Perfusion Index via the Finger and Toe during Cesarean Section by Spinal Anesthesia

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Introduction

The perfusion index (PI), which is the ratio of the pulsatile blood flow to the nonpulsatile or static blood in peripheral tissue, represents a noninvasive measure of peripheral perfusion that can be continuously and noninvasively obtained from a pulse oximeter. It has been reported that PI via the toe can be an early objective monitor that detects proper epidural catheter placement for labor analgesia. However, it has not been studied if PI via the toe can detect proper spinal anesthesia for cesarean section. As spinal anesthesia for cesarean section often causes supine hypotension syndrome, which may reduce PI via the toe, it seems to be interesting to study if PI via the toe can detect proper spinal anesthesia for cesarean section. In the present study, we measured PI via the toe and finger before and after spinal anesthesia for cesarean section.

Methods

Pulse oximetry with tissue perfusion index monitor (Masimo Radical) was used. Two probes were placed both on the left finger and toe, and then spinal anesthesia was performed at the right lateral position. After intrathecal administration of 10mg of hyperbaric bupivacaine, 25mcg of fentanyl, and 0.1mg of morphine, the patients were returned to the supine position and the operating table was tilted around 15 degrees to the left to prevent supine hypotension syndrome. Attending anesthesiologist, who was not allowed to see PI via the toe, checked an anesthetic level of the patients by cold sensation test and treated hypotension after spinal anesthesia as usual. After the operation, PI from the finger (PI-Finger), PI from the toe (PI-Toe), and PI-Ratio (PI-Toe/ PI-Finger) was calculated and analyzed before and after spinal anesthesia.

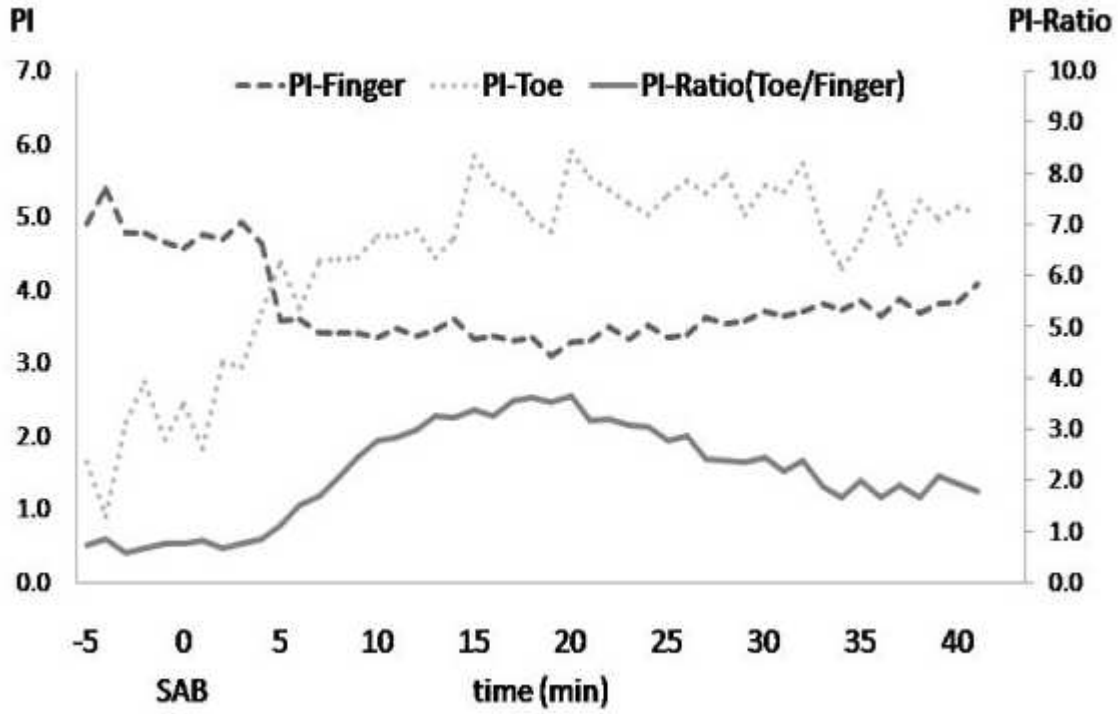
Results

A total of 30 patients were studied. PI-Toe significantly increased within 5min, whereas PI-Finger showed precipitous drop at 5min after the spinal anesthesia. As a result, PI-Ratio significantly increased within 5min.[figure1]

Discussion

PI via the toe could detect proper spinal anesthesia for cesarean section when supine hypotension syndrome was treated appropriately. It is interesting to note that PI via the finger decreased significantly, possibly reflecting a blood shift to lower part of the body. It seems to be useful to put a pulse oximetry probe at the toe to detect a proper spinal anesthesia for cesarean section.

Figure 1


PI
PI-Ratio
PI-Finger
PI-Toe
PI-Ratio(Toe/Finger)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-5
0
5
10
15
20
25
30
35
40
SAB
time (min)