Direct application of Monte Carlo calculations for brachytherapy patient dose computation remains intractable due to the enormous time requirement. We propose a direct calculation method based on the use of spatial data structures derived from oct-trees and quad-trees. Typically the secondary effects for a given photon collision are inversely related to the distance from the primary voxel. This allows for approximation of the scatter effect due to a collision at a proximate point that is far away from the point of interest by the scatter effect due on a single point at the center of this cluster. This process is repeated for each collision of a given photon history in Monte Carlo simulations. The approximation is decided if the distance from a collision point to a voxel of interest exceeds a preset threshold. Experimental calculations using a threshold value of 20 mm show that an order of magnitude improvement in time required can be achieved over the Monte Carlo calculations. The maximum error in total dose calculated, relative to the Monte Carlo calculations, is maintained to within 4.5% at distances up to 3.8 cm from a stainless steel encapsulated Ir-192 seed.