Cochrane Anaesthesia

Which medicines work best to prevent people from being sick (vomiting) after an operation?

This network meta-analysis identified seven effective single drugs for the prevention of postoperative vomiting – five with high certainty evidence (aprepitant, ramosetron, granisetron, dexamethasone, and ondansetron) and two with moderate certainty evidence (fosaprepitant and droperidol). When ranked, drug combinations and single NK1 receptor antagonists were more effective than other single drugs. Overall, high and recommended doses based on previous consensus panel classifications are more beneficial than low doses. For most drugs there is no convincing evidence regarding the occurrence of SAE, any AE, and drug class-specific side effects.

What is the current situation?

Postoperative nausea and vomiting (PONV) are common adverse effects of surgery and anaesthesia. Although dozens of different antiemetics are available for clinical practice, there is currently no comparative ranking regarding efficacy and safety of these drugs to inform practice.

What was the objective?

To compare antiemetic drugs with each other or with placebo or no treatment used to prevent PONV in adults after general anaesthesia, rank these drugs in terms of efficacy and safety, and to identify the best doses.

How did we conduct the review?

- We searched for randomized controlled trials (RCTs) investigating single drugs or drug combinations belonging to 5-HT_3, D_2-, NK_1-receptor antagonists, corticosteroids, antihistamines, and anticholinergics, used to prevent PONV in adults undergoing any surgery with general anaesthesia. We included evidence published up to November 2017.
- We assessed the effect on vomiting within 24 hours postoperatively, serious adverse events (SAE), any adverse events (AE), and drug class-specific side effects (e.g. headache, constipation, sedation, extrapyramidal symptoms, and arrhythmia).
- We compared all antiemetics with each other using a mathematical method called network meta-analysis. Drugs were ranked according to efficacy and safety compared to placebo.
- We analysed dose effects of drugs in subgroup analysis classified according to recent consensus panel recommendation.
- Risk of bias and certainty of evidence were assessed using the Cochrane RoB 1.0 tool and the GRADE approach and CINeMA framework.

What did the review find?

- 585 RCTs (97,516 participants, 83% women) investigating 44 single drugs and 51 drug combinations were included.
- Compared with placebo, 10 out of 28 single drugs and 29 out of 36 combinations of drugs reduced postoperative vomiting (282 studies).
- Drug combinations are more effective than single drugs in the prevention of vomiting. NK_1-antagonists have comparable efficacy to most drug combinations.
- The single drug that worked best in the ranking of all drugs was fosaprepitant, followed by casopitant, aprepitant, ramosetron, granisetron, dexamethasone, tropisetron, ondansetron, dolasetron, and droperidol.
- We are confident that aprepitant, ramosetron, granisetron, dexamethasone, and ondansetron reduce vomiting. We are moderately confident that fosaprepitant and droperidol reduce vomiting, but this finding may change when further evidence becomes available. We are uncertain how well casopitant, tropisetron, and dolasetron reduce vomiting. Low doses of granisetron, dexamethasone, ondansetron and droperidol did not prevent vomiting sufficiently. No dose effect was found for aprepitant, ramosetron and fosaprepitant.
- Due to poor reporting, we are uncertain about the effect of most drugs on SAE (28 studies), any AE (61 studies) or drug class-specific side effects. However, granisetron and amisulpride (moderate-certainty) have no effect on any AE, while dimenhydrinate and scopolamine (low-certainty) may increase the number of patients with any AE compared to placebo. Ondansetron (moderate-certainty) increases headache and reduces sedation, while droperidol (moderate-certainty) reduces headache, dimenhydrinate increases sedation (moderate-certainty), and dexamethasone (high-certainty) has no effect on sedation. Scopolamine may increase the risk for visual disturbances.

Reference:
Weibel S et al. Drugs for preventing postoperative nausea and vomiting in adults after general anaesthesia: a network meta-analysis. Cochrane Database of Systematic Reviews. 2020;(10). doi:10.1002/14651858.CD012859.pub2

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