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RADIATION ONCOLOGY CORE
Global Leaders in Clinical Trial Quality Assurance

IROC RI QA Center Questionnaire for Stereotactic Radiosurgery (SRS) with a Gamma Knife

Return the completed form to: IROC Rhode Island QA Center (QARC)
Building B, Suite 201
640 George Washington Highway
Lincoln, RI 02865-4207

This questionnaire, with the requested information, must be submitted to IROC RI QA Center before patients can be placed on a stereotactic protocol. The data will be used by IROC RI QA Center in the review and verification of protocol treatments.

Check the applicable boxes and write in the requested information. Wherever it says "Describe", you may submit a published paper, an internal report, the vendor's descriptive literature, or provide a short description. Use additional pages, if necessary.

Please complete a sample RS-1 patient dosimetry summary form for a non-protocol patient treated in your institution.

If you have questions, please call the IROC RI QA Center Protocol Dosimetrist at 401-753-7600 or fax 401-753-7601 or email Physics@QARC.org.

I. General

Institution _____

Physicist who can answer questions about dosimetry, quality assurance, and dose calculations for stereotactic irradiation:

Name _____ Telephone _____

Address _____ Fax _____

_____

Email _____

Will you treat pediatric patients? Yes ❑ No ❑

If yes, will you routinely anesthetize pediatric patients during the radiosurgery procedure?

Yes ❑ No ❑

If yes, please include a letter documenting the method of anesthesia that will be employed during the procedure.

How long has your institution been performing SRS? _____

Number of SRS cases treated at your institution in the past six months: _____

II. Equipment

A. Date of Gamma Knife installation: _____
Date of most recent source replacement: _____

B. Head-frame/ Fixation device

Used for: CT ❑ MR ❑ Treatment ❑

❑ Commercial system, manufacturer, model: _____

_____

❑ System not commercially available. Describe: _____

_____

_____

_____

C. Treatment planning system

Version Number of GammaPlan: _____

Have you performed any in-house modifications? Yes ❑ No ❑

Please describe: _____

_____

_____

_____

D. What is the limit, if any, of the number of isocenters? _____

Please describe the guidelines used to select the number of isocenters. _____

_____

_____

_____

Can the system provide isodoses in three orthogonal planes? Yes ❑ No ❑

Can the system generate dose-volume histograms for target volume? Yes ❑ No ❑

for volumes of interest (normal tissue)? Yes ❑ No ❑

Can the system perform image fusion? Yes ❑ No ❑

Is image fusion routinely used for your SRS treatments? Yes ❑ No ❑

What image set is routinely used for definition of target volumes and normal tissues?

CT ❑ MR ❑ Fused (i. e. both) ❑

What image set is routinely used for dose calculation? CT ❑ MR ❑

III. Dose Calculations

A. Please describe the calibration procedure used for this unit when new sources are installed.

B. What routine calibration checks do you perform? _____

C. How frequently? _____

IV. Quality Assurance

A. Techniques to verify patient position

Describe: _____

B. Techniques to verify source "ON/ OFF" accuracy

Describe: _____

C. Techniques to verify the dose distribution

Frequency: Annually ❑ Periodically ❑

Describe: _____

D. When the Co-60 source is changed, what QA procedures do you follow, in addition to the calibration procedure described in IIIA?

Describe: _____

E. How do you verify the dose? _____

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IROC RI QA Center Questionnaire for Stereotactic Radiosurgery (SRS) with a Linear Accelerator

Return the completed form to: IROC Rhode Island QA Center (QARC)
Building B, Suite 201
640 George Washington Highway
Lincoln, RI 02865-4207

This questionnaire, with the requested information, must be submitted to IROC RI QA Center before patients can be placed on a stereotactic protocol. The data will be used by IROC RI QA Center in the review and verification of protocol treatments.

Check the applicable boxes and write in the requested information. Wherever it says "Describe", you may submit a published paper, an internal report, the vendor's descriptive literature, or provide a short description. Use additional pages, if necessary.

Please complete a sample RS-1 patient dosimetry summary form for a non-protocol patient treated in your institution.

If you have questions, please call the IROC RI QA Center Protocol Dosimetrist at 401-753-7600 or fax 401-753-7601 or email Physics@QARC.org.

I. General

Institution _____

Physicist who can answer questions about dosimetry, quality assurance, and dose calculations for stereotactic irradiation:

Name _____ Telephone _____

Address _____ Fax _____

_____

Email _____

Will you treat pediatric patients? Yes ❑ No ❑

If yes, will you routinely anesthetize pediatric patients during the radiosurgery procedure?
Yes ❑ No ❑

If yes, please include a letter documenting the method of anesthesia that will be employed during the procedure.

How long has your institution been performing SRS? _____

Number of SRS cases treated at your institution in the past six months _____

II. Equipment

A. Treatment unit used for stereotactic irradiation:

Manufacturer, model _____

Nominal beam energy _____ MV. Source- isocenter distance _____ cm.

Variation of isocenter over the range of gantry angles and couch rotations employed is _____ mm. Describe how this is determined (e.g. “beam spots”). How frequently is this determined?

_____

_____

_____

The calibration of this unit is routinely verified by the RPC (mailed TLD’s) Yes ❑ No ❑

Most recent date: _____

B. Head-frame

❑ Commercial system, manufacturer, model: _____

_____

❑ System not commercially available. Describe: _____

_____

_____

_____

C. Fixation system (i.e., head-frame to isocenter or treatment couch, if applicable)

❑ Commercial system, manufacturer: _____

❑ System not commercially available. Describe: _____

_____

_____

_____

D. Treatment planning system

❑ Commercial system, manufacturer, model: _____

❑ System not commercially available. Who developed it? _____

Describe the procedure used to define the target volume in three dimensions (using CT, MRI, or other).

_____

_____

_____

_____

Can your system accommodate more than one isocenter? Yes ❑ No ❑

If yes, how many? _____

Can the system provide isodoses in three orthogonal planes? Yes ❑ No ❑

Can the system generate dose-volume histograms for target volume? Yes ❑ No ❑

for volumes of interest? Yes ❑ No ❑

Can the system perform image fusion? Yes ❑ No ❑

Is image fusion routinely used for your SRS treatments? Yes ❑ No ❑

What image set is routinely used for definition of target volumes and normal tissues?

CT ❑ MR ❑ Fused (i. e. both) ❑

What image set is routinely used for dose calculation? CT ❑ MR ❑

III. Data for dose calculations

A. Beam monitor units (MU)

For this accelerator, 1 MU = _____ cGy...

... to ❑ water or ❑ muscle, at _____ cm distance from the nominal source (s)
(distance = SSD + depth), at _____ cm depth in water with _____ cm X _____ cm field size.

Calibration protocol used is: TG 51 ❑ TG 21 ❑ SCRAD ❑ NORDIC ❑
❑ Other _____

If this does not completely describe your calibration, add information separately.

B. Beam data

1. Collimator field size is defined at: ❑ 100 cm ❑ other _____ cm

2. Collimator sizes available: Circular _____ cm _____ cm
_____ cm _____ cm
_____ cm _____ cm

Describe any non-circular collimators: _____
_____
_____

3. The standard field for relative output factors is _____
at _____ cm distance
at _____ cm depth

4. Relative output factors for the different collimators were measured:
with a _____ detector at _____ depth
in ❑ water ❑ other _____

5. Depth dose dependences of dose for the different collimators were measured with a
_____ detector.

6. Depth dose dependence of dose was measured for
   - ❑ each collimator or
   - ❑ list if not all:

   _____ _____ _____

   _____ _____ _____

7. Profiles of the beams were measured with a _____ detector
   in ❑ water ❑ other _____
   ❑ for each collimator or list _____

   _____

   _____

8. Submit an isodose distribution (in color) for a single stationary beam for a typical collimator used for stereotactic irradiation. Normalize to 100% at 5 cm depth. Please state SSD and field size on the submission.

IV. Dose Calculations

A. Calculation of dose when the prescription point is at isocenter, for a stationary beam

If we were to use a single stationary beam, we would calculate the dose D (d,s) at isocenter (depth d, field size s, determined by the collimator) for a monitor setting.

❑ using the relation D (d,s) = TPR (d,s) OF(s) where the TPR = 1 at depth d_{ref} = _____ cm for all collimators, and OF = D (d_{ref},s) is the output factor;

❑ using the relation D (d,s) = TMR (d,s) OF(s) with TMR = 1 at the depth of maximum dose d_m = _____ cm , which varies with the collimator, and OF = D (d_m,s);

❑ using another calculation technique. In this case describe your method. _____

_____

_____

❑ relying on our commercially available treatment planning system to calculate the monitor units; Name of program _____, version _____.

B. Calculation of doses off-axis

For stereotactic irradiation, we calculate the dose at a distance r from the central axis by

❑ multiplying the central-axis value with OAR (d,s,r), which is
   - ❑ measured in water for each collimator, at one depth
   - ❑ measured in water for each collimator, at multiple depths
   - ❑ measured in water for some, but not all, collimators, at one depth
   - ❑ measured in water for some, but not all, collimators, at multiple depths

❑ other method (describe separately).

C. Arc Techniques

When calculating the monitor units to be delivered in an arc,

❑ we use the same approach as in IV.A but with

- ❑ the average depth
  - ❑ averaged every _____ degrees of arc
- ❑ the average TPR, TMR etc.;
  - ❑ averaged every _____ degrees of arc

❑ we use another method (describe separately).

V. Quality Assurance

A. Techniques to verify mechanical accuracy (couch, gantry, collimator, head frame, etc.)

Before every treatment
Describe: _____

_____

_____

_____

Periodically (indicate frequency)
Describe: _____

_____

_____

B. Techniques to verify the treatment dose
Describe: _____

_____

_____

C. Techniques to verify the dose distribution
Describe: _____

_____

_____