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TITLE: Cost Analysis of Heart Rate Characteristics Monitoring in the NICU
Background: Heart rate characteristics (HRC) monitoring in very low birth weight (VLBW; <1500 g birth weight) infants has been shown to decrease mortality. However, the use of HRC monitoring is not widespread likely due to the costs associated with the technology. The effects of sepsis are not limited to morbidity and mortality; financial costs can also be significant. Sepsis laboratory evaluation, antibiotics, and extended hospital stays all contribute to financial burden. Determining the incremental cost associated with HRC monitoring may provide additional justification for its use.
Objective: To develop a cost analysis of HRC monitoring for VLBW infants.
Design/Methods: A cost analysis was performed using a decision-tree model consisting of probabilities of sepsis evaluation, culture proven sepsis, and mortality in VLBW infants who were or were not HRC monitored. A PubMed search for publications reporting rates of sepsis evaluation, sepsis, and mortality in VLBW infants was performed. Base case estimates of sepsis evaluation (82%) and sepsis (25%) were used. The base case rate of mortality with and without HRC monitoring was 12% and 20% respectively. Incremental cost of HRC monitoring was $2000 per bed per year using manufacturer data ($333 per patient with an average VLBW length of stay). Median hospital costs were collected from the HeRO randomized controlled trial participants at our center. A sensitivity analysis was performed to determine the incremental cost of HRC monitoring across published rates of sepsis evaluations (5-95%), sepsis (4-30%) and mortality (3-44%).
Results: The average hospital cost per patient with HRC monitoring was $78,674 vs $79,981 in those not monitored. In those infants with sepsis who survived, the HRC monitored group had a lower attributed cost compared to those who were not monitored ($133,984 vs $159,740). A sensitivity analysis demonstrated lower attributable costs at a mortality rate of <27.2% in unmonitored and across all published mortality rates in monitored patients. Additionally, across all rates of sepsis, HRC monitoring holds a cost advantage. Two-way analysis varying HeRO cost and sepsis probability demonstrated lower attributed costs for HRC monitoring across the majority of published sepsis rates and expected HRC monitoring costs. (Figure)
Conclusion(s): HRC monitoring provides a small cost advantage across the majority of published rates of sepsis and mortality. This cost advantage in addition to improved survival rates supports the use of HRC monitoring in high-risk NICU patients.
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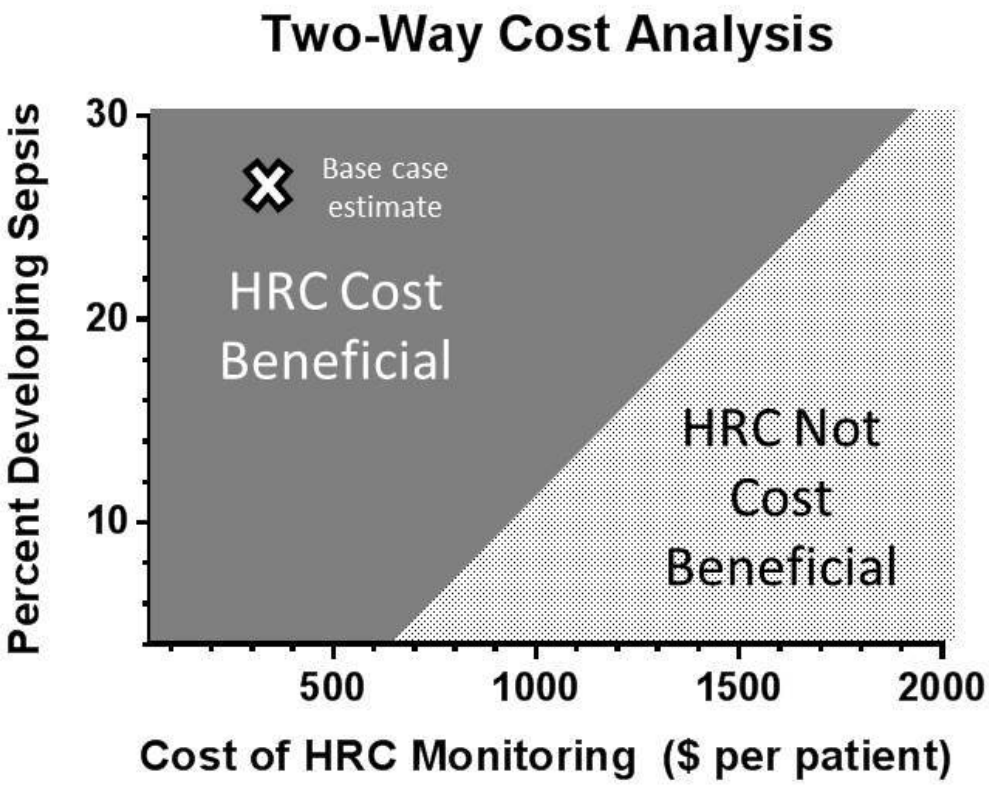

Two-Way Cost Analysis of HRC cost and sepsis probability. X marks base case estimates ($333 and 25%).

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