and antibody determination in assessing the risks of perinatal transmission of hepatitis B. It is well known that hepatitis B antigen correlates well with the presence of complete viral particles in the serum, active viral replication, and high infectivity in the perinatal period and at other times. The authors find hepatitis B virus-DNA, detected by spot hybridisation technique not only in four hepatitis B antigen positive sera but also in 10 of 89 maternal sera containing hepatitis B antibody, and in the summary state that the technique is useful in identifying mothers who might transmit infection to their offspring. This study does not confirm, however, that the presence of hepatitis B virus-DNA without hepatitis B antigen positivity indicates a state of infectivity of these mothers. Evidence of hepatitis B virus infection was found in one of 10 infants from hepatitis B antigen negative, hepatitis B virus-DNA positive mothers, and in none of 82 infants from hepatitis B antigen negative, hepatitis B virus-DNA negative mothers, giving a P value by Fisher's exact test of 0.1-08.

All the infants in the study received hepatitis B immunoglobulin at birth and at 3 and 6 months of age. Since this immunoprophylaxis has been shown to influence the rate of infection of infants, further studies will be required to assess the infective implications of hepatitis B virus-DNA in maternal serum containing no hepatitis e antigen. A more meaningful and potentially helpful conclusion may be obtained in infants of hepatitis B antigen negative mothers for whom hepatitis B immunoglobulin is not available.

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Dr De Virgiliis and co-workers comment:
We thank Drs Mowat and Mieli-Vergani for the interest they have shown in our short report.1

The detection of hepatitis B antibody in the serum of chronic hepatitis B surface antigen carriers does not coincide with the disappearance of hepatitis B virus-DNA, which is the expression both of high hepatitis B virus replication and infectivity.2 This finding explains the transmission of hepatitis B virus and the occurrence of fulminant hepatitis in infants born to hepatitis B antibody positive mothers.3 4

Accordingly, several pregnant women with hepatitis B antibody in our series showed serum values of hepatitis B virus-DNA similar to those who were hepatitis B antigen positive. Hepatitis B immunoglobulin administration in all our newborns from hepatitis B surface antigen positive mothers has obviously reduced the risk of the transmission of infection making statistical analysis useless. Nevertheless we have noticed hepatitis B virus infection in three infants, all born to hepatitis B virus-DNA positive mothers. One of these was hepatitis B antibody positive and the other two were hepatitis B antigen positive. We agree with Drs Mowat and Mieli-Vergani that a clinical study without hepatitis B immunoglobulin administration would allow a more useful analysis (as already stated in our paper) but we do not believe this to be ethical.

References

Inspiratory:expiratory ratio and pulmonary interstitial emphysema

Sir,
Dr Greenough and colleagues' study has emphasised that mechanical ventilation at rates of 100 per minute can exacerbate established pulmonary interstitial emphysema. They speculated that at fast rates of mechanical ventilation insufficient expiratory time may cause further accumulation of trapped air.

In one of the studies cited Ng and Easa described two patients. In the first, early pulmonary interstitial emphysema deteriorated during mechanical ventilation at 100 per minute while in the second pulmonary interstitial emphysema appeared during mechanical ventilation at the same rate. In both there was complete resolution of early pulmonary interstitial emphysema after hand ventilation with a resuscitation bag using peak pressures of 10 to 15 cm H2O and end expiratory pressures of 3 to 5 cm H2O for 2 to 36 hours. The authors stressed that infants receiving high ventilator pressures or with pulmonary interstitial emphysema of several days' duration might not respond so well. Neither study reported the inspiratory:expiratory ratio used.

We have investigated the effects of hand versus mechanical ventilation on the proximal airway pressure waveform. We used (a) a Penlon bag with a refill valve (circuit compressible volume less than 50 ml) and (b) a Sechrist IV100B time cycled, pressure limited, continuous flow ventilator with a Fisher Paykel MR 500 humidifier (circuit compressible volume 500 ml). The ventilator respiratory rate was set at 120 per minute and the inspiratory:expiratory ratio at 1:1. Each was connected to a neonatal lung simulator (Specialised Laboratory Equipment, Croydon) set to give compliance 0.5 ml/cm H2O and resistance 100 cm H2O/l/sec at a flow of 6 1/min. Pressure traces were recorded on paper using a Hewlett Packard 8805C transducer. Typical traces are shown in the Figure. Hand ventilation gave an inspiratory:expiratory ratio which was always less than 1:3-6 at rates of 120 to 150 per minute.

If an inspiratory:expiratory ratio considerably greater...
than those seen during hand ventilation were employed in mechanical ventilation at rapid rates, then a rationale emerges for the apparent efficacy of hand ventilation. Achieving a substantially longer time for deflation than inflation may enhance the decompression of trapped interstitial gas. The use of low inspiratory-expiratory ratios may provide an additional strategy in the prevention or management of pulmonary interstitial emphysema but will require careful evaluation.

**References**


**Apnoea monitors and sudden infant death**

Sir,

The report from the Foundation for the Study of Sudden Infant Death and the British Paediatric Respiratory Group\(^1\) is in some respects misleading.

(1) The case for monitors is not that cot death is due to a disorder of respiration, but the common observation that, whatever the cause of death, respiration nearly always fails before circulation.\(^2\) Some adults die of acute heart failure, but this is very rare in babies. Some babies may be so ill that they cannot be revived even temporarily after 20 seconds of apnoea but, in one special care baby unit where about 5000 babies have been monitored over a period of 14 years this has happened only once.

(2) The statement that 'it is well documented that babies who were on apnoea monitors have died in spite of immediate attempts at resuscitation' is seriously misleading. It is based on only one case, where the response was delayed for 'approximately' 30 seconds. There seems to be no recorded instance of a death where an alarm failed to detect apnoea.

(3) Four different monitors are described but it is not made clear that the Graseby MR 10 is practically the only one now in home use in the United Kingdom. Unlike the other three monitors described, it detects respiratory movements rather than changes in chest impedance or weight distribution and therefore requires no adjustment to prevent cardiac triggering.\(^3\)

(4) Failure to detect obstructive apnoea is regularly added as a serious objection to all existing apnoea alarms but it is not clear how common obstructive apnoea is or how many, if any, babies have actually died of it. Tonkin, who is a keen proponent of its importance, has told me that she believes that the MR 10 is satisfactory and that parents cannot manage the extra cost and complexity of a cardiac monitor.

(5) False alarms are referred to as 'anxiety-provoking' but they can be reassuring and, with the MR 10 on a healthy baby, only one or two alarms a month may occur.\(^4\)

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Drs Greenough and Robertson comment:

We thank Dr Tarnow-Mordi and his colleagues for their letter and their interesting results. As they say we were concerned that fast rate ventilation (greater than 100/min) could worsen pulmonary interstitial emphysema by increasing air-trapping, possibly by not allowing sufficient expiratory time,\(^1\) and we would agree that a prolonged expiratory time during fast rate, low pressure ventilation deserves careful evaluation in infants with severe pulmonary interstitial emphysema. One of the problems, however, is that that type of setting is very difficult to achieve with most of the ventilators currently available for neonatal use. It also has to be remembered that in the past when short inspiratory-expiratory ratios at high rates were used initially in the treatment of respiratory distress syndrome, adequate ventilation was only achieved using high peak pressures\(^3\) which were subsequently implicated as an important cause of pulmonary barotrauma.\(^4\)

**Figure**: Proximal airway pressure waveforms during intermittent positive pressure ventilation.
Inspiratory: expiratory ratio and pulmonary interstitial emphysema.

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