

A diagnosis of pneumococcal peritonitis secondary to pyo-salpinx in a young healthy female by culturing peritoneal pus

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SUMMARY

Pneumococcal intra-abdominal infections of female genital tract origin are rare. A 33-year-old woman with peritonitis due to *Streptococcus pneumoniae* serotype 3 was reported. The patient did not have any of the known predisposing conditions for intra-abdominal pneumococcal infection. The clinical presentation included signs of multiorgan failure. Peritoneal toilette, bilateral salpingectomy and antibiotic treatment were promptly administered. The patient remained febrile, developed respiratory failure and required a repeated laparotomy and a prolonged antimicrobial treatment. Penicillin susceptible *S. pneumoniae* was isolated from the pus collected at surgery. Thus, culturing of intra-operative specimens should never be neglected to establish the correct microbiologic diagnosis.

KEY WORDS: *Streptococcus pneumoniae*, Intra-abdominal infection, Upper female genital infection, Intra operative microbiologic examinations

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INTRODUCTION

Pneumococci most frequently have a role in causing otitis, sinusitis, meningitis and infections of the respiratory tract (Musher, 2005). *Streptococcus pneumoniae* is a common component of the indigenous flora of the oropharynx. It is not a part of the resident vaginal flora (Musher, 2005; Gardien *et al.*, 2001) however, in some women vaginal colonization can occur and lead to upper

genital organ infection and peritonitis (Dugi *et al.*, 2001; Nielsen *et al.*, 2003). In most of these cases, predisposing conditions such as the use of intrauterine contraceptive devices, recent delivery, obstetric surgery or oral sex have been recognized (Dugi *et al.*, 2001; Nielsen *et al.*, 2003; Garnache *et al.* 2003; Kahlke V *et al.* 2000). *S. pneumoniae* peritonitis associated with female upper genital tract infection has also been observed in otherwise healthy women (Boucher *et al.* 2002; Sirotnak *et al.* 1996).

In the pre-antibiotic era, pneumococcal female genital infections were more common than they are today (Musher 2005). Generally, most pneumococcal genital infections have been reported to be caused by strains belonging to serotypes 1 and 3 (Gardien *et al.*, 2001). Here, we report on a case of peritonitis with bilateral pyo-salpinx caused by penicillin susceptible *S. pneumoniae*

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serotype 3 in a woman who did not have any apparent predisposing condition.

CASE REPORT

A 33-year-old female from Romania visiting Italy came to the emergency room complaining of nausea, vomiting, abdominal pain and fever which had started four days before. On admission, the patient was febrile, tachycardic and tachypnoic and blood pressure was normal. Diffuse abdominal tenderness with rebound was present. Leucocytes were 18777, 97% neutrophils, BUN 140 mg/dl, creatine 1.27 mg/dl, AST 53/45 UI/l, ALT 144/45 UI/l, LDH 1412/450 UI/l, CPK 334/180 UI/l. No other laboratory abnormalities were present. Chest radiography was negative. Abdominal-pelvic CT scan revealed intra-peritoneal fluid, distended intestinal loops with levels (Figure 1), thickening of the mesenteric fat, enlarged lymph nodes and bilateral ovarian nodules. Antimicrobial empiric therapy (piperacillin/tazobactam 4.5 mg three times a day, amikacin 400 mg twice a day and metronidazole 500 mg four times a day) was administered and an exploratory laparotomy was performed. At surgery, pus was found in the abdominal cavity, fibrino-purulent material covered the abdominal wall and intra-abdominal organs. This infection extended to the Fallopian tubes which were resected. Purulent secretion collected during surgery showed the presence of gram positive diplococci (Figure 2), subsequently identified as

Streptococcus pneumoniae serotype 3, susceptible to penicillin, erythromycin, quinolones and glycopeptides (Clinical Laboratory Standard Institute, 2006). Amikacin was substituted with ciprofloxacin: IV 400 mg twice a day. *S. pneumoniae* antigen (Binax Now, Scarborough, ME, USA) was evidenced in the urine sample of the day after surgery (Neuman *et al.*, 2003; Gisselsson-Solen *et al.*, 2007). Concomitant blood culture remained negative while vaginal swabbing was never carried out. The patient was questioned about a previous episode of abdominal pain or vaginal discharge as well as her sexual activity. A pregnancy test was negative, HIV antibodies were negative, IgG, IgA, IgM levels were normal. A transthoracic echocardiogram failed to disclose either vegetations or valve malformation. Over the following two days, the patient's condition remained stable, renal function improved but both the fever and elevated leucocytes persisted (29730 mm³ with 92% of neutrophils). A second CT scan showed a large quantity of fluid in both the epiploon retrocavity and pleural space. Subsequently, the pleural fluid was drained and was transudate and culture negative. Following the placement of bilateral transthoracic pleural drainage, the patient developed respiratory failure, was intubated and transferred to the intensive care unit. A couple of days later, the patient had an episode of rectal bleeding. Proctoscopy revealed a small anal ulceration. The patient continued to have a high fever, elevated leukocytes and neutrophils, thus it was decided to perform a second laparotomy to rule out an untreated intra-abdominal abscess.

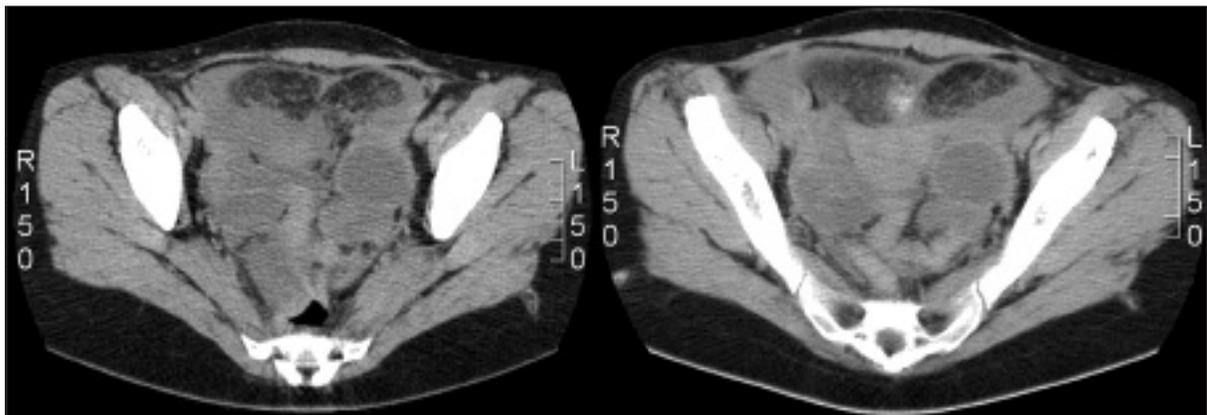


FIGURE 1 - Admission abdominal CT scan showing: copious intra-peritoneal fluid, distended intestinal loops with levels, thickening of the mesenteric fat, enlarged lymph nodes and bilateral ovarian nodules.

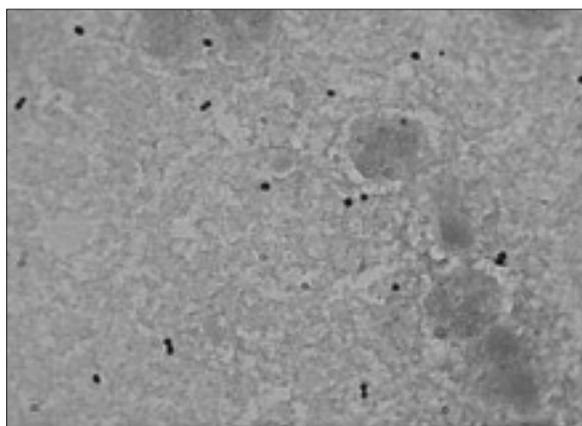


FIGURE 2 - Gram stain of peritoneal pus at surgery: leukocytes and gram positive diplococci.

Sero-hematic peritoneal fluid, erythema and thickening of the omentum adherent to the intestinal wall, erythema of the intestinal loops lumped together due to a fibrinous reaction that also extended to the visceral peritoneum were found. The fluid was drained, fibrinolysis and omentectomy were performed. All the cultures sent were negative. Before surgery antimicrobial treatment was modified as follows: piperacillin/tazobactam 4.5 mg three times a day, metronidazole 500 mg four times a day, teicoplanin 400 mg a day, amikacin 400 mg twice a day plus fluconazole 400 mg per day; the latter antimicrobial was prescribed because of serosity along with the isolation of *Candida glabrata* from the previous abdominal wound. After the second laparotomy, the fever still persisted but gradually receded during the following 17 days and the patient could be transferred back to the surgical unit. Four days later, parenteral nutrition was also discontinued. Antimicrobial therapy was reduced to ceftriaxone 2 gr EV and oral ciprofloxacin 500 mg twice per day which were administered for a total of 13 and 18 days respectively. Finally the patient was discharged cured.

DISCUSSION

This is a diagnosed case of *S. pneumoniae* peritonitis secondary to bilateral pyosalpinx in a young healthy woman. Clinical presentation was acute with signs of multiorgan failure. An urgent laparotomy with drainage, bilateral salpingecto-

my was performed and antimicrobial therapy administered. Nonetheless, the patient's condition after a first temporary improvement presented signs of deterioration to require intubation. The peritoneal pus culture at the time of first surgery permitted identification of *S. pneumoniae* as the causative microorganism. Pneumococcal antigens were also detected in the urine of this patient using the *in vitro* immunochromatographic assay which has proved to be useful for the detection of *S. pneumoniae* antigen in the urine of patients with pneumonia and in the cerebrospinal fluid of patients with meningitis. Also it is reported to be positive in other *S. pneumoniae* infections (Gisselsson-Solen *et al.*, 2007). Blood cultures remained negative, but the culture had been drawn after the antimicrobial treatment was initiated. Vaginal swabs were never cultured to search for vaginal colonization.

S. pneumoniae is a rarely observed cause of bacterial peritonitis (Dugi *et al.*, 2001; Nielsen *et al.*, 2003; Garnache *et al.*, 1997). Most cases of *S. pneumoniae* peritonitis reported in literature in apparently healthy female patients have been associated with local predisposing conditions (Dugi *et al.*, 2001; Nielsen *et al.*, 2003; Garnache *et al.*, 1997; Kahlke *et al.*, 2000) and genital colonization. Three cases of tubo-ovarian abscess and peritonitis have been reported in females of non-childbearing age (Sirotnak *et al.*, 1996). Also, early neonatal *S. pneumoniae* infections have been correlated to mother genital tract colonization/infection at the time of delivery (Westh *et al.*, 1990). In all these cases, *S. pneumoniae* reaches the peritoneal cavity via the genital tract. Our patient presented none of the above mentioned risk factors for pneumococcal genital infections. Also HIV infection or immunoglobulin deficit, both of which are known to lead to more frequent and invasive pneumococcal infections, were not demonstrated (Whitney *et al.*, 2005; Picard *et al.*, 2003). It is very likely that also in this patient *S. pneumoniae* reached the peritoneal cavity through the Fallopian tubes and therefore the genital tract. Moreover, we were unable to identify further localizations of pneumococcal infection.

S. pneumoniae isolate belonged to serotype 3, one of the most virulent pneumococcal serotypes and commonly responsible for human disease. Bacteremias caused by this serotype have been

reported to have a mortality rate of up to 50% (Lipman, 1988). Our patient also had a serious clinical presentation and her recovery was delayed.

The patient's strain was susceptible to penicillin, macrolides, quinolones and glycopeptides though the patient was from a country with a high level of penicillin resistant pneumococci (Westh *et al.*, 1990). She was treated with piperacillin/tazobactam either in association with ciprofloxacin, and/or teicoplanin all of which were active against the isolated strain, followed by ceftriaxone and ciprofloxacin until discharge.

In conclusion, the patient was cured but due to infection sterility resulted.

Though rare, *S. pneumoniae* should be included in the differential diagnoses when dealing with peritonitis in female patients and the presence of upper genital infection. Culturing of the intra-operative samples helps to obtain the correct microbiologic diagnosis.

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