

Multiple arc FSRT Conformal FSRT DVH

\* , † , ‡ , § ,  
 \* , \* , \* , \* , † , ‡ , § , \*

\_\_\_\_\_: Multiple arc FSRT(fractionated stereotactic radiotherapy) conformal FSRT DVH(dose volume histogram)

\_\_\_\_\_: 16 1997 8 1998 12  
 12 FSRT AP(Anterior-posterior),  
 lateral ISOLOC  
 IF (irregular factor)  
 multiple arc FSRT conformal FSRT  
 Multiple arc FSRT IF 1-1.2 , Conformal FSRT IF 1.3  
 DVH DVH  
 가 가

\_\_\_\_\_: 1mm Multiple arc FSRT ISOLOC DVH  
 90,91,92,93% 90.6% , conformal FSRT  
 DVH 81,85,87,91% 5%

\_\_\_\_\_: Multiple arc FSRT conformal FSRT IF Multiple arc  
 FSRT conformal FSRT  
 : FSRT, conformal FSRT, DVH

:가 ,

가 가 3Cm .2)

(stereotactic radiosurgery)  
 가 ,

. 1951 Leksell1)

stereotactic radiotherapy) (fractionated

가 ,

가 3Cm ,

.3,4)

arc

가 가

arc

가

1999 6 9 1999 8 13

. 5,7)

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가

arc (multiple arc field shaping)  
 (multiple fixed shaped beams)  
 (beam's eye view)  
 edge  
 가 . 8,9)  
 (conformal radiation therapy)

3,8,10,11)

arc  
 (multiple arc FSRT)  
 (conformal FSRT)

DVH(dose volume histogram)

1998 12 16 1997 8  
 112

CT(Computed Tomography)  
 setup geometry

1. Imaging Study

3 2mm  
 AP(Anterior-Posterior) Lateral scout view  
 CT

CT  
 Upper series, Lower series, Target series  
 scan CT  
 MRI

CT slice 1mm, 1mm Target series  
 margin 3cm  
 1mm, 3mm CT  
 slice setup CT  
 Target series Lower

Upper series 1 mm, 10 mm  
 skull base 5 cm  
 POV  
 (field or view) 25 X 25 cm<sup>2</sup>, matrix size 512 X  
 512, gantry tilt angle 0° CT  
 CT

4 mm DAT tape

2. Presimulation

가 couch  
 (immobilization board) back pad 가 couch  
 head pad  
 가 couch  
 가  
 head cradle 가 head pad  
 head pad  
 plastic bag Mevgreen head cradle  
 CT MRI  
 AP Lat

(small field collimator)  
 가  
 30 X 30 cm<sup>2</sup> 0 90  
 (Fig. 1.)

2~3 MU(monitor unit)  
 (micropositioner) 0  
 floor

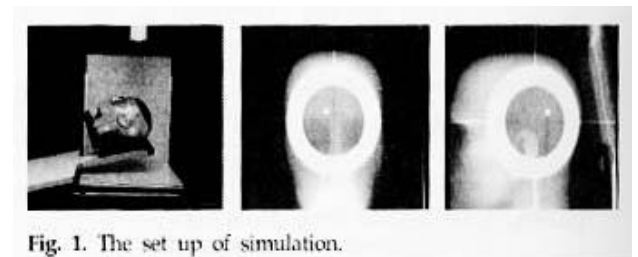


Fig. 1. The set up of simulation.

가 . “4” 가 4  
 AP, Lat . AP Lat 2  
 3  
 digitizer , CT 3  
 (NMPE, U.S.A) , ISOLOC  
 AP, Lat 3  
 ISOLOC 가  
 floor 가 2mm

3. Treatment Plannig

CT

4 arc preference  
 90% 12) 3 mm  
 setup (clinical target volume)  
 2 mm 4 mm가  
 90% 7 mm가  
 13)

CT

IF(irregular factor)

$$IF = \frac{\text{Surface area}}{(10.6 \times \text{Volume})^{0.66}}$$

IF 1 , 가 IF IF AP, Lat 3  
 가 IF 1~1.2 arc arc  
 , IF 1.2~1.3 arc

IF 1.3 가 . (planning  
 target volume)  
 DVH DVH 가 .

ISOLOC 가 DVH 가 .

4. The Verification of Simulation

CT  
 ISOLOC 1mm 가

2 가 .

5. Treatment

MV X- 6

가 가

simulation arc

CL2100C/D (Varian, U.S.A), preference (NMPE, U.S.A) preference TPS 1.0~2.8(NMPE, U.S.A)

AP, Lat 3

ISOLOC

couch  
 1 mm  
 0.8mm . FSRT 16 arc  
 11  
 1 4 , 1 2  
 9 1  
 15 3~5 arc  
 . 3 arc  
 1 (7%), 4 arc 11 (73%), 5 arc 3 (20%)  
 4 arc  
 4 arc transverse arc, sagital arc,  
 right sagital arc, sagital arc , arc

arcs path Fig. 2

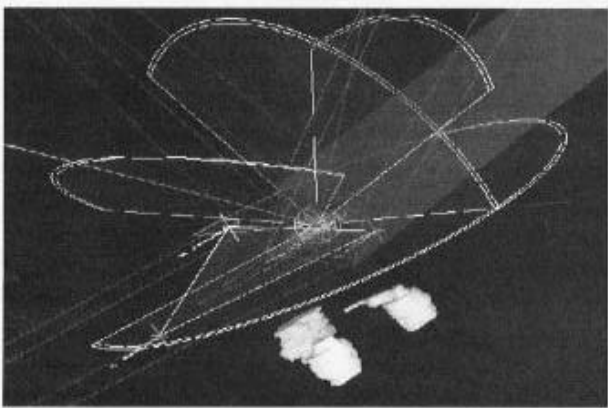


Fig. 2. The arc paths of multiple arc FSRT planning.

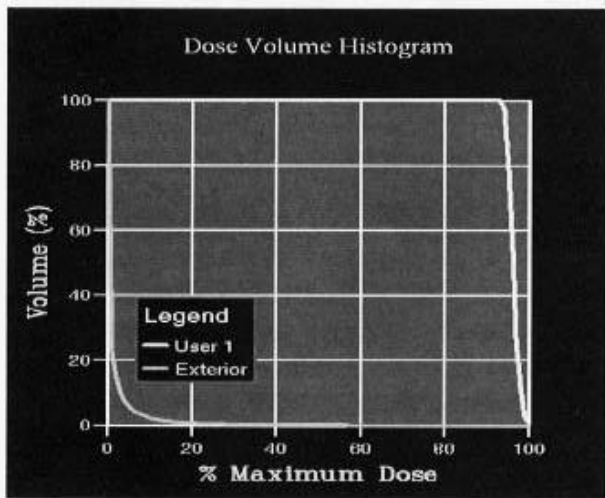


Fig. 3. The DVH of multiple arc FSRT planning.

. Fig. 3 arc  
 DVH .  
 15 arc  
 DVH 90~93% ,  
 90% 가  
 10 (66.7%), 91% 가 2 (13.3%), 92% 가  
 2 (13.3%), 93% 가 1 (6.7%) 90.6% .  
 5 5 , beam  
 ports 5~6 . 5 beam ports  
 1 6 4  
 beam ports .(Fig. 4). DVH  
 81,85,86,87,91%  
 86% .

Fig.5

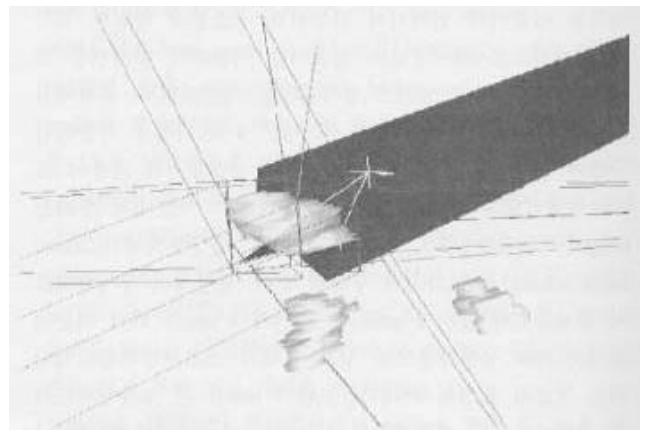


Fig. 4. The ports of conformal FSRT planning.

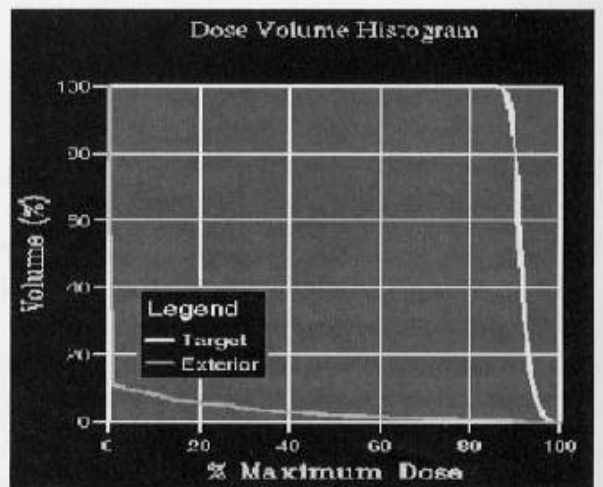


Fig. 5. The DVH of conformal FSRT planning.

DVH  
 가 arc  
 DVH 5%  
 .(Fig. 6,7).

가 3

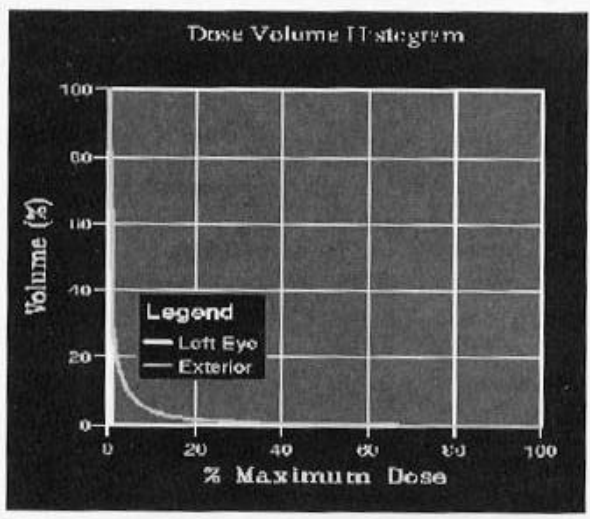


Fig. 6. The DVH of critical organ with multiple arc FSRT planning.

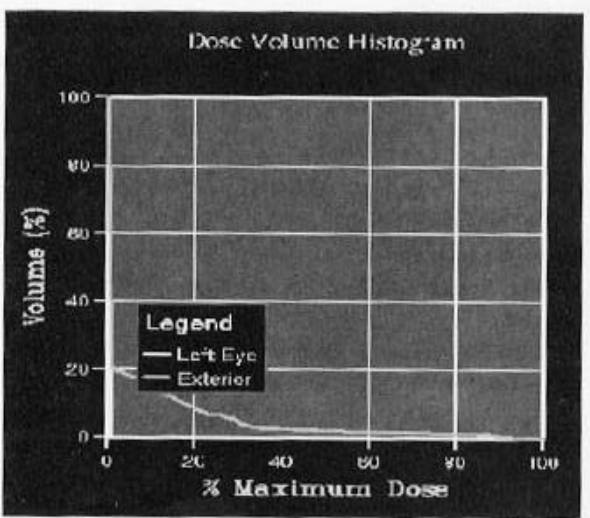


Fig. 7. The DVH of critical organ with conformal FSRT planning.

가 3  
 가 3  
 가 2  
 가 (stereotactic radiotherapy)  
 (noncoplanar) arc  
 ,<sup>14)</sup>  
 DVH arc  
 ,<sup>15)</sup> 4arc  
 6~7 ports  
 ,<sup>11,15)</sup>  
 IF arc  
 가  
 arc  
 DVH arc 81,85,86,87,91%

가 86%  
5%  
arc

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*Abstract*

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The Comparison of DVH between Multiple arc FSRT and Conformal FSRT

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**Purpose:** In FSRT (Fractionated stereotactic radiotherapy) planning, we studied the usefulness between multiple arc FSRT and conformal FSRT by comparing tumor shape and DVH(dose volume histogram).

**Materials and Methods:** In Chungnam Univ. hospital, we had treated the sixteen patients with FSRT from Aug. 1997 to Dec. 1998. In choosing multiple arc FSRT or conformal FSRT, we had considered multiple arc FSRT if tumor shape was similar to sphere or the value of IF was less than 1.25, conformal FSRT if tumor shape was very irregular or IF was more than 1.3. For evaluation of treatment planning, we had considered the appropriate DVH for tumor volume and for critical organs.

**Result:** The errors between reference point and the coordinates point on AP, Lat radiography were less than 1 mm before treatment. We had planned 3~5 arcs for multiple arc FSRT, 5~6pots for conformal FSRT. The mean dose distribution of tumor volume of cumulative DVH between multiple arc FSRT and conformal FSRT was 90.6, 86%, respectively. The dose of critical organs irradiated was less than 5% maximum dose of cumulative DVH.

**Conclusion:** We had obtained the similar value between multiple arc FSRT and conformal FSRT, so that we had appropriate treatment planning of FSRT for multiple arc FSRT and conformal FSRT according to tumor shape and size.

**Key Words:** FSRT, Conformal FSRT, DVH