**Impact of common surgical and anaesthetic strategies for pain control after elective gastrointestinal surgery: cohort study**

**Supplement**

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# Supplementary Table 1: Demographics for patients who underwent conversion from epidural to PCA

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Patients with persistent pain failure (n=147)** | **All patients (n=308)** |
| **Age (SD)** |  | 49.3 (16.7) | 54.3 (17.2) |
| **Sex, n (%)** | Female | 67 (45.6) | 132 (42.9) |
| Male | 80 (54.4) | 176 (57.1) |
| **Preoperative chronic pain medications, n (%)** | No | 74 (50.3) | 159 (51.6) |
| Yes | 73 (49.7) | 149 (48.4) |
| **Operative approach, n (%)** | Open | 118 (80.3) | 245 (79.6) |
| MIS | 21 (14.3) | 41 (13.3) |
| MIS converted to open | 8 (5.4) | 22 (7.1) |
| **Procedure, n (%)** | Ileostomy procedures\* | 18 (12.2) | 32 (10.4) |
| Small bowel resection | 22 (15.0) | 45 (14.6) |
| Colostomy procedures\* | 17 (11.6) | 27 (8.8) |
| Colonic resection | 47 (32.0) | 118 (38.3) |
| Rectal resection | 43 (29.2) | 86 (27.9) |
| **Postoperative opiates, n (%)** | None | 42 (28.6) | 132 (42.9) |
| Weak opiate | 20 (13.6) | 32 (10.4) |
| Strong opiate | 85 (57.8) | 144 (46.8) |

\*formation/reversal

MIS: minimally invasive surgery; PCA: patient controlled analgesia; SD: standard deviation

# Supplementary Table 2: Subgroup analysis of patient demographics for patients with persistent pain control failure

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **PCA**  **(n=249)** | **Epidural**  **(n=260)** | **Other†**  **(n=48)** | **Total**  **(n=557)** | **P-value** |
| **Age (SD)** |  | 50.0 (18.0) | 54.2 (17.4) | 51.3 (17.3) | 52.1 (17.7) | 0.028 |
| **Sex, n (%)** | Female | 128 (51.4) | 117 (45.0) | 28 (58.3) | 273 (49.0) | 0.141 |
| Male | 121 (48.6) | 143 (55.0) | 20 (41.7) | 284 (51.0) |
| **Preoperative chronic pain medications, n (%)** | No | 210 (84.3) | 137 (52.7) | 34 (70.8) | 381 (68.4) | <0.001 |
| Yes | 39 (15.7) | 123 (47.3) | 14 (29.2) | 176 (31.6) |
| **Operative approach, n (%)** | Open | 115 (46.2) | 205 (78.9) | 29 (60.4) | 349 (62.7) | <0.001 |
| MIS | 114 (45.8) | 38 (14.6) | 18 (37.5) | 170 (30.5) |
| MIS converted to open | 20 (8.0) | 17 (6.5) | 1 (2.1) | 38 (6.8) |
| **Procedure, n (%)** | Ileostomy procedures\* | 35 (14.1) | 24 (9.2) | 28 (58.3) | 87 (15.6) | <0.001 |
| Small bowel resection | 20 (8.0) | 34 (13.1) | 1 (2.1) | 55 (9.9) |
| Colonic procedures\* | 20 (8.0) | 27 (10.4) | 8 (16.7) | 55 (9.9) |
| Colonic resection | 100 (40.2) | 90 (34.6) | 5 (10.4) | 195 (35.0) |
| Rectal resection | 74 (29.7) | 85 (32.7) | 6 (12.5) | 165 (29.6) |
| **Postoperative opiates, n (%)** | None | 70 (28.1) | 83 (31.9) | 14 (29.2) | 167 (30.0) | 0.067 |
| Weak opiate | 45 (18.1) | 27 (10.4) | 11 (22.9) | 83 (14.9) |
| Strong opiate | 134 (53.8) | 150 (57.7) | 23 (47.9) | 307 (55.1) |

A total 557 patients included in this subgroup.

\*formation/reversal †Analgesia strategies not including an epidural or PCA

MIS: minimally invasive surgery; PCA: patient controlled analgesia; SD: standard deviation

# Supplementary Figure 1: Patient inclusion flowchart

![A flowchart with black text and black arrows

Description automatically generated]()

\*Patients were included if there was at least one pain score available in the early postoperative period (postoperative days 0-2)

# Supplementary Figure 2: Operative approach stratified by procedure



MIS: minimally invasive surgery; PCA: patient controlled analgesia

# Supplementary Figure 3: Initial analgesia strategy stratified by operative approach

![A graph of different colored squares

Description automatically generated]()

MIS: minimally invasive surgery; PCA: patient controlled analgesia

# STROBE Statement Checklist

|  |  |  |  |
| --- | --- | --- | --- |
|  | Item No | Recommendation | Page |
| **Title and abstract** | 1 | (*a*) Indicate the study’s design with a commonly used term in the title or the abstract | 1 |
| (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| Introduction | | |  |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 4 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 4 |
| Methods | | |  |
| Study design | 4 | Present key elements of study design early in the paper | 5 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up | 5 |
| (*b*)For matched studies, give matching criteria and number of exposed and unexposed | n/a |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 6-7 |
| Data sources/ measurement | 8\* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 5 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 11 |
| Study size | 10 | Explain how the study size was arrived at | n/a |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 6-7 |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 7-8 |
| (*b*) Describe any methods used to examine subgroups and interactions | 7-8 |
| (*c*) Explain how missing data were addressed | n/a |
| (*d*) If applicable, explain how loss to follow-up was addressed | n/a |
| (*e*) Describe any sensitivity analyses | n/a |
| Results | | |  |
| Participants | 13\* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | 9 |
| (b) Give reasons for non-participation at each stage | 18 |
| (c) Consider use of a flow diagram | 18 |
| Descriptive data | 14\* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | 9,13-14 |
| (b) Indicate number of participants with missing data for each variable of interest | 18 |
| (c) Summarise follow-up time (eg, average and total amount) | n/a |
| Outcome data | 15\* | Report numbers of outcome events or summary measures over time | 9-10 |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 9-10,15-17 |
| (*b*) Report category boundaries when continuous variables were categorized | n/a |
| (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | n/a |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | 9-10,15-17 |
| Discussion | | |  |
| Key results | 18 | Summarise key results with reference to study objectives | 11 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 11-12 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 12 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | 12 |
| Other information | | |  |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | n/a |