Water-aided colonoscopy: a systematic review

CRD summary
This review concluded that both water immersion and water exchange reduced colonoscopy pain, compared with air insufflation, and water exchange might be superior to water immersion. These conclusions seem overly strong, given the potential for missing relevant trials, the limited quality of the included trials, and the lack of reporting of the review methods.

Authors’ objectives
To assess the impact of different water-aided methods on pain during colonoscopy and the adenoma detection rate.

Searching
PubMed was searched for articles from January 2008 to December 2011. Studies published before 2008 were identified by an earlier systematic review (see Other Publications of Related Interest). Experts on the topic were contacted to identify studies that had been accepted for publication, but were not published. The Internet was searched, using Google.

Study selection
Randomised controlled trials (RCTs) comparing water-aided methods, such as immersion (in which the infused water was removed predominantly during withdrawal) or exchange (in which the infused water was removed predominantly during insertion), with traditional air insufflation (blowing into the cavity), for colonoscope insertion, were eligible for inclusion. The outcomes of interest were pain during colonoscopy and the adenoma detection rate.

Most of the included trials compared water immersion versus air insufflation. A few trials compared water exchange versus air insufflation. Where reported, the mean age of patients ranged from 52 to 67 years, and their mean body mass index ranged from 24 to 31. Most patients were male. Where reported, 11% to 37% of patients had undergone previous abdominal surgery. Most of the trials used a pain scale of 0 (no pain) to 10 (most severe pain).

The authors did not state how many reviewers assessed studies for inclusion.

Assessment of study quality
The quality of trials was assessed using the Jadad scale. The authors did not state how many reviewers assessed quality.

Data extraction
The mean (with standard deviation) or median (with interquartile range) were extracted for pain and the event rates were extracted for adenoma detection. The data were grouped according to whether water immersion or water exchange was used. If trials used a different pain scale (0 to 5; 0 to 100), scores were recalculated to a scale of 0 to 10.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
For pain, the data were combined in a narrative synthesis, supported by data tables. For adenoma detection, a combined overall rate was derived, and the Fisher exact test was used to compare water immersion or exchange versus air insufflation. The correlation between the withdrawal time and the adenoma detection rate, when combining air and water conditions, or when comparing the difference between air and water conditions, was calculated.

Results of the review
Twelve randomised controlled trials (1,979 patients) were included in the review. All the trials had a Jadad score of three.

Pain: All 12 trials assessed pain. Eight out of nine trials reported a significant reduction in pain score with water immersion during colonoscopy, compared with air insufflation. All three trials reported a significant reduction in pain...
score with water exchange during colonoscopy, compared with air insufflation.

**Adenoma detection:** Nine trials reported the detection rate. There were mixed results for water immersion (six trials), compared with air insufflation. The difference in rates ranged from -15.4% to +6.9%; overall there was no difference between the two procedures (34.8% for air insufflation versus 32.9% for water immersion). A higher rate of adenoma detection was observed with water exchange (50.6%) than with air insufflation (40.9%; p=0.026; three trials).

**Authors' conclusions**
Both water immersion and water exchange reduced colonoscopy pain, compared with air insufflation. Water exchange might be superior to water immersion, in minimising colonoscopy discomfort and increasing the adenoma detection rate.

**CRD commentary**
The review question and inclusion criteria were clear. Limited sources were searched, so some relevant trials may have been missed. Limited attempts were made to find unpublished trials, so publication bias cannot be ruled out. It was unclear whether language restrictions were applied in the search, which makes it difficult to assess the risk of language bias. It was unclear whether any attempts were made to minimise errors and bias during the review process.

A relevant tool was used to assess trial quality, but only composite quality scores were presented, making it difficult to determine the types of bias that each trial was subject to. A narrative synthesis was suitable for the pain outcome, but deriving an overall measure of the adenoma detection rate may have been inappropriate, given the high level of clinical variation between the trials.

The authors' conclusions seem overly strong, given the potential for missing relevant trials, the limited quality of the included trials, and the lack of reporting of the review methods.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that a head-to-head comparison of air insufflation, water immersion and water exchange, during colonoscopy, was required to investigate whether water exchange was superior to water immersion, in minimising pain and optimising adenoma detection in the proximal colon.

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