No sustained improvement in tumor oxygenation after localized mild hyperthermia.

Abstract:
This study has attempted to address the controversy concerning sustained increases in tumor oxygenation upon localized mild hyperthermia. While some previous studies have reported transient increases, others have reported persistent increases in tumor oxygenation, lasting for up to 2 days after application of mild hyperthermia. In order to determine changes in oxygenation at clinically relevant tumor temperatures, experimental tumors in rats underwent localized hyperthermia at either 40, 41.8 degrees C or 43 degrees C for 1 h using water-filtered infrared-A irradiation. Oxygenation was continuously measured before, during and up to 60 min after hyperthermia in the tumors of anesthetized rats using oxygen-sensitive catheters. The data obtained indicate that localized hyperthermia can lead, on average to an improved tumor oxygenation, although this improvement is generally transient and no longer evident 1 h after heating. Since clinically relevant increases in oxygenation enduring beyond the heating period were rarely seen, it would appear that an improvement in the efficacy of oxygen-dependent cancer therapy is unlikely to be achieved in the post-hyperthermia period.