within 12-24 hours in babies >37 weeks. Four babies (8%) were on oxygen therapy even at 28 days of age. Two of them were from the <28 weeks group and one each from the 28-33+ weeks and 34-36+ week groups.

There were 14 deaths in the study group comprising 5/12 of <28 weeks, 5 /22 of 28-33+ weeks, 4/11 of 34-36+ weeks. The deaths are analysed in table 1.

Table 1
Analysis of deaths

Cause of deaths	<28 weeks	28-33+ weeks	34-36+ weeks
IRDS	1	1	
Pulmonary haemorrhage	1	1	2
Chronic lung disease	1		
Septicaemia	2	1	1
Intraventricular hemorrhage		1	
Renal failure		1	
Congenital heart disease			1

Duration of ventilation varied. Five of 7 babies from the <28 weeks group needed more than 10 days of ventilation whereas 10 of 17 babies from the 28-33+ weeks group, 4 of 7 babies from the 34-36+ week group and 2 of 3 babies from the > 37 weeks group needed less than 10 days of ventilation.

Discussion

Surfactant replacement therapy for babies with HMD is one of the life saving therapeutic advances in neonatology. Surfactant can be given as prophylactic or as rescue therapy. As a unit in a developing country with significant financial constrains, at Sri Jayewardenepura General Hospital it is generally given as rescue therapy. We usually give one dose (4ml/kg) for those needing respiratory support. We use a second dose if oxygen requirement is >25% 8 - 12 hours after the first dose.

Although surfactant replacement therapy is expensive, it has beneficial effects especially when

managing premature babies. It is clear that oxygen requirement was reduced within 6 hours of therapy in the majority of babies thus reducing oxygen related complications in premature babies. The strongest grounds for continuing surfactant therapy is that only 16% developed complications such as pulmonary haemorrhage and chronic lung disease. There were no cases of pneumothorax.

Conclusions

- Reduction in oxygen requirement was seen within 6 hours of surfactant therapy in 65% babies.
- Only 16% babies who had surfactant therapy developed complications such as pulmonary haemorrhage and chronic lung disease.
- Duration of ventilation varied according to the maturity of the baby.

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