The Clinical Role of Intraoperative Core Temperature In Free Tissue Transfer

J. Bradford Hill, MD; Kevin W. Sexton, MD; Gabriel A. Del Corral, MD; Ashit Patel, MBChB, MRCS; Oscar D. Guillamondegui, MD, MPH; Jesse M. Ehrenfeld, MD, MPH; R. Bruce Shack, MD

Abstract

Background: Lengthy microvascular procedures carry hypothermia risk, yet limited published data evaluates the overall impact of core temperature on patient and flap morbidity.[1] While hypothermia may contribute to complications, warming measures are challenged by conflicting reports of intraoperative hypothermia improving anastomotic patency.[2-5]

Methods: A retrospective review included all free flaps performed by plastic surgeons at an academic medical center from December 2005 to December 2010. Intraoperative core temperatures were measured by esophageal probe and median values recorded over five-minute intervals yielded a case mean (T_{avg}), maximum (T_{max}) and nadir (T_{min}). Outcomes included flap failure, pedicle thrombosis, recipient site infection and complications associated with patient and flap morbidity. Analysis utilized Student's T-test, Fisher's exact test, Probit and logistic regression.

Results: Of 156 consecutive free tissue transfers, the median T_{avg}, T_{max} and T_{min} were 36.5°, 37.1°, and 35.8°C, respectively. The flap failure rate was 7.7%[12/156] and pedicle thrombosis occurred in 9[6%] cases. Core temperatures did not associate with overall flap failure or pedicle thrombosis but recipient site infection occurred in 21[13%] patients who had significantly lower mean core temperatures (T_{avg} = 36.0°C, $p < 0.01$). Lower T_{avg} and T_{max} significantly predicted recipient site infection ($p < 0.01$, $p < 0.05$, respectively). Probit analysis revealed T_{avg} predicted recipient site infection in a statistically significant exposure-response relationship ($p < 0.01$) [Figure 1]. Cut-point analysis revealed significant increases in recipient site infection risk at $T_{avg} < 37.0$°C ($p = 0.026$) and $T_{min} \leq 34.5$°C ($p = 0.020$) [Figure 2].

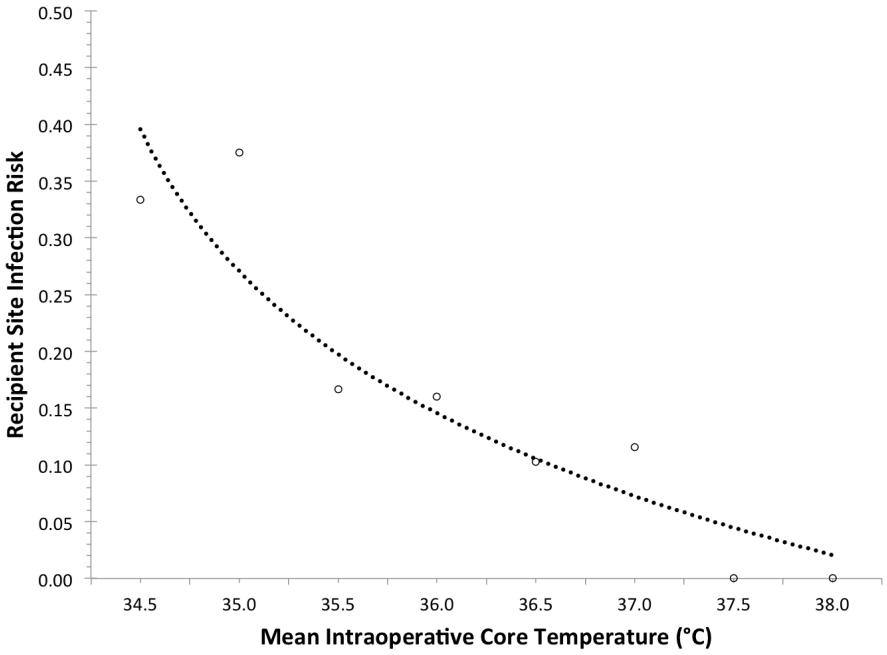

Figure 1. Recipient site infection risk by mean intraoperative core temperature. Points represent observed risk and trend-line illustrates predicted risk.

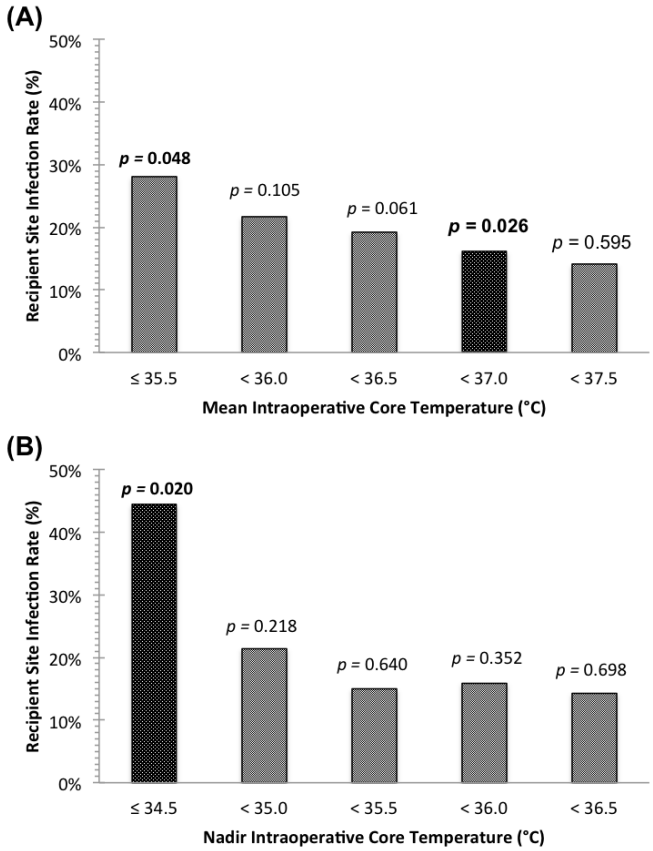

Figure 2. Cut-point analysis of recipient site infection by (A) mean and (B) nadir core temperatures.

Conclusions: Intraoperative hypothermia posed significant risk of flap infection with no benefit in anastomotic patency. These findings support diligent maintenance of normothermia in free tissue transfer.

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