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Title:
Inter-rater Agreement of the CLASSification of Intra-operative Complications (CLASSIC) in a prospective abdominal surgery cohort

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Topic:
Abdominal emergency surgery

Background:
Surgical outcomes depend on the quality of preoperative, intraoperative and post-operative care. Prospectively validated classification systems for evaluation of intraoperative adverse events (iAEs) are not available. Recently, *class*ification of *i*ntraoperative *c*omplications (CLASSIC) to grade iAEs has been developed, retrospectively validated, and modified to 5 grades of severity.

Aim:
Assesing the inter-rater agreement of CLASSIC and its predictive value for post-operative complications.

Methods:
Detailed data on iAEs and their treatment had been prospectively collected in the LAPAD study. For the current research questions, two independent teams, each consisting of a dedicated researcher and a surgeon, retrospectively graded all previously recorded iAEs according to the 5-grade CLASSIC. The two teams were blinded for each other's grading. Cohen's Kappa coefficient was calculated to determine the inter-rater agreement between both teams. Discrepancies between the teams in the grading of iAEs were resolved through discussion. Uni- and multivariable linear regression was used to estimate the predictive value of the highest CLASSIC grade on the occurrence of the sum of all post-operative complications according to the Comprehensive Complication Index (CCI®).

Results:
Seven hundred fifty-five abdominal surgeries were reviewed for the occurrence of iAEs. IAEs were observed in 333 surgeries (44.1%) by team 1, and 324 (42.9%) by team 2. Cohen's Kappa coefficient across all 5 CLASSIC grades was 0.87 (95% CI 0.84-0.90). At least one post-operative complication was observed in 278

(36.8%) patients, the median CCI for patients with a post-operative complication was 26.2 (IQR 18.6). The occurrence of an iAE was a significant and independent risk factor for post-operative complications in multivariable analysis, 5.36 (95% CI 2.29 - 8.42) for CLASSIC grade 2, 9.77 (95% CI 4.88 - 14.66) for CLASSIC 3 and 16.12 (95% CI 6.44 - 25.80) for CLASSIC 4 compared to no iAEs (CLASSIC grade 0). Other significant predictors for post-operative complications in multivariable analysis were increasing age, higher ASA score and male gender.

Discussion:
Classification of iAEs with the newly proposed CLASSIC has a good inter-rater agreement. A higher severity grade of iAEs according to CLASSIC is associated with an increased risk of post-operative complications.

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