A breakthrough in treating eye cancers

Dr. Debraj Shome, *Consultant Plastic Surgeon and Head, Institute for Aesthetic Surgery, Apollo Hospitals, Hyderabad* and eye cancer expert was recently chosen for the esteemed Colonel Rangachari Gold Medal Award and the Hanumantha Reddy Award for the year 2010 at the Annual Conference of the All India Ophthalmological Society. Dr Shome is the youngest ever recipient of this award which bears testimony to the exceptional work being done by him.

Dr. Shome is also the first Indian recipient of the Davis Foundation Grant Award by the Royal College of Surgeons, Glasgow, UK. This is awarded to two physicians every year for Physicians who have performed sterling work in Cancer Research & Therapy and have contributed to life saving research.

Raj Shankar in conversation with Dr. Debraj Shome...

HI: How different was your research and findings on eye cancer from that of other researchers and doctors?

DS: Radically different! Clinical trials have already demonstrated the efficacy of intra-venous (injected thru the blood-stream) carboplatin therapy in the management of retinoblastoma (RB). Systemic chemotherapy coupled with appropriate focal therapy has become the current standard of care in the management of these eye tumors. However, systemic chemotherapy is associated with its own risks. The regimens currently used can cause transient neutropenia, anemia and thrombocytopenia that may require blood product transfusions, and organ toxicities including ear toxicity, kidney toxicity, and liver toxicity. This is especially true in children as many children even die not from the cancers per se but from the drugs injected.

We have actually started 'local' injections of carboplatin around the eye so that damage to the normal cells of the body is negligible.

HI: What was your research and how did you hit upon this route?

DS: In a landmark series of experiments, our group has come closer to treating these eye cancers as well as some neural cancers better. The first step occurred when Dr. Santosh Honavar of the L V Prasad Eye Institute, Hyderabad and I at the Tata Memorial Center Mumbai started using carboplatin injections locally instead of intra-venously (through the blood) to treat children with eye cancers. The rationale for using local (around the eye) carboplatin injections was to increase the concentration of the drug within the eye without incurring additional systemic toxicity from increasing intra-venous dosages. This was extremely successful and more than 60% of the children treated benefitted from this regimen.

After the success of the first trial, we hypothesized that reducing the size of the drug molecule may further increase concentration in the body. Hence, our group created a novel nanomolecule carboplatin for the local injections. We found as much as 11 times greater penetration into the body with this newer drug as compared to the carboplatin drug available in the market. This was a huge breakthrough."

The problem however for our group was that a nanomolecule without a protein base had never been produced anywhere in the world, not only for carboplatin, but also for any chemotherapy ever targeted against the brain and the eye cancers. The group kept working on the process and finally have developed a PMMA based nanomolecule of carboplatin. Poly methyl methacrylate (PMMA) is a bio-neutral substance and is used commonly for lenses used post cataract surgery. It has a long history of complete safety. This is the first time that PMMA has ever used been used in developing this revolutionary new nano-molecule of carboplatin which is now being used in trials in cancer patients.

Phase I: Injecting chemotherpeutic drugs locally in eye cancers (2005 – 2006)

Phase II: Developing a nano-molecule of carboplatin (a chemotherapy drug). (2007)

First ever carboplatin molecule so altered in the world, for