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Case Report

Recurrent atelectasis in a preterm neonate

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ABSTRACT

Excessive or thick pulmonary secretions obstructing the small airways are a common problem in neonatal population. Pulmonary collapse may occur secondary to mucus plug. Recombinant - DNase is thought to improve atelectasis by decreasing viscosity and assisting mucociliary clearance in cases of pulmonary collapse. Inhaled hypertonic saline is tried as an alternative. Here we report a case of respiratory distress syndrome with collapse of entire left lower lobe which is very rare and it responded significantly to hypertonic saline nebulisation along with chest physiotherapy and regular suctioning. Atelectasis is common in post extubated neonates but in our case it developed in pre intubation period. Here we highlight the fact that nebulized hypertonic saline can be an effective alternative to recombinant DNase in resource limited settings like in India.

Keywords: Neonate, Mucus plugs, Atelectasis, Recombinant DNase, Inhaled hypertonic saline

INTRODUCTION

Atelectasis of lung is a rare cause of significant respiratory distress and hypoxemia in neonatal population. Preterm neonates are at a greater risk due to diffuse microatelectasis with impaired gas exchange whereas massive focal collapse is a rare feature.[1] X ray chest, CT scan are primary diagnostic aids and recently ultrasonography and Electric Impedence Tomography are also deemed as advantageous in early diagnosis of atelectasis.[2,3] Inhaled Recombinant DNAase (rhDNase) is the primary mode of treatment for clearing of secretions and mucous plugs but the huge costs incurred precludes its wide usage.[4] Hypertonic saline is the other alternative.[5]Here we are presenting a case of massive left lower lobe collapse which developed immediately after delivery in a preterm treated successfully with Inhaled hypertonic saline, suctioning and chest physiotherapy.

CASE REPORT

A female baby of 32 weeks of gestation was born out of a non-consanguineous marriage. Baby cried immediately. On examination no anomalies were found and systemic examination was normal. Prophylactic surfactant therapy was administered soon after birth. Baby developed respiratory distress within 4 hours and X-ray chest at that time showed mediastinal shift with left lower lobe collapse. CT-scan chest confirmed the collapse and consolidation of left lower lobe. Considering mucous plug resulting in lobar collapse, Chest physiotherapy, regular suctioning and nebulization with 3% hypertonic saline was administered second hourly. Baby was mechanically ventilated, improved over a period of 72 hrs and was subsequently extubated successfully. In view of persisting mild respiratory distress, repeat X-ray was done and it suggested clearing of left lower lobe collapse and a new collapse development in right upper zone. Hypertonic saline nebulization, chest physiotherapy and regular suctioning were continued for another 3 days. Collapse resolved completely and baby was discharged. Apart from exaggerated physiological jaundice, no other co-morbidities were found. Complete hemogram was normal and sepsis screen was negative. Due to logistic constraints cystic fibrosis screening was not done.

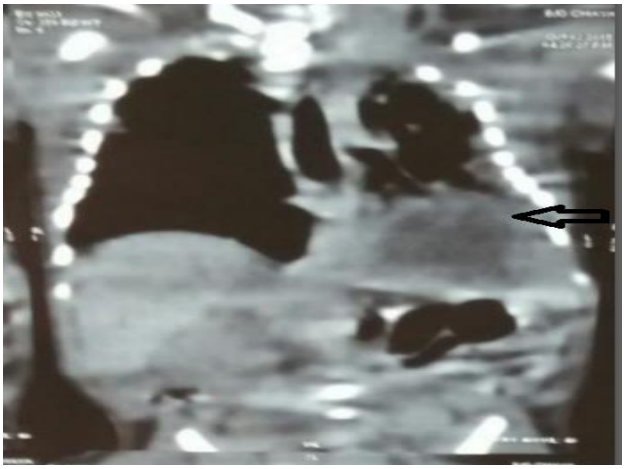

Figure 1: CT chest showing collapse of the left lower lobe with mediastinal shift.

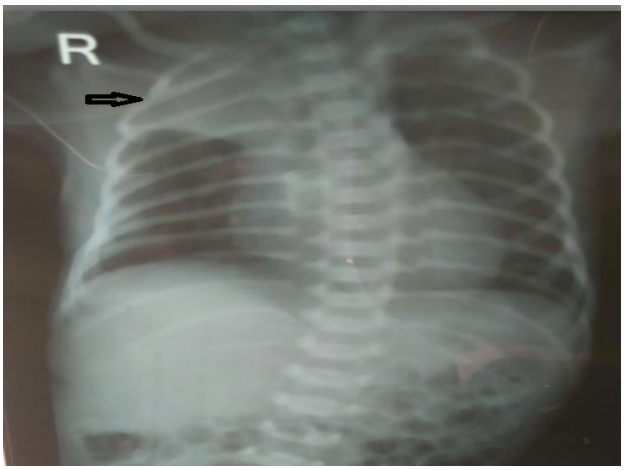

Figure 2: X-ray chest showing right upper lobe collapse.

DISCUSSION

In our case, the preterm neonate of gestational age 32 weeks developed respiratory distress within 4 hrs even after giving prophylactic surfactant immediately after delivery. Pooled secretions and mucous plug were considered as the cause of distress and atelectasis rather than a primary surfactant deficiency as the prophylactic surfactant was adequately given. Moreover surfactant deficiency will show diffuse microatelectasis with reticuloendothelial pattern rather than massive left lower lobe atelectasis which this baby had developed.[1] With mechnical ventilation, physiotherapy and Inhaled hypertonic saline the baby got symptomatically better but the serial X-ray chest on the day 5 showed clearing of lower lobe collapse but a new area of collapse was seen in right upper lobe.

Collapse is most common in post ventilated babies but our baby developed collapse in the immediate neonatal period prior to mechanical ventilation which is very rare.[6] Serial areas of collapse suggest an inherent tendency for collapse in this baby like cystic fibrosis, acquired bronchial stenosis and congenital lung malformations.[7,8]

CT scan chest was done which confirmed the diagnosis of the focal areas of consolidation and a massive left lower lobe collapse and ruled out other congenital lung anomalies.

Ultrasonography of the chest can be used as an alternative and portable method in diagnosis of neonatal atelectasis. This recent modality has 100% sensitivity compared to 75% sensitivity in case of chest X- ray. The main ultrasound findings were large areas of lung consolidation with clearly demarcated borders, air bronchograms, pleural line abnormalities, and absence of A-lines, as well as the presence of lung pulse and absence of lung sliding on real-time ultrasound.[2]

Electrical Impedence Tomography is yet another new modality which is a continuous monitoring of various lung areas of expansion and gives the earliest clue of atelectasis before the VP mismatch takes place.[3]

Suggested modalities of treatment in neonatal atelectasis are inhaled DNase and inhaled hypertonic saline. Previous studies showed that rh DNase was effective in re -establishing airway patency in atelectasis and mucus-plugging in mechanically ventilated, premature neonates.[4,9,10] A study by Altunhan H A, et al confirmed the superiority of rh DNase over HS.[11] In contrast, a study by Youness HA, et al rejected the effectiveness of inhaled rhDNase.[12]

A study by Dilmen U, et al stated that 3% HS solution was a more effective therapeutic option on the basis of clinical and radiological improvement compared to rhDNase treatment in newborns with pulmonary atelectasis.[5]

CONCLUSION

Our baby responded well to inhaled hypertonic saline which substantiates its use in neonatal atelectasis.

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