DOES GEOGRAPHY MATTER: META-ANALYSIS OF PATIENT SAFETY DURING PROCEDURAL SEDATION WITH AND WITHOUT CAPNOGRAPHY

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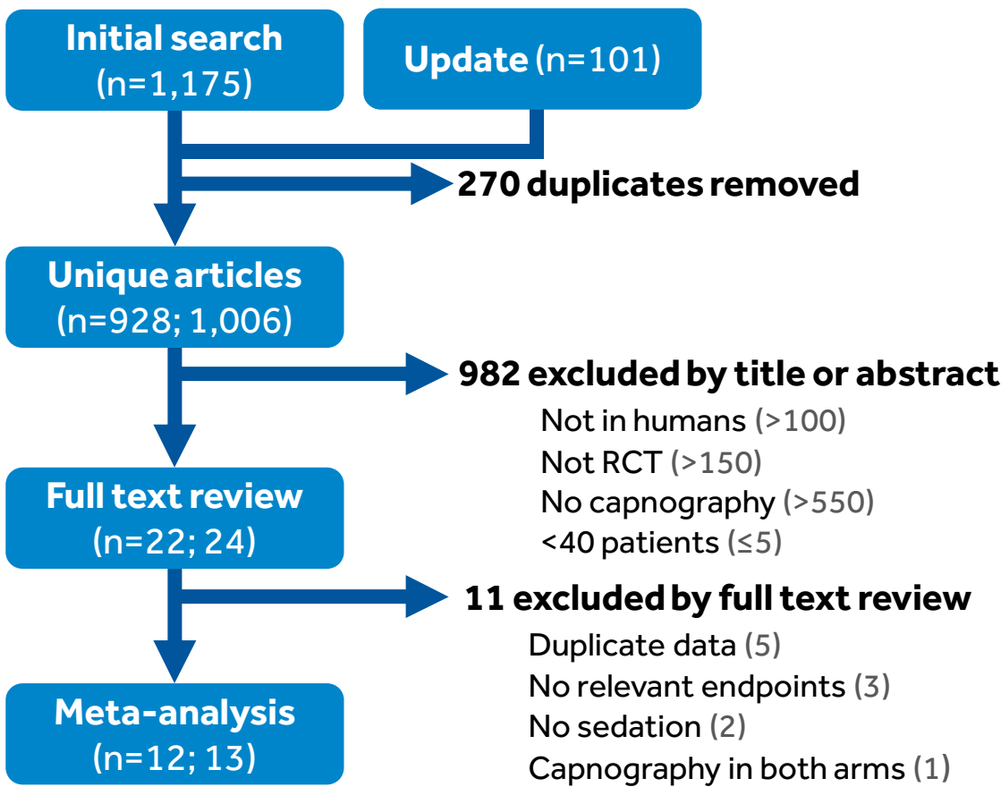
Background and Goal of Study

The comparability of randomised, controlled trial (RCT) data from disparate geographies has been questioned because clinical practice and event rates may vary. Here, the impact of capnography on patient safety during procedural sedation (PS) across geographies is assessed via meta-analysis.

Materials and methods

- Systematic, independent review of PubMed, the Cochrane Library and EMBASE for RCTs published in or after 1995 and enrolling patients undergoing PS
  - Searches were conducted using Medical Subject Heading (MeSH) terms and title and abstract free-text searches
  - Updated searches and analysis in January 2017
- The primary endpoint was oxygen desaturation; the protocol allowed for analysis of other endpoints reported by ≥3 studies.
- Title, abstract, and full-text screening was performed independently by 2 reviewers using *Sourcerer*
- Extracted data were assessed for clinical utility by physicians.
- Meta-analysis with OpenMEE used a random effects model. Results are odds ratios (OR, 95% confidence interval) for events with capnography versus control across all eligible studies, whereby values <1 indicate improved safety with capnography
  - Low events rates for assisted ventilation required the Peto method, reporting OR with a fixed-effects model, to be used

Figure 1. Systematic identification of capnography literature



Number in brackets are the articles excluded.

Results

- The 13 included studies covered Europe (n=6), USA (n=5), Canada (n=1), and China (n=1) [1-13]
- All studies reported mild desaturation, which was significantly reduced with capnography: the OR was 0.65 (0.53, 0.80) and did not differ substantially by geography (Table 1)
  - Where defined as <90% the OR was 0.76 (0.65, 0.89)
- Severe desaturation (<85%) was reported by 7 studies [1-7], with 109 events in 1,646 patients (6.6%) with capnography and 192 events in 1,669 patients (11.5%) without capnography. The OR was 0.47 (0.36, 0.62)

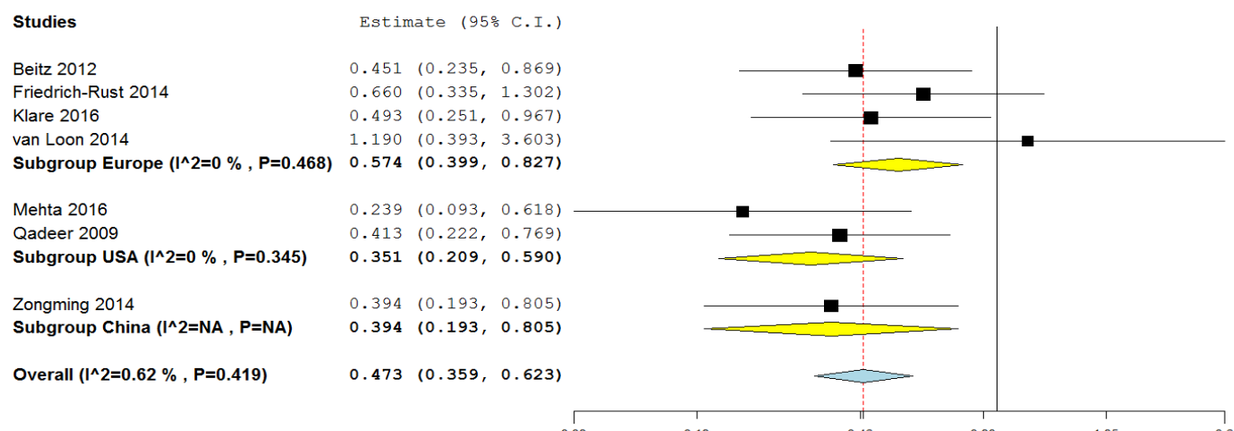
Table 1. Odds ratio (OR) for events with capnography by geography

Event	OR global	OR in Europe	OR in USA
Mild desat.	0.65 (0.53–0.80)	0.68 (0.51–0.90)	0.59 (0.38–0.88)
Severe desat.	0.47 (0.36–0.62)	0.57 (0.40–0.83)	0.39 (0.19–0.81)
Assisted vent.	0.47 (0.23–0.95)	0.57 (0.26–1.22)	NA

Results are OR (95% confidence interval). Desat: desaturation; Vent: ventilation

- Assisted (generally bag-mask) ventilation was significantly reduced with capnography (10 events in 1,847 patients) compared with control (22 events in 1,892 patients)
  - The Peto OR was 0.47 (0.23–0.95)
- Other adverse events assessed did not differ significantly between capnography and control nor by geography

Figure 2. Impact of capnography does not differ by geography



Discussion

- Although clinical practice during PS varies by setting, the impact of capnography is independent of geography
- The identified reduction in need for assisted ventilation with capnography suggests that patient deterioration was prevented
- Respiratory compromise is a global problem with a consistent underlying aetiology; as such best practice for prevention of AEs can be shared across geographies

Conclusions

- Capnography reduces the incidence of oxygen desaturation and the requirement for assisted ventilation
- The impact of capnography is consistent over different geographies
- Monitoring to detect earlier signs of respiratory compromise may universally improve patient safety

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Funding

This study was supported by funding from Medtronic, USA

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