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GENERAL GYNECOLOGY

Acute colonic pseudoobstruction (Ogilvie's syndrome) in gynecologic and obstetric patients: case report and systematic review of the literature

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Abstract

Background Acute colonic pseudo-obstruction or Ogilvie's syndrome (OS) is a rare form of postsurgical or posttraumatic complication. OS rarely occurs in the postoperative course of gynecologic and obstetric patients and is difficult to diagnose.

Case presentation We present the case of an 83-years-old patient with carcinosarcoma of the uterus who developed OS with non-obstructive dilation of the right hemicolon and intraabdominal compression after total abdominal hysterectomy, omentectomy, and lymphadenectomy. Laparotomy with colonic decompression and abdominal dressing was performed. Subsequently, the patient developed pneumonia and peritonitis and died due to septic shock.

Systematic literature review We identified 49 case reports and 10 case series describing 17 gynecologic (cervical cancer, $n=2$; carcinosarcoma of the uterus, $n=1$; benign gynecologic condition, $n=14$) and 76 obstetric patients (cesarean section, $n=66$; OS during pregnancy or after vaginal delivery, $n=10$). Outcome data were available for 59 patients. First-line treatment was conservative in 22/59 (37%) cases, laparotomy with decompression or colon resection was performed in 20/59 (34%) cases, endoscopic decompression in 12/59 (20%) cases, and i.v. neostigmine in 4/59 (7%) cases. Resolution was achieved in 22/59 (37%) of patients. The most common second-line treatment was right hemicolectomy. Adverse events grade 3 and 4 were observed in 8/59 and 31/59 patients (together 66%), respectively, mortality was 3/59 (5%).

Conclusion OS is a rare postoperative complication of gynecologic and obstetric patients with a good prognosis, but a high morbidity. Pregnancy seems to be a predisposing factor for OS. Conservative treatment is a successful first-line approach.

Keywords Ogilvie's syndrome · Pseudo-obstruction · Colon dilatation · Bowel decompression · Gynecology · Surgical complication

Abbreviations

OS	Ogilvie's syndrome
MRT	Magnetic resonance tomography
CT	Computed tomography
POD	Postoperative day
NPO	Nil per os
CTCAE	Common Terminology Criteria for Adverse Events

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Background

Ogilvie's syndrome (OS) is a rare, but potentially fatal form of acute postsurgical or posttraumatic pseudo-obstruction of the colon diagnosed mostly in older adults [1]. It typically occurs in the sixth and seventh decades of life in patients with multiple co-morbidities and surgical interventions. Men are more often affected than women [2]. OS leads to a massive dilation of the colon and is usually confined to the right hemicolon with massive cecal dilation and high intraabdominal pressure. The pathophysiology of OS is unknown, but a dysfunction of the autonomic nervous system with reduced activity of stimulatory neurotransmitters such as

acetylcholine on the one hand and overactivity of inhibitory neurotransmitters such as vasoactive intestinal peptide on the other hand have been suspected to be the underlying cause. The anatomic localization in the cecum, ascending colon, and transverse colon corresponds to the separation of the parasympathetic efferent innervation zones between the vagus nerve and the sacral nerve roots at the splenic flexure [2, 3]. Clinical signs and symptoms of OS include abdominal distension, cecal dilation, pain, and intraabdominal compression without evidence of mechanical obstruction. Prolonged OS may lead to bowel ischemia with subsequent bowel perforation and peritonitis. A mortality rate of 15% in uncomplicated cases and 44% in complicated cases has been reported in the literature [1, 2]. First-line therapy of OS is conservative including electrolyte stabilization, oral food abstinence, and bowel stimulation with neostigmine [4]. In complicated cases endoscopic or open surgical decompression of the colon are the mainstay of treatment [3, 5].

OS in gynecologic and obstetric patients is rare and difficult to diagnose. In addition, gynecologists and obstetricians are usually not familiar with the diagnosis and management of OS. However, OS may complicate the postoperative course of gynecologic surgery or cesarean section and may even occur after vaginal delivery. In addition, age is a well-known predisposing factor for OS and—given the fact of an aging population—OS may be encountered more often among gynecologic patients in the future. To increase the awareness of OS in the gynecologic and obstetric community and to highlight the clinical characteristics, management, and prognosis of patients with OS, we report the case of a woman with uterine carcinosarcoma who developed postoperative OS. Additionally, we present a systematic review of the literature with cohort studies, case series, and case reports of gynecologic and obstetric patients with OS. We discuss the most common therapies and respective outcomes.

Case report

We report the case of an 83-years-old woman who presented to the clinic with vaginal discharge. Gynecologic examination revealed an exophytic tumor protruding from the cervical os and involving the upper third of the vaginal wall. Biopsies were taken demonstrating a poorly differentiated carcinosarcoma of the uterus. On manual pelvic examination, the uterus was enlarged and mobile, the parametria were not involved. A magnetic resonance tomography (MRT) of the pelvis showed an enlarged uterus with a centrally inhomogeneous tumor infiltrating the uterine walls without signs of serosal involvement or extrauterine disease. There was no ascites and no signs of peritoneal carcinomatosis. The right iliac lymph nodes were enlarged. A pelvic computed tomography (CT) scan of the lungs showed emphysema, but no signs of metastases. The patient was assessed for surgical fitness and subsequently underwent total abdominal hysterectomy with resection of the upper third of the vagina, omentectomy, and pelvic lymphadenectomy. The tumor was completely resected and the intraoperative course was uncomplicated. On histology the carcinosarcoma cells consisted of undifferentiated non-keratinizing squamous cell cancer cells (60%) and undifferentiated spindle cells sarcoma cells (40%). Tumor cells expressed p40, and CK 5/6, the expression of desmin and S100 was negative. The final tumor stage was pT3a, pN0, G3, L1, V1, Pn1, R0. On the fourth postoperative day, the patient developed anuria, abdominal pain and abdominal distension. An abdominal CT scan demonstrated non-obstructive dilation of the right hemicolon 8 cm in the largest diameter and intraabdominal compression. Figure 1 shows a CT image of the patient demonstrating cecal dilation. Conservative therapy was not indicated due to dehiscence of the abdominal fascia and the acute clinical presentation. An intravesical pressure catheter was applied and intraabdominal compression was confirmed. The patient underwent laparotomy on the same day. There was no mechanical obstruction and OS was diagnosed. We placed a rectal decompression tube. Primary abdominal closure was not possible and abdominal dressing was performed. Two repetitive laparotomies after 3 and 6 days with colonic decompression and abdominal dressing were performed until the abdomen was finally closed after 8 days. Subsequently, the patient developed pneumonia and sepsis and died due to a septic shock 26 days after initial surgery.

Literature review

In a systematic literature search of the databases PubMed, EMBASE, and Cochrane Central Register of Controlled Trials (search date 14-03-2019) using the search terms (“colonic pseudo-obstruction”[MeSH Terms] OR (“colonic”[All Fields] AND “pseudo-obstruction”[All Fields]) OR “colonic pseudo-obstruction”[All Fields] OR (“colonic”[All Fields] AND “pseudo”[All Fields] AND “obstruction”[All Fields]) OR “colonic pseudo obstruction”[All Fields]), we identified 1120 citations. After screening all abstracts, 22 citations were identified reporting on obstetric or gynecologic patients with OS, defined for the purpose of this review as acute colonic pseudo-obstruction in the absence of mechanical causes for obstruction or any other mechanical occlusive gut lesion, diagnosed on the basis of clinical intraoperative findings and/or imaging studies among patients after gynecologic or obstetric surgery or delivery [6–27]. Studies not reporting on women with OS, not reporting on gynecologic or obstetric patients, and double publications were excluded. The 22 identified studies were retrieved in full and cross

Fig. 1 Computed tomography scan of the patient demonstrating cecal dilation of at least 8 cm due to Ogilvie's syndrome. The screenshot has been modified to crop out patient-identifying information

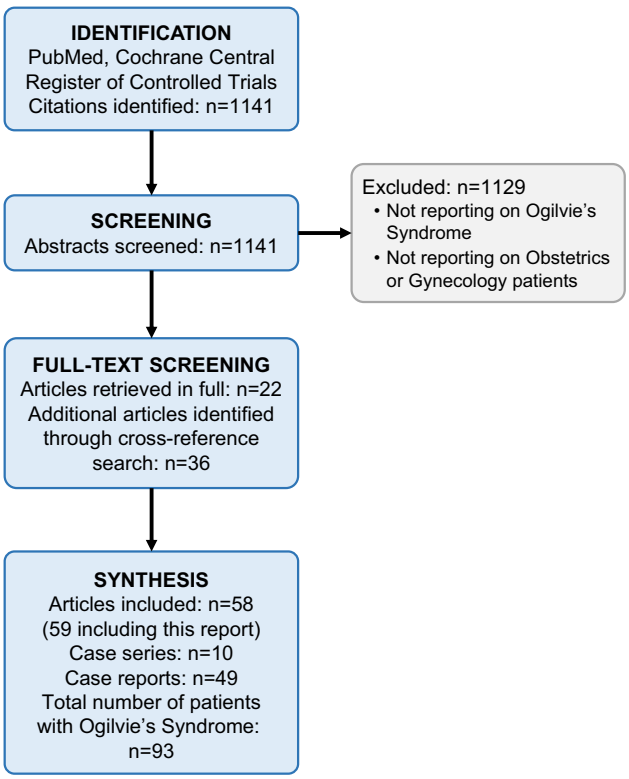

Fig. 2 Flow diagram of the literature search algorithm

reference searches were performed identifying a further 36 studies reporting on women with OS [28–63]. Therefore, in summary, 58 studies were analyzed for this review (59 when including the present case report). Figure 2 shows a flow diagram of the literature search algorithm. Among the 59 studies, we found 49 case reports and 10 case series describing 93 patients. Of these patients, 3 were diagnosed with cancer (cervical cancer, $n=2$; carcinosarcoma of the uterus, $n=1$), 14 had a benign gynecologic condition, 66 had a cesarean section, and 10 developed OS during pregnancy or after vaginal delivery. The mean age of all reported patients was 35.9 years. The mean cecal dilation was 10.9 cm and the mean postoperative day (POD) on which the first symptoms of OS developed, was POD 2.6. Apart from pregnancy itself, only 2/93 patients had a potentially predisposing condition, namely Friedreich's ataxia [29] and osteogenesis imperfecta [33].

Of the 49 case reports, 9 reported on gynecologic patients and 40 on obstetric patients. Of the 10 case series, 1 reported on gynecologic patients, 7 reported on obstetric patients, and 2 reported on mixed populations. No prospectively collected data were identified. Only 10 studies reported on ≥ 3 patients: 3 cases [22, 23, 27, 34, 51], 4 cases [16, 37, 52, 57], and 7 cases [45], respectively. Table 1 shows the study characteristics of patients with OS described in all 59 studies. In summary, 93 cases of OS in gynecologic and obstetric patients have been reported in the literature.

Treatment modalities of patients with OS and outcomes were reported in 40 studies (41 including the present case report) and 59 patients and are shown in Table 2. The most common first line treatment of OS was conservative (including one or more of the following: nil per os [NPO], nasogastric tube, electrolyte balancing, iv fluid substitution, no opioids, analgesics, and/or antibiotics) in 22/59 (37%) cases, followed by laparotomy with surgical decompression or colon resection in 20/59 (34%) cases, decompression by rectal tube or colonoscopy in 12/59 (20%) cases, and neostigmine in 4/59 (7%) cases. Resolution was achieved in 22/59 (37%) of patients. Thus, 37/59 (63%) patients had to undergo at least one laparotomy to control the condition. Among them, the most common treatment was right hemicolectomy in 25 cases, other colon resection (ileocecal resection, subtotal colectomy) in 10 cases. Ileostomy was necessary in 7 patients. The reported

Table 1 Clinical studies describing women with gynecologic or obstetric conditions with Ogilvie's syndrome

Author	Year	Study type	Number of cases	Age (years)	Underlying condition	Colon dilation (cm)	Time of first symptoms after surgery (POD)
Tempfer [this]	2019	CR	1	83	Carcinosarcoma of the uterus	8	4
Orfanelli [6]	2018	CR	1	35	Cervical cancer	11	2
Elsebay [7]	2017	CR	1	40	CSec	–	2
Khajenoori [8]	2016	CR	1	40	CSec	–	1
Margot [9]	2016	CR	1	35	CSec	11	3
Cebola [10]	2015	CR	1	41	Bleeding disorder	< 10	2
Gunyeli [28]	2015	CR	1	36	HYS	< 10	4
E [11]	2014	CR	1	22	VD	–	10
Yasa [29]	2014	CR	1	39	HYS; Friedreich's ataxia	9	5
George [30]	2013	CR	2	45; 48	Abdominal fistula repair ($n=1$); vaginal HYS + TVT ($n=1$)	13; 12	6; 2
Lang [31]	2013	CR	1	37	CSec	–	–
Latunde-Dada [12]	2013	CR	1	20	CSec	13	0
Munzar [13]	2013	CR	1	–	CSec		1
Kim [32]	2012	CR	1	23	Pregnancy	10	–
Fiegel [33]	2011	CR	1	27	CSec; Osteogenesis imperfecta	20	0
Kotsev [14]	2011	CR	1	35	CSec	–	2
Roux [15]	2011	CR	1	–	CSec	–	–
Shakir [34]	2011	CS	3	35; 26; 21	CSec ($n=3$)	> 10; –; 13	2; 1; 4
Bhatti [35]	2010	CR	1	32	VD	14	1
Rawlings [16]	2010	CS	4	33; 28; 32; 39	CSec ($n=4$)	–; –; –; 10	2; 6; 1; 3
Cartlidge [36]	2010	CR	1	36	VD	–	5
Cho [37]	2009	CS	4	32; 30; 28; 29	CSec ($n=4$)	11; > 10; > 10; < 5	0; 2; 1; 1
Saha [17]	2009	CR	1	28	CSec	> 10	1
Tung [38]	2008	CR	1	–	Pregnancy	–	–
Ernst [18]	2007	CR	1	33	CSec	9	1
Rausch [39]	2007	CR	1	41	Pregnancy	–	–
Srivastava [40]	2007	CR	1	31	CSec	13	3
Attarbashi [41]	2006	CR	1	42	CSec	11.5	1
Busch [42]	2004	CR	1	–	CSec	–	
Roth [43]	2003	CR	2	81; 87	Abdominal HYS ($n=2$)	11; 14	5; 3
De [44]	2002	CR	1	38	CSec	–	4
Schjoldager [45]	2001	CS	7	–	CSec ($n=7$)	–	–
Roberts [19]	2000	CR	1	–	CSec	–	–
Cantiello [46]	1996	CR	2	–	CSec ($n=2$)	–	–
Pecha [47]	1996	CR	1	–	Pregnancy	–	–
Wignakumar [20]	1995	CR	1	–	CSec	–	–
Tang [48]	1995	CR	1	29	CSec	13	2
Beer [49]	1994	CR	1	32	CSec	–	–
Dickson [50]	1994	CR	1	32	CSec	–	–

Table 1 (continued)

Author	Year	Study type	Number of cases	Age (years)	Underlying condition	Colon dilation (cm)	Time of first symptoms after surgery (POD)
Kolben [51]	1993	CS	3	42; 32; 26	CSec ($n=3$)	10; 12.5; –	1; 1; 2
Nishida [21]	1993	CR	1	23	Pregnancy	12	–
Thessen [22]	1993	CS	3	–	Vaginal surgery ($n=3$)	–	–
Weber [23]	1993	CS	3	–	CSec ($n=3$)	–	–
Hamed [52]	1992	CS	4	–	HYS ($n=2$); CSec ($n=2$)	<9 ($n=3$); >9 ($n=1$)	–
Imai [24]	1990	CR	1	–	Pregnancy	–	–
Walss Rodríguez [53]	1990	CR	2	–	CSec ($n=2$)	–	–
Rodriguez-Ballesteros [54]	1989	CR	2	–	CSec ($n=2$)	–	1; 1
Singh [25]	1989	CR	1	48	Cervical cancer	15	13
Schreiner [26]	1988	CR	1	–	Abdominal HYS	–	–
Paraskevaides [55]	1988	CR	1	32	CSec	6.5	4
Moore [56]	1986	CR	1	–	CSec	–	
Hall [57]	1985	CS	4	–	CSec ($n=4$)	–	0; 2; 2; 2
Choo [58]	1979	CR	1	–	CSec	–	–
DePalma [59]	1978	CR	1	–	CSec	–	–
Rudigoz [60]	1978	CR	1	–	CSec	–	–
Spira [27]	1976	CS	3	–	Abdominal HYS ($n=1$); VD ($n=1$); CSec ($n=1$)	–	–
Jensen [61]	1972	CR	1	28	CSec	10	4
Millar [62]	1966	CR	2	24; 35	CSec ($n=2$)	–	5, 2
Robertson [63]	1958	CR	1	22	CSec	–	2
Pooled analysis	CR: $n=49$ [9 gyn, 40 obs, 0 mixed] CS: $n=10$ [1 gyn, 7 obs, 2 mixed]		$n=93$ [17 gyn, 76 obs]	Mean 35.9 median 32.5, interquartile range 28–39	Cancer ($n=3$); Benign Gynecologic condition ($n=14$); CSec ($n=66$); Pregnancy ($n=10$)	Mean 10.9	Mean 2.6

POD postoperative day, *CR* case report, *CSec* cesarean section, *CS* case series, *HYS* hysterectomy, *VD* vaginal delivery, *TVT* tension-free vaginal tape, *gyn* gynecology, *obs* obstetrics

outcomes of patients with OS carried a significant morbidity. We graded adverse events according to Common Terminology Criteria for Adverse Events (CTCAE) version 4.03 criteria [64]. Specifically, CTCAEs of grades 3 and 4 were observed in 8/59 and 31/59 patients (together 66%), respectively. The mortality rate was 3/59 (5.1%) when adding our own patient to the 58 patients with outcome data reported in the literature.

Discussion

OS is a form of postsurgical or posttraumatic pseudo-obstruction of the colon. OS may complicate the postoperative course of gynecologic patients and is difficult to diagnose due to its rarity. In a case report and systematic

Table 2 Treatment modalities and outcomes of women with gynecologic or obstetric conditions and Ogilvie's syndrome

Author	Year	Number of Patients	Treatment modality (first line)	Treatment modality (second line)	Outcome	Morbidity (CTCAE)	Mortality
Tempfer [this]	2019	1	LAP; rectal tube; abdominal dressing	LAP; rectal tube	Sepsis, pneumonia	5	1
Orfanelli [6]	2018	1	NPO, IVFLUID, no opioids, ELECTROBAL	NEO 2 mg iv over 10 min + rectal tube	Resolution	2	0
Elsebay [7]	2017	1	NPO; nasogastric tube; ELECTROBAL	–	LAP; RHEMI	4	0
Khajehnoori [8]	2016	1	ANTIBIO	–	LAP; ileo-colic resection, double-barrel stoma	4	0
Margot [9]	2016	1	Colonoscopy	LAP	RHEMI	4	0
Cebola [10]	2015	1	IVFLUID, no opioids, ELECTROBAL	LAP	Cecal resection, ileostomy	4	0
E [11]	2014	1	LAP	–	Sepsis, pneumonia	4	0
Yasa [29]	2014	1	LAP	–	Total colectomy; ileostomy	4	0
George [30]	2013	2	LAP ($n=1$); nasogastric tube + NPO + ELECTROBAL ($n=1$)	NEO ($n=1$)	RHEMI + ileostomy ($n=1$); resolution ($n=1$)	4/2	0
Lang [31]	2013	1	NEO, ANTIBIO	–	Resolution	1	0
Latunde-Dada [12]	2013	1	Endoscopic decompression; ANTIBIO	–	Resolution	2	0
Kim [32]	2012	1	ANTIBIO + nasogastric tube	Enema; rectal tube; pregnancy termination	Resolution	3	0
Fiegel [33]	2011	1	LAP	–	Rectosigmoid resection	4	0
Kotsev [14]	2011	1	NPO; nasogastric tube; rectal tube; ELECTROBAL	–	LAP; RHEMI	4	0
Shakir [34]	2011	3	Nasogastric tube ($n=1$); LAP ($n=2$)	LAP ($n=1$)	RHEMI ($n=3$)	4/4/4	0
Bhatti [35]	2010	1	NPO; ELECTROBAL	LAP	RHEMI	4	0
Cartlidge [36]	2010	1	LAP	–	Cecal perforation + RHEMI	4	0
Rawlings [16]	2010	4	LAP ($n=2$); endoscopic decompression ($n=1$); NPO + nasogastric tube ($n=1$)	LAP ($n=1$)	Cecal perforation + ileocecal resection ($n=2$); double barrel stoma ($n=1$); resolution ($n=2$);	4/4/2/2	0
Cho [37]	2009	4	Nasogastric tube ($n=2$); enema ($n=3$); metoclopramide ($n=3$)	–	Resolution ($n=4$)	2/2/2/2	0
Saha [17]	2009	1	IVFLUID, nasogastric tube, analgesics	NEO 2 × 2 mg, rectal tube, LAP	Cecal perforation; RHEMI	4	0
Ernst [18]	2007	1	NEO	Endoscopic decompression; nasogastric tube; rectal tube	Resolution	2	0
Rausch [39]	2007	1	Nasogastric tube; NEO 2 mg i.v. Over 5 min	Colonoscopic decompression; LAP	CS + subtotal colectomy + ileostomy	4	0

Table 2 (continued)

Author	Year	Number of Patients	Treatment modality (first line)	Treatment modality (second line)	Outcome	Morbidity (CTCAE)	Mortality
Srivastava [40]	2007	1	Colonoscopic decompression	LAP	RHEMI; ileostomy	4	0
Attarbashi [41]	2006	1	Conservative	–	Resolution	2	0
Roth [43]	2003	2	Decompression by nasogastric and rectal tubes ($n=1$), decompression by nasogastric tube and colonoscopic decompression ($n=1$)	LAP ($n=1$)	Resolution ($n=1$); RHEMI ($n=1$)	1/4	0
De [44]	2002	1	Analgesics	LAP	RHEMI	4	0
Schjoldager [45]	2001	5	LAP ($n=5$)	–	RHEMI ($n=5$)	4/4/4/4/5	1
Roberts [19]	2000	1	Endoscopic decompression; ANTIBIO	–	Resolution	2	0
Cantiello [46]	1996	2	Colonoscopic decompression	LAP ($n=2$)	RHEMI ($n=2$)	4/4	0
Pecha [47]	1996	1	Colonoscopic decompression	–	Resolution	2	0
Tang [48]	1995	1	LAP	–	Resolution	3	0
Kolben [51]	1993	3	LAP ($n=1$); Colonoscopic decompression ($n=2$) + nasogastric tube + NEO ($n=1$)	–	Resolution ($n=2$); RHEMI ($n=1$)	4/2/2	0
Imai [24]	1990	1	IVFLUID, nasogastric tube, analgesics	–	Resolution	2	0
Singh [25]	1989	1	ANTIBIO	LAP; rectal tube, manual decompression	Resolution	3	0
Paraskevaides [55]	1988	1	Nasogastric tube	LAP	RHEMI	3	0
Choo [58]	1979	1	Nasogastric tube	LAP	Cecostomy	3	0
DePalma [59]	1978	1	LAP	–	RHEMI ileotransverse colostomy	3	0
Rudigoz [60]	1978	1	LAP	–	RHEMI, ileotransverse colostomy	4	0
Jensen [61]	1972	1	LAP	–	RHEMI	4	0
Millar [62]	1966	2	Nasogastric tube (n = 2), NEO ($n=1$)	LAP ($n=1$)	Resolution ($n=1$), cecostomy ($n=1$)	3, 5	1
Robertson [63]	1958	1	Nasogastric tube	LAP	Cecostomy	3	0
Pooled analysis*		59	Conservative only** ($n=22$); NEO ($n=4$); decompression by rectal tube or colonoscopy ($n=12$); LAP ($n=20$)	NEO ($n=1$); decompression by rectal tube or colonoscopy ($n=3$); LAP ($n=18$)	Resolution ($n=22$); RHEMI ($n=25$); other colon resection ($n=10$); sepsis ($n=2$)	1 (n = 2); 2 (n = 15); 3 ($n=8$); 4 ($n=31$); 5 ($n=3$)	3/59 (5.1%)

CTCAE common terminology criteria for adverse events, *LAP* laparotomy, *NPO* nil per os, *IVFLUID* electrolyte balancing, *ELECTROBAL* iv fluid substitution, *NEO* neostigmine, *RHEMI* right hemicolectomy, *ANTIBIO* antibiosis, *CSec* cesarean section

*For pooled analysis of interventions, only the most invasive procedure necessary was counted for each patient (ranking: LAP > decompressions/rectal tubes > NEO > conservative); **Conservative treatment including NPO, nasogastric tube, ELECTROBAL, IVFLUID, analgesics, and antibiotics, but no opioids

review of the literature, we found that OS is a very rare surgical complication of gynecologic oncology patients. Of note, including the case presented here, only three cases of women with OS after surgery for a gynecologic tumor were identified in the literature. OS was successfully resolved by iv neostigmine in one case and by laparotomy and manual decompression in the other case. The third patient died after laparotomy and decompression after developing pneumonia and sepsis. In the broader gynecologic and obstetric literature, we identified another 49 case reports and 10 case series describing 93 patients with OS. Fourteen of these patients had a benign gynecologic condition, 66 developed OS after cesarean section, and 10 developed OS during pregnancy or after vaginal delivery.

It is of note that most patients with OS identified were pregnant. Seventy-six of 92 patients identified in the literature search were pregnant and developed OS either during pregnancy, after vaginal delivery or after cesarean section. This suggests that pregnancy is a predisposing factor for OS. It is well known that pregnant women often complain of obstipation. For example, Derbyshire et al. report an incidence of 35%, 39%, and 20% in the first, second, and third trimesters of pregnancy, respectively [65]. Although the exact reason for this is unknown, it is consistent with the fact that most patients with OS reported in the literature were pregnant. In addition, the sympathetic hyperactivity during pregnancy is in line with the reduced activity of stimulatory neurotransmitters such as acetylcholine and overactivity of inhibitory neurotransmitters such as vasoactive intestinal peptide described in OS [2, 3].

There are several limitations to this review. For example, OS is rare and there is a high likelihood of underreporting of gynecologic and obstetric cases in the literature. In addition, many cases may have gone undiagnosed due to the relative lack of awareness of OS in the gynecologic community. Therefore, reporting bias has to be considered when interpreting the results of our review. Moreover, the real incidence of OS may be higher than reported in the literature and described in this systematic review. Finally, we found that most cases of OS were diagnosed among obstetric patients and concluded that pregnancy predisposes to OS. However, pregnancy is much more common than gynecologic surgery and therefore, the higher detection rate of OS after cesarean section and vaginal delivery may reflect higher absolute numbers rather than relative rates.

The outcome of both gynecologic and obstetric patients with OS was good in the analyzed studies, but the morbidity and mortality were high, because a majority of patients required major surgery. Specifically, in patients with available outcome data conservative treatment consisting of analgesics, electrolyte balancing, iv fluids, antibiotics, and placement of a nasogastric tube was most often used as a first line intervention (37% of cases). Other conservative means of treatment used in these patients were i.v. neostigmine and colon decompression by rectal tube or colonoscopy. Successful resolution of OS by conservative means was achieved in 37% of cases. Major surgery with colon resection, mostly right hemicolectomy, however, was necessary in 59% of cases. Although OS was finally resolved in 95% of cases, the morbidity was high. Specifically, adverse events grade 3 or 4 were observed in 66% of patients.

A mortality rate of 15% in uncomplicated cases of OS and 44% in complicated cases of OS has been cited in the literature [1, 2]. Our data are in contrast to these high mortality rates, since we found a mortality rate of only 5%. It is reasonable to assume that our patient population is different from the general surgical population described in other studies. Gynecologic and obstetric patients were young with a mean age of 35.9 years and may thus have a better prognosis than most other patients with OS, who are typically in their 6th and 7th decades of life [1–3, 5].

In conclusion, we found that OS is a very rare postoperative complication of gynecologic oncology patients with only three cases reported in the literature. Based on 93 gynecologic and obstetric patients identified in the literature, we conclude that OS has a good prognosis but carries a high morbidity. Pregnancy seems to be a predisposing factor for OS. Conservative treatment is a successful first-line approach but colon resection is necessary in 59% of patients. Despite this, the mortality was only 5%. Gynecologic and obstetric surgeons should be aware of this rare surgical complication.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

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References

1. Vanek VW, Al-Salti M (1986) Acute pseudo-obstruction of the colon (Ogilvie's syndrome). An analysis of 400 cases. Dis Colon Rectum. 29:203–210
2. Conner S, Mitchell C. Ogilvie Syndrome. StatPearls Publishing, Treasure Island (FL). Available online at https://www.ncbi.nlm.nih.gov/books/NBK526102.
3. Haj M, Haj M, Rockey DC (2018) Ogilvie's syndrome: management and outcomes. Medicine (Baltimore). 97:e11187. https://doi.org/10.1097/MD.0000000000011187
4. Ponec RJ, Saunders MD, Kimmey MB (1999) Neostigmine for the treatment of acute colonic pseudo-obstruction. N Engl J Med. 341:137–141. https://doi.org/10.1056/NEJM199907153410301
5. Pereira P, Djeudji F, Leduc P, Fanget F, Barth X (2015) Ogilvie's syndrome-acute colonic pseudo-obstruction. J Visc Surg. 152:99–105. https://doi.org/10.1016/j.jviscsurg.2015.02.004
6. Orfanelli T, Chung S, Kohut A, Gibbon D, Leiser A (2018) Ogilvie's syndrome after robotic-assisted radical hysterectomy for cervical cancer. J Minim Invasive Gynecol. 25:175–179. https://doi.org/10.1016/j.jmig.2017.07.003
7. Elsebay L, Galal MA (2017) Ogilvie's syndrome after cesarean section: case report in Saudi Arabia and management approach. Case Rep Obstet Gynecol 2017:5328160. https://doi.org/10.1155/2017/5328160
8. Khajehnoori M, Nagra S (2016) Acute colonic pseudo-obstruction (Ogilvie's syndrome) with caecal perforation after caesarean section. J Surg Case Rep. https://doi.org/10.1093/jscr/rjw140
9. Margot A, Xavier H (2016) Post caesarean ogilvie's syndrome. J Belg Soc Radiol. 100:73. https://doi.org/10.5334/jbr-btr.905
10. Cebola M, Eddy E, Davis S, Chin-Lenn L (2015) Acute colonic pseudo-obstruction (ogilvie's syndrome) following total laparoscopic hysterectomy. J Minim Invasive Gynecol. 22:1307–1310. https://doi.org/10.1016/j.jmig.2015.06.023
11. Harish E, Sundeep VK, Kola SK, Kumar K (2014) Spontaneous caecal perforation associated with ogilvie's syndrome following vaginal delivery—a case report. J Clin Diagn Res. 8:ND08–ND09. https://doi.org/10.7860/JCDR/2014/9078.4484
12. Latunde-Dada AO, Alleemudder DI, Webster DP (2013) Ogilvie's syndrome following caesarean section. BMJ Case Rep. https://doi.org/10.1136/bcr-2013-010013
13. Munzar Z, Munir TA, Asad M (2013) Ogilvie's syndrome (acute colonic pseudo-obstruction) after caesarean section. J Coll Physicians Surg Pak 23:298–300
14. Kotsev S (2011) Ogilvie's syndrome following cesarean delivery: the Dubai's case. Saudi J Anaesth 5:335–338. https://doi.org/10.4103/1658-354X.84117
15. Roux M, Fichez A, Roth P, Gaucherand P (2011) Syndrome d'Ogilvie après une césarienne: à propos d'un cas. Gynecol Obstet Fertil 39:e15–e19. https://doi.org/10.1016/j.gyobfe.2010.08.006
16. Rawlings C (2010) Management of postcaesarian Ogilvie's syndrome and their subsequent outcomes. Aust N Z J Obstet Gynaecol 50:573–574. https://doi.org/10.1111/j.1479-828X.2010.01214.x
17. Saha AK, Newman E, Giles M, Horgan K (2009) Ogilvie's syndrome with caecal perforation after caesarean section: a case report. J Med Case Rep 3:6177. https://doi.org/10.4076/1752-1947-3-6177
18. Ernst RM, Müller RC, Hess T (2007) Ogilvie-Syndrom (akute idiopathische kolondilatation) nach sectio caesarea. Gynakol Geburtshilfliche Rundsch 47:236–239. https://doi.org/10.1159/000107265
19. Roberts CA (2000) Ogilvie's syndrome after cesarean delivery. J Obstet Gynecol Neonatal Nurs 29:239–246
20. Wignakumar V, Eriksen CA, Ebbs SR (1995) Acute pseudo-obstruction of the colon (Ogilvie's syndrome) following caesarean section under epidural anaesthesia. S Afr J Surg 33:73–75
21. Nishida S, Tanaka K, Kawaji H, Hamada N, Ono T, Taira A (1993) Ogilvie's syndrome in pregnancy–a case report. Nihon Geka Gakkai Zasshi 94:182–184
22. Thessen CC, Kreder KJ (1993) Ogilvie's syndrome: a potential complication of vaginal surgery. J Urol 149:1541–1543
23. Weber P, Heckel S, Hummel M, Dellenbach P (1993) Syndrome d'Ogilvie après césarienne. A propos de trois cas. Revue de la littérature. J Gynecol Obstet Biol Reprod (Paris) 22:653–658.
24. Imai A, Mikamo H, Kawabata I, Kondoh H, Tamaya T (1990) Acute pseudo-obstruction of the colon (Ogilvie's syndrome) during pregnancy. J Med 21:331–336
25. Singh P, Ilancheran A, Ti TK, Ratnam SS (1989) Ogilvie's syndrome of colonic pseudo-obstruction: a complication of radical hysterectomy with pelvic and paraaortic lymphadenectomy. Gynecol Oncol 32:390–393
26. Schreiner B (1988) Das Ogilvie-syndrom als Komplikation nach erweiterter abdominaler totaler Hysterektomie. Schweiz Med Wochenschr 118:726–728
27. Spira IA, Wolff WI (1976) Colonic pseudo-obstruction following termination of pregnancy and uterine operation. Am J Obstet Gynecol 126:7–12
28. Gunyeli I, Sezik M, Kose SA, Sozen I, Sezik HT (2015) Caecal rupture associated with Ogilvie syndrome following caesarean hysterectomy due to morbidly adherent placenta. J Obstet Gynaecol 35:304–305. https://doi.org/10.3109/01443615.2014.948410
29. Yasa C, Dural O, Ugurlucan FG, Bastu E, Demir O, Topuz S (2014) Acute colonic pseudo-obstruction after hysterectomy in a patient with Friedreich ataxia. Arch Gynecol Obstet 289:1151–1153. https://doi.org/10.1007/s00404-013-3125-0
30. George A, Hensley A, Hale D (2013) Pelvic surgeons be aware: Ogilvie's syndrome (a case report). Int Urogynecol J 24:693–696. https://doi.org/10.1007/s00192-012-1839-3
31. Lang CL, Haveman MC, Achiam M (2013) Vellykket konservativt behandlet caecumperforation ved Ogilvies syndrom. Ugeskr Laeg 175:1120–1121
32. Kim T-H, Lee H-H, Chung S-H (2012) Constipation during pregnancy: When a typical symptom heralds a serious disease. Obstet Gynecol 119:374–378. https://doi.org/10.1097/AOG.0b013e318242e386
33. Fiegel MJ (2011) Cesarean delivery and colon resection in a patient with type III osteogenesis imperfecta. Semin Cardiothorac Vasc Anesth 15:98–101. https://doi.org/10.1177/1089253211412978
34. Shakir AJ, Sajid MS, Kianifard B, Baig MK (2011) Ogilvie's syndrome-related right colon perforation after cesarean section: a case series. Kaohsiung J Med Sci. 27:234–238. https://doi.org/10.1016/j.kjms.2010.11.006
35. Bhatti ABH, Khan F, Ahmed A (2010) Acute colonic pseudo-obstruction (ACPO) after normal vaginal delivery. J Pak Med Assoc 60:138–139
36. Cartlidge D, Seenath M (2010) Acute pseudo-obstruction of the large bowel with caecal perforation following normal vaginal delivery: a case report. J Med Case Rep 4:123. https://doi.org/10.1186/1752-1947-4-123
37. Cho F-N, Liu C-B, Li J-Y, Chen S-N, Yu K-J (2009) Adynamic ileus and acute colonic pseudo-obstruction occurring after cesarean section in patients with massive peripartum hemorrhage. J Chin Med Assoc 72:657–662. https://doi.org/10.1016/S1726-4901(09)70451-4
38. Tung CS, Zighelboim I, Gardner MO (2008) Acute colonic pseudoobstruction complicating twin pregnancy: a case report. J Reprod Med 53:52–54

39. Rausch ME, Troiano NH, Rosen T (2007) Use of neostigmine to relieve a suspected colonic pseudoobstruction in pregnancy. J Perinatol 27:244–246. https://doi.org/10.1038/sj.jp.7211669
40. Srivastava G, Pilkington A, Nallala D, Polson DW, Holt E (2007) Ogilvie's syndrome: a case report. Arch Gynecol Obstet 276:555–557. https://doi.org/10.1007/s00404-007-0386-5
41. Attarbashi S, Yadav Y, Ahmad G (2006) Intestinal pseudoobstruction (Ogilvie's syndrome) following cesarean delivery. Int J Gynaecol Obstet 94:133–134. https://doi.org/10.1016/j.ijgo.2006.05.008
42. Busch FWJ, Hamdorf JM, Carroll CS, Magann EF, Morrison JC (2004) Acute colonic pseudo-obstruction following cesarean delivery. J Miss State Med Assoc 45:323–326
43. Roth TM, Meeks GR (2003) Acute pseudoobstruction of the colon (Ogilvie syndrome): a postoperative complication of gynecologic surgery. J Pelvic Med Surg 9:3–8
44. De M, Mandal A, Cooper JC (2002) A case of Ogilvie's syndrome after caesarean section. J Obstet Gynaecol 22:686–687. https://doi.org/10.1080/0144361027620623358
45. Schjoldager BT, Sørensen JL, Svaerke T, Berthelsen JG (2001) Ogilvies syndrom efter sectio. Ugeskr Laeg 163:3064–3068
46. Cantiello L, Laghi A, Ferrara I, Lauro C (1996) Sindrome di Ogilvie. Descrizione di due casi. Minerva Ginecol 48:211–214
47. Pecha RE, Danilewitz MD (1996) Acute pseudo-obstruction of the colon (Ogilvie's syndrome) resulting from combination tocolytic therapy. Am J Gastroenterol 91:1265–1266
48. Tang PT, Collopy BT, Somerville M (1995) Ogilvie syndrome with caecal perforation in the post-caesarean patient. Aust N Z J Obstet Gynaecol 35:104–106
49. Beer P, Pescatore PA, Desbiolles A, Bader P (1994) Akute pseudoobstruktion des kolons (ogilvie-syndrom) nach sectio caesarea. Gynakol Geburtshilfliche Rundsch 34:232–235. https://doi.org/10.1159/000272379
50. Dickson MA, McClure JH (1994) Acute colonic pseudo-obstruction after caesarean section. Int J Obstet Anesth 3:234–236
51. Kolben M, Loos W (1993) Akute pseudo-obstruktion des kolons (Ogilvie-Syndrom) nach Sectio caesarea–eine seltene Komplikation. Geburtshilfe Frauenheilkd 53:577–579. https://doi.org/10.1055/s-2007-1022938
52. Hamed AD, Dare FO (1992) Ogilvie's syndrome. Int J Gynaecol Obstet 37:47–50
53. Walss Rodríguez RJ, Hernández Román P, Siller Rodríguez G (1990) Pseudobstrucción del colon (síndrome de Ogilvie), asociado a operación cesárea. Informe de dos casos y revisión de la literatura. Ginecol Obstet Mex 58:289–291.
54. Rodriguez-Ballesteros R, Torres-Bautista A, Torres-Valadez F, Ruiz-Moreno JA (1989) Ogilvie's syndrome in the postcesarean section patient. Int J Gynaecol Obstet 28:185–187
55. Paraskevaides EC, Sodipo JA (1988) Atypical Ogilvie syndrome. Aust N Z J Obstet Gynaecol 28:148–149
56. Moore JG, Gladstone NS, Lucas GW, Ravry MJ, Ansari AH (1986) Successful management of post-cesarean-section acute pseudoobstruction of the colon (Ogilvie's syndrome) with colonoscopic decompression. A case report. J Reprod Med 31:1001–1004
57. Hall B (1985) Colonic pseudo-obstruction: An uncommon complication of caesarean section. Aust N Z J Obstet Gynaecol 25:121–123
58. Choo YC (1979) Ileus of the colon with cecal dilatation and perforation. Obstet Gynecol 54:241–245
59. DePalma RT (1978) Nonobstructive cecal dilatation and perforation after cesarean section. Obstet Gynecol 52:61S–63S
60. Rudigoz RC, Bérard P, Hallonet P (1978) Idiopathic perforations of the caecum after caesarean section. A new case report. J Gynecol Obstet Biol Reprod (Paris). 7:1253–1256.
61. Jensen HK (1972) Spontaneous perforation of the caecum following Caesarean section. Report of a case and review of the literature. Acta Obstet Gynecol Scand. 51:381–383.
62. Millar DR, Ovlisen B (1966) Two cases of spontaneous perforation of the caecum following caesarean section. Acta Obstet Gynecol Scand. 45:254–260
63. Robertson JA, Eddy WA, Vosseler AJ (1958) Spontaneous perforation of the cecum without mechanical obstruction. Am J Surg. 96:448–452
64. National Cancer Institute. Common Terminology Criteria for Adverse Events (CTCAE) v4.03. 2010. https://ctep.cancer.gov/protocoldevelopment/electronic_applications/ctc.htm. Accessed 22 Nov 2018.
65. Derbyshire E, Davies J, Costarelli V, Dettmar P (2006) Diet, physical inactivity and the prevalence of constipation throughout and after pregnancy. Matern Child Nutr. 2:127–134. https://doi.org/10.1111/j.1740-8709.2006.00061.x