

Morbidity and mortality following standardised perioperative management of patients operated with acute abdominal surgery in a high-risk emergency setting

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentlig försvaras i Hörsal Arvid Carlsson, Medicinaregatan 3, Göteborg.

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av

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Avhandlingen baseras på följande delarbeten

- I. Timan TJ, Sernert N, Karlsson O, Prytz M. SMASH standardised perioperative management of patients operated with acute abdominal surgery in a high-risk setting. BMC Research Notes. 2020;13(1)
- II. Jansson Timan T, Hagberg G, Sernert N, Karlsson O, Prytz M. Mortality following emergency laparotomy: a Swedish cohort study. BMC Surgery. 2021;21(1).
- III. Timan TJ, Karlsson O, Sernert N, Prytz M. Standardized perioperative management in acute abdominal surgery: Swedish SMASH controlled study. Br J Surg. 2023 May 16;110(6):710-716
- IV. Terje Jansson Timan, Niklas Ekerstad, Ove Karlsson, Ninni Sernert, Mattias Prytz. One-year mortality following standardized management for emergency laparotomy: results from the Swedish SMASH study. Submitted.

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Abstract

Patients suffering from acute pathology in the abdomen is common throughout the world and surgical intervention can often be necessary. Those who are most seriously ill need an acute management with major abdominal surgery, the dominant procedure being an emergency laparotomy. The most common underlying causes are obstructed or perforated bowel, intra-abdominal bleeding and surgical complications. The postoperative period is associated with a high risk of complications, such as high mortality, high need for intensive care and long hospital stays. International studies from 2014 and 2017 have suggested improved post-operative outcome after standardization of the management of the patients that undergo emergency laparotomy.

The aim of the study is to implement and evaluate the intervention of a protocol-based standardised care for patients undergoing acute high-risk abdominal surgery. The objective is to investigate whether standardised perioperative care can reduce mortality and morbidity on short and long term.

During 2017 a protocol for management of patient undergoing emergency laparotomy was developed at NU-Hospital group in Trollhättan, Sweden. The study was named SMASH (Standardised perioperative Management of patients operated with Acute abdominal Surgery in a High-risk setting). Key elements in the protocol include: pre-operative communication, planning and rapid assessment with initiation of antimicrobial therapy. Furthermore, high level of competence and systematic approach in operation room as well as elevated level of post-operative care, with focus on bedside assessments and monitoring are of major importance.

The post-operative outcome after emergency laparotomy for a prospective intervention group managed according to the protocol-based standardised care was compared with a control group operated the years before the intervention was implemented. Study endpoints to investigate was 30-day mortality (primary), one-year mortality, length of stay in hospital and intensive care and surgical complications (secondary). The cohort of controls was operated during 38 months in 2014-2017 and the intervention group during 42 months in 2018-2021.

A total of 1344 patients was included in the study, 681 interventions and 663 controls. The 30-day mortality seen was 10.7% for interventions and 14.5% for controls ($p=0.045$), and one-year post-operative mortality was 19.7% and 27.8% respectively ($p=0.0005$). Length of stay in Intensive care unit was reduced to 3.1 days from 5.4 days ($p=0.007$) and in hospital the stay reduced to 10.2 days from 11.9 ($p=0.009$). Severe surgical complications were reduced to 27.3% from 37.6% ($p<0.0001$).

Adjusted analysis strongly indicate that the protocol-based standardised care improves post-operative outcome after emergency laparotomy both in the short and long term, reduce length of stay both in intensive care and in the hospital, and leads to fewer post-operative complications.

Keywords: Acute care surgery, Emergency laparotomy, perioperative management, anesthesiology