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[Intervention Review]

Antiemetic medication for prevention and treatment of chemotherapy-induced nausea and vomiting in childhood

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ABSTRACT

Background

Nausea and vomiting remain a problem for children undergoing treatment for malignancies despite new antiemetic therapies. Optimising antiemetic regimens could improve quality of life by reducing nausea, vomiting, and associated clinical problems. This is an update of the original systematic review.

Objectives

To assess the effectiveness and adverse events of pharmacological interventions in controlling anticipatory, acute, and delayed nausea and vomiting in children and young people (aged less than 18 years) about to receive or receiving chemotherapy.

Search methods

Searches included the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, LILACS, PsycINFO, conference proceedings of the American Society of Clinical Oncology, International Society of Paediatric Oncology, Multinational Association of Supportive Care in Cancer, and ISI Science and Technology Proceedings Index from incept to December 16, 2014, and trial registries from their earliest records to December 2014. We examined references of systematic reviews and contacted trialists for information on further studies. We also screened the reference lists of included studies.

Selection criteria

Two review authors independently screened abstracts in order to identify randomised controlled trials (RCTs) that compared a pharmacological antiemetic, cannabinoid, or benzodiazepine with placebo or any alternative active intervention in children and young people (less than 18 years) with a diagnosis of cancer who were to receive chemotherapy.

Data collection and analysis

Two review authors independently extracted outcome and quality data from each RCT. When appropriate, we undertook meta-analysis.

Main results

We included 34 studies that examined a range of different antiemetics, used different doses and comparators, and reported a variety of outcomes. The quality and quantity of included studies limited the exploration of heterogeneity to narrative approaches only.

The majority of quantitative data related to the complete control of acute vomiting (27 studies). Adverse events were reported in 29 studies and nausea outcomes in 16 studies.

Two studies assessed the addition of dexamethasone to 5-HT_3 antagonists for complete control of vomiting (pooled risk ratio (RR) 2.03; 95% confidence interval (CI) 1.35 to 3.04). Three studies compared granisetron 20 mcg/kg with 40 mcg/kg for complete control of vomiting (pooled RR 0.93; 95% CI 0.80 to 1.07). Three studies compared granisetron with ondansetron for complete control of acute nausea (pooled RR 1.05; 95% CI 0.94 to 1.17; 2 studies), acute vomiting (pooled RR 2.26; 95% CI 2.04 to 2.51; 3 studies), delayed nausea (pooled RR 1.13; 95% CI 0.93 to 1.38; 2 studies), and delayed vomiting (pooled RR 1.13; 95% CI 0.98 to 1.29; 2 studies). No other pooled analyses were possible.

Narrative synthesis suggests that 5-HT_3 antagonists are more effective than older antiemetic agents, even when these agents are combined with a steroid. Cannabinoids are probably effective but produce frequent side effects.

Authors' conclusions

Our overall knowledge of the most effective antiemetics to prevent chemotherapy-induced nausea and vomiting in childhood is incomplete. Future research should be undertaken in consultation with children, young people, and families that have experienced chemotherapy and should make use of validated, age-appropriate measures. This review suggests that 5-HT_3 antagonists are effective in patients who are to receive emetogenic chemotherapy, with granisetron or palonosetron possibly better than ondansetron. Adding dexamethasone improves control of vomiting, although the risk-benefit profile of adjunctive steroid remains uncertain.

PLAIN LANGUAGE SUMMARY

Drugs to prevent nausea and vomiting in children and young people undergoing chemotherapy

Background

The use of chemotherapy to treat cancer in children and young people can produce nausea (a sensation that one might vomit) and vomiting. These extremely unpleasant sensations continue to be a problem despite better antiemetic (antisickness) drugs.

Review question

How effective are medications to prevent nausea and vomiting in children and young people undergoing chemotherapy?

Key results

We found only 34 properly randomised trials that had been undertaken in children, which examined 26 drug combinations. Trials tended to report vomiting rather than nausea, even though nausea is generally a more distressing experience. We could make no firm conclusions about which drugs are best, what dose of drug is most effective, or whether it is better to receive treatments orally (by mouth) or intravenously (injected). It seems that the 5-HT_3 antagonists (the 'trons', for example ondansetron, granisetron, or tropisetron) are better than older agents, and that adding dexamethasone to these drugs makes them even more effective. Further research should consider what patients and families deem to be important, use established measures of nausea and vomiting, and attempt to use even newer techniques in the undertaking of reviews in order to maximise the information available.