Masimo SET Technology Using Perfusion Index is a Sensitive Indicator for Epidural Onset
Kakazu C.Z., Chen B.J., Kwan W.F. *Proceedings of the 2005 Annual Meeting of the American Society of Anesthesiologists*, A576

Introduction
Toe perfusion index (PI) is an early objective monitor that detects proper epidural catheter placement. (1) A rise in PI occurs before a drop in blood pressure or onset in analgesia; affording the anesthesiologist to predict its efficacy before the block sets in. Although, a rise in PI is a reliable predictor of a functioning epidural catheter, little is known about its sensitivity. Therefore, we conducted a study to determine whether a small amount of local anesthetic (3mL of 1.5%lidocaine with 1:200,000 epinephrine [standard test dose]) injected into the epidural space resulted in a PI increase.

Methods
Pulse oximetry with tissue perfusion index (Masimo Radical) was used. The probe was placed on the toe before the epidural was performed. Baseline blood pressure (BP), heart rate (HR), and perfusion index (PI) were recorded prior to epidural placement. Epidural catheter was inserted either at the L2-3 or L3-4 spinal level and threaded 4 to 5cm in the epidural space. After a negative test dose with 1.5%lidiocaine plus 1:200,000epinephrine the PI was record every minute. After waiting 5minutes the epidural catheter was then incrementally loaded with 0.25%bupivicaine. Epidural sensory level, BP, HR, and PI were measured at different intervals for 20minutes.

Results
A total of 16 laboring paturients were studied. Paired t-test comparing baseline PI vs 5min PI, baseline PI vs 20min PI and 5min PI vs 20min PI shown below with their P values, respectively. The graph represents the 1st thru 3rd quartile at baseline, 5 minutes, and 20 minutes each with standard deviation bars.

Discussion
PI is a sensitive indicator of a standard test dose of 1.5%lidocaine with 1:200,000 epinephrine (p-value=0.0001). Even after a considerably small amount of local anesthetic solution (3mL) is administered the average PI change from baseline to 5 minutes doubled. Early detection of proper catheter placement is paramount in the obstetrical patient. We have devised a sensitive and reliable monitor for early detection of epidural anesthesia onset by measuring tissue perfusion changes in the lower extremities.

1) Clinton Z Kakazu, M.D., Tanzhen Wu, M.D., Biing-Jaw Chen, M.D. and Wing-Fai Kwan, M.D.;Toe Perfusion Index as an early detection device for Proper Epidural Catheter Placement in Obstetrical Patients. Anesthesiology 2004, A-1187

Figure 1

Paired t-test
Hypothesized Difference = 0

	Mean Diff.	DF	t-Value	P-Value
Baseline PI, 5 min PI	-1.845	15	-5.171	.0001

Paired t-test
Hypothesized Difference = 0

	Mean Diff.	DF	t-Value	P-Value
20 min PI, Baseline PI	6.269	15	8.335	<.0001

Paired t-test
Hypothesized Difference = 0

	Mean Diff.	DF	t-Value	P-Value
5 min PI, 20 min PI	-4.424	15	-5.687	<.0001

Box Plot