neonatal resuscitation, to determine the surface activity and to compare the results with clinical data.

Methods: Suction aspirates and clinical data of 74 individuals were collected with parental consent, weighed and mucus, cell detritus plus large particles were removed. Subsequently the samples were ultracentrifugated. The pellet was resuspended at a ratio of 60µL/1g of original sample size. Then surface tension of 1-5µL of the samples was determined after 5 min adsorption to a ~20µL bubble in the CBS using sucrose as a surfactant hypophase.

Results: Surface tension of aspirates of neonates with a bw < 1500g was 48.6±5.4mN/m (Mean±SD) and significantly increased compared to individuals >2000g (35.8±9.9; p< 0.01). Absorption surface tension in non-ventilated neonates was significantly lower (34.1±9.8mN/m) compared to CPAP treated neonates (47.8±7.4 mN/m; p< 0.05) or mechanically ventilated individuals (48.4±5.6 mN/m; p< 0.01)

Conclusions: Small volume airway samples from neonatal aspirates may be used to determine biophysical activity of the surfactant system quantitatively using the CBS. The obtained data correlate with the clinical course, birth weight and the mode of ventilatory support.

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PULSE OXIMETRY SCREENING FOR DETECTION OF CRITICAL CONGENITAL HEART DISEASE IN THE UNITED KINGDOM

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Background and aims: Pulse oximetry screening (POS) has been proposed as an effective and non invasive screening tool to increase the detection of critical congenital heart disease (cCHD). The objective of our survey was to assess the current practice in UK neonatal units.

Methods: Level 3 and level 2 units in the UK were contacted to participate in a telephonic questionnaire in April 2010.

Results: All 135 units contacted agreed to participate in the survey.20(15%) units are currently practising routine POS. POS is usually performed before 24 hours in all units either by a trained nurse or doctor. Four centres were part of a multicentric trial in 2008-09. Saturation of < 95% in either limb (right hand or any foot) or ≥ 3% difference between the two is considered significant (positive). In the remaining 16 centres postductal saturation of < 95% in the foot is considered positive. A second reading is obtained in all positive cases within next 2 hours and if still positive, a senior review followed by early echocardiogram is undertaken. All units expressed that a saturation reading of < 90% in a baby who has no other obvious cause warranted an urgent echocardiogram.

Conclusion: Two large trials in Europe have recommended that POS should be used as an adjunct to postnatal examination to improve detection of cCHD. Our survey shows that a minority of centres are practising POS in UK and are using different crtieria. With mounting evidence, all units should consider adopting POS as a scrrening tool.

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HIGH-SPEED VIDEO ANALYSIS OF HIGH-AMPLITUDE BUBBLE-CONTINUOUS POSITIVE AIRWAY PRESSURE DEMONSTRATES THAT "WATER HAMMER" EFFECTS CAUSE LARGE OSCILLATIONS IN AIRWAY PRESSURE

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Background and aims: We have shown, in lavaged rabbits, that High-Amplitude Bubble-Continuous Positive Airway Pressure (HAB-CPAP,see figure) provides greater gas exchange and lower work of breathing than conventional bubble-CPAP (PedsResearch,June,2010). The mechanisms generating the high amplitude pressure waves are the focus of this study.

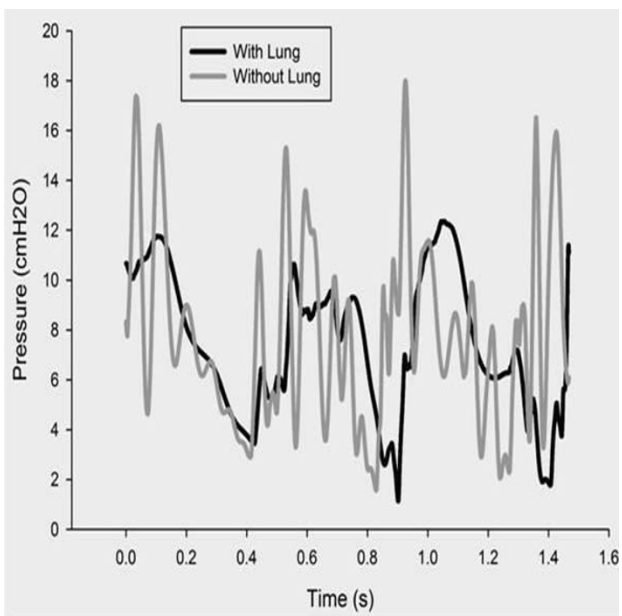
Methods: A high-speed camera (PhantomV9.1;900frames/s) was used to visualize, simultaneously, the bubbling action in the HAB-CPAP device and airway pressures (Paw) measured in the patient circuit. Signals were generated with/without an infant lung model attached to the patient circuit. Measured changes in Paw were compared with calculated values obtained using a force balance.

Results: Videos revealed sharp increases in Paw concomitantly with the release of bubbles. Water appears to rush down the inclined tube and transfers momentum to the air it contacts, producing a water hammer effect. The rapid rise in

pressure was followed by rarefaction as the wave propagates through the air system. The waveform without the lung model, see figure, is similar to an under-damped mechanical oscillator. Adding the lung model resulted in an over-damped system and appeared to act as a RCI filter removing the high-frequency components. A typical sharp pressure rise was 19.8 cmH2O with a calculated value of 17.1 cmH2O.

Conclusions: The “water hammer” effect can account for the sudden oscillations in Paw. Lung mechanics dampen these pressure oscillations suggesting that the stiffer the lung, the greater the oscillations in Paw.

[HABCPAP]



[Pressure Signal Overlay]

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WHEN TO TREAT NEONATAL JAUNDICE: IS THERE ANY EVIDENCE?

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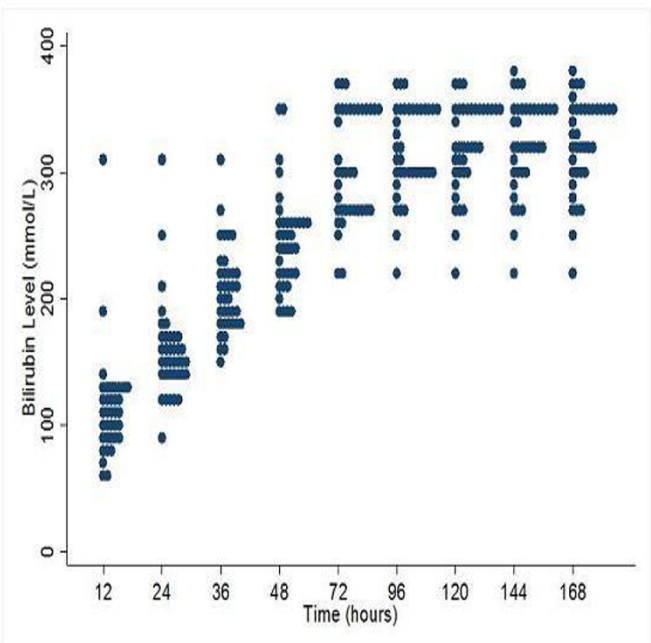
Objectives: To analyse if the currently used jaundice action charts are evidence based.

Methods: We contacted 72 neonatal units in the Great Britain and enquired about the unit guidelines for management of neonatal jaundice. The jaundice action charts were analysed to explore the variation between different charts. The time at which the threshold value for treatment reached a plateau was recorded.

Results: Of the 72 units contacted 46 responded with charts. Four neonatal units were using formulas and one hospital was using separate chart for each gestation. The data displayed wide variation in treatment levels (phototherapy and exchange transfusion) at 12 to 168 hours in the three gestational groups studied (28, 32 weeks and term). There was no reference of evidence quoted in the jaundice action charts.



[Term phototehrapy data]