

Quick Shots 2 (cont.)

Q21

NATURAL EXCRETION OF ENDOLUMINAL SPRINGS AFTER SPRING-MEDIATED INTESTINAL LENGTHENING

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Purpose

Spring-mediated intestinal lengthening has been studied in numerous animal models to effectively achieve up to a 3-fold increase in length. However, both the implantation and retrieval of springs has previously required surgery. In this study, we are interested in determining whether it is possible for springs to safely pass out of the intestine on their own without re-operation, by using dissolvable sutures to secure the springs.

Methods

Juvenile mini-Yucatan pigs (n=6) underwent laparotomy for nitinol spring implantation within the intestine. Springs were secured by intestinal plication or narrowing of the intestine around the springs. Dissolvable sutures were used for the plication. Post-operatively pigs were kept on a liquid diet the first 3 weeks and then advanced to a regular diet. Spring position was followed with radiographs. Pigs were euthanized at either 3 weeks or 2 months. At that time, intestinal segments were retrieved and evaluated for lengthening and histological changes. T-tests were used for analysis.

Results

Pigs tolerated their diet and advancement to a regular diet did not result in any complications. At 3 weeks, there was a 2-fold increase in intestinal length and all springs were in their original locations. At 2 months, springs were found to have safely passed out of the intestine without any complications, and there was a 1.7-fold increase in length (FIGURE). All lengthened segments of intestine showed significant increase in muscularis propria thickness and in crypt depth when compared to unlengthened intestine ($p < 0.001$).

Conclusions

Implanted endoluminal springs are effective in achieving intestinal lengthening. When secured with dissolvable sutures, they are also able to safely pass out of the intestine without any further surgical intervention. These results indicate that multiple operations are not needed to implant and retrieve springs, and may be important in developing future therapies for short bowel syndrome.

Quick Shots 2 (cont.)

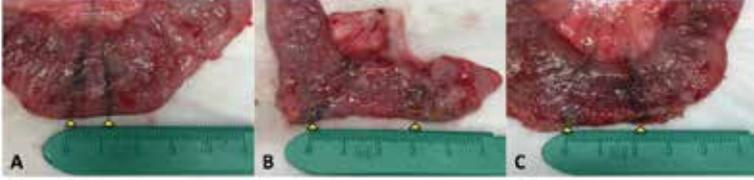


FIGURE. A) Jejunum at 60 days without an implanted spring. B) Jejunum at 21 days with an implanted spring (removed) that has lengthened. C) Jejunum at 60 days with an implanted spring (passed without intervention) that has lengthened.