

Esophageal Stricture Measuring Device

Client: Dr. Reichelderfer

Advisor: Dr. Tompkins

Team Members: William Stanford (Team Leader)

Karissa Thoma (Communicator)

Dan Frost (BWIG)

Allie Finney (BSAC)

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Problem Statement

Esophageal strictures form in the esophagus from built up scar tissue caused by stomach acid entering the esophagus. A previous group designed a device that can measure both the volume of the esophagus at the stricture and the tissue compliance. In the Fall of 2007, a team created a LabVIEW program that was able to measure pressure and volume in real time. The device must now be calibrated for use in procedures. This includes generating curves from esophagi and trying to develop a correlation between stricture size and compliance. With this relationship, it will be possible to warn doctors when they are about to perforate the esophagus. With more research, it may also be possible to produce a stress vs. strain curve to aid in perforation prevention. Once sufficient research has been accomplished, the device will need to be redefined to work in a hospital setting. This will include incasing the sensors and a 5V power supply.

Last Week's Goals

- Generate more curves and record the data
- Analyze data in excel to see if there is a trend among the curves
- Look through the supplied LabVIEW circuits to see if there is one that will work with the graph
- Finalize poster for poster session

Summary of Accomplishments

The team tested the device on several esophagi with vary balloon sizes. The calibration data for the linear potentiometer and the pressure sensor were also determined. The data from the graph was recorded for each trial and inputted into excel so that all the data could be graphed on the same graph. The graph showed that as the diameter of the esophagus decreased the slope of the compliance graph increased. Esophagi with similar diameters but different thicknesses showed the same relationship as the thickness increased. The team also simulated the perforation of an esophagus by inserting a large diameter balloon into small diameter esophagi. When the esophagus was perforated, there was a noticeable decline in pressure that was evident on the graph. This new information was put onto the poster along with device setup, future work, and other topics. The A/D converter did not have any VI's that we capable of displaying the necessary graph. The team hopes to borrow a computer and ELVIS board from the instrumentation lab for the presentation tomorrow.

Next Week's Goals

- Give poster presentation
- Set up final advisor and client meeting
- Complete final paper

Difficulties

No new difficulties

Activities

Name	Activity	Hours
William Stanford	class time, poster	40
Karissa Thoma	class time, esophagi	39
Dan Frost	class time, poster	38
Allie Finney	class time, poster	38