Pulsatility Index in Term and Preterm Newborns during Transition

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Background

Pulse oximeter-derived pulsatility index (PI) has recently emerged as an indicator of peripheral perfusion. The PI represents a ratio of the pulsatile (arterial) blood flow versus the non-pulsatile blood flow at the monitoring site, and is dependent on the amount of blood at that site. Decreased PI is indicative of peripheral underperfusion and can be an early indicator of variety of illnesses that include hemodynamic compromise. *Objective*: To determine the pulsatility index in normal, term and preterm newborn infants during the first 30 minutes of life.

Design/Methods

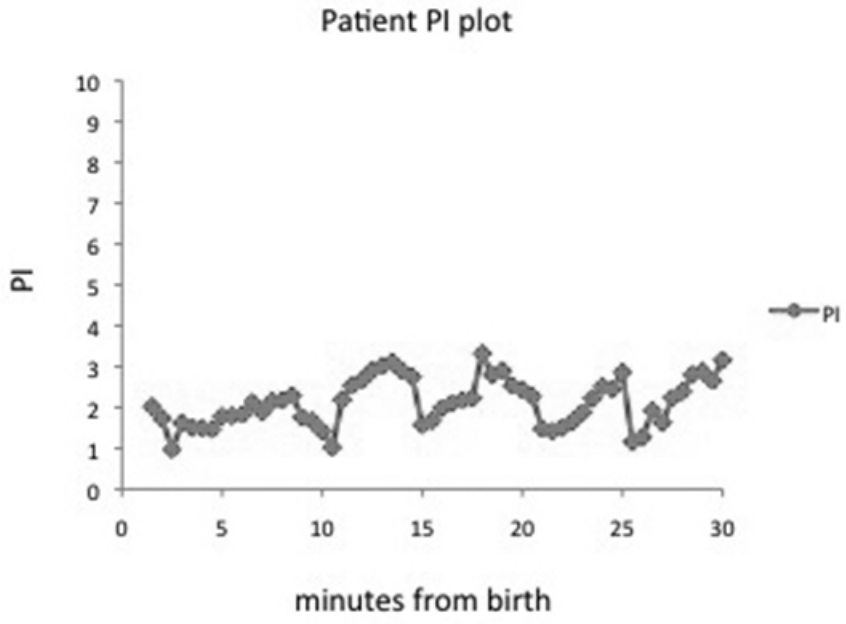
The study is a prospective observational study in term (>37 weeks) and preterm (<37 weeks) neonates. At delivery, consented infants had a Masimo LNOP Neo-L SpO2 sensor placed on their right wrist with PI data recorded every 30 seconds in conjunction with other vitals. Sensors were placed within 30 seconds after cord clamping; most data points were available within two minutes after delivery. The data are plotted against time, with statistical analysis at specific time points.

Results

The study is ongoing, with over 50 normal term newborns currently enrolled, and enrollment of preterm infants underway. Pulsatility index as measured on the right wrist ranges during the first 30 minutes of life is relatively stable with a median of 1.92, and interquartile range of 1.15 to 2.87, and a range of 0.92 to 7.39. Plotting of PI with time demonstrates that the PI is relatively stable from early time points after delivery through transition, despite the circulatory changes inherent to extrauterine adaptation.

Conclusions

These results are among the first to demonstrate the range of pulsatility index (PI) readings during transition in normal newborns. The PI data collected thus far are similar to data collected from normal infants well after transition, demonstrating that extrauterine circulatory adaptation as measured by PI occurs rapidly. These PI data may serve as a reference for normal newborns during transition.


Patient PI plot
PI
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
minutes from birth
PI