



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com



Small bowel obstruction after caesarean section: Laparoscopic management. Two case report

Giuseppe Di Buono^{a,*}, Federica Ricupati^a, Elisa Maienza^a, Leonardo Gulotta^b, Salvatore Buscemi^a, Antonino Agrusa^a

^a Department of Surgical, Oncological and Oral Sciences, Section of General and Urgent Surgery, University of Palermo, Italy

^b Department of Human Pathology of Adult and Evolutive Age, General Surgery Unit, University Hospital of Messina, Italy

ARTICLE INFO

Article history:

Received 4 July 2020

Received in revised form 7 September 2020

Accepted 7 September 2020

Available online xxx

Keywords:

Caesarean section

Bowel obstruction

Laparoscopy

Urgent laparoscopic surgery

ABSTRACT

INTRODUCTION: Caesarean section is the most common abdominal surgery performed on women worldwide. Adhesions represent a severe complication of cesarean section and can cause different degrees of bowel obstruction.

CASE REPORTS: We report two unusual cases of small bowel obstruction treated with laparoscopic approach after caesarean section performed for gynecological pathologies. In the first one small bowel obstruction was due to volvulus caused by a severe pelvic adhesion syndrome; in the second one, occlusive picture was related to presence of multiple adhesion phenomena between the sigmoid colon and the right ovary as result of abdominal hysterectomy.

DISCUSSION: The incidence of small bowel obstruction after caesarean section is very low and postoperative adhesions represent the main cause. Diagnosis was established by clinical signs, radiological and intraoperative findings. Laparoscopic approach can be the treatment of choice only in selected patients. In presence of dense adhesions, inability to visualize the site of obstruction, iatrogenic intestinal perforation, bowel necrosis and technical difficulties, conversion to open surgery is mandatory.

CONCLUSION: In selected patients with small bowel obstruction laparoscopy is a safe and feasible procedure if conservative measures fail.

© 2020 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Caesarean section is the most common abdominal surgery performed on women in the world. Its frequency is greatly increased in recent years and is associated with short- and long-term complications [1]. As reported by Tulandi et al. [2], adhesions represent a severe complication of cesarean section and can cause abdominal discomfort, female delayed conception and different degrees of bowel obstruction. The incidence of small bowel obstruction (SBO) after caesarean section is very low compared to other abdominal surgery and is commonly found after an abdominal hysterectomy. In this article, we present two unusual cases of SBO after an uncomplicated caesarean section performed for gynecological pathologies and treated with a laparoscopic approach. These cases are reported in line with the SCARE criteria [3,4].

2. Case reports

2.1. Patient 1

A 49 year-old Caucasian woman came to the Emergency Department with colic abdominal pain, nausea and therapy-resistant vomiting for 4 days. She had an history of caesarean section performed many years earlier for benign gynecological pathology. She was afebrile and her physical examination revealed generalized abdominal distention and tenderness with tympanic bowel sounds. On laboratory investigation we saw WBC count of 14260/mm³, Hb 11.9 g/dL and C-reactive protein (CRP) 43.81 mg/L. Other routine laboratory tests were in the normal range. She had no other systemic symptoms and preoperative study showed no comorbidity. Family history was negative for relevant diseases. A contrast-enhanced CT abdominal scan revealed a marked distension of the stomach and small bowel with multiple air fluid levels up to the middle-proximal ileum where there was a transition bowel loop with no appreciable causes of organic obstruction (Fig. 1). Considering the previous gynecological surgery and the probable presence of a single adhesion band, despite the hyperdistension of the intestinal loops we preferred a laparoscopic approach with possible conversion to open surgery in presence of difficult exposure of working

* Corresponding author at: Department of Surgical, Oncological and Oral Sciences (Di.Chir.On.S.), University of Palermo - Italy, Via L. Giuffrè, 5, 90127, Palermo, Italy.

E-mail addresses: giuseppe.dibuono@unipa.it (G. Di Buono), fede.ricupati90@gmail.com (F. Ricupati), elisa.maienza@yahoo.it (E. Maienza), gulotta.leonardo@gmail.com (L. Gulotta), buscemi.salvatore@gmail.com (S. Buscemi), agrusa@unipa.it (A. Agrusa).

<https://doi.org/10.1016/j.ijscr.2020.09.059>

2210-2612/© 2020 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

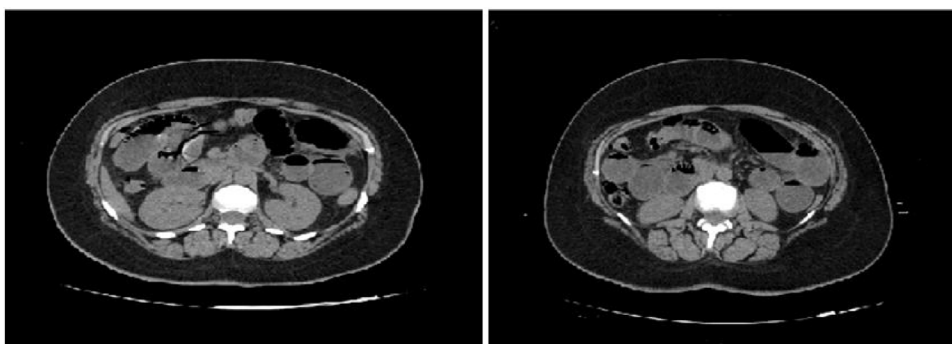


Fig. 1. A contrast-enhanced CT abdominal scan revealed multiple air fluid levels up to the middle-proximal ileum and a transition loop in the abdominal center.

space. We induced pneumoperitoneum with Hasson technique using a 10-mm trans-umbilical optical trocar [5] and after a careful exploration of the peritoneal cavity, we placed other two 5-mm trocars respectively in the right and left flank in order to scan pelvic and all abdominal quadrants [6,7]. After an initial surgical exploration, we identified a middle-ileal volvulus caused by a severe pelvic adhesion syndrome following previous surgery with remarkable distension of the small bowel loops. On exploration of the pelvic excavation the uterus was increased in size for diffuse fibromatosis. The ileal loop responsible of obstruction did not appear to be ischemic or necrotic. We performed an adequate laparoscopic adhesiolysis and detorsion of the involved ileal loop with no resection. Our patient had an uncomplicated postoperative course and was discharged on POD 5 in good health.

2.2. Patient 2

A 44 year-old Caucasian woman was admitted to Emergency Department with severe abdominal pain localized in the upper quadrants and right iliac fossa associated with nausea and vomiting and with no transit of stools for the last 48 h. Last year, the patient underwent abdominal hysterectomy through Pfannenstiel incision for benign gynecological disease (diffuse fibromatosis). In addition, he also had a surgical scar in his right iliac fossa for previous appendectomy. She had no other comorbidities. The laboratory tests revealed a WBC count and Hb values in the normal range. C-reactive protein (CRP) was 93.77 mg/L. After administration of Gastrografin (methylglucamine diatrizoate), an hyperosmolar fluid typically used in gastrointestinal radiology, she underwent to an abdominal X-ray that showed multiple air fluid levels. A contrast-enhanced CT scan confirmed this feature picture of intestinal obstruction with multiple air fluid levels of the jejuno-ileal loops extending to the distal ileum (Fig. 2). The radiologist identified two sections reduced in size in close contiguity with the right ovary. Furthermore, there was relevant supra- and sub-mesocolic abdominal effusion. Also in this case, in consideration of the hemodynamic stability and the young age of the patient we performed exploratory laparoscopy with possible conversion to open surgery in case of an inadequate surgical field. We induced the pneumoperitoneum with Hasson technique by placing a first 10-mm trans-umbilical trocar [8]. We started an accurate exploration of the peritoneal cavity to exclude an excessive distension of the bowel loops or other complications (ischemia, unknown perforation) and then we placed other two 5-mm trocars respectively in the left flank and in suprapubic region like in laparoscopic appendectomy [9]. The intestinal loops appeared dilated and in the right iliac fossa there was an adhesion band on the terminal ileal tract which presented a thickened and ecchymotic meso with substenotic lumen, but with no vascular compromise. We performed an adequate adhesiolysis with laparoscopic scissors and observed the consequent restora-

tion of trophism and peristalsis of the involved ileal tract. Though we could not exclude inflammatory bowel disease that would have caused fibrous stenosis of the ileum we decided for conservative treatment in consideration of the progressive functional restoration of the affected tract. Continuing the surgical exploration, we noted the presence of severe adhesion phenomena between the sigmoid colon and the right ovary, which were cautiously divided. In addition, the right ovary had a 5-cm benign cystic lesion that was fenestrated. Our patient had an uneventful postoperative course and was discharged on POD 4.

3. Discussion

The incidence of SBO after caesarean section is 0.1% [10] and the most common cause is represented by post-surgical adhesions or volvulus [11,12]. It is known that an higher number of cesarean section increase the risk of SBO and only few cases are reported in literature. Al-Took et al. [13], in their cohort study on 262 women with adhesion-related SBO conclude that abdominal hysterectomy is the most common gynecologic surgery associated with SBO. Andolf et al. [14] show that the risk of intestinal obstruction in women underwent to cesarean delivery is twice increased. Another uncommon cause of SBO is represented by internal herniation [15,16] and it is reported in a study conducted by Marchocki et al. [17]. The authors describe an unusual case of SBO secondary to herniation of a small bowel tract through intact rectus sheath and rectus muscle. This phenomenon can be related to non-closure of the parietal and visceral peritoneum after caesarean section, practice associated with shorter operative time and less postoperative use of analgesic drugs. A recent meta-analysis shows that adhesion formation can be potentially avoided by peritoneal closure [16]. Very important in determining the etiology of SBO are clinical history and physical examination. In our cases, both women had a Pfannenstiel incision for previous gynecological surgery. In the first one SBO was due to volvulus secondary to a severe pelvic adhesion syndrome. In the second one, occlusive picture was caused by multiple adhesion phenomena between the sigmoid colon and the right ovary as result of abdominal hysterectomy. Diagnosis was established by clinical signs, radiological and operative findings. In both cases, women came to our attention with some typical symptoms such as abdominal pain, nausea, vomiting, abdominal distention and constipation (absence of defecation or flatus in the previous 24 h). The first radiological examination that was performed to confirm the presence of SBO was an abdominal X-ray that revealed multiple air-fluid levels. We made a contrast-enhanced CT abdominal scan because was the first line imaging modality in detecting bowel ischaemia (accuracy 73–80%, sensibility 85–100%) [18]. Even if it cannot easily identify the presence of adhesion phenomena, it can show the transition point and can distinguish between different obstructions allowing to select patients candidates for laparoscopic

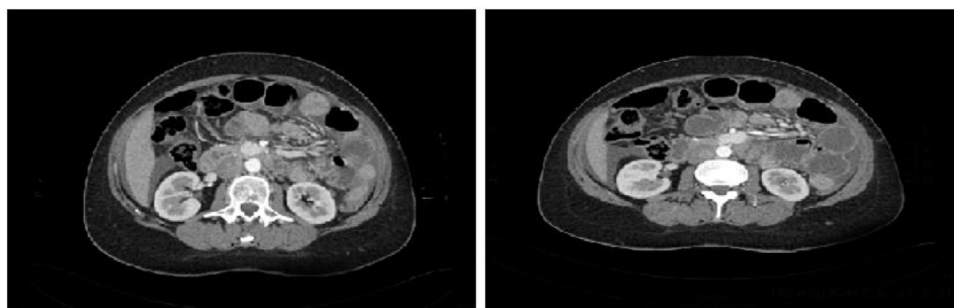


Fig. 2. A contrast-enhanced CT abdominal scan revealed multiple air fluid levels of the jejunoileal loops extending to the distal ileum.

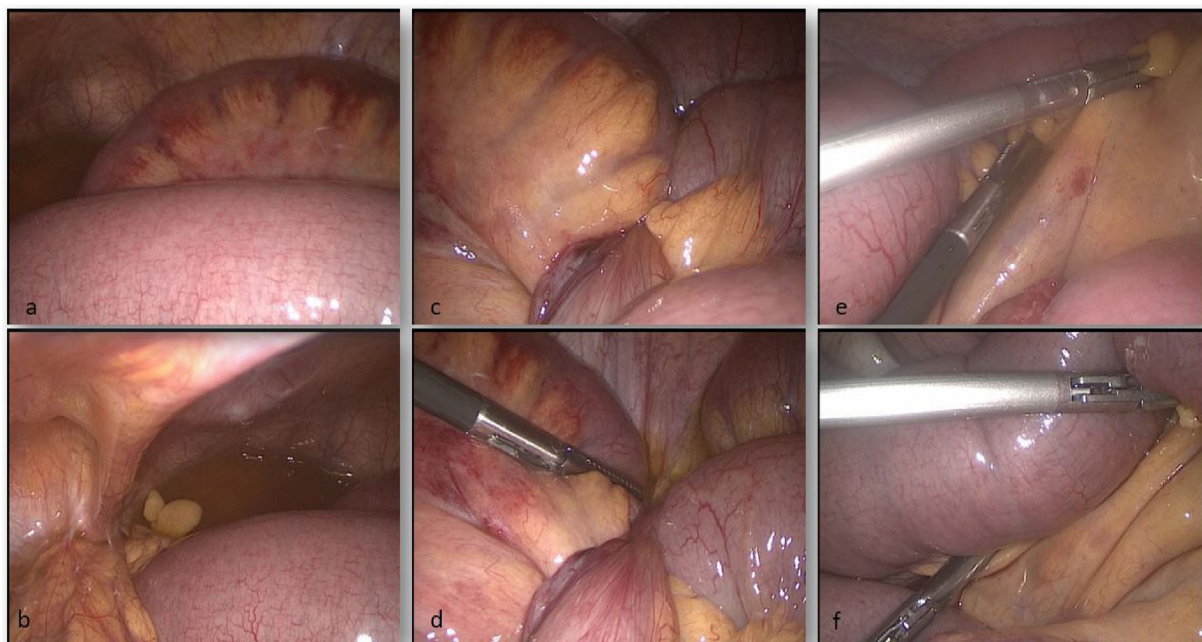


Fig. 3. Intraoperative findings of small bowel obstruction after caesarian section. a-b) dilated bowel loops with fluid in pelvic fluid; the surgical fields was reduced with difficult maneuvers; c-d) transition loop due to adhesion band; e-f) laparoscopic exploration by handling the mesentery and not the visceral wall.

adesiolysis. Moreover, it can reveal signs of necrosis or perforation. In presence of SBO that not react to conservative therapy, exploratory laparotomy, through a midline incision, is the more diffuse therapeutic approach. The first laparotomy aimed to adhesiolysis dates back to 1883, when Battle and Jones operated a woman suffering from recurrent subocclusive crises after an annexectomy. The involved bowel loops were freed but the woman died later [19]. Since 1991, in literature, has arise the possibility of a laparoscopic approach also in case of SBO [20]. In these patients absolute contraindications to laparoscopy are hemodynamic instability and cardiopulmonary impairment which not recommend induction of pneumoperitoneum. SBO, diffuse peritonitis, previous laparotomies and BMI (body mass index) are to be considered relative surgeon-dependent contraindications. Laparoscopic approach is useful for diagnosis with excellent precision (97–100%) but also allows to treat the cause of obstruction in 66% of cases [21]. This technique provides less postoperative pain and reduces the incidence of new adhesions formation (with lower risk of new SBO), wound infections and incisional hernia [22]. The risks and difficulties of the laparoscopic technique are mainly due to a small inadequate surgical field and increased risk of trocar injuries in presence of dilated bowel loops. Suter et al. [23] refer that a bowel diameter exceeding 4 cm is associated with an higher rate of conversion to open surgery. In SBO, to prevent visceral lesions, is more

prudent to induce pneumoperitoneum with an open technique by Hasson's trocar placed away from pre-existing scar [24] than a blind access with Veress needle. Levard et al. [25] report a 3.7% incidence of intestinal perforation using a blind-access technique in cases of bowel obstruction. Predictive factors for success or failure of this type of approach are the earliness and duration of the operation, the diameter of the dilated intestine greater than 4 cm and the number of previous surgical procedures undergone by the patient [26]. In addition, conversion to open surgery must be considered an option in the diagnostic-therapeutic algorithm with possibility of performing tailored minilaparotomies (<5 cm) instead of an extended laparotomy. The main causes of conversion are dense and numerous adhesions, inability to find the site of obstruction, iatrogenic intestinal perforation, bowel necrosis, generic technical difficulties. Ghosheh et al. [27] in their study describe that morbidity of patients treated laparoscopically is less than those treated with the traditional open approach and it does not increase in patients required conversion laparotomy. In our cases, clinical history led us to suspect a SBO due to limited adhesions and we decided to perform an exploratory laparoscopy to made diagnosis and eventually to treat the lesions. An early intervention after hospital admission was essential to avoid ischemic damage of the bowel loops but also to prevent an excessively intestinal distension which would make laparoscopy much less achievable. On the basis

of these considerations given by the literature review we can highlight some take-home messages for clinical practice. We know that in the case of intestinal obstruction due to adhesion syndrome, the first therapy is conservative management to ensure the restoration of intestinal canalization. In this case, on the contrary, we try an approach as early as possible in order to manage disease by laparoscopic technique. Veress needle is the most widely used induction technique of the pneumoperitoneum worldwide. In these clinical conditions of intestinal obstruction, instead, it is absolutely contraindicated because of the risk of visceral injuries which can compromise the entire surgical procedure. The same manipulation of the distended intestinal loops with laparoscopic forceps can cause iatrogenic perforations therefore it is essential to carry out a laparoscopic exploration by handling the mesentery and not the visceral wall. In this case the surgical procedure was performed by a young surgeon experienced in laparoscopic surgery and does not require particularly difficult technical maneuvers, however it is essential to know some tips and tricks to obtain a good surgical outcome (Fig. 3). The patients were satisfied with the treatment received with typical advantages of laparoscopic surgery with rapid postoperative recovery, earlier food intake and less postoperative pain.

4. Conclusion

The most common causes of SBO are postoperative adhesions. After caesarean section the risk of SBO is very low. In presence refractory SBO the laparoscopy allows us to make diagnosis and to treat occlusion. If conservative management fails, in selected patients with SBO and in high volume emergency centers [28–30] the laparoscopic adhesiolysis is a safe and feasible procedure with multiple advantages in postoperative course.

Declaration of Competing Interest

Di Buono Giuseppe and other co-authors have no conflict of interest.

Sources of funding

Di Buono Giuseppe and other co-authors have no study sponsor.

Ethical approval

Ethical Approval was not necessary for this study.
We obtained written patient consent to publication.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Di Buono Giuseppe: study design, data collections, data analysis and writing
Ricupati Federica: study design, data collections, data analysis and writing
Maienza Elisa: data collections
Gulotta Leonardo: data collections
Buscemi Salvatore: study design
Agrusa Antonino: study design, data collections, data analysis and writing

Registration of research studies

This article is part of a supplement entitled Case reports from Italian young surgeons, published with support from the Department of Surgical, Oncological and Oral Sciences – University of Palermo.

Guarantor

Di Buono Giuseppe.
Agrusa Antonino.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Acknowledgement

This article is part of a supplement entitled Case reports from Italian young surgeons, published with support from the Department of Surgical, Oncological and Oral Sciences – University of Palermo.

References

- [1] A.P. Betran, M.R. Torloni, J. Zhang, J. Ye, R. Mikolajczyk, C. Deneux-Tharaux, et al., What is the optimal rate of caesarean section at population level? A systematic review of ecologic studies, *Reprod. Health* 12 (57) (2015).
- [2] T. Tulandi, M. Agdi, A. Zarei, L. Miner, V. Sikirica, Adhesion development and morbidity after repeat cesarean delivery, *Am. J. Obstet. Gynecol.* 201 (56) (2009) e1–6.
- [3] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill, for the SCARE Group, The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* 34 (2016) 180–186.
- [4] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A. Fowler, D.P. Orgill, For the SCARE Group, The SCARE 2018 statement: updating consensus Surgical Case Report (SCARE) guidelines, *Int. J. Surg.* 60 (2018) 132–136.
- [5] A. Agrusa, G. Di Buono, S. Buscemi, G. Cucinella, G. Romano, G. Gulotta, 3D laparoscopic surgery: a prospective clinical trial, *Oncotarget* 9 (April (25)) (2018) 17325–17333, <http://dx.doi.org/10.18632/oncotarget.24669>, eCollection 2018 Apr 3.
- [6] G. Cucinella, A. Perino, G. Romano, G. Di Buono, G. Calagna, V. Sorce, L. Gulotta, M. Triolo, V. Billone, G. Gulotta, A. Agrusa, Endometrial cancer: robotic versus laparoscopic treatment. Preliminary report, *GIOG* 37 (November–December (6)) (2015) 283–287.
- [7] G. Cucinella, G. Calagna, G. Romano, G. Di Buono, G. Gugliotta, S. Saitta, G. Adile, M. Manzone, G. Accardi, A. Perino, A. Agrusa, Robotic versus laparoscopic sacrocolpopexy for apical prolapse: a case-control study, *G. Chir.* 37 (May–June (3)) (2016) 113–117.
- [8] A. Agrusa, G. Romano, G. Cucinella, G. Cocorullo, S. Bonventre, G. Salamone, G. Di Buono, G. De Vita, D. Frazzetta, D. Chianetta, V. Sorce, G. Bellanca, G. Gulotta, Laparoscopic, three-port and SILS cholecystectomy: a retrospective study, *G. Chir.* 34 (September–October (9–10)) (2013) 249–253.
- [9] A. Agrusa, G. Romano, G. Di Buono, G. Frazzetta, D. Chianetta, V. Sorce, V. Billone, G. Cucinella, G. Gulotta, Acute appendicitis and endometriosis: retrospective analysis in emergency setting, *GIOG* 35 (2013) 728–732.
- [10] G. Barmparas, B.C. Branco, B. Schnuriger, L. Lam, K. Inaba, D. Demetriades, The incidence and risk factors of post-laparotomy adhesive small bowel obstruction, *J. Gastrointest. Surg.* (2010).
- [11] M.M. Connolly, J.A. Unti, P.F. Nora, Bowel obstruction in pregnancy, *Surg. Clin. North Am.* 75 (1995) 101–113.
- [12] V. Ranjan, Primary volvulus of the small bowel following normal delivery, *Br. J. Obstet. Gynaecol.* 100 (1993) 860–861.
- [13] S. Al-Took, R. Platt, T. Tulandi, Adhesion-related small-bowel obstruction after gynecologic operations, *Am. J. Obstet. Gynecol.* 180 (1999) 313–315.
- [14] E. Andolf, M. Thorsell, K. Kallen, Cesarean delivery and risk for postoperative adhesions and intestinal obstruction: a nested case-control study of the Swedish Medical Birth Registry, *Am. J. Obstet. Gynecol.* 203 (406) (2010) e1–6.
- [15] R. Owen, D. Polson, Two cases of significant postoperative morbidity following peritoneal non-closure at caesarean section, *J. Obstet. Gynaecol.* 29 (1) (2009) 65–66.
- [16] C. Van Der Wal, P.A. Maharajan, J.S. Nicholls, Postoperative obstruction following caesarean section possibly due to non-closure of the peritoneum, *J. Obstet. Gynaecol.* 28 (2) (2008) 239–240.
- [17] Z. Marchocki, D.J. Brennan, C. Mak, M. O'Riordan, R.A. Greene, An unusual case of small bowel obstruction post caesarean section, *J. Surg. Case Rep.* 2011 (November (11)) (2011).

- [18] J.H. Kim, H.K. Ha, J.K. Kim, et al., Usefulness of known computed tomography and clinical criteria for diagnosing strangulation in small-bowel obstruction: analysis of true and false interpretation groups in computed tomography, *World J. Surg.* 28 (2004) 63–68.
- [19] L. Shi Z Ma, Y. Yang, et al., Adhesion formation after previous caesarean section—a meta-analysis and systematic review, *BJOG* 118 (2011) 410–422.
- [20] W.W. Babcock, The operative treatment of carcinoma of the recto-sigmoid, *Surg. Gynecol. Obstet.* 55 (1932) 627–630.
- [21] D.F. Bastug, S.W. Trammell, J.P. Boland, E.P. Mantz, E.H. Tiley, Laparoscopic adhesiolysis for small bowel obstruction, *Surg. Laparosc. Endosc.* 1 (1991) 259–262.
- [22] B. Kirshtein, A. Roy-Shapira, L. Lantsberg, et al., Laparoscopic management of acute small bowel obstruction, *Surg. Endosc.* 19 (April (4)) (2005) 464–467.
- [23] M. Suter, P. Zermatten, N. Hakic, et al., Laparoscopic management of mechanical small bowel obstruction: are there predictors of success or failure? *Surg. Endosc.* 14 (2000) 478–484.
- [24] I.S. Bailey, M. Rhodes, N. O'Rourke, L. Nathanson, G. Fielding, Laparoscopic management of acute small bowel obstruction, *Br. J. Surg.* 85 (1998) 84–87.
- [25] H. Levard, M. Boudet, S. Msika, et al., Laparoscopic treatment of acute small bowel obstruction: a multicentre retrospective study, *Aust. N. Z. J. Surg.* 71 (2001) 641–646.
- [26] M. Khaikin, N. Schneiderei, S.D. Wexner, et al., Laparoscopic vs. open surgery for acute adhesive small-bowel obstruction: patients' outcome and cost-effectiveness, *Surg. Endosc.* 21 (May (5)) (2007) 742–746.
- [27] B. Ghosheh, J.R. Salameh, Laparoscopic approach to acute small bowel obstruction: review of 1061 cases, *Surg. Endosc.* 21 (November (11)) (2007) 1945–1949.
- [28] A. Agrusa, G. Frazzetta, D. Chianetta, S. Di Giovanni, L. Gulotta, G. Di Buno, V. Sorce, G. Romano, G. Gulotta, "Relaparoscopic" management of surgical complications: the experience of an Emergency Center, *Surg. Endosc.* 30 (2016) 2804–2810.
- [29] G. Di Buono, S. Buscemi, A.I. Lo Monte, G. Geraci, V. Sorce, R. Citarrella, E. Gulotta, V.D. Palumbo, S. Fazzotta, L. Gulotta, D. Albano, M. Galia, G. Romano, A. Agrusa, Laparoscopic adrenalectomy: preoperative data, surgical technique and clinical outcomes, *BMC Surg.* 18 (April (Suppl. 1)) (2019) 128, <http://dx.doi.org/10.1186/s12893-018-0456-6>.
- [30] A. Agrusa, G. Romano, G. Navarra, G. Conzo, G. Pantuso, G.D. Buono, R. Citarrella, M. Galia, A.L. Monte, G. Cucinella, G. Gulotta, Innovation in endocrine surgery: robotic versus laparoscopic adrenalectomy. Meta-analysis and systematic literature review, *Oncotarget* 8 (October (60)) (2017) 102392–102400, <http://dx.doi.org/10.18632/oncotarget.22059>, eCollection 2017 Nov 24.

Open Access

This article is published Open Access at [sciencedirect.com](https://www.sciencedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.

Please cite this article in press as: G. Di Buono, et al., Small bowel obstruction after caesarean section: Laparoscopic management. Two case report, *Int J Surg Case Rep* (2020), <https://doi.org/10.1016/j.ijscr.2020.09.059>