AABIP JOURNAL CLUB

Cough Control: Harnessing Dextromethorphan Premedication for Enhanced Comfort in Flexible Bronchoscopy

Respirology / 2023

The clinical question

Does premedication with dextromethorphan during flexible bronchoscopy improve cough severity?

Take Home Message

Administration of oral dextromethorphan before flexible bronchoscopy can significantly reduce the patient-rated cough severity at the end of the procedure. However, this antitussive effect was short-lasting, and patients showed similar cough severity an hour after the procedure. Similarly, there was no difference in the topical anesthetic, sedation, or analgesia amount. This contrasts with prior studies that have demonstrated improvement in cough 6 hours following bronchoscopy and reduced sedation during the procedure.

Background

Patients who undergo flexible bronchoscopy with conscious sedation and topical anesthetic commonly experience cough during the procedure. While current guidelines recommend a combination of opioids, benzodiazepines, and topical anesthetic to suppress cough, this is frequently not adequate. Dextromethorphan is known to decrease the sensitivity of cough receptors through non-competitive N-methyl-Daspartate antagonism.

Study Design

Study design: Randomized Control Trial, double-blind, parallel group with block randomization using blocks of four and allocated by opaque sealed envelope.

N: 112 patients screened, 94 randomized

Study groups: Dextromethorphan vs placebo
Settings: Single Center (All India Institute of Medical Sciences. Bhubaneswar, Odisha, India)
Enrollment: February 2020 to July 2021
Treatment period: Day of flexible bronchoscopy
Follow up: Immediately following and 1 hour after bronchoscopy
Primary outcome: Improved patient-rated cough severity on a visual analogue scale (VAS)
Secondary Outcome(s): Improved patient-rated discomfort on VAS, improved bronchoscopist-rated discomfort on VAS, and decreased need for additional analgesia and sedation during bronchoscopy.

Intervention(s):

- Comparison: Dextromethorphan (30ml/90mg) vs placebo (30ml of invert sugar syrup)

- All patients received topical lidocaine, sedation (mainly midazolam), and the option of fentanyl for additional analgesia.
- Lidocaine:
- 2ml of 2% lidocaine gel in each nostril (total 4ml = 80mg), 4 actuations of 10% lidocaine spray, and 5ml of 1% lidocaine over the vocal cords.
- Supplemental 2ml aliquots of 1% lidocaine were instilled at the trachea and bronchi
- Midazolam:
- Target sedation of modified Ramsay Sedation score of 2-3
- 2mg (1mg in patients >60 years old) as loading with additional doses of 0.5-1mg as needed up to a max of 5mg
- Fentanyl:
- 50mcg load with 25-50mcg supplemental dose.

- The VAS consisted of a 100 mm long horizontal straight line with the left endpoint (0 mm) indicating no cough (discomfort) and the right endpoint (100 mm) indicating severe cough (discomfort). Two independent observers measured scores on VAS, and the average was recorded as the final score

Population

Inclusion criteria:

- Age >18 to <= 70
- Undergoing diagnostic bronchoscopy and able to consent

Exclusion criteria:

- Refractory hypoxemia
- Severe bleeding diathesis
- Uncontrolled hypertension
- Renal failure
- Pregnant or lactating women
- Patients who received/used sedative or centrally acting agents 12 hours before bronchoscopy, use monoamine oxidase inhibitors, serotonergic agents or amiodarone or have a history of hypersensitivity to dextromethorphan

Baseline characteristics:

- Median age (years): 51 (control), 51 (intervention)
- Sex: 68% male, 32% female

- **Indications:**
  - 50% suspected bronchogenic carcinoma,
  - 24% suspected pulmonary tuberculosis
  - 8% preoperative bronchoscopy
  - 7% non-resolving pneumonia

- **Procedures performed:**
  - 47% bronchoalveolar lavage
  - 18% bronchial wash and endobronchial biopsy
  - 14% endobronchial biopsy

- **Median Duration of bronchoscopy:** 15 minutes (intervention), 13 minutes (control)

- **Proceduralist: 88% performed by trainee fellows**

Outcomes

Primary outcome:

- Patient-rated cough severity on a visual analogue scale (VAS):
- End of procedure:
- The median difference in the dextromethorphan and placebo groups were 15mm (10-23) and 20mm (12-45.5) (median difference [95% CI] - 6.00 mm [-12.99 to 0.00]; *p-value 0.03)*
- The mean (±SD) VAS scores between the dextromethorphan and placebo were 19.31 ± 16.29 mm vs. 30.23 ± 24.99 mm (mean difference [95% CI] -10.95 [-19.60 to -2.29]; p = 0.01)
- 1 h after the procedure: median difference:
- The median VAS scores an hour after the procedure were 5mm (4-9.7) in the dextromethorphan group and 6mm (4-11) in the placebo group. *(p-value 0.21)*

Secondary outcome:

- Patient-rated discomfort on a VAS at the end of the procedure:
- The median VAS score for discomfort after the procedure was 12.5mm (8-17.75) in the dextromethorphan group and 12.5mm (7.5-23.5) in the placebo group. *(p-value 0.49)*
- Bronchoscopist-rated cough severity at the end of the procedure:
- The median cough score rated by the bronchoscopist 26mm (12-46.5) in the dextromethorphan group and 35mm (20-63.5) in the placebo group. *(p -value 0.09)*
- Medication Use:
- Midazolam (mg): 2.04 ± 0.41 vs 1.92 ± 0.32 *(p -value 0.16)*
- Fentanyl (mcg): 57.69 ± 18.77 vs 55.76 ± 18.12 (*p -value 0.79)*
- Topical lidocaine (mg): 227.40 ± 26.33 vs 231.70 ± 30.59 (*p -value 0.47)*

Adverse events:

- No safety concern related to dextromethorphan use was found in any patient.

Commentary

Study Strengths:

- This is a simple and practical intervention with little potential for harm.
- The study was a double-blinded, placebo controlled, randomized controlled trial.
- The visual analog scale is simple and easy to use for patients to report symptoms.

Study Limitations and Potential for Bias:

- Outcomes represent subjective perception of cough, but no objective measurements (e.g.: cough count)
- Small study size
- Potential lack of generalizability given single center study

Funding

No funding source listed

Suggested Reading

1. Wahidi MM, Jain P, Jantz M, Lee P, Mackensen GB, Barbour SY, et al. American College of Chest Physicians Consensus Statement on the Use of Topical Anesthesia, Analgesia, and Sedation During Flexible Bronchoscopy in Adult Patients. CHEST [Internet]. 2011 Nov 1 [cited 2020 Mar 14];140(5):1342–50. Available from: https://journal.chestnet.org/article/S0012-3692(11)60604-1/fulltext
2. Du Rand IA, Blaikley J, Booton R, Chaudhuri N, Gupta V, Khalid S, et al. British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults: accredited by NICE. Thorax [Internet]. 2013 Jul 16;68(Suppl 1):i1–44. Available from: https://thorax.bmj.com/content/68/Suppl_1/i1
3. Schwarz Y, Greif J, Lurie O, Tarrasch R, Weinbroum AA. Dextromethorphan Premedication Reduces Midazolam Requirement: Objective and Subjective Parameters in Peribronchoscopy. Respiration. 2007;74(3):314–9.
4. Amini S, Soheil Peiman, Mahdi Khatuni, Marziyeh Ghalamkari, Rahimi B. The Effect of Dextromethorphan Premedication on Cough and Patient Tolerance During Flexible Bronchoscopy. Journal of bronchology & interventional pulmonology (Online). 2017 Oct 1;24(4):263–7.

Article Citation

Manoj Kumar Panigrahi, Datta A, Sourin Bhuniya, Shakti Kumar Bal, Prasanta Raghab Mohapatra. Dextromethorphan premedication in the alleviation of cough during flexible bronchoscopy in adults: A randomized double-blind placebo-controlled trial. Respirology. 2023 Jan 10;28(5):484–90.

Contributors

Author
Chris Yurosko, DO
Cleveland Clinic

Reviewer 1:
Christian Ghattas, MB BCh
The Ohio State University Wexner Medical Center

Reviewer 2:
Sameer K. Avasarala, MD
University Hospitals, Case Western Reserve University School of Medicine

If you would like to become a reviewer for the "AABIP Journal Club," Please contact Christian Ghattas at *christian.ghattas@osumc.edu*