Radioactive Plaque Brachytherapy for Ocular Tumors

How is radiation therapy used in the management of ocular tumors?

For over 100 years or longer, the usual treatment of intraocular tumors has been enucleation. Since World War II, various forms of radiation treatment have been used in the management of retinoblastoma and melanoma, the most common malignant primary intraocular tumors in children and adults respectively. During the past 3-4 decades, the technique of radiotherapy has been refined to produce optimal results with minimal collateral damage.

Radiation is intended to eliminate proliferating tumor cells without causing anatomical or functional damage to normal ocular structures. While using radiation to treat tumors of the eye, the goal is to destroy the tumor, save the eye, and maximise visual potential. To be able to do so, it is necessary to provide high dose of radiation to the tumor, while preventing exposure to rest of the normal ocular structures. Radioactive plaque brachytherapy does this with finesse and precision.

What is a radioactive plaque?

A radioactive plaque is a device that can be used to deliver therapeutic dose of radiation precisely and selectively to a tumor and negligible radiation to the surrounding normal structures. It is constructed using radioactive Cobalt, Ruthenium, Iridium, Palladium or Iodine. Of these, Ruthenium (Ru106) and Iodine (I125) are most popular. Plaques come in several useful shapes and sizes.
What are the current indications for plaque brachytherapy?

1. Retinoblastoma measuring < 16 mm in basal diameter and < 8 mm in thickness, either as primary treatment, or for residual or recurrent tumors following chemoreduction or failure of focal therapy
2. Primary treatment for most medium-sized and some large iris, ciliary body and choroidal melanomas
3. Choroidal hemangioma with exudative retinal detachment not amenable to focal therapy, and for diffuse choroidal hemangioma with a nodular component
4. Choroidal metastasis
5. Choroidal lymphoma
6. Malignant retinal pigment epithelial tumors
7. Retinal vascular tumors such as large retinal capillary hemangioma or vasoproliferative retinal tumor with extensive exudative retinal detachment
8. Ocular surface squamous neoplasia or melanoma with scleral invasion
9. Selected cases of malignant eyelid tumors

How is radioactive plaque used?

The intraocular tumor is measured for its exact location, height and basal diameter by clinical evaluation and imaging.

Radiation dose and exposure time are calculated by an automated dosimetry software. The process needs the expertise of a radiation oncologist and a physicist well-versed with brachytherapy.
Is plaque brachytherapy available in India?

Dr Santosh G Honavar initiated plaque brachytherapy for the first time in India over 12 years ago and has the largest experience in this field. The Ocular Oncology Service at the Centre for Sight, Hyderabad is specifically approved by the Atomic Energy Regulatory Board, Government of India to procure radioactive isotopes and perform the procedure. The radioactive source Ruthenium-106 has been acquired from BEBIG Isotopen and Medizintechnik GmbH, Germany.

How is the surgery performed?

The surgery is performed under local or general anesthesia. Conjunctival peritomy is performed in the concerned quadrant. The tumor is localized by a combination of intraoperative indirect ophthalmoscopy and transillumination and confirmed using transscleral laser. The exact location of the tumor is marked on the sclera, the plaque is centered on the tumor and sutured to the sclera. The conjunctiva is then repositioned back. The patient stays in the hospital under strict radiation safety precautions for the duration of radiation exposure, following which the plaque is removed. The patient goes home later the same day.

The effect of plaque brachytherapy on tumor regression is periodically assessed every 8-12 weeks until complete regression.

What are the results of plaque brachytherapy?

Plaque brachytherapy has excellent success in tumor control with >90% eye salvage in retinoblastoma, melanoma, metastasis and lymphoma. It has nearly 100% success in choroidal hemangioma. The recent application in managing ocular surface squamous neoplasia and melanoma with scleral infiltration has met with spectacular success in eye and vision salvage.
Ocular Oncology Service
Centre for Sight, Hyderabad

The Ocular Oncology Service at Centre for Sight, Hyderabad has been conceived as the Centre of Excellence - a tertiary care referral centre for the diagnosis and management of patients with ocular tumors.

The entire spectrum of ocular tumors, including those of the eyelid, ocular surface, intraocular structures and orbit are optimally managed with the best of protocols and proven success. As one of the largest centres for the treatment of ocular tumors in the region, the centre is equipped with state-of-the-science facilities.

Being sensitive to the life-saving implications of the specialty, cost of care has been kept extremely modest, and deserving patients are treated free of charge with support from grants.

The staff at the Ocular Oncology Service comprises a cohesive multi-disciplinary team with impeccable training pedigree and immense experience.

Facilities
Diagnostics

- Well-equipped Diagnostic Suites
- A- and B-scan Ultrasonography
- Ultrasound Biomicroscopy
- Optical Coherence Tomography
- Digital Fundus and Slit-Lamp Camera
- Fluorescein Angiography
- Indocyanine Green Angiography
- Computed Tomography Scan
- Magnetic Resonance Imaging
- Positron Emission Tomography
- Radionuclear Imaging
- National Reporting Centre for Ophthalmic Pathology
- Intraoperative Frozen Section and Rapid Diagnosis
- Cytology
- Immunohistochemistry
- Molecular Biology
- Ophthalmic Genetics

Therapeutics

- Day Care Surgical Facility
- Quick-recovery Anesthesia Protocol
- Hypotensive Anesthesia
- Well-equipped Surgical Suites
- Dedicated EUA Suite
- Diode Laser Transpupillary Thermotherapy
- Thermocouple-driven Cryotherapy
- Radiosurgery
- Mechanized Orbital Surgery
- Stereotactic Radiotherapy
- Plaque Brachytherapy
- Chemotherapy
- Neurosurgery, ENT and Head and Neck Oncosurgery Support
- Endoscopy Suite
- Ocular and Orbital Prosthesis

Common Tumors Managed

- Eyelid: Sebaceous Gland Carcinoma, Squamous Cell Carcinoma, Basal Cell Carcinoma, Melanoma, Nevus, Capillary Hemangioma of Infancy, Plexiform Neurofibroma etc
- Ocular Surface: Squamous Cell Carcinoma, Melanoma, Nevus, PAM, Dermolipoma etc
- Intraocular: Irs, Ciliary Body and Choroidal Melanoma, Choroidal Metastasis, Choroidal Hemangioma, Intraocular Lymphoma, Retinoblastoma, Retinal Capillary Hemangioma etc
- Orbit: All benign and malignant orbital tumors

How to Refer

- Call 08500552020, 08500652020 or 040-40045500 or e-mail cfshyd.appointment@centreforsight.net for an appointment
- Prior appointment is not essential
- New patients can consult on any day Mon-Sat
- e-mail reports to santosh.honavar@gmail.com for a quick e-consult
- Call or Text Dr Santosh G Honavar on 098483 04001 for treatment-related information
- Referral Doctor Helpline: 08500752020

Faculty

Ocular Oncology, Oculoplasty and Orbital Surgery
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