CLAIMS

1. A device for implanting radiotherapy seeds in a tumor, comprising:

a delivery tube having a distal end designed to enter the tumor, and defining an internal channel; and

an elongate applicator carrying one or more radiotherapy seeds each having a length of at least 1 millimeter, the elongate applicator passing through the internal channel of the delivery tube,

wherein when a distal end of the elongate applicator is near the distal end of the delivery tube, the distal end of the elongate applicator assumes an angle relative to an axis of the delivery tube, such that seeds ejected from the elongate applicator enter the tumor at an angle relative to the axis of the delivery tube.

2. The device of claim 1, further comprising a stylet within the elongate applicator designed to push the one or more radiotherapy seeds relative to the elongate applicator so as to eject the one or more radiotherapy seeds from the elongate applicator into the tumor, when the distal end of the elongate applicator is in the tumor.

3. The device of claim 2, further comprising a stylet handle configured to accurately push the stylet relative to the elongate applicator by an extent equal to the length of a seed at the distal end of the elongate applicator.

4. The device of claim 3, wherein the stylet handle is configured to push the stylet while holding the elongate applicator stationary.

5. The device of claim 3, wherein the stylet handle is configured to hold the stylet stationary while retracting the elongate applicator.

6. The device of any one of claims 1-5, wherein the distal end of the elongate applicator is configured to eject the seeds from the elongate applicator at an angle of at least 5° relative to the axis of the delivery tube.

7. The device of claim 6, wherein the distal end of the elongate applicator is configured to eject the seeds from the elongate applicator at an angle of at least 30° relative to the axis of the delivery tube.

8. The device of claim 6, wherein the distal end of the elongate applicator is configured to eject the seeds from the elongate applicator at an angle of at least 45° relative to the axis of the delivery tube.

9. The device of claim 6, wherein the distal end of the elongate applicator is configured to eject the seeds from the elongate applicator at an angle of less than 25° relative to the axis of the delivery tube.

10. The device of claim 6, wherein the distal end of the elongate applicator is configured to eject the seeds from the elongate applicator at an angle of less than 15° relative to the axis of the delivery tube.

11. The device of any one of claims 1-10, wherein the elongate applicator comprises a nitinol tube.

12. The device of any one of claims 1-11, wherein the delivery tube is configured to be rotated within the tumor.

13. The device of claim 12, further comprising a rotation mechanism configured to rotate the delivery tube within the tumor by a prescribed angle.

14. The device of any one of claims 1-13, wherein the elongate applicator is configured to carry and eject seeds having a length of at least 5 millimeters.

15. The device of any one of claims 1-14, wherein the distal end of the elongate applicator is configured to assume a bended shape with an angle relative to the axis of the delivery tube, when free of external forces.

16. The device of any one of claims 1-15, wherein the delivery tube comprises a side window toward the distal end of the delivery tube, and wherein the elongate applicator is configured to eject the one or more radiotherapy seeds through the side window.

17. The device of claim 16, wherein the delivery tube comprises two concentric tubes which are rotated relative to each other to open and close the side window.

18. The device of claim 16, wherein the delivery tube comprises a slope near the side window, which causes the distal end of the elongate applicator to assume the angle relative to the axis of the delivery tube.

19. The device of claim 1, wherein the elongate applicator carries at least three seeds.

20. The device of claim 19, wherein the elongate applicator carries at least five seeds.

21. The device of any one of claims 1-20, wherein the elongate applicator has a longitudinal axis and an opening disposed on the longitudinal axis at a distal end of the elongate applicator, for ejection of the radiotherapy seeds.

22. A method of planning a radiotherapy treatment of a tumor, comprising:

acquiring an image of the tumor;

determining a type of the tumor;

determining a coverage of the entire tumor by one or more cylindrical regions, having a diameter not greater than a predetermined maximal diameter corresponding to the determined tumor type;

for each of the one or more cylindrical regions, selecting a number of layers of radiotherapy seeds and a number of radiotherapy seeds in each layer required to provide a sufficient radiation dose to every point in the cylindrical region, wherein each layer includes a plurality of radiotherapy seeds to be implanted from a delivery tube when a distal end of the delivery tube is located at a single point; and

presenting a plan for implanting radiotherapy seeds in the tumor, responsive to the determined one or more cylindrical regions.

23. The method as in claim 22, wherein each layer is cone-shaped.

24. The method as in claim 22, wherein the predetermined maximal diameter is at least 10 millimeters.