

The potential usefulness of vascular radiotherapy to prevent coronary restenosis has rapidly developed from positive preclinical studies carried out in animals in the 80's and 90's to a large number of clinical trials which are underway in both United States and Europe in 1999. Trials are currently underway which encompass varying treatment techniques (Temporary and Permanent Implants), varying source preparations (sealed and non-sealed sources), various isotopes and a variety of delivery methods. At the time that clinical trials were initiated there was little information available as to the mechanism of radiation in preventing restenosis. This situation unfortunately continues today. In this presentation I will review some of the principals of vascular brachytherapy elaborated in the early pre-clinical trials. Newer preclinical information regarding the effect of radiation on healing, thrombosis, and newer source preparations will be presented.

As mentioned previously there are a large number of clinical trials underway in the United States and Europe which are mostly sponsored by Device Companies. Three double blind randomized trials of catheter based therapy using ^{192}Ir have been reported showing 50-70% reductions in restenosis rates and clinical events. Similarly positive results compared with historical controls have been reported with catheter based beta emitting sources ($^{90}\text{Sr}/\text{Y}$, ^{32}P). In contrast to the positive results of catheter based irradiation we are seeing discouraging results with the radioactive stent with the description of "the candy-wrapper effect" with higher activity stents.

In general radiation has been well accepted by the patients and the cardiology community. The future of brachytherapy looks promising with newer more sophisticated devices coming to the marketplace. Incorporation of treatment planning and increasingly sophisticated treatment techniques may allow further reductions in restenosis. It is my belief that

we are in the early phase of the development of vascular brachytherapy much as we were 40 years ago with the first megavoltage treatment machines. Furthermore the possibility that external radiation treatment may come to be used in the prevention of restenosis is certainly within the realm of possibility. I believe that the Radiation Oncologist brings to this field a unique level of expertise and should continue to play a role in the therapy of vascular disease with radiation over the long-term.

Goals: 1. Familiarize the audience with the benefits of the application of radiation in preventing restenosis in animals models including various devices and treatment techniques.

2. Familiarize the audience with the various clinical studies involving radiation in preventing restenosis

3. Familiarize the audience with new developments in the field of vascular radiotherapy