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ASSESSMENT OF ANASTOMOTIC VIABILITY WITH SPECTROSCOPIC REAL-TIME OXYGEN SATURATION MEASUREMENT: AN IN-VIVO PILOT STUDY.

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Purpose/Background: Anastomotic leak (AL) is a dreaded complication after GI surgery. Intra.Ox™ by ViOptix Inc. (Newark, CA, USA) is a novel, FDA-approved spectroscopic device which enables fast, real-time measurement of mixed tissue oxygen saturation (StO₂). This study aims to investigate the applicability of Intra.Ox™ in a porcine intestinal anastomotic model and to explore the correlation between StO₂ measurements and AL.

Methods/Interventions: Eleven female swine were divided into 3 different groups to explore AL in different ischemic conditions. Group 1: 100% mesenteric ligation, n=3; Group 2: 50% mesenteric ligation, n=5; Group 3: NO mesenteric ligation, n=3. Side-to-side stapled anastomoses were performed. StO₂ at the anastomotic line was measured before and after vessel ligation and anastomosis. Measurements were taken at 6 distinct locations along afferent and efferent loops. AL was evaluated on postoperative day 5 by re-laparotomy.

Results/Outcome(s): AL rate was 100%, 60% and 0% in group 1, 2 and 3, respectively. No differences in StO₂ values were detected before mesenteric ligation. Post-anastomotic StO₂ in group 1 (22.9±18.5%) and 2 (39.2±15.5%) were significantly lower than in group 3 (53.1±9.2%) (P<0.05). Post-anastomotic StO₂ readings ≤35% indicated potential for AL with 100% sensitivity, 80% specificity, positive predictive value of 85.7% and negative predictive value of 100%.

Conclusions/Discussion: This study is the first to assess anastomotic viability via spectroscopic mixed tissue oxygen levels. Intra.Ox™ enables non-invasive, reliable real-time tissue StO₂ measurements which appear useful in predicting anastomotic failure. Further studies are required to validate our findings.