

# Cecal Perforation Due to Paralytic Ileus Following Primary Caesarean Section

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## Abstract

**Background:** Reports of cecal perforation complicating a Caesarean section postoperatively are very uncommon. Cecal perforations often are due to an antecedent bowel obstruction.

**Case:** A 39-year-old primigravid woman presented with obstructed labour at a cervical dilatation of 6 cm. An uncomplicated Caesarean section was performed. Postoperatively, the patient developed signs consistent with a bowel obstruction and was managed conservatively. A perforated viscus was confirmed via imaging on the third and fourth postoperative days. The patient underwent laparotomy with resection of a perforated cecum, and she recovered well.

**Conclusion:** Although uncommon after a Caesarean section, cecal perforation should be suspected if a patient presents with symptoms of a prolonged bowel obstruction. Early identification and prompt imaging are the mainstays of treatment for these patients.

## Résumé

**Contexte :** Les signalements de perforation caecale compliquant une césarienne à la suite de l'opération sont très peu courants. Les perforations caecales sont souvent attribuables à une occlusion intestinale déjà présente.

**Cas :** Une primigravide de 39 ans connaissait un arrêt de progression du travail en présence d'une dilatation cervicale de 6 cm. Une césarienne non compliquée a été effectuée. À la suite de l'opération, la patiente en est venue à présenter des symptômes rappelant une occlusion intestinale et a fait l'objet d'une prise en charge conservatrice. La présence d'un viscère perforé a été confirmée par imagerie au cours du troisième et du quatrième jours à la suite de l'opération. La patiente a subi une résection du caecum perforé par laparotomie et s'est bien rétablie.

**Conclusion :** Bien que peu courante à la suite d'une césarienne, la présence d'une perforation caecale devrait être soupçonnée lorsqu'une patiente présente des symptômes rappelant une occlusion intestinale prolongée. L'identification précoce et le fait de procéder sans délai à une imagerie constituent les fondements du traitement pour ces patientes.

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**Key Words:** Bowel obstruction, Caesarean section, cecal perforation, Ogilvie's syndrome, paralytic ileus

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## INTRODUCTION

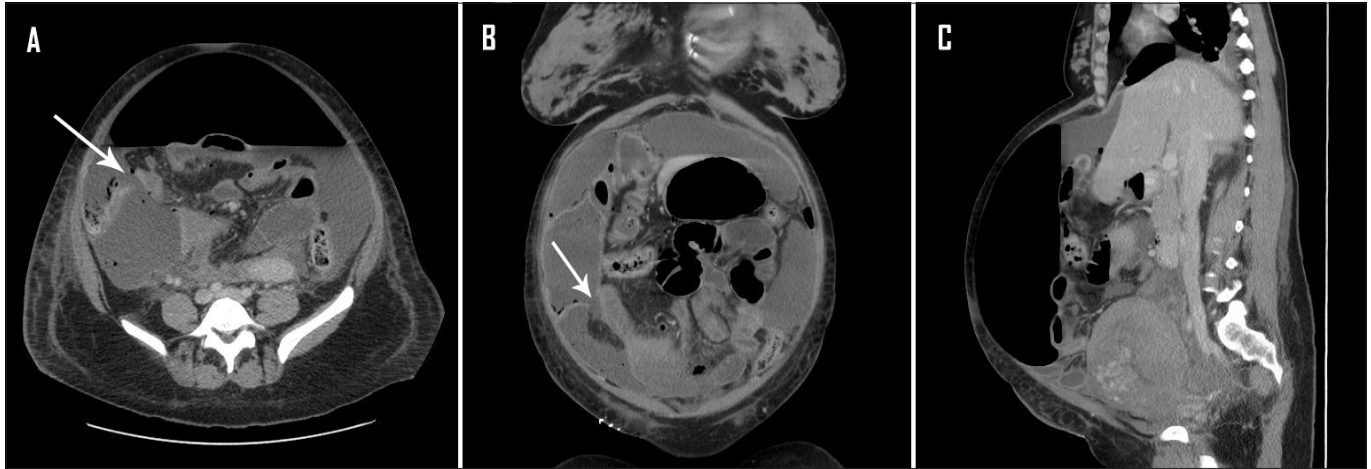
After Caesarean section, it would be unexpected for the patient to suffer any large or small bowel complication because of the lack of bowel manipulation. A perforated cecum after a Caesarean section has been described in 20 previous case reports,<sup>1-16</sup> the first from 1954.<sup>1</sup> Bowel obstruction can be due to either mechanical or functional causes. The most common mechanical etiologies are adhesions (58%), volvulus (24%), and intussusception (5%).<sup>17</sup> Although Ogilvie's syndrome and paralytic ileus are rare, they are the two most common causes of functional bowel obstruction. One of the most severe sequelae of these etiologies is a bowel perforation, with the cecum being the most susceptible. Mortality rates from a cecal perforation range from 30% to 72%.<sup>3,5</sup>

## THE CASE

A 39-year-old primigravid woman was admitted to hospital in active labour at 41 weeks' gestation after spontaneous rupture of membranes. Oxytocin augmentation of labour was commenced and an epidural anaesthetic was used for pain management. Cervical dilatation did not progress beyond 6 cm over the next 12 hours, and with failed progress a low-segment primary Caesarean section was performed under epidural anaesthetic. Intraoperatively, a moderate amount of intra-abdominal transudate fluid was observed, consistent with obstructed labour. A live born female infant weighing 4086 g was delivered with Apgar scores of 8 and 9 at one and five minutes, respectively.

Clear fluids were commenced on the first postoperative day. Active bowel sounds were noted. The patient had mild abdominal distension and pain but denied any nausea. On the second postoperative day, she had increasing abdominal distension and stopped passing flatus. She continued to complain of lower back and abdominal pain. The abdomen was soft, tympanic, and non-tender with high pitched, infrequent bowel sounds. Conservative management was

**Figure 1.** The following are axial, coronal and sagittal images following the administration of IV and oral contrast in a female patient four days after Caesarean section. Figures 1a and 1b show axial and coronal images, demonstrating a significant amount of free fluid and free air out of keeping with the patient's postoperative status. Free fluid collection demonstrates rim enhancement. The arrow indicates a gap in the cecal wall suggestive of a cecal perforation. Figure 1c shows the sagittal image again, demonstrating a large amount of free air and free fluid. A postpartum uterus is seen with increased vascularity in its anterior wall in keeping with a recent postoperative status.



continued. On the third postoperative day, the patient began complaining of mild nausea. Her abdominal girth continued to increase, and she became mildly short of breath. A rectal tube was inserted and drained sparse amounts of loose stool.

An abdominal X-ray showed intraperitoneal free air under the left and right hemidiaphragms. There were also dilated loops of small bowel consistent with an ileus. A nasogastric tube was inserted on the third postoperative day, with drainage of 600 cc of bile-stained fluid. The patient subsequently had mild relief of her nausea, but the abdominal distension persisted.

On the fourth postoperative day, the patient was found to have a marked leukocytosis ( $22 \times 10^9/L$  with a left shift). CT with contrast of the abdomen and pelvis was performed (Figure 1), and this showed a significant amount of free air and fluid throughout the abdomen and pelvis adjacent to the anterior abdominal wall. There were also multiple locules of free gas seen in the mesentery and contrast opacification of multiple loops of small bowel but no evidence of extravasated contrast. The study was highly suggestive of a perforated viscus. The general surgery service was consulted, and the patient was immediately taken to the operating room for an exploratory laparotomy.

At laparotomy, a perforated cecum surrounded by a large zone of necrotic cecal wall was found. There was marked dilatation of the small bowel, but the large bowel was decompressed. Extensive feculent peritonitis that appeared to be at least 24 hours old was noted. The appearance was consistent with a paralytic ileus, cecal distension, and cecal perforation. A resection of cecum and ascending colon was

performed, with a terminal ileostomy and a closed mucous fistula.

The pathology report described 30 cm of terminal ileum, appendix, ileo-cecal junction and ascending colon. A 1 cm diameter transmural perforation was noted in the ascending colon (Figure 2). There was a necrotic area with a paper-thin wall measuring 7 cm in diameter located 3 cm distal to the ileo-cecal valve. The pathologist described this as typhlitis, an inflammation of the cecum resulting in necrotizing ulceration with perforation of the ascending colon. The specimen was negative for malignancy or any other pre-existing pathology.

The patient's postoperative course was complicated by an intra-abdominal infection that required treatment with antibiotics. She slowly returned to a full diet and was discharged in stable condition 15 days after her bowel resection. She required home care to help with her stoma and ambulation.

## **DISCUSSION**

Colonic obstruction is characterized by a clinical picture suggestive of a mechanical bowel obstruction. Its incidence during pregnancy varies from 0.001% to 0.2%.<sup>17</sup> Some patients with colonic obstruction may be asymptomatic before Caesarean section, but most of these cases will present after Caesarean section even if there was no evidence of pre-operative symptoms. During pregnancy, diagnosing colonic obstruction clinically can be especially difficult due to the gravid uterus distending the abdomen. Constipation, nausea, and vomiting occur relatively frequently in pregnancy and confound the diagnosis.

The first clinical sign of colonic obstruction is usually abdominal distension without the passage of flatus. If there is a perforation present, the patient may begin to exhibit signs of intra-abdominal sepsis such as fever, hypotension, or tachycardia. An X-ray with erect and supine views of the abdomen is the single most reliable diagnostic study. If there is simply a mechanical obstruction, then there will be grossly dilated loops of large bowel, which may also lead to mild dilatation of small bowel loops. However, if a perforation is present, a significant amount of free air will be visible inferior to the diaphragm.

In a review of the literature, a total of 20 other cases of post-Caesarean section cecal perforation were identified. The details of these cases are summarized in the Table. The most common etiologies are paralytic ileus, occurring in at least 7/21 cases (33%) and Ogilvie's syndrome, occurring in at least 5/21 cases (24%). Volvulus was the etiology in 2/21 cases (9.5%), and the etiology was unknown in 7/21 cases (33%). The mortality rate from a post-Caesarean section cecal perforation in our review was 1/21 cases (4.8%); the mortality rate in the non-obstetrical population ranges from 5.9%<sup>1</sup> to 71%,<sup>18</sup> with cases reported several decades ago having higher mortality rates. This could be due to better surveillance and prompt intervention for suspected colonic perforation within the last several decades.

Cecal perforation, rather than perforation elsewhere in the colon, is thought to occur because the cecum has the thinnest wall in the colon and the largest diameter. This allows it to expand three times faster than other areas of the colon. Cecal dilatation depends on a competent ileo-cecal valve to prevent retrograde decompression of the cecum and proximal colon. The cecum bears the brunt of tension within the bowel because the tension on the wall of a hollow viscus is proportional to its radius and intraluminal pressure (the Law of Laplace). This tension causes stretching of the cecal vessels, followed by occlusion, ischemia, and then necrosis.<sup>1</sup> Davis and Lowman reported that the cecum was in severe danger of perforation if dilated to more than 9 cm,<sup>18</sup> while Lawaetz and Jensen found that the average cecal diameter after a Caesarean section is 6.4 cm.<sup>19</sup> In general, this is still observed today, although in some cases dilatations of greater than 9 cm resolve spontaneously.<sup>1</sup>

It can be difficult to establish the specific etiology for a cecal perforation after a Caesarean section, because Ogilvie's syndrome and paralytic ileus have similar presentations and have similar clinical and therapeutic implications. A post-operative ileus is an expected temporary impairment of gastrointestinal motility that follows abdominal surgery. There is a disruption in the normal coordinated movement of the small and large intestines, which results in failure of propulsion of intestinal contents. The term paralytic ileus is used

**Figure 2. Gross specimen of ileum, ileocecal valve, and cecum with a perforation measuring 1 cm in diameter.**



when the impairment lasts beyond the expected postoperative time for that particular surgery. It is often rapid in onset, within one to two days of surgery, and may progress to complete cessation of gut motor function. It may involve the entire gastrointestinal tract apart from the esophagus. Signs and symptoms include abdominal distension, abdominal tenderness, cessation of the passage of stool or flatus, nausea, vomiting, and absent bowel sounds. A paralytic ileus often resolves after stopping oral intake and reverting to parenteral fluid replacement with or without nutrition. A nasogastric tube may be used to allow for decompression and removal of upper gastric contents and air to allow the gut to recover its normal function. Ambulation has also been shown to help restore normal gastrointestinal motility.<sup>11</sup>

Ogilvie's syndrome is specific to the colon. In a patient with paralytic ileus, bowel sounds are absent; Ogilvie's syndrome presents with higher pitched and hyperactive bowel sounds. Patients with Ogilvie's syndrome may continue to pass stool. Nausea and vomiting are rare in patients with Ogilvie's syndrome but are part of the natural progression in a paralytic ileus. Ogilvie's syndrome develops gradually over three to five days and takes longer to resolve than a paralytic ileus. In addition to bowel rest with use of a nasogastric tube, other interventions may benefit a patient with Ogilvie's syndrome.<sup>11</sup> Colonoscopy may help in diagnosis and may decompress the colon to allow for the resolution of the colonic obstruction.<sup>20</sup> In patients treated with colonoscopic decompression, there is a 15% failure rate necessitating repeat colonoscopy or abdominal surgery.<sup>21</sup> In extreme cases, bowel resection is needed even when there is no perforation or extravasation of bowel contents.<sup>11</sup>

## Published cases of spontaneous cecal perforation following Caesarean section

Case	Author	Age	Parity	Etiology	Treatment	Outcome
1	Brock <sup>1</sup>	34	3	volvulus	colectomy and ileotransversostomy	recovery
2	Robertson et al. <sup>12</sup>	25	1	?	cecostomy and over-sewing of lesions	recovery
3	Millar and Ovlisen <sup>7</sup>	24	0	paralytic ileus	cecostomy	recovery
4	Millar and Ovlisen <sup>7</sup>	35	0	paralytic ileus	cecostomy	death
5	Dumont and Dovy <sup>4</sup>	23	0	?	cecostomy	recovery
6	Jensen <sup>5</sup>	28	0	paralytic ileus	resection and over-sewing of lesions	recovery
7	DePalma <sup>3</sup>	33	5	paralytic ileus	right colectomy and ileotransverse colostomy (after failed cecostomy)	recovery
8	Choo <sup>2</sup>	32	0	paralytic ileus	cecostomy	recovery
9	Wesch <sup>16</sup>	36	1	?	over-sewing of lesions	recovery
10	Wesch <sup>16</sup>	36	2	?	over-sewing of lesions	recovery
11	Karger and Scholtes <sup>6</sup>	33	2	?	over-sewing of lesions	recovery
12	Ravo et al. <sup>10</sup>	30	0	Ogilvie's syndrome	intraoperative needle decompression	recovery
13	Trezza and Orellano <sup>15</sup>	?	?	?	?	?
14	Trezza and Orellano <sup>15</sup>	?	?	?	?	?
15	Sperling et al. <sup>14</sup>	35	0	paralytic ileus	cecostomy and over-sewing of lesions	recovery
16	Roberts <sup>11</sup>	44	0*	Ogilvie's syndrome	resection and ileostomy	recovery
17	Noory and Abbaszadeh <sup>8</sup>	40	8	Ogilvie's syndrome	cecostomy	recovery
18	Noory and Abbaszadeh <sup>8</sup>	40	1	Ogilvie's syndrome	cecostomy	recovery
19	Pal et al. <sup>9</sup>	39	2	volvulus	cecostomy	recovery
20	Singh et al. <sup>13</sup>	41	0	Ogilvie's syndrome	right hemicolectomy with primary end to end anastomosis	recovery
21	Current study	39	0	paralytic ileus	resection and ileostomy	recovery

\*Twin pregnancy at 34 weeks' gestation

Post-Caesarean section patients who present with signs and symptoms consistent with a bowel obstruction must be identified quickly. If the patient develops gross abdominal distension and altered bowel sounds with lack of passage of flatus by 48 hours postoperatively, an abdominal X-ray should be performed urgently. If the colonic dilatation is mild, simple non-invasive interventions such as stopping oral intake and ambulation should be instituted. However, if colonic dilatation is of 9–12 cm, a decompression procedure such as insertion of a nasogastric tube or a colonoscopy should be carried out.<sup>21</sup> If the patient is stable and there is uncertainty about whether there is a perforated

bowel, a CT scan may be done to help to establish the diagnosis and to exclude other possible causes of the bowel obstruction, such as a mass lesion. If there are any signs of imminent perforation such as colonic dilatation that is substantially greater than 9 cm, the patient should undergo a laparotomy in order to prevent intra-abdominal sepsis from leakage of bowel contents. If there are obvious signs of bowel perforation or sepsis, such as worsening distension, severe abdominal tenderness, increased temperature, tachycardia, hypotension, severe leukocytosis or positive blood cultures, then emergency laparotomy should be performed by a general surgeon.

**CONCLUSION**

Cecal perforation is a rare postoperative complication after a Caesarean section. Its etiology is a bowel obstruction which may be due to either Ogilvie's syndrome or a paralytic ileus. Early identification is critical for successful treatment of these patients. If a postoperative patient presents with features consistent with a bowel obstruction, prompt imaging should be performed in order to aid early diagnosis and intervention.

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The woman whose story is told in this case report has provided signed permission for its publication.

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