Perfusion Index (PI)

What is PI?

- Perfusion Index, or PI, is a relative assessment of the pulse strength at the monitoring site.

- PI display ranges from .02% (very weak pulse strength) to 20% (very strong pulse strength).

- Perfusion Index is a numerical value that indicates the strength of the IR (infrared) signal returning from the monitoring site.

- The LED-based Masimo pulse oximeters such as Rad-5 and Rad-5v display PI as the Pulse Amplitude Index (PAI) where the height of the bar represents the pulse strength. Low PAI is indicated by the lower two bar segments turning red.

- PI is a relative number and varies between monitoring sites and from patient to patient, as physiologic conditions vary.

How do I use PI in a clinical setting?

- During sensor placement, use PI to quickly evaluate the appropriateness of an application site, looking for the site with the highest PI number.

- Placing the sensor at the site with the strongest pulse amplitude (highest PI number) improves performance during motion. Monitor the trend of the PI for changes in physiologic conditions.

- Changes in sympathetic nervous tone affect smooth muscle tone, thereby altering levels of perfusion.[1]

How does PI work?

- The Masimo SET infrared signal is influenced primarily by the amount of blood at the monitoring site, not by the level of oxygenation in the blood.

- The ratio of AC (pulsatile) to DC (non-pulsatile) components of the IR (infrared) signal correspond to the pulsatile and the non-pulsatile amounts of blood.

- The relationship of the pulsatile to the non-pulsatile amounts of blood at any particular site corresponds to PI at that site.

Has PI been clinically validated?

- Preliminary data suggest high PI values correspond with health and low PI values with illness on neonates.[2]

References

1. Hager H, Reddy D, Kurz A. Perfusion Index - A Valuable Tool To Assess Changes in Peripheral Perfusion Caused by Sevoflurane? Anesthesiology 2003;99:A593 (www.asa-abstracts.com).

2. De Felice C, Latini G, Vacca P, Kopotic RJ. The pulse oximeter perfusion index as a predictor for high illness severity in neonates. Eur J Pediatr 2002; 161:561-562.

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