Water-Soluble Contrast Challenge in the Management of Pediatric Adhesive Small Bowel Obstruction: A Systematic Review

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Introduction

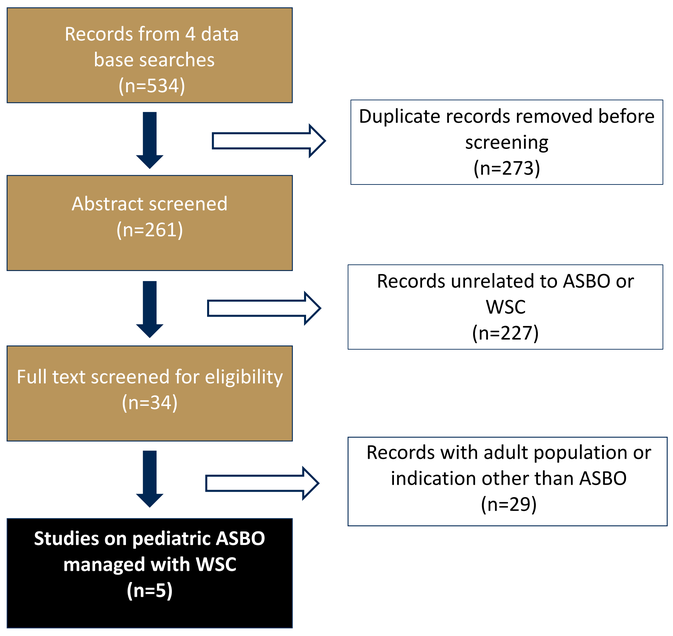
Background:
Adhesive small bowel obstruction (ASBO) is a serious complication of intra-abdominal surgery[1]
Water-soluble contrast (WSC) challenges have been used for medical management in the adult population[2,3]

Knowledge Gap:
The therapeutic value of water-soluble contrast challenge in the pediatric population with ASBO is under-studied[3,4]

Research Question: Does administration of water-soluble contrast challenge reduce the need for surgery in pediatric patients with adhesive small bowel obstruction?

Methods

- Inclusion criteria: studies involving only patients 18 and younger with postoperative ASBO managed with WSC.
- Four databases (PubMed, Embase, Web of Science, and Cochrane Library) were searched for contrast challenge, adhesive small bowel obstruction, and pediatric patients as keywords. This was followed by a comprehensive search using an exhaustive keyword and Mesh term list.
- The review was conducted using PRISMA guidelines, with Covidence used as a screening and organizing tool. All abstracts and full texts were reviewed by the 3 primary authors.

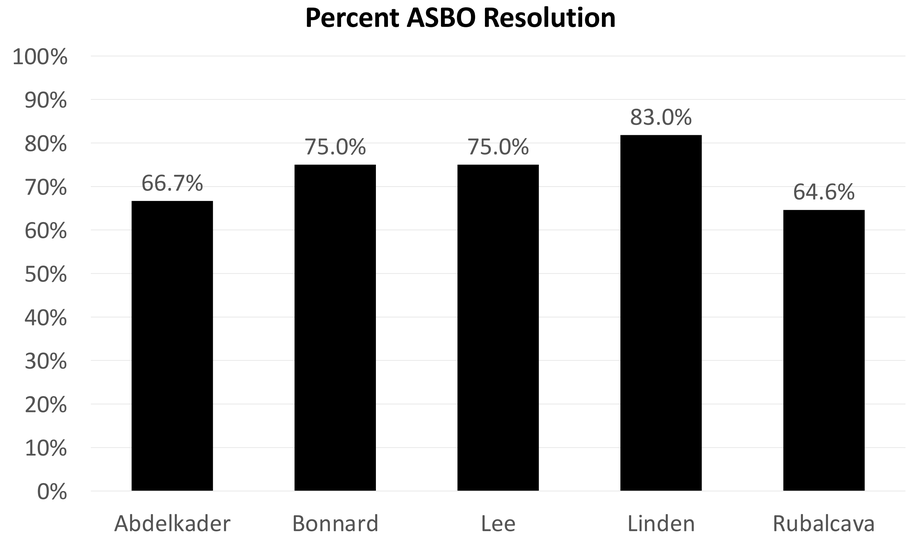


A majority of pediatric patients (68%) had resolution of ASBO with WSC

Results

Study Summaries

Author	Total patients	Type of contrast	Dosing criteria	Time from admission to challenge	Time points of X-Rays
Abdelkader 2011	33	Gastrografin	1-4 = 20ml 4-8 = 30ml 8-12 = 40ml 12-16 = 50ml	48 hours	3, 6, 12, 24 hours
Rubalcava 2023	82	Gastrografin, diluted gastrografin, cystografin, and omnipaque	< 1 = 44 [15,105] 1-4 = 100 [58,100] 5-10 = 100 [50,200] >10 = 200 [100,200] Median volume 100mL	Varied by institution	8-10 hours, 24 hours
Bonnard 2011	Treatment: 8 Control: 16	Gastrografin	< 5 years: 50mL > 5 years: 100mL	48 hours	4-6 hours
Linden 2019	Pre-protocol: 26 Post-protocol: 11	Cystografin	< 8 = 100mL > 8 = 200mL	As early as possible in patient's admission	10, 24 hours
Lee 2015	24	Gastrografin	< 10 yrs old: 30-50mL diluted with twice its volume of water > 10 yrs old: 100mL	48 hours	4-24 hours



Results

- Studies: three retrospective, two prospective.
- Clinical criteria that precluded contrast administration
  - signs of strangulation, peritonitis, or other signs that warranted immediate surgical exploration
- All studies used age-based dosing criteria
- All studies defined contrast failure as a lack of contrast in the colon at the time of the final X-Ray
- **85/125 (68%) had resolution of their ASBO with WSC**
- Three studies specified a 48-hour period of observation and non-operative management prior to contrast administration
- The rate of resolution of pediatric ASBO with WSC in this review (68%) was slightly lower than previous findings in the adult population with the same disease (79%).[3]

Conclusions

- Water soluble contrast challenge is an effective treatment for adhesive small bowel obstruction in pediatric patients
- The small samples sizes, lack of control groups, and lack of randomized data found in our review highlight the need for further studies directly comparing rates of ASBO resolution with WSC to those managed with traditional non-operative strategies.

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