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Meconium aspiration syndrome

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Keywords

Meconium aspiration syndrome, surfactant, tracheal bronchial lavage

Comments

This paper proposes a safe and seemingly effective method for the treatmentof severe MAS. However, the apparent benefits over current best practiceshould be taken in the context of the study's limitations.In particular, only a small number of patients were involved and theoutcome of treatment was assessed retrospectively by comparison with historic controls. Furthermore, it is difficult to know to what extent thesignificant improvements reported were the result of the lavage per se, asopposed to the residual surfactant. A multicentre randomized controlledtrial is needed to further validate the efficacy of this treatment.

Introduction

Meconium aspiration syndrome (MAS) remains a major cause of respiratorymorbidity and mortality in newborn infants. This is due in part toobstruction of the airways and inactivation of pulmonary surfactant bymeconium, which leads to pulmonary atelectasis, and to the development ofchemical pneumonitis. Prevention of this disorder relies on adequatesuctioning of the airway at birth, but this is not entirely effective. Theability to remove residual meconium from the airway would seem to be alogical step in the treatment of MAS.

Aims

To establish the safety of using diluted bovine lung surfactant lipidextract solution as a tracheobronchial lavage fluid in the treatment ofterm infants with severe MAS, and to determine the validity of a randomizedcontrolled trial.

Methods

Six term infants with severe MAS requiring ventilation within 6 h ofbirth were recruited consecutively during an 18 month period in a regionalneonatal intensive care unit. The outcome of treatment was compared with sixconsecutive historic controls with equally severe MAS, who were identifiedretrospectively during a similar period. Tracheal bronchial lavage wasperformed at a mean age of 3 h (range 2-6 h), using 15 ml/Kg ofdiluted surfactant saline suspension (Survanta [Rosslaboratories Ohio USA] phospholipid concentration 5 mg/ml) in 2 ml aliquots.Suction was performed after each aliquot, and all aspirated fluid was sentfor meconium content analysis. Continuous oxygen saturation, bloodpressure, and intermittent arterial blood gas sampling were performedthroughout the procedure. Echocardiographic evidence of persistentpulmonary hypertension (PPHN) was sought prior to and 48 h after thecommencement of treatment.

Results

When compared with neonates in the control group, those treated withsurfactant lavage showed an improvement in; the fraction of inspiredoxygen, mean airway pressure, oxygenation index and arterial/alveolaroxygen tension within 2 h of treatment, (these values beingsignificant, 131 ± 61 h to 55 ± 5 h), and the duration of oxygentherapy (from 20.1 ± 8.1 days to 4.1 ± 0.5 days). Furthermore, thelavage-treated neonates were less likely to progress to PPHN (2 vs 6 incontrol), or to develop airleak complications (0 vs 4 in control). Theprocedure took between 27 and 60 min (mean 38 ± 12) to complete and was welltolerated in all the patients, except for 2 neonates who developedtransient desaturation during suctioning. There were no deaths in thetreatment group, compared to two deaths amongst the controls.

Discussion

Previous studies have demonstrated the beneficial effects of surfactantreplacement therapy (SRT) in the treatment of severe MAS. In addition, animalmodels have shown that the uneven distribution of surfactant followingbolus administration can be improved upon, by either increasing the fluidvolume in which the surfactant is suspended, or by giving it by lavage.They have also suggested that diluted surfactant solution is an effectivedetergent which is capable of removing meconium from the airway. On thebasis of this, the authors felt that the use of lavage using dilutednatural surfactant solution would facilitate the airway clearance ofmeconium, thereby reducing obstruction and allowing a more homogeneousdistribution of any residual surfactant. This may explain the fact thatfavourable results were achieved despite using a lower dosage ofsurfactant (Survanta 75 mg phospholipid/Kg) to that recommended for SRT (100 mgphospholipid/Kg). Despite obvious limitations (small number of patients, useof historic controls), this pilot study has suggested that early lavage withdiluted surfactant solution is a safe and well tolerated procedure that canreduce air leak complications, ventilation duration and improveoxygenation.

References

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