Use of Perfusion Index as an Indicator of Microvascular Insufficiency - A Case Report
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During microsurgical operations of the hand the digital vessels are very susceptible to vasospasm. Regional blockade helps both prevent vasospasm as well as improves postoperative pain management. We present a case involving microsurgical re-implantation of amputated thumb and a monitoring technique to evaluate adequacy of perfusion of the re-implanted digit. 36 yrs old male underwent microsurgical re-implantation of left thumb. General anesthesia was administered along with continuous infra-clavicular brachial plexus block using ropivacaine. The re-implanted thumb appeared pink at the end of surgery, however, in the recovery room the Phillips CMS system oximeter showed no plethysmographic waveform and intermittent SpO2, raising concern over the perfusion in the re-implanted digit. At this time we used a Masimo Radical 7 pulse oximeter, which demonstrated a Perfusion Index (PI) of 11 and Pleth Variability Index (PVI) of 7 on the middle digit of the left (blocked) hand and a PI of 0.4-1 and PVI of 28-32 on left hand re-implanted thumb. The PI and PVI on right (non-blocked) hand digit were 4.67 and 11 respectively. Based on these results perfusion was considered adequate and the patient did not require further operation.

The higher PI value on left compared to right hand digit was secondary to sympathetic blockade resulting in vasodilatation. The low PI and higher PVI value on the re-implanted left thumb was possibly due to local microvascular insufficiency. The abnormally elevated PVI in this digit indicates that damage to microvascular circulation can cause significant changes in PVI.
The additional data, including the PI and the ability to read at low perfusion states provided by the Masimo pulse oximeter allowed us to determine the efficacy of the regional block and the adequacy of perfusion to the re-implanted digit.

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