

**23. 2009 CHARLES C. GUTHRIE AWARD FOR BASIC SCIENCE RESEARCH**

**Identification of the Ideal Bioabsorbable Material and Solute for a Bioabsorbable Self Expanding Stent**

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**OBJECTIVES:** The aim of this study was to investigate different bioabsorbable materials to find the ideal one for construction of a self expanding stent graft. Additionally, the degradation patterns and tensile properties of the materials in different solutes were measured.

**METHODS:** The following materials were tested: Poly-(L)-Lactic Acid (PLA), Poly-(D,L)-Lactic Acid co Polyglycolic Acid (PLG), Polydioxanone (PDS), polyglactin (Vicryl), Poliglecaprone (Vicryl), Chromic Catgut and Polypropylene (control). Five 0.24 mm of each material were prepared by immersion in Phosphate Buffered Saline (PBS), mineral oil (MO), and 0.625% glutaraldehyde (GA) and then were incubated at 37°C. Testing was performed on a uniaxial testing machine, and measured after testing at 0, 1, 2, 3, 4 and 8 weeks. The specimens were loaded at a slow controlled rate of 1mm/sec and original length of 20 mm. The data was processed to determine breaking force (N) and Stiffness (N/mm).

**RESULTS:** Poliglecaprone had the greatest breaking force at the baseline ( $48.6 \pm 1.3$ ) ( $p < .0001$ ). After emersion in the solutions, Poliglecaprone in MO remained the strongest material at 2 weeks ( $48.2 \pm 1.3$ ) ( $p < .0001$ ) and 3 weeks ( $47.9 \pm 0.6$ ) ( $p < .0001$ ). At 4 weeks, Poliglecaprone and PDS in MO had similar strength, and were not statistically different ( $37.6 \pm 0.7$ ,  $37 \pm 0.7$ ). However, at 8 weeks, PDS in MO was associated with the strongest tensile profile among the others with breaking force at  $36.13 \pm 0.35$  ( $p < .0001$ ). All material except polypropylene and PDS in MO showed significant decreases in strength after emersion in the solutions for 8 weeks ( $p < .0001$ ).

**CONCLUSIONS:** While other bioabsorbable materials showed significant loss of tensile properties in various solutions, PDS in MO kept its initial tensile strength for 8 weeks. Several self expanding stents have now been constructed of PDS, and sterile mineral oil is the best storage solution. Further investigation of this material as a self expanding stent is warranted.

**9:15 A.M. – 10:00 A.M.**

**HONORED GUEST LECTURE** - Wellington Ballroom

**“VA Cooperative Studies on AAA”**

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