

Combination treatment with radiation and alternating electric fields causes increased apoptosis in pancreatic cancer cell lines

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Purpose: Tumor treating fields (TTF) therapy is a non-invasive method that uses alternating electric fields to treat various types of cancer. This study demonstrates the combined effect of TTF and radiotherapy (RT) in vitro on pancreatic cancer, which is known to be difficult to treat.

Materials and Methods: In CFPAC-I and HPAF-II pancreatic cancer cell lines, the combined in vitro effect of TTF and RT was evaluated by measuring cell counts, markers of apoptosis, and clonogenic cell survival. The synergy effects were verified using the Valeriote and Carpentier equations.

Results: TTF and RT inhibited cancer cell growth more effectively than did monotherapy with TTF or RT. The combined treatment also enhanced apoptosis more than monotherapy, as shown by assays for cleaved poly (ADP-ribose) polymerase (PARP) and annexin V. In addition, on the survival curve, this treatment method has been shown to work synergistically.

Conclusions: These results suggest that combined treatment with TTF and RT may be a good alternative treatment for patients with pancreatic cancer.

Keywords: Alternating electric fields; Tumor treating fields; Radiotherapy; Pancreatic cancer; Combined therapy