May 20th, 12:30 PM

Translational Model for External Volume Expansion in Irradiated Skin

Jorge R. Lujan-Hernandez
University of Massachusetts Medical School

Michael S. Chin
University of Massachusetts Medical School

Oksana O. Babchenko
University of Massachusetts Medical School

See next page for additional authors

Follow this and additional works at: https://escholarship.umassmed.edu/cts_retreat

https://escholarship.umassmed.edu/cts_retreat/2014/posters/94

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in UMass Center for Clinical and Translational Science Research Retreat by an authorized administrator of eScholarship@UMMS. For more information, please contact Lisa.Palmer@umassmed.edu.
**Presenter Information**

**Comments**
Abstract of poster presented at the 2014 UMass Center for Clinical and Translational Science Research Retreat, held on May 20, 2014 at the University of Massachusetts Medical School, Worcester, Mass.

Oksana Babchenko participated in this study as a medical student in the Senior Scholars research program at the University of Massachusetts Medical School.

**Creative Commons License**
This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 License.

This poster abstract is available at eScholarship@UMMS: https://escholarship.umassmed.edu/cts_retreat/2014/posters/94
Translational Model for External Volume Expansion in Irradiated Skin

Jorge Lujan-Hernandez M.D.1, Michael S Chin M.D. 2, Oksana O Babchenko B.S. 1, Elizabeth Bannon M.S. 2, Heather Strom M.A. 1, Ronald Ignotz Ph.D. 1, Yuan-Chyuan Lo Ph.D. 2, Thomas J. Fitzgerald M.D. 2, Janice F Lalikos M.D. 1

1 Division of Plastic and Reconstructive Surgery.
2 Department of Radiation Oncology.
University of Massachusetts Medical School

Contact Information:
Jorge Lujan-Hernandez, M.D.
Post-Doctoral Research Associate
Division of Plastic Surgery
Jorge.lujan-hernandez@umassmed.edu

Introduction:
External Volume Expansion (EVE) treatment has gained popularity in breast reconstruction, enriching recipient sites for fat grafting. For patients receiving radiotherapy (XRT), results of EVE use vary, partly because the effects of EVE on irradiated tissue are not well understood. Based on our previous work with EVE and XRT, we developed a new translational model to investigate the effects of EVE in the setting of chronic radiation skin injury.

Methods:
Twenty-Eight SKH1-E mice received 50Gy of beta-radiation to each flank. Animals were monitored until chronic radiation fibrosis developed (8 weeks). EVE was then applied to one side for 6hrs on 5 consecutive days. The opposite side served as control. Hyperspectral Imaging (HSI) was used to assess perfusion changes before and after EVE. Mice were sacrificed at 5 days (n=14) and 15 days (n=14) after last application for histological analysis. Tissue samples were stained for vascularity (CD31) and collagen composition (Picro-Sirius red).

Results:
All animals developed skin fibrosis 8 weeks post-radiation, and changes in perfusion verified skin damage. EVE application induced edema on treated sides. Five days post-application, both sides were hypo-perfused as seen by HSI; with the EVE side 13% more ischemic than the untreated side (p<0.001). Perfusion returned to control side levels by day 15. Blood vessels increased 20% by day 5 in EVE versus control. Collagen composition showed no difference in scar index analysis.

Conclusion:
EVE temporarily augments radiation-induced hypo-perfusion, likely due to transient edema. Fibrosis remained unchanged after EVE, possibly accounting for the limited expansion seen in patients. It appears that EVE induces angiogenic effect but does not affect dermal collagen composition. Future efforts should focus on reducing fibrosis post radiation to allow EVE to achieve its full potential, to benefit irradiated patients.