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Clinical trials in breast and bladder cancer: Thermally enhanced chemosensitization and drug delivery

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Over the past decade, hyperthermia (HT) researchers have made cutting edge advances in HT augmented delivery of liposomal drugs. The performance characteristics of temperature sensitive liposomal formulations containing chemotherapeutic agents are far superior to other formulations largely because of the rapid release characteristic at temperatures between 40 and 42°C and a significant improvement in drug delivery. Several preclinical studies provided compelling rationale to initiate a number of clinical trials that will be presented. In a phase I trial of low temperature sensitive liposomal Doxorubicin (Thermodox) and HT for breast cancer patients with chestwall recurrence, toxicities have generally been those that are typical for doxorubicin and no dose limiting toxicities have been observed thus far. With respect to clinical response within the heated fields, results are quite encouraging. In a Phase I/II study, neoadjuvant liposomal Doxorubicin, Paclitaxel, and HT was shown to be a safe and effective strategy for improving pathological response rates and surgical outcome in patients with LABC. The encouraging results from a pilot study of external HT and intravesical Mitomycin C (MMC) to treat recurrent bladder cancer after resection and standard adjuvant therapy are likely due to the effects of HT on bladder permeability as well as synergistic interaction between HT and MMC to enhance cytoxocity of MMC. This trial has established the basis for a subsequent trial using thermally targeted intravesical drug delivery which could further improve local control rates beyond what is achievable with the current best conventional therapy.