

Digital Stethoscope Utility in NICU, SCN, and LDRP Patients

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Introduction: To this day, abnormal auscultatory findings on acoustic examination of the cardiovascular system remains the most common reason for referral to a cardiologist. Three limitations exist with acoustic stethoscopes: 1) high selective sensitivity requirement is needed; 2) easy disruption by ambient environmental noise; 3) subjectivity of interpretation based on the provider's experience, skills, and auditory proficiency. The introduction of digital stethoscopes offered a solution to the limitations of the traditional acoustic stethoscope while at the same time broadening the diagnostic potential of such devices: 1) improvement in sound quality; 2) amplification of the acoustic signal; 3) reduction of ambient noise. The objectives were: 1. To determine the accuracy of the digital stethoscope when used in neonatal intensive care unit (NICU), Special Care Nursery (SCN), and Labor & Delivery Recovery Postpartum (LDRP) patients; and 2. To determine if its use leads to improved detection rates of cardiac pathologies compared to the use of a classic acoustic stethoscope.

Methods: This is a single center, prospective study of neonates in the NICU, SCN, and LDRP at Ascension St. John Children's Hospital. After obtaining informed consent, infants were examined using both acoustic and electronic stethoscopes by trained residents. Data from chart review and echocardiography were also collected. Results from the two stethoscopes were compared to each other and to echocardiographic findings. Data were analyzed using Student's t-test, the χ^2 test and the McNemar χ^2 test.

Results: The study included 15 infants, mean of 33.3 ± 3.8 weeks' gestation at birth, 46.7% female (7/15) and 66.7% (10/15) black. Of the 15 patients evaluated, for the differential diagnosis and the ECHO results, there was 56% (5/9) better agreement with the electronic stethoscope, 33% (3/9) equivocal agreement between the electronic and acoustic stethoscopes, and 11% (1/9) worse agreement between the electronic stethoscope differential diagnosis and the actual ECHO results.

Conclusions: There is a trend towards better agreement between the electronic stethoscope differential diagnosis and the actual ECHO results. A larger sample size is needed to determine true statistical significance of the data and probability.