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**LeakCheck: The first prospective study to identify peri-operative modifiable risk factors for anastomotic leak in colorectal surgery**

**Purpose:** Numerous risk factors for colorectal anastomotic leak (AL) have been identified using large retrospective datasets. Most of these are unmodifiable baseline patient factors. The international LeakCheck prospective study was initiated to identify peri-operative modifiable risk factors for AL.

**Methodology:** Patients from 13 hospitals in Europe and Australia, undergoing colorectal resections with the formation of a primary anastomosis were enrolled from June 2016 to December 2018. Patient, operation and surgeon-related parameters were recorded intra-operatively at the time of anastomosis formation. Univariate and multivariate logistic regression analyzes were used to determine risk factors for AL.

**Results:** Out of 1120 patients, 107 developed an AL (9.6%). On univariate analysis: low preoperative haemoglobin (male < 8mmol/l, female < 7mmol/l), intra-operative blood loss > 100ml, use of inotropes, gross fecal contamination, and high peri-operative glucose were significantly correlated with AL. On multivariate analysis: hemoglobin < 7mmol/l in women (OR:1.3, 95%CI 1.12-1.5), use of inotropes (OR:1.552, 95%CI 1.005-2.66), fecal contamination (OR:5.013, 95%CI 2.389-10.52), and conversion (OR:2.749 95%CI 1.08-6.961), were significant. There was a 5.1% AL rate in those without any of these risk factors. Patients with one or more risk factors had an increased AL rate: 13% in patients with one risk factor to 33% in patients with five.

**Conclusion:** This study has identified four potentially modifiable risk factors for AL in colorectal surgery: anemia, use of inotropes, fecal contamination and conversion. Using these risk factors, an intra-operative AL risk estimate can be made.