Infant Response to Monitoring Breath Sounds in the Newborn ICU: Electronic Remote vs. Stethoscope

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Background Introduction:
Auscultation of infant lung sounds may cause them disturbance. That disturbance may compromise the patient’s well being. The infant’s agitation may effect the quality of breath sounds. Bedside nurses may try to protect the babies environment by limiting RT access to the patient. We wondered if breath sounds could be monitored without disturbing the infant.

New electronic means of auscultation are marketed that may offer a means to reduce disturbance of infants. We took three different measurements of infant response to assess whether there was a significant difference between remote electronic and stethoscope auscultation.

Method
Twenty events of lung sound auscultation were monitored. Half were monitored by stethoscope and half by pre-placed electronic biological sound sensor. Each patient served as their own control. No patient was auscultated unless the normal care plan called for it. Wires from these sensors ran to the outside of the infant’s isolette, where they connected to the auscultation device. Five mechanically ventilated breaths were monitored. Infant motor response was assessed by NIDCAP trained nurses before during and after sound auscultation. Respiratory Therapists monitored for changes in ventilator synchrony (per waveform monitoring) and O2 saturation (per pulse oximetry). Infant state (wakefulness) and attention related responses (e.g. fussing,) were not documented.

Results
Results showed that stethoscope auscultation had significant effect on infant O2 saturation, autonomic (ventilator synchrony) and motor response. Remote sensing of sounds had no obvious response in the patient.

Discussion
All monitored parameters showed disturbance during stethoscope auscultation with some prolonged effect five minutes afterwards. P/V curve stability was the most consistent indicator of disturbance.

Disturbance was often noted at five minutes after stethoscope auscultation. The remote electronic sensor, once placed on the skin, does not create disturbance during monitoring. Remotely monitored sounds are of very high quality & may be recorded.

Conclusions
Hands are vectors for infection. Contact of the (often cold) stethoscope disturbs the patients sleep pattern, & causes O2 desaturation, agitation of the patient, effects the breathing pattern & ventilator synchrony. A breath sound monitoring system may be placed on an infant so that the infant state is not disturbed and sound may thereby be more effectively analyzed. The electronic system tested cost $250 for the monitor and $5 each for the sensors. A reusable stethoscope (ideally dedicated to individual patient) may be purchased for ~$70.

New forms of electronic sensors are under development that promise to cover less skin and transmit sounds wirelessly.

* NIDCAP – Newborn Individualized Developmental Care & Assessment Program provides a neurologic assessment system for newborns.