

IART®: A PERSPECTIVE NEW DEVELOPMENT

Giovanni Paganelli, MD

Division of Nuclear Medicine, European Institute of Oncology, Milano (Italy)

INTRODUCTION

External Beam RadioTherapy (EBRT) after conservative surgery is the treatment of choice for early breast cancer patients. However, irradiation of normal organs (lung, heart) and long lasting EBRT procedures are major drawbacks. Intraoperative Avidination for Radionuclide Therapy (IART®) is a new molecular device that may overcome some of EBRT limitations. IART is based on the well known avidin-biotin system [see references]. The approach consist of two steps as follows:

- i) "avidination" of the index quadrant with avidin injected by the surgeon, into and around the tumour bed
- ii) delivery energy (electron) to the tumor bed by intravenous injection of radiolabelled biotin, one day later.

The first aim of this study was to proof the hypothesis that a sort of a "*new receptor*", induced by means of intraoperative injection of avidin, is able to homing intravenously administered radioactive biotin. The second objective was to estimate doses to targeted area obtained with this molecular device.

METHODS

Ten patients with breast cancer at Stage T1-2-N0-1 suitable for surgical intervention of quadrantectomy and axillary dissection (or sentinel lymph node biopsy) were enrolled after written informed consent was obtained. Immediately after tumour resection, the surgeon injected 100 mg of avidin (20ml saline) into the tumour bed. The day after surgery, pts received 111 MBq of ¹¹¹In-DOTA-biotin (i.v.) after appropriate chase of biotinylated albumin (20 mg) to remove circulating avidin. Biokinetics was studied by scheduled blood samples, urine collection, scintigraphic images (5 WB+1 SPECT/CT).

RESULTS

The scintigraphic images acquired up to 48 hours showed that the radio-labelled compound remained well localized at the operated breast.

CONCLUSION

The results of this pilot study suggest that the IART® device succeeds in creating interstitial receptors which are able to bind labelled DOTA-biotin.

This approach may have also implications for the trafficking and homing of biotinylated stem cells.