

# Treatment with antibodies against primary group A streptococcal peritonitis

## A case report and a review of the literature

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### Abstract

**Rationale:** Several reports describe severe group A streptococcal (GAS) infections causing septic shock, soft-tissue necrosis, and multiple organ failure known as streptococcal toxic shock syndrome (STSS). However, primary peritonitis with GAS is rare and most of them were undertaken surgical procedure.

**Patient concerns:** We herein reported the case of 26-year-old healthy woman with sudden severe abdominal pain and hypotension. Computed tomography (CT) showed that large amount of free fluid in the peritoneal cavity consist with peritonitis, and no free air.

**Diagnoses:** Primary peritonitis with GAS.

**Interventions:** Proper antibiotic therapy according to blood culture results.

**Outcomes:** After antibiotic therapy, the patient recovered well without complications.

**Lessons:** An appropriate diagnostic approach and prompt antibiotic therapy is essential in GAS primary peritonitis.

**Abbreviations:** CT = computed tomography, GAS = group A *Streptococcus*, STSS = streptococcal toxic shock syndrome.

**Keywords:** antibiotic therapy, primary peritonitis, *Streptococcus*

## 1. Introduction

The most of surgical patients suffer from secondary peritonitis caused by perforation of stomach or intestine, or leakage from an intestinal anastomosis. On the other hand, primary peritonitis constitutes less than 1% of peritonitis. In absence of comorbid conditions including liver cirrhosis, immunosuppression, or nephritic syndrome, primary peritonitis is rare. In secondary peritonitis patients, surgical treatment against the infectious focus is the first choice, but patients with primary peritonitis rarely require surgical therapy and the mainstay of treatment is antibiotic therapy.<sup>[1]</sup>

Group A *Streptococcus* (GAS) is a common pathogen that causes pharyngitis, impetigo, erysipelas. GAS infection, characterized by sudden septic shock and necrosis of the soft tissue, which has been termed streptococcal toxic shock syndrome (STSS).<sup>[2]</sup> Primary peritonitis because of GAS is rare. Till date, 46 cases, excluding our case, have been described in the literature. Most of cases had undertaken surgical treatment. We successfully treated GAS primary peritonitis patient without surgical treatment. In this report, we present the first case to the best of our knowledge of primary peritonitis caused of GAS treated with only antibiotic therapy.

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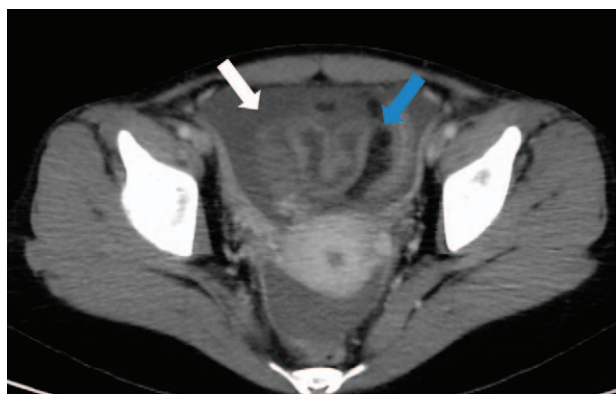
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### 1.1. Ethical statement

The study mainly involves retrospective observations of a patient; therefore, ethical approval was not needed. Informed consent was obtained from the patient for publication.

## 2. Case report

The patient was a healthy female aged 26 years with no history of delivery. She presented in the emergency room for a fever of 39°C associated with abdominal pain and femoral pain over 2 days. She had no sore throat and no diarrhea, but did have pain when swallowing. There was marked tenderness, rebound tenderness, and muscular defense over the entire abdomen, mainly in the lower right abdomen, with no audible bowel sounds. Her blood pressure 85/52 mmHg, pulse 113 beats per minute, respiratory rate 20 breaths per minute, and oxygen saturation 99% on room air. She had normal regular menses and there was no history of abnormal vaginal discharge or dysuria. Her medical history and her family history were unremarkable. There was no recent travel



**Figure 1.** Contrast-enhanced computed tomography on admission day revealed thickened peritoneal enhancement (blue arrow), edematous swelling of the colonic wall, and free intraperitoneal fluid (white arrow), but confirmed the absence of any secondary cause of peritonitis such as appendicitis or intestinal perforation.

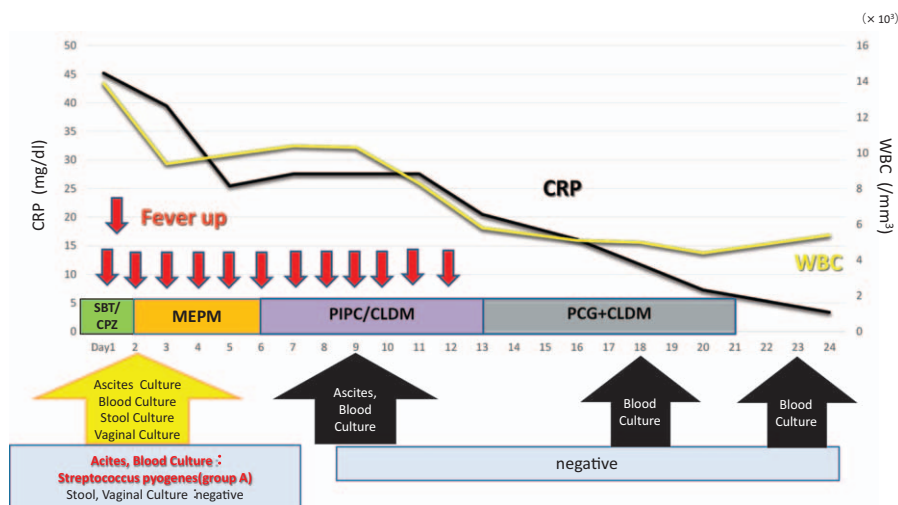
history or contact with animals. She did not take any medications. Laboratory findings included C-reactive protein 45.2 mg/dL, WBC 13900/mm<sup>3</sup>. An abdominal CT scan showed that a large amount of free fluid in the peritoneal cavity consist with a peritonitis, and no free air (Fig. 1). A gynecologic source was ruled out by negative gynecologic culture results and by the clinical presentation. Therefore, we performed a diagnostic puncture under ultrasound. The collected fluid was pus, not bloody, and we diagnosed primary peritonitis. Cultures of blood, vaginal, and abdominal fluid were taken on admission day. An empirical therapy by meropenem (1 g 3 times daily) was initiated. Reports of blood culture, ascites culture showed gram-positive cocci. Final results of all cultures tested confirmed *Streptococcus pyogenes* and initial empiric antibiotics switched to PIPC and CLDM on day 6. Her temperature kept over 38°C and antibiotics switched to PCG and CLDM on day 13. She made an excellent recovery and discharged on day 24 (Fig. 2).

### 3. Discussion

*S. pyogenes* is a usual cause of, pharyngitis, impetigo, and erysipelas. Primary peritonitis caused by *S. pyogenes* is uncommon and rarely diagnosed in a healthy person without underlying diseases. Primary peritonitis is defined as peritoneal infection without an evident intraperitoneal septic focus. It is more common in children than in adults. To our knowledge, only 46 cases of primary peritonitis in adult caused by GAS have been reported, 40 cases (87.0%) of which involved women or girls (Table 1).<sup>[3–36]</sup> This disease rarely occurs in men. Because of the higher incidence in women, the female genital organs are thought to be a possible route of infection. In our case, her source of infection was unclear because of her gynecological examination was normal.

STSS is a fatal disease and overall mortality rate reported in the literature is at least 25%.<sup>[37]</sup> STSS is diagnosed using criteria established by the Centers for Disease Control and Prevention isolation of GAS, hypotension, and multiorgan involved characterized by 2 or more of the following: renal impairment, coagulopathy, liver dysfunction acute respiratory distress syndrome, generalized erythematous macular rash, and soft tissue necrosis.<sup>[38]</sup> Our case met criteria IA (isolation of group A *Streptococci* from peritoneal fluid and blood) and II A(hypotension), but didn't met II B. Therefore our case was not STSS. STSS is a rare disease, and STSS associated with primary peritonitis is extremely rare, with only 23 cases reported in English literatures.

Most of cases (38 cases) were managed surgical treatment (28 laparotomy and 10 laparoscopy). Only 5 cases, including our case, were undertaken only antibiotics therapy. No firm diagnosis was available at the time of initial surgery. Primary peritonitis is usually retrospective, when other causes have been ruled out by surgery, because abdominal CT scan shows only intraperitoneal fluid and it is not nonspecific finding. By that reason, most patients underwent exploratory laparotomy or laparoscopy with preoperative diagnosis of the gastrointestinal perforation. In our case, we did diagnostic puncture under ultrasound and could get the diagnosis “primary peritonitis with *S. pyogenes*” and could start the appropriate antibiotic therapy quickly. We were able to avoid laparotomy or laparoscopy. Some authors recommend a



**Figure 2.** Summary of the clinical and therapeutic course.

surgical approach for suspected primary peritonitis, but most advocates for surgery.

Because of the limited number of cases, no standardized guidelines exist for management of GAS primary peritonitis. Rimawi et al<sup>[39]</sup> mentioned that surgical therapy to remove the source of GAS and its toxin production is beneficial in the treatment of STSS. This theory supported that the high rate of exploratory laparotomy or laparoscopy and drainage in GAS peritonitis. Venkataramanasetty et al<sup>[40]</sup> and Gisser et al<sup>[41]</sup> reported that no improvement in their patients despite early aggressive management with intravenous antibiotics and their patient's improvement was not seen until the patients' infected tissues were debrided. Iwata et al<sup>[36]</sup> mentioned that the mortality rate in the patients with antibiotics therapy was higher than in the

patients with surgical treatments. However, some patients with GAS peritonitis can be treated with appropriate antibiotics. In our case, we treated the patient with antibiotics and avoid the surgical treatment. The need for surgical treatment should be carefully considered depending on the severity of the peritonitis after the prompt initiation of proper antibiotic therapy.

#### 4. Conclusions

We presented a GAS primary peritonitis patient with antibiotics therapy. The incidence of STSS has increased over the past decades, so STSS and GAS primary peritonitis must be kept in mind as potential diagnosis. Diagnostic puncture was performed in this case and avoided the surgical treatment. An appropriate

**Table 1**  
Demographics and clinical presentation of patients with GAS peritonitis.<sup>[3-36]</sup>

Author	Year	Sex	Age	Abdominal pain	Fever	STTS	Treatment	Antibiotics at admission	After diagnosis	Discharge
Khoury <sup>[3]</sup>	1982	F	27	+	+	No	Laparotomy	Nothing	PCs	Alive
Christen <sup>[4]</sup>	1990	F	50	+	+	Yes	Laparotomy	CMD + TOB	PCG	Alive
Christen <sup>[4]</sup>	1990	F	58	+	+	No	Laparotomy	MFPC + NTL + ONZ	PCG	Alive
Gribbin <sup>[5]</sup>	1990	M	44	+	+	N/A	Laparotomy	N/A	N/A	Alive
Casadevall <sup>[6]</sup>	1990	F	87	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Casadevall <sup>[6]</sup>	1990	F	42	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barham <sup>[7]</sup>	1993	F	36	+	+	No	Antibiotics	DOXY + MNZ + MCZ	AMPC/CVA	Alive
Graham <sup>[8]</sup>	1995	F	39	+	+	Yes	N/A	N/A	N/A	N/A
Garvey <sup>[9]</sup>	1997	F	41	+	+	Yes	Laparoscopy	GM + CLDM	ABPC + GM + MNZ	Alive
Garvey <sup>[9]</sup>	1997	F	39	+	+	No	Laparotomy	Nothing	ABPC + GM + MNZ	Alive
Moskovitz <sup>[10]</sup>	2000	F	39	+	+	Yes	Laparotomy	LVFX + MNZ	CTRX + SBT/ABPC	Alive
Borgia <sup>[11]</sup>	2001	F	36	+	+	No	Laparoscopy	CLDM + GM	CLDM + GM	N/A
Sanchez <sup>[12]</sup>	2001	M	34	+	+	No	Laparoscopy	N/A	PCG + CLDM	6 Days
Vuilleumier <sup>[13]</sup>	2001	F	33	+	-	Yes	Laparotomy	N/A	N/A	N/A
Ueyama <sup>[14]</sup>	2001	F	52	+	+	No	Laparotomy	CMZ	N/A	14 Days
Gavala <sup>[15]</sup>	2002	M	40	+	+	Yes	Laparotomy	MNZ + NTL + PIPC/TAZ	PIPC/TAZ + PCs	50 Days
Fox <sup>[16]</sup>	2002	F	39	+	-	Yes	Laparotomy	OFLX + MNZ	CLDM + TAZ/PIPC	17 Days
Kanetake <sup>[17]</sup>	2004	M	40	+	+	Yes	Laparotomy	PIPC	FOM + IPM/CS	14 Days
Okumura <sup>[19]</sup>	2004	F	29	+	+	No	Laparotomy	LVFX	IPM/CS + MNZ	14 Days
Brivet <sup>[18]</sup>	2005	F	82	+	+	Yes	Antibiotics	CVA/AMPC	N/A	N/A
Brivet <sup>[18]</sup>	2005	F	54	+	+	Yes	laparoscopy	CVA/AMPC + GM	N/A	14 Days
Jarvis <sup>[20]</sup>	2006	F	38	+	+	Yes	Laparotomy	AMPC + GM + MNZ	CZX + GM + MNZ + PCs	13 Days
Jarvis <sup>[20]</sup>	2006	F	30	+	+	Yes	Laparotomy	AMPC + MNZ	AMPC + MNZ + CTRX + PCs	34 Days
Saha <sup>[21]</sup>	2006	F	23	+	+	No	Laparotomy	PCG + CLDM + CPFX + DOXY	PCG + CLDM + CPFX + DOXY	11 Days
Doloy <sup>[22]</sup>	2008	F	35	+	+	-	Laparoscopy	CTRX + MNZ + OFLX	CVA/AMPC	21 Days
Lelyveld-Haas <sup>[23]</sup>	2008	F	28	+	+	Yes	Laparotomy	TAZ/PIPC	PCG	10 Days
Thomas <sup>[24]</sup>	2009	F	37	+	+	Yes	Laparotomy	N/A	CLDM	Alive
Kinsella <sup>[25]</sup>	2009	M	38	+	+	No	Laparotomy	GM + AMPC + MNZ	GM + AMPC + MNZ + CPFX	Alive
Haap <sup>[26]</sup>	2010	F	27	+	+	Yes	Laparotomy	CVA/AMPC	PIPC + TAZ + CPFX + MNZ	12 Days
Monneuse <sup>[27]</sup>	2010	M	N/A	N/A	N/A	N/A	Laparotomy	N/A	N/A	N/A
Monneuse <sup>[27]</sup>	2010	F	N/A	N/A	N/A	N/A	Laparotomy	N/A	N/A	N/A
Monneuse <sup>[27]</sup>	2010	F	N/A	N/A	N/A	N/A	Laparotomy	N/A	N/A	N/A
Monneuse <sup>[27]</sup>	2010	F	N/A	N/A	N/A	N/A	Laparotomy	N/A	N/A	N/A
Tilanus <sup>[28]</sup>	2010	F	39	+	+	Yes	Laparotomy	CVA/AMPC + GM + CLDM	PCG + CLDM	N/A
Legras <sup>[29]</sup>	2011	F	23	+	+	Yes	Laparoscopy	CTRX + MNZ + LVFX	AMPC	9 Days
Park <sup>[30]</sup>	2012	F	29	+	+	Yes	Laparoscopy	SBT/ABPC	PCG + MNZ	16 Days
Nogami <sup>[31]</sup>	2014	F	40	+	+	Yes	Laparotomy	MEPM + VCM	SBT/ABPC	14 Days
Kaneko <sup>[33]</sup>	2015	F	28	+	+	No	Antibiotics	MINO + CMZ	PCG + CLDM	19 Days
Malota <sup>[32]</sup>	2015	F	23	+	+	No	Laparoscopy	N/A	N/A	N/A
Malota <sup>[32]</sup>	2015	F	34	+	-	Yes	Laparoscopy	N/A	N/A	N/A
Malota <sup>[32]</sup>	2015	F	36	+	+	No	Laparotomy	N/A	N/A	N/A
Abellán <sup>[34]</sup>	2016	F	60	+	+	Yes	Laparoscopy	N/A	N/A	10 Days
Yokoyama <sup>[35]</sup>	2016	F	40	+	+	Yes	Laparotomy	AZM + MEPM	PCG + CLDM	106 Days
Iwata <sup>[36]</sup>	2017	F	66	+	+	Yes	Antibiotics	MEPM	SBT/ABPC + CLDM	Alive
Our case	2017	F	26	+	+	No	Antibiotics	MEPM	PCG and CLDM	24 Days

GAS = group A *Streptococcus*, STTS = streptococcal toxic shock syndrome.

diagnostic approach and prompt antibiotic therapy is essential in GAS primary peritonitis.

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