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Laparoscopic versus open surgery in small bowel obstruction (Review)

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[Intervention Review]

Laparoscopic versus open surgery in small bowel obstruction

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ABSTRACT

Background

Acute intestinal obstruction is one of the most common surgical emergencies. The small bowel obstruction (SBO) is the site of obstruction in most patients (76%) and adhesions are the most common etiology (65%). Laparoscopy in SBO has no clear role yet as it may have a therapeutic and diagnostic function. In some settings laparoscopic or laparoscopy-assisted surgery is considered feasible and convenient more than conventional surgery for SBO; however little is known if laparoscopic or laparoscopy-assisted surgery is more suitable with respect to open surgery for patients with SBO.

Objectives

The aim of this systematic review is to assess whether laparoscopic or laparoscopy-assisted surgery is feasible and safe for acute SBO, and whether laparoscopic and laparoscopy-assisted surgery present advantages compared to open surgery in terms of short-term and long-term outcomes.

Search methods

We searched for published randomised and prospective controlled clinical trials without language restrictions using the following electronic databases: Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (1950 onwards) and EMBASE (1980 onwards).

Selection criteria

Randomised controlled trials and non randomised controlled prospective trials evaluating laparoscopic and laparoscopy-assisted surgery versus traditional open surgery for acute SBO were considered.

Data collection and analysis

We conducted the review according to the recommendations of The Cochrane Collaboration and the Cochrane Colorectal Group as well, using Review Manager 5 to conduct the review.

Main results

No published or unpublished randomised controlled trials or prospective controlled clinical trials comparing laparoscopy with open surgery for patients with SBO were identified.

Authors' conclusions

Although data from retrospective clinical controlled trials suggest that laparoscopy seems feasible and better in terms of hospital stay and mortality reduction, high quality randomised controlled trials assessing all clinically relevant outcomes including overall mortality, morbidity, hospital stay and conversion are needed.

PLAIN LANGUAGE SUMMARY

Should laparoscopic adhesiolysis be used in patients with acute small bowel intestinal obstruction?

Abdominal laparoscopy is a minimally invasive surgical technique in which operations are achieved through incision (usually 2-3 cm) using a laparoscope which is connected to a video camera. Small bowel obstruction is an event that may follow open surgery. According to several studies laparoscopic surgery is technically feasible and safe for the treatment of small bowel obstruction, however little is known about its efficacy in terms of mortality and morbidity.

This review addresses the question if laparoscopic surgery is effective with respect to traditional laparotomy. No randomised controlled trials or prospective controlled clinical trials that compared laparoscopy with laparotomy for small bowel obstruction were identified. Although there was some evidence from case series reports, observational studies and retrospective controlled clinical trial, high quality randomised controlled trials are required on the potential benefit and harms associated with the use of laparoscopy in small bowel obstruction.

BACKGROUND

Acute intestinal obstruction is one of the most common surgical emergencies. The small bowel obstruction (SBO) is the site of obstruction in most patients (76%) and adhesions following open surgery are the most common etiology (65%) (Markogiannakis 2007). Postoperative intraabdominal adhesions are associated with significant rehospitalization rates and costs (Ray 1998). The first laparoscopic adhesiolysis for small bowel obstruction was performed by Clotteau (Clotteau 1990). Following this first case, laparoscopy has been delivered for treating SBO by several surgeons, because of its perceived advantages in selected cases. Laparoscopy in SBO has no clear role yet; it may have a therapeutic and diagnostic role as well. In several series laparoscopic or laparoscopy-assisted surgery is considered feasible and convenient more than conventional surgery for SBO; there is also reason to suspect both difficulties and risks. In this systematic review clinical series and comparative studies were analysed in order to assess feasibility, safety and efficacy in the short and the long term..

OBJECTIVES

The aim of this systematic review is to assess whether laparoscopic or laparoscopy-assisted surgery is feasible and safe for acute SBO, and if laparoscopic and laparoscopy-assisted surgery shows advantages compared to open surgery in terms of short-term and long-term outcomes.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials and non randomised controlled prospective trials evaluating laparoscopic and laparoscopy-assisted surgery versus traditional open surgery for acute SBO were considered.

Types of participants

Adult (aged >16 yrs) patients who underwent surgery for a acute SBO.

Types of interventions

All minimally invasive approach for acute SBO were compared with conventional open surgery.

Types of outcome measures

Primary outcome:
1) short-term (within 30 postoperative days) overall morbidity.

Secondary outcomes:

1) the following events within 30 days: any operative complication (bleeding, subphrenic or pelvic intraabdominal abscesses); any wound infectious complication; any respiratory complication (pulmonary embolism, pneumonia, pleural effusion, atelectasis, acute respiratory distress syndrome); any cardio-vascular complication (acute coronary syndrome, myocardial infarction, deep vein thrombosis);

2) the following long-term complications (after 30 postoperative days): adhesions requiring re-intervention and incisional hernias;

3) re-operations within 30 postoperative days;

4) re-admissions within 30 postoperative days;

5) length of hospital stay;

6) duration of post-operative ileus measured as days until first bowel movement after surgery;

7) pain scores on day 1-3;

8) 30-day mortality;

9) hospital costs;

10) surgical (not anaesthetic) time;

11) conversion rate in laparoscopic arms;

12) procedures carried out during the operation (i.e. adhesiolysis, bowel resection, hernia repairs etc).

Search methods for identification of studies

We searched for published randomised and non randomised controlled trials without language restrictions using the following electronic databases: Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library 2008 issue 4, MEDLINE (1950 onwards) and EMBASE (1980 onwards).

This research was carried out using medical subject headings (MeSH) in combination with free text words.The proposed MEDLINE strategy (Ovid interface), modified when applied to other databases, is given below:

#1 (intestinal obstruction) or (small bowel obstruction) or (small near bowel near obstruction)

#2 MeSH descriptor Intestinal obstruction explode all trees

#3 (#1 OR #2)

#4 laparotom* or laparascop* or (abdominal surgery)

#5 MeSH descriptor laparotomy explode all trees

#6 MeSH descriptor laparoscopy explode all trees

#7 (#4 OR #5 OR #6)

#8 (#3 AND #7)

Data collection and analysis

Two authors (RC, EF) assessed titles or abstracts of all studies identified by the initial search and excluded clearly non-relevant studies. Full text articles were obtained for potentially relevant studies and any studies with unclear methodology. All these studies were assessed by two authors as to whether they met the inclusion criteria. Disagreements on inclusion were resolved by consensus and, if necessary, by scrutiny with an independent third author (IA).

RESULTS

Description of studies

No studies meeting the inclusion criteria were identified.

Risk of bias in included studies

Not applicable

Effects of interventions

Not applicable

DISCUSSION

This review documents that there are no published randomised controlled trials and controlled prospective controlled clinical trials comparing laparoscopy and laparoscopy-assisted vs. open surgery for acute small bowel obstruction in adults.

Most of the current information relating to the management of SBO with laparoscopy comes from case retrospective reports (Levard 2001, Liauw 2005, Navez 1998, Neufang 2000, Saribeyoğlu 2008, Strickland 1999, Zerey 2007), observational studies (Chévre 1997, Cirocchi 2007, Clotteau 1990) and retrospective controlled clinical trials (Wullstein 2003, Khaikin 2007). Although these studies may have encouraged the feasibility of laparoscopic intervention the occurrence of conversion was considerable. The largest retrospective multicenter study, for example, recruited 306 patients but reported a conversion rate of 54.6% (Levard 2001).

The first controlled clinical trial published by Wullstein 2003, compared 52 patients treated with standard laparotomy with 52 patients who underwent laparoscopy and laparoscopy-assisted adhesiolysis. The patients managed with open access had a significant higher morbidity (40.4 vs 19%) and longer postoperative hospital stay (18.1 vs 11.3 days), when compared with laparoscopy. Conversely the surgical operating time was longer in patients treated laparoscopically (103 vs 84 min).

The second controlled clinical trial was published in 2007, including 62 patients during the period 1999 to 2005, (Khaikin 2007). Laparoscopy and laparoscopy-assisted adhesiolysis 31 patients showed a significant lower morbidity (16 vs 45%), shorter postoperative hospital stay (5 vs 9 days), earlier first bowel movement (3 vs 6 days) and with respect to 31 patients in the laparotomy group; the surgical operating time was similar between two groups (78 vs 70 min).

Although data from retrospective clinical controlled trials suggest that laparoscopy seems feasible and better in terms of hospital stay and mortality reduction, high quality randomised controlled trials are required assessing all clinically relevant outcomes including overall mortality, morbidity, hospital stay and conversion rates are needed.

AUTHORS' CONCLUSIONS

Implications for practice

In this systematic review we have documented that there are no published randomized controlled trials or prospective controlled clinical trials the feasibility and efficacy of laparoscopy compared with laparotomy. Most of the information on benefit and risk of laparoscopy is drawn from cases series studies, observational trials and two retrospective controlled clinical trials which are associated with potential bias and results must be interpreted with caution.

Implications for research

There were no studies included in this field. The available studies on laparoscopic surgery for the treatment of small bowel obstruction does not provide sufficient evidence on the potential benefit of laparoscopy techniques. Future trials should be of high quality and carefully address the methods of randomisation since blinding is unfeasible in surgical studies. These studies should include outcomes listed in the present review.

ACKNOWLEDGEMENTS

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Khaikin 2007 *{published data only}*

Khaikin M, Schneidereit N, Cera S, Sands D, Efron J, Weiss G, Nogueras JJ, Vernava AM, Wexner SD. Laparoscopic vs. open surgery for acute adhesive small-bowel obstruction: patient' outcome and cost-effectiveness. *Surg Endosc* 2007;**21**:742-746.

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Farinella 2009

Farinella E, Cirocchi R, La Mura F, Morelli U, Cattorini L, Delmonaco P, Migliaccio C, De Sol AA, Cozzaglio L, Sciannameo F. Feasibility of laparoscopy for small bowel obstruction. *World J Emerg Surg* 2009;**4**:3.

CHARACTERISTICS OF STUDIES

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Ghosheh 2007	review
Khaikin 2007	retrospective controlled clinical trial
Levard 2001	multicentric retrospective case series
Liauw 2005	retrospective case series
Navez 1998	retrospective case series
Neufang 2000	retrospective case series
Pearl 2008	review
Saribeyoğlu 2008	retrospective case serie
Strickland 1999	retrospective case series
Szomstein 2006	review
Wullstein 2003	retrospective controlled clinical trial
Zerey 2007	retrospective case series

WHAT'S NEW

Date	Event	Description
9 October 2009	Amended	second amendment

CONTRIBUTIONS OF AUTHORS

None mentioned

DECLARATIONS OF INTEREST

None known

NOTES

A version of this review (Farinella 2009) was published in:

World J Emerg Surg. 2009 Jan 19;4:3. Feasibility of laparoscopy for small bowel obstruction.
Authors: Farinella E, Cirocchi R, La Mura F, Morelli U, Cattorini L, Delmonaco P, Migliaccio C, De Sol AA, Cozzaglio L, Sciannameo F.

INDEX TERMS

Medical Subject Headings (MeSH)

Acute Disease; Intestinal Obstruction [*surgery]; Intestine, Small [*surgery]; Laparoscopy [*methods]

MeSH check words

Humans