Laparoscopy and small bowel obstruction in children

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ABSTRACT

Three issues are studied: 1. What is well-known about post-operative small bowel obstructions. The cost of this pathology, the complications associated (blood loss, enterocutaneous fistulas, major bowel resections, abdominal wall damages, death), the distribution of adhesions in the abdominal cavity, and previous surgeries. 2. Small bowel obstructions happen after laparoscopy and the incidence is more than 1% of patients: herniation of the small bowel through a trocar site, herniation of the omentum through a trocar site, peritoneal defect, spillage of stones and stercolitis. Suggestions to avoid small bowel obstruction after laparoscopy include the use of smaller trocars whenever possible, repairing the fascia under direct vision, carefully desufflating the abdominal cavity, avoiding bleeding, spilled stones and staples and washing the abdominal cavity at the end of the surgical procedure. 3. The treatment of small obstruction is feasible by laparoscopy, reliability, and results are studied with a multicentric GECI (Groupe d'Etude en Coelioscopie Infantile) and literature series. We obtained good results for 2/3 children.

Moreover, complications associated with postoperative adhesions are substantial and risks include blood loss, enterocutaneous fistulas, major bowel resections, abdominal wall damages, and death. The distribution of adhesions has been studied, for instance after colectomy, in case of ulcerative colitis or familial polyposis. Most adhesions are provided by the omentum, or develop between small bowel loops, or between the bowel and the abdominal wall. The duration of the operation is a significant predictor of the severity of adhesion formation. If open surgery takes approximately 5 hours, adhesions will be dense, thick, and well-vascularized. With shorter operative times, namely less than 3 hours, the adhesions will be filmy, thick, and avascular.

1. Is small bowel obstruction a major public health problem? The costs of postoperative small bowel obstruction have been well studied in the United States of America. The number of patients hospitalized with small bowel obstruction secondary to adhesions is estimated at almost 200,000 a year. More than 50,000 of these patients require new surgery. The average length of hospital stay is 10.6 days for patients needing an operation for small bowel obstruction. Costs are estimated at $22,000 per patient; total costs related to adhesions have been estimated at $1.2 billion per year.

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2. Do small bowel obstructions occur even after laparoscopy, and how is it possible to avoid them? More than a decade after the beginning of laparoscopic surgery, universal experience indicates that postoperative obstructions occur less frequently. Even if this result is obvious, it is difficult to demonstrate it.
scientifically. It would be necessary to compare 2 groups of patients in a randomized study. Retrospective studies are more ethical but not statistically significant. Even if postoperative obstructions seem to be rare after laparoscopy, they have been reported in the recent literature. The incidence is evaluated at almost 1%. Postoperative small bowel obstructions after laparoscopy are possible. After laparoscopy, 18% of patients present with adhesions between the omentum and a trocar insertion site. However, 85% of patients present with adhesions among the intestinal loops or from the site of laparotomy to an intestinal loop or the omentum in case of open surgery. Herniation of the small bowel through a trocar site has been reported through a 5 mm port and herniation of the omentum through a trocar site has been reported even through a 3 mm port in a newborn (own experience not yet reported), after surgery of a small bowel volvulus caused by malrotation. It is necessary to deal with peritoneal defects even if they occur during laparoscopy. Spillage of stones or stercorilis may result in adhesions and obstruction. Small bowel obstruction following a laparoscopy can be avoided by the use of smaller trocars whenever possible, the repair of fascia under direct vision, slow desulfation of the abdominal cavity, avoidance of bleeding, spilled stones or staples, and careful lavage of the abdominal cavity at the end of the surgical procedure. Surgery is required for early postoperative obstruction after laparoscopy in 25% of patients.

3. Is the laparoscopic treatment of small bowel obstruction in children possible? The treatment of small bowel obstruction is possible, effective and safe with laparoscopy. The feasibility of laparoscopic management of acute small bowel obstruction has been demonstrated in children. Before surgery for small bowel obstruction, a gastric tube and a urinary probe are required. The surgeon must be able to turn the patient around to be able to detect adhesions wherever they are present in the abdominal cavity. The Hasson procedure must be carried out away from previous scars. The operative field is very narrow. That is why the "one trocar in the other" technique is necessary to avoid any small bowel injury. Monopolar electrocaulation must be avoided at the beginning of the procedure. One must use atraumatic forceps. A difficulty remains in determining when and if bowel resection is required. It is important to make a perfect white balance with the camera as well as to take time before this kind of decision. When a band has been resected, it seems to be obvious that the obstruction has been treated. However, it is important to look for any other band or adhesion that may be responsible for an immediate recurrence of the obstruction. The results of laparoscopic management of acute small bowel obstructions are good in two thirds of cases in children. Previous surgery before obstruction is most often an open appendectomy (57%). Conversion rates are lower in series with children (23%) than with adults (36%). No matter what the previous surgery is, the chances of a favorable result are the same. A conversion is needed in case of bowel resection (25% of conversions), inability to perform viscerolysis (50% of conversions), bowel perforation with a trocar (15% of conversions) or bowel perforation with a forceps (10% of conversions). The reoperation rate is approximately 6%. Reoperation is often due to an early failure. The severity of the obstruction may have been misjudged and the viscerolysis insufficient. Late recurrences happen between 6 months and 3 years in the experience of the Group d'Etude en Coeliochirurgie Infantile (Study Group in Pediatric Endosurgery (GECl). We have operated on 30 postoperative small bowel obstructions in Strasbourg. Our conversion rate was 16%. The mean duration of laparoscopy was 45 minutes. Recovery was approximately 3 days. Patients who suffer from obstructing bands rather than generalized adhesions will particularly benefit from the laparoscopic approach.

References

5. Waldhaussen JHT. Incisional hernia in a 5-mm trocar site following pediatric laparoscopy. *J Laparoendosc Surg* 1996; 6: S89-S90.