PostScript

LETTERS

The pressure is on! The danger of a broken blow off valve on a bag valve mask

We would like to draw the reader's attention to a potentially dangerous occurrence with bag valve mask systems when repair and reassembly is carried out incorrectly. Bag valve masks are in common use in neonatal and paediatric resuscitations[1 2] and incorporate a pressure relief valve to prevent excessive pressures being delivered.

In this case, checking of a Laerdal paediatric (500 ml) resuscitator (catalogue number 86005033) before use revealed that the blow off valve was not working despite the initial cursory inspection failing to detect any problem (fig 1). Closer inspection revealed that the yellow over-ride button had been broken off and the device reassembled in such a way that the button was placed inside the valve the wrong way round (fig 1 inset). The resuscitator was taken out of use and subjected to further testing. The problem was then brought to the attention of the manufacturer.

As in other reports of problems with bag valve mask systems used in adults and children, the fault was not immediately apparent.[3 4] In this case the reassembled device did not look so different from the normal functioning valve (fig 2 and inset), yet by connecting it to a manometer we could generate pressures of 70 cm H_2O even with gentle manual ventilation.

Although it seems likely that the blow off valve was reassembled by an inexperienced person, we feel that this could have been prevented had the button been too large to fit within the valve body. This design fault is not unique to Laerdal resuscitators and should merit a review by all manufacturers. This event also highlights to clinicians that equipment should always be checked before use and that visual inspection alone cannot be relied on to reveal any potential problems.

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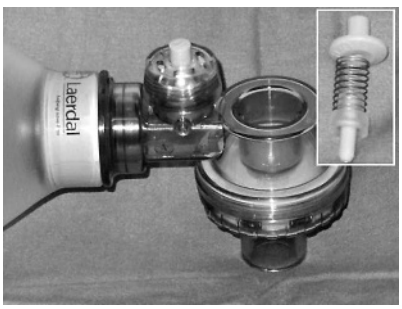

Figure 1 The ''odd'' appearance of the spring loaded blow off valve. Inset: the spring loaded pressure regulator assembly shown as it was reassembled with top of the yellow part reversed.

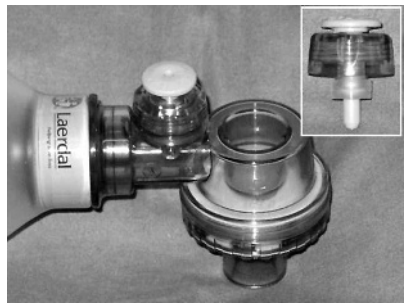

Figure 2 The spring loaded blow off valve of the Laerdal silicone paediatric resuscitator as it should normally appear. Inset: the spring loaded pressure regulator assembly, unscrewed to show the normal configuration.

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Nasal nitric oxide to diagnose primary ciliary dyskinesia in newborns

Retrospective data suggest that approximately half of patients with primary ciliary dyskinesia (PCD) have symptoms of neonatal respiratory distress. Respiratory distress syndrome in a full term infant should therefore raise PCD as a potential underlying disease.[1 2] The non-invasive measurement of nasal nitric oxide (NO) is of diagnostic value in adults and children with PCD,[1 3] but similar information is not available for neonates with PCD.

A 3550 g male infant was delivered after uncomplicated pregnancy by caesarean section at 41 weeks of gestation. During the first hours of life, respiratory distress developed, and supplemental oxygen was required to maintain arterial oxygen saturation above 88%. Neonatal infection was suspected, and antibiotic treatment initiated. Chest radiographs and abdominal ultrasound scans showed complete situs inversus, compatible with the diagnosis of Kartagener's syndrome. C reactive protein increased to a maximum of 87 mg/l on day 2, blood cultures remained sterile, and throat swabs showed *Klebsiella pneumoniae*. Antibiotic therapy was continued for 10 days.

Measurements of nasal NO revealed concentrations below 5 ppb on day 4, while the patient was treated for neonatal infection. Low nasal NO was confirmed after antibiotic therapy was discontinued and the infant was without clinical symptoms on day 34 of life (9.4 ppb). Mean nasal NO in six healthy term newborns with a median age of 14 days (range 2–24) was 171.2 ppb (range 100–232).

The diagnosis of PCD was subsequently confirmed by nasal brush biopsy at 6 weeks of age.

PCD is a rare cause of neonatal respiratory distress but is under-diagnosed, as many infants recover spontaneously. Delayed diagnosis is accompanied by poorer outcome, as sufficient treatment maintains lung function or at least delays disease progression in the lower airways.[1 4] Therefore there is a need for early diagnosis and treatment. This case illustrates that nasal NO measurements may be used to diagnose PCD in the newborn.

NO is thought to play an important role in postnatal adaptation of the pulmonary circulation. Decreased nasal NO in the neonate may have a negative impact on physiology of the lower airways, as newborns usually inhale high levels of NO which form in the upper airways. It can therefore be speculated that decreased nasal NO in newborns may contribute to the clinical signs of neonatal respiratory distress.

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Pooling of trials is not appropriate in the case of heterogeneity

We read with great interest the systematic review by Thome *et al*[1] on the elective use of high frequency ventilation compared with conventional mechanical ventilation in preterm infants. Thome *et al* included 17 randomised trials and stated that, unlike previous meta-analyses, they did not find significant benefits in pulmonary outcome. They also referred to our published cumulative meta-analysis.[2] However, we would like to point to the fact that, in our meta-analysis, we reported the same finding, but we restricted pooling to subgroups according to ventilation strategies used for both high frequency ventilation and conventional mechanical ventilation. The reason we did not pool all studies was because there was considerable heterogeneity between studies. The use of random effect models to overcome the problem of heterogeneity is