ABSTRACT

Cryosurgery is a surgery technique to combat cancer tissue by utilizing extremely cold liquid nitrogen in an equipment called cryoprobe. The purpose of cryosurgery is to maximize the coagulation inside the cancer tissue ant to minimize the damage in the healthy tissue. In this project, cryoprobe optimization by simulation was done in the cryosurgery process of prostate cancer by using bubble packing method. Bubble packing method was used to optimize the cryoprobe position in the cryosurgery process of prostate cancer. The heat transfer in the cancer area by using finite difference method of one and two dimention. The heat transfer of one dimention was done until steady state condition was reached. The results of one dimention numerical analysis was compared with exact solution as a reference, so that average relative error was obtained with the lowest value of average relative error as 0.0106786%, one dimentional numerical solution can be accurately accepted in the two dimentional system. By using bubble packing method in the two dimentional simulation, the optimum 10 cryoprobes position was obtained with faster heat transfer compared to 4, 5, 6,7 ,8, and 9 cryoprobes which was around 93 seconds.

Keywords: cryosurgery, bubble packing, prostate, finite difference method