Pre-calculation of the dose distribution produced by evenly spaced radioactive seeds aligned in a needle, such as I-125 Rapid StrandTM, provides shortcut in treatment planning for ultrasound guided prostate implants. In cylindrical coordinates, we reduced the two-dimensional dose distribution produced by n+1 I-125 seeds with 1 cm spacing to a one-dimensional function by averaging the dose over *n* cm length along the *z* direction at various radii. Each set of data is fitted by a polynomial function of r. The largest dose variation in *z* coordinates for r > 0.5 cm is found to be about 30% with n = 1, 2, 3, 4, and 5. The dose distribution of parallel seed arrays can be approximately calculated using these reduced dose functions. To find the optimized treatment plan we project all the transverse cuts of the target volume on the guiding template. The number of overlapped cuts projected at a template hole determines how many seeds to implant and which precalculated dose function to apply if that needle location is used. The desired dose distribution in the target area is weighted based on the length of the target at the calculating points and the dose non-uniformity along the z-axis to ensure that the base and apex of the target are not cold. In summary, we have developed a method of fast dose calculation in treatment planning for prostate implants: whatever optimization strategy is to be used, only a two dimensional target needs to be considered.