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**EVOLIUCINĖ MEDICINA:
ŽMOGAUS RAIDOS PERSPEKTYVOS IR SVEIKATA
BESIKEIČIANČIOJE APLINKOJE**

**EVOLUTIONARY MEDICINE:
PERSPECTIVES ON HUMAN DEVELOPMENT AND HEALTH
CONSEQUENCES IN A CHANGING ENVIRONMENT**

Rengėjas:

Vilniaus universiteto Medicinos ir sveikatos mokslų
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Organized by

the Doctoral School of Medicine and Health sciences
at Vilnius University, VU Faculty of Medicine

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POTENTIAL ROLE OF THE GASTROINTESTINAL MICROBIOME IN THE PATHOGENESIS OF SURGICAL SITE INFECTIONS AFTER MAJOR GASTROINTESTINAL CANCER SURGERY

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Background and Aim: Despite advances in aseptic techniques, SSIs remain a major challenge in surgery of GI oncology. Emerging preclinical evidence suggests that endogenous GI microorganisms may contribute to SSI development. However, clinical validation of this hypothesis is still lacking. This study aims to investigate whether bacteria causing surgical site infections (SSIs) may be derived from the patient's gastrointestinal (GI) tract microbiome.

Materials and Methods: This prospective longitudinal observational study included adults undergoing major GI cancer surgery. Preoperative stool, oral swabs, and blood samples were collected, with intraoperative wound cultures obtained. Postoperative blood samples were collected on postoperative days (POD) 2 and 4, and samples from infected surgical sites were collected at SSI diagnosis. Intestinal barrier disruption markers (intestinal fatty acid-binding protein (iFABP) and lipopolysaccharide-binding protein (LBP)) were measured, and microbiome composition of stool, oral, and SSI samples was analysed using 16S rRNA gene amplicon sequencing to assess microbial concordance.

Results: Of 110 patients, 25 (23%) developed SSIs. Patients with SSIs showed early postoperative intestinal barrier disruption, reflected by elevated iFABP on

POD2 and LBP on POD4. Among 21 patients with paired samples, bacterial DNA was detected in all SSI specimens, and 7 (33%) showed concordant taxa between their gut/oral microbiome and the infection site. Concordance was observed in 4 of 7 (57%) patients with superficial SSIs, including 2 (50%) with intraoperatively confirmed non-contaminated wounds, whereas concordance in deep SSIs was limited (3 of 16, 19%).

Conclusions: This study provides the first clinical observations consistent with microbiome concordance between SSI sites and the GI tract, even among patients with intraoperatively confirmed non-contaminated wounds.

Keywords: gastrointestinal microbiome, gastrointestinal surgery, surgical site infections, Trojan Horse hypothesis