

CLINICAL PRACTICE

Anaesthesia care with and without tracheal intubation during emergency endoscopy for peptic ulcer bleeding: a population-based cohort study

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Abstract

Background: Emergency upper gastrointestinal bleeding is a common condition with high mortality. Most patients undergo oesophagogastroduodenoscopy (OGD), but no universally agreed approach exists to the type of airway management required during the procedure. We aimed to compare anaesthesia care with tracheal intubation (TI group) and without airway instrumentation (monitored anaesthesia care, MAC group) during emergency OGD.

Methods: This was a prospective, nationwide, population-based cohort study during 2006–13. Emergency OGDs performed under anaesthesia care were included. End points were 90 day mortality (primary) and length of stay in hospital (secondary). Associations between exposure and outcomes were assessed in logistic and linear regression models, adjusted for the following potential confounders: shock at admission, level of anaesthetic expertise present, ASA score, Charlson comorbidity index score, BMI, age, sex, alcohol use, referral origin (home or in-hospital), Forrest classification, ulcer localization, and postoperative care.

Results: The study group comprised 3580 patients under anaesthesia care: 2101 (59%) for the TI group and 1479 (41%) for the MAC group. During the first 90 days after OGD, 18.9% in the TI group and 18.4% in the MAC group died, crude odds ratio=1.03 [95% confidence interval (CI)=0.87–1.23, $P=0.701$], adjusted odds ratio=0.95 (95% CI=0.79–1.15, $P=0.590$). Patients in the TI group stayed slightly longer in hospital [mean 8.16 (95% CI=7.63–8.60) vs 7.63 days (95% CI=6.92–8.33), $P=0.108$ in adjusted analysis].

Conclusions: In this large population-based cohort study, anaesthesia care with TI was not different from anaesthesia care without airway instrumentation in patients undergoing emergency OGD in terms of 90 day mortality and length of hospital stay.

Key words: cohort study, gastroscopy, intubation, mortality

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Editor's key points

- In patients undergoing emergency oesophagogastroduodenoscopy for upper gastrointestinal bleeding, no universally agreed approach exists to the type of airway management required.
- In a large prospective, population-based cohort study, the incidence of 90-day mortality and length of hospital stay was compared between patients undergoing anaesthesia care with tracheal intubation and those without airway instrumentation (monitored anaesthesia care).
- There were no significant differences in 90-day mortality and length of hospital stay, between patients who received anaesthesia care with and without tracheal intubation.

Emergency upper gastrointestinal bleeding is a common medical condition, with a 30 day mortality of 10%.^{1,2} Bleeding from peptic ulcers accounts for 36–46% of all upper gastrointestinal bleeding,^{3,4} with an annual incidence of hospitalization as a result of peptic ulcer bleeding of 19–57 per 100 000 persons.^{2,5,6} Most of these patients undergo oesophagogastroduodenoscopy (OGD), but no universally agreed approach exists to the level of monitoring and type of airway management required during the procedure.⁷ The choice lies between anaesthesia care with tracheal intubation (TI) and anaesthesia care without airway instrumentation (monitored anaesthesia care; MAC), most often accompanied by light sedation of the patient. The former requires a higher level of anaesthetic expertise and might lead to circulatory collapse in haemodynamically unstable patients, while the latter carries a higher risk of pulmonary aspiration, with consequences ranging from mild aspiration without symptoms to death.^{8–10}

Recent studies have documented that medical comorbidity contributes considerably to peptic ulcer bleeding mortality,¹¹ and per- and postendoscopic measures that could prevent medical complications may be important to lower peptic ulcer bleeding mortality. Thus, choosing the right monitoring level is a question of concern to both surgeons and anaesthetists. Three small observational studies, including a total of 380 patients, have compared TI with MAC in patients with upper gastrointestinal bleeding.^{12–14} However, all three studies are hampered by the limited sample size, the retrospective design and the single-centre design, all of which increase the risk of bias.¹⁵ Additional evidence is needed to guide us in choosing the appropriate method of airway management. Better knowledge about risks and benefits concerning airway management in patients with upper gastrointestinal bleeding could be translated into better prognosis for the patients and might, at the same time, save time and money in the health-care system. The aim of the present population-based cohort study was to assess whether airway protection with TI during emergency OGD for peptic ulcer bleeding is associated with reduced 90 day mortality and length of stay in hospital.

Methods

Design and approval

This nationwide, population-based cohort study with consecutive inclusion and prospective data collection was approved by The Danish Data Protection Agency (no. 2013-41-2358) and did not require informed patient consent according to Danish health law. The manuscript was prepared according to the 'Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)' statement.^{16,17}

Study population

The study population included patients with peptic ulcer bleeding who were undergoing emergency OGD under anaesthesia care for the first time between 2006 and 2013. From the nationwide Danish Anaesthesia Database, we identified patients at least 16 yr old undergoing OGD monitored by nurse anaesthetists, physicians, or both at any hospital in Denmark between 2006 and 2013. Patients identified in the Danish Anaesthesia Database were linked to the Danish Clinical Register of Emergency Surgery database,² the Danish National Patient Registry, and the Danish Civil Registration System through the unique personal identification number assigned to all Danish citizens and residents.^{18,19}

Organization of anaesthetic care for oesophagogastroduodenoscopy in Denmark

Danish nurse anaesthetists work under direct or indirect supervision of a resident or an attending (specialist) anaesthetist, and they are all able to perform TI. Hence, while the nurse may be the only anaesthetist present in the endoscopy room, he or she will always be able to call for assistance from the anaesthetist if needed. Likewise, resident anaesthetists also have the opportunity to call for assistance from the specialist. Emergency care takes place in the public health-care system only, and involvement of anaesthetists in emergency OGDs is a clinical decision taken by the endoscopist and is not a question of potential extra cost.

Data sources

Danish Civil Registration System

The Danish Civil Registration System is maintained by the Danish government, which since 1968 has assigned a unique personal identification number (the CPR number) to all Danish citizens.^{18,19} The Danish Civil Registration System contains information on address, immigration, emigration, sex, date of birth, and the exact date of death on all Danish citizens. The registry is updated within a few days of any relevant changes in information.

Danish Anaesthesia Database

The Danish Anaesthesia Database was established in 2004 as a national clinical quality database that contains specific quantitative anaesthetic and surgical indicators describing the perioperative period.²⁰ All types of surgery and endoscopic procedures are included. Information is uploaded to a central database during or immediately after each anaesthetic and surgical procedure. Fourteen Danish anaesthesia departments in 2005, 25 departments in 2006–7 and 37 departments in 2013 prospectively reported data to the Danish Anaesthesia Database. The data completeness within reporting departments was recently found to be 92% for emergency gastrointestinal surgery in the Capital Region of Denmark during 2009–10.²¹

Danish Clinical Register of Emergency Surgery

The Danish Clinical Register of Emergency Surgery was founded in 2003 by the public Danish health-care authorities,²² aiming to monitor the quality of care provided to patients with complicated peptic ulcer disease by Danish public hospitals, through the registration of quality standards, indicators, and prognostic factors. Inclusion criteria are bleeding or perforated benign gastric or duodenal peptic ulcer verified by OGD or surgery. The Danish National Health Service provides tax-funded health care, with

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