

# Management of High Complicated Genital Infections at the Aristide De Le Dantec Hospital: Apropos of Six Cases

Aliou Cisse\*, Mef Dieme, Omar Gassama, Youssoupha Toure, An Coly, Alassane Diouf

Dantec Hospital and University Center, Dakar, Senegal  
Email: aliou6c23@gmail.com

**How to cite this paper:** Cisse, A., Dieme, M., Gassama, O., Toure, Y., Coly, A. and Diouf, A. (2023) Management of High Complicated Genital Infections at the Aristide De Le Dantec Hospital: Apropos of Six Cases. *Open Journal of Obstetrics and Gynecology*, 13, 1816-1830.  
<https://doi.org/10.4236/ojog.2023.1311154>

**Received:** September 11, 2023

**Accepted:** November 13, 2023

**Published:** November 16, 2023

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## Abstract

**Objective:** To study the epidemiology, the diagnostic elements and the prognosis after laparotomy surgery, of complicated upper genital infections. **Patients and method:** This is a retrospective study of six cases of complicated upper genital infections collected over a period of 20 months in the Obstetrics and Gynecology department of the Aristide Hospital Center of LEDANTEC. **Results:** The average age of the patients was 37.67, in two patients; a hysterosalpingography had been performed less than seven days before the start of the symptoms, a notion of multiple sexual partners was noted in two patients. All patients presented with acute abdominal-pelvic pain associated with vomiting in three patients. An infectious syndrome was found in two patients, adnexal pain caused in four patients and signs of peritoneal irritation (guarding and umbilical tenderness) in three patients. Para-clinically, a biological inflammatory syndrome was found in all patients, including an elevation of C-reactive protein in all patients and hyperleukocytosis in four patients and an elevation of CA 125 in two patients. The cytobacteriological examination of the pus taken intraoperatively was positive in two patients, the isolated germs were *Pseudomonas aeruginosa* and *Enterobacter cloacae*. Pelvic ultrasound was performed in all patients and revealed a cystic adnexal mass in five cases, a pyosalpinx and peritoneal effusion in two cases. Abdominal & pelvic computed tomography was performed in four patients and revealed a lateral-uterine adnexal mass in two cases, pyosalpinx in two cases, uretero-hydronephrosis and peritoneal effusion in one case. An exploratory laparotomy was performed in each patient and confirmed the diagnosis of tuboovarian abscess, the presence of pelvic adhesion and purulent effusion in four patients, the presence of false membranes in two patients, pyometra and isolated bilateral pyosalpinx were found in one patient. Radical surgical treatment was associated with double probabilistic antibiotic therapy

and symptomatic treatment in all patients. The postoperative course was favorable in most cases; postoperative pneumopathy was noted and resolved under treatment.

## Keywords

Tubo-Ovarian Abscess, Pyometra, Pyosalpinx

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## 1. Introduction

Upper genital infections (UGI) include infections of the endometrium (endometritis), tubal infections (salpingitis) but also tuboovarian abscesses and pelvic peritonitis of genital origin. Isolated endocervicitis is not one of them [1]. It mainly affects sexually active women [2].

The consequences of these upper genital infections can be very disabling and make the disease serious; they are responsible for chronic pelvic pain, adhesions, and infertility due to ectopic pregnancy [3].

These infections present a clinical, biological and imaging polymorphism which makes their diagnosis difficult. In order to facilitate the diagnosis, the National College of French Gynecologists and Obstetricians (CNGOF) updated in 2012 recommendations for clinical practice in the management of upper genital infections [4]. We report the management of six cases of complicated upper genital infection collected in the obstetrics & gynecology department of the Aristide Hospital Center of Le DANTEC, during the period from January 1, 2021 to August 1, 2022 with the objectives of studying epidemiology, diagnostic elements and prognosis.

It is in this context that we decided to do this work to share our experience in the management of these pathologies.

## 2. Cases

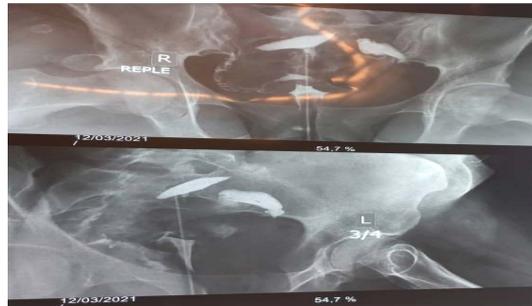
### 2.1. Case 1

It was a 39-year-old patient, married under the monogamous regime, third gesture et third part admitted for abdominal-pelvic pain of 48 hours duration and occurring five days after a hysterosalpingography (**Figure 1**) performed as part of an infertility assessment.

On admission, she presented with an infectious syndrome and signs of peritoneal irritation (guarding at the right iliac fossa, umbilical tenderness).

Paraclinical examinations revealed a non-specific biological inflammatory syndrome: CRP = 48 mg/l, WBC = 8000/mm<sup>3</sup>, HGB = 10.8 g/dl, PLT = 200,000/mm<sup>3</sup>.

A pelvic ultrasound highlighted at the level of the left ovary a heterogeneous formation measuring 85.9 × 50.9 mm with mixed component with predominance of rounded areas with hypoechoic content (**Figure 2**). It also revealed



**Figure 1.** Left hydrosalpinx X-ray image.



**Figure 2.** Ultrasound image of left ovarian abscess post hysterosalpingography.

tubal dilation with hypoechoic content, thickened tubal fimbriae in favor of a pyosalpinx and an effusion of medium abundance in the cul-de-sac of Douglas (**Figure 3**).

The diagnosis of upper genital infection was suspected.

Bi-antibiotic therapy made of Ceftriaxone 2 g/d by direct intravenous and Metronidazole 500 mg  $\times$  3/d by infusion last 10 days and symptomatic treatment with Paracetamol 4 g/d by infusion last 7 days was instituted.

The exploratory laparotomy revealed a left pyosalpinx and a collection of pus in the pouch of Douglas and dystrophic multi-cystic ovaries.

A left salpingectomy, bilateral ovarian drilling, drainage and collection of pus were performed.

The cytobacteriological examination of the pus made it possible to isolate a strain of *Pseudomonas aeruginosa* and the vaginal sample a bacterial vaginosis with *Gardnerella vaginalis*. The evolution was favorable with apyrexia after 4 days of antibiotic therapy and 3 days after surgery. The hospitalization lasted 11 days and the postoperative course was unremarkable.

## 2.2. Case 2

It was a 40-year-old female patient, nulligravida, married under the regime of polygamy referred for acute abdominal-pelvic pain lasting for 7 days after a hysterosalpingography carried out as part of an infertility assessment.



**Figure 3.** Ultrasound image of a pyosalpinx post hysterosalpingography.

On admission, she presented an acute abdominal-pelvic pain, abdominal guarding, exquisite pain in the right iliac fossa, umbilical tenderness and pain provoked in the pouch of Douglas.

Additional biological examinations revealed a non-specific biological inflammatory syndrome: CRP = 119 mg/l, WBC = 9830/mm<sup>3</sup>, HGB = 11.7 g/dl, PLT = 493,000/mm<sup>3</sup> and an elevation of CA 125 = 196.8 U/ml (N < 35).

Pelvic ultrasound revealed a right hydrosalpinx with a biloculated left ovarian cyst measuring 56 × 35 mm. The abdominal & pelvic computed tomography was in favor of a right pyosalpinx associated with ipsilateral grade I hydronephrosis and an effusion in the cul-de-sac of Douglas.

The diagnosis upper genital infection was suspected.

Dual antibiotic therapy consisting of Ceftriaxone 2 g/day by direct intravenous and Metronidazole 500 mg × 3/day by infusion last 10 days and symptomatic treatment with Paracetamol 4 g/day by infusion last 7 days were instituted.

Laparotomy revealed utero-grelic, vesico-uterine and utero-parietal adhesions, a right tuboovarian abscess, a left hydrosalpinx and a purulent effusion of approximately 200 cc.

A right adnexectomy, a left salpingectomy, peritoneal washing and drainage were performed.

The cytobacteriological examination of the pus was sterile and the histopathological examination of the surgical specimen was in favor of a bilateral tubo-ovarian abscess.

The evolution was favorable with improvement in clinical signs and an 80% drop in CRP after 10 days of antibiotic therapy and 7 days after surgery.

The hospitalization lasted 26 days and the postoperative course was unremarkable.

### 2.3. Case 3

It was a 27-year-old patient, nulligravida, single with a notion of multiple sexual

partners, referred for acute abdominal-pelvic pain and diffuse abdominal distension.

On admission, she presented with diffuse abdominal tenderness, abdominal distention with shifting dullness of the flanks and a well-tolerated anemic syndrome.

A urine pregnancy test was performed and came back negative.

Additional examinations revealed a non-specific biological inflammatory syndrome: CRP = 96 mg/l, WBC = 26,000/mm<sup>3</sup>, HGB = 6.1 g/dl, PLT = 567,000/mm<sup>3</sup>, an increase in CA 125 to 48.3 U/ml (N = 35) and negative retroviral serology.

A pelvic ultrasound was performed and revealed two hypo-echoic, heterogeneous intrapelvic collections with a thick wall, measuring 98 × 75 mm and septate as cited suggestive of pelvic peritonitis.

The abdominal & pelvic computed tomography done was in favor of two right lateral-uterine cystic masses probably ovarian measuring 41 × 51 × 52 mm and 100 × 118 × 89 mm without obvious signs of malignancy suggesting a serous cyst adenoma (**Figure 4**).

Diagnosis of upper genital infection was suspected and antibiotic therapy based on Ceftriaxone 2 g/day by direct intravenous lasts 7 days, Metronidazole 500 mg × 3/day by infusion last 15 days and symptomatic treatment with Paracetamol 4 g/d by infusion last 7 days were started as well as a transfusion of packed red blood cells.

Laparotomy revealed adhesive magma, false membranes, a right tuboovarian abscess and an effusion of pus in the cul-de-sac of Douglas.

Adhesiolysis, right adnexectomy, drainage, abdominal washing and pus sampling were performed.

The cytobacteriological examination of the pus was sterile and the pathological



**Figure 4.** CT image of an abscess of the right ovary (frontal section).

examination of the surgical specimen was in favor of an abscessed ovarian cyst without signs of malignancy.

The evolution was marked by the occurrence of febrile pneumonia on the 3rd day after laparotomy. A chest CT scan revealed ground glass images. Ceftriaxone was replaced by Ciprofloxacin 500 mg/day per os, which resulted in a pyrexia on the fifth day after surgery and a decrease in leukocytes is from 24,000 to 16,000/mm<sup>3</sup>. On the 12th postoperative day, C-reactive protein was normal (CRP = 6 mg/l) and without any particular finding on clinical examination.

The hospitalization lasted 15 days and the surgical consequences were unremarkable.

#### 2.4. Cases 4

It was a 23-year-old female patient, nulligravid, single with the notion of multiple sexual partners, referred for acute abdominal-pelvic pain associated with food and bilious vomiting.

Examination at admission revealed a tender, distended abdomen with shifting dullness of the flanks, and umbilical and Douglas pouch tenderness.

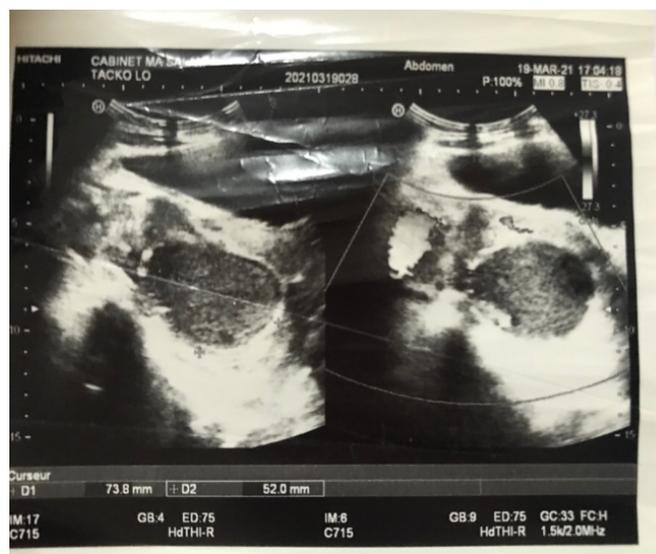
The urine pregnancy test came back negative.

Additional biological examinations revealed a non-specific biological inflammatory syndrome: CRP = 81 mg/l, WBC = 18,000/mm<sup>3</sup>, HGB = 9.1 g/dl, PLT = 570,000/mm<sup>3</sup>.

A pelvic ultrasound done revealed a lateral heterogeneous cystic mass to the right of the uterus measuring 73 × 52 mm, suggestive of a dermoid cyst (**Figure 5**).

With this clinical picture, the diagnosis of upper genital infection was suspected.

Bi-antibiotherapy with Ceftriaxone 2 g/d by direct intravenous, Metronidazole



**Figure 5.** Ultrasound image of a right ovarian abscess.

500 mg  $\times$  3/d by infusion last 10 days and symptomatic treatment with Paracetamol 2 g/day by infusion last 7 days was instituted as well as a transfusion of packed red blood cells.

A laparotomy was performed and revealed false membranes on the pelvis and the intestinal loops, a right tuboovarian abscess and a diffuse intra-abdominal purulent collection.

The procedures performed were a right adnexectomy, a removal of pus, washing and drainage.

Cytobacteriological examination for pus was sterile.

The evolution was favorable with an 80% drop in CRP (24 mg/l) 11 days after surgery and antibiotic therapy.

The hospitalization lasted 13 days and the postoperative course was unremarkable.

## 2.5. Case 5

It was a 52-year-old patient, married under the regime of monogamy, seventh gesture and fifth part and menopausal for one year. She was admitted for acute abdominal-pelvic pain on the ground of chronic pelvic pain and recurrent undocumented genital infection.

On admission, she presented with an infectious syndrome associated with signs of peritoneal irritation (guarding in the left iliac fossa and a Douglas pouch tenderness) and offensive leucorrhoea.

Paraclinical examinations revealed a non-specific biological inflammatory syndrome: CRP = 200 mg/l, HGB = 11 g/dl, WBC = 14,000/mm<sup>3</sup>, PLT= 272,000/mm<sup>3</sup>.

A pelvic ultrasound was performed and revealed two lateral-uterine cystic masses with raised walls, oval on the right and pseudo-tubulated on the left.

Abdominal & pelvic computed tomography highlighted a right adnexal liquid mass, salpingian in appearance in favor of a hydrosalpinx of about 8 cm, infiltration of the adjacent perineal fat without infiltration of the salpingian collection.

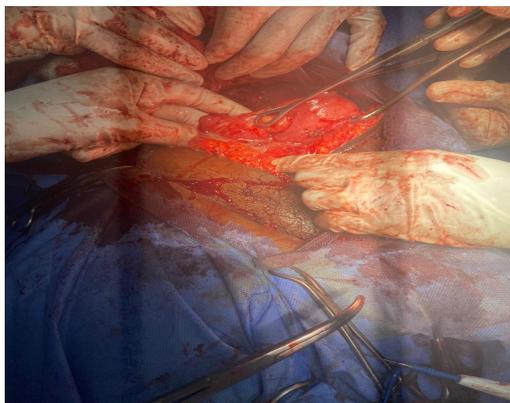
Diagnosis of upper genital infection was suspected.

Antibiotic therapy based on Ceftriaxone 2 g/d by direct intravenous, Metronidazole 500 mg  $\times$  3/d by infusion last 10 days and symptomatic treatment based on Paracetamol 3 g/d last 7 days was instituted.

A laparotomy was performed and revealed a bilateral tuboovarian abscess (**Figure 6**). A bilateral adnexectomy and lavage of the pelvic cavity were performed.

The cytobacteriological examination of the pus taken intraoperatively was sterile, as was the NAAT (nucleic acid amplification test) with research of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* was negative.

The outcome was favorable with a pyrexia after 3 days of antibiotic therapy and on day 1 after surgery. Biologically, we noted a drop in CRP of 68% (63 mg/l) and a drop in white blood cell count to 7000/mm<sup>3</sup>.



**Figure 6.** Right pyosalpinx operative view.

The hospitalization lasted 14 days and the postoperative course was unremarkable.

## 2.6. Case 6

It was a 45-year-old patient, married under the regime of monogamy, IVGIVP (fourth gesture and fourth part), referred for the management of an ovarian tumor. She presented with acute abdominal-pelvic pain associated with vomiting.

Physical examination revealed a firm, painful hypogastric mass and a Douglas pouch tenderness on vaginal examination.

Paraclinical examinations findings revealed a non-specific biological inflammatory syndrome: CRP: 192 mg/l, WBC: 20,000/mm<sup>3</sup>, HGB: 6.3 g/dl, PLT: 978,000/mm<sup>3</sup>.

Abdominal & pelvic CT scan revealed a mixed adnexal mass (liquid, solid, calcium and fatty) measuring 160 × 144 × 102 mm responsible for right ureterohydronephrosis, suggestive of a teratoma.

Bi-antibiotic therapy consisting of Ceftriaxone 2 g/day by direct intravenous, Metronidazole 500 mg × 3/day by infusion last 10 days and symptomatic treatment with paracetamol 3 g/day last 5 days last were instituted.

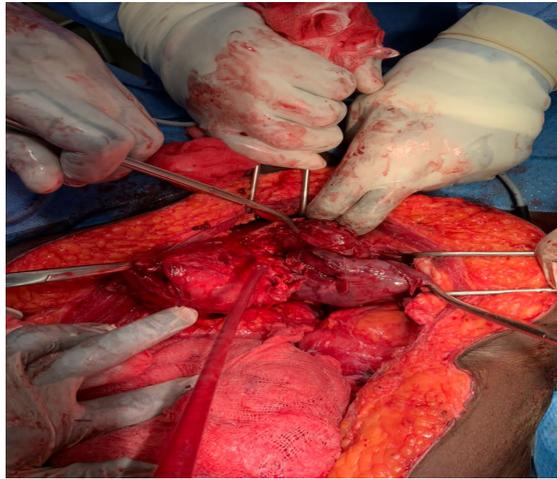
An exploratory laparotomy was carried out and revealed agglutination of the small bowel loops and part of the cecum around the two pyosalpinxes and bowel-parietal adhesions (**Figure 7**).

The procedures performed were an adhesiolysis allowing the discovery of the two pyosalpinxes attached to the uterus forming a mass of about 20 cm, a total hysterectomy with a bilateral annexectomy and a sample of pus.

Cytobacteriological examination of pus made it possible to isolate a strain of *Enterobacter cloacke*.

The evolution was favorable with clinical improvement and biologically, we noted a 67% drop in CRP (63 mg/l) and a decrease in white blood cells to 7000 elements/mm<sup>3</sup> after 10 days of antibiotic therapy.

The hospitalization lasted 14 days and the postoperative course was unremarkable.



**Figure 7.** Bilateral pyosalpinx operative view.

### 3. Summary of Observations

Figures 8-11.

### 4. Discussion

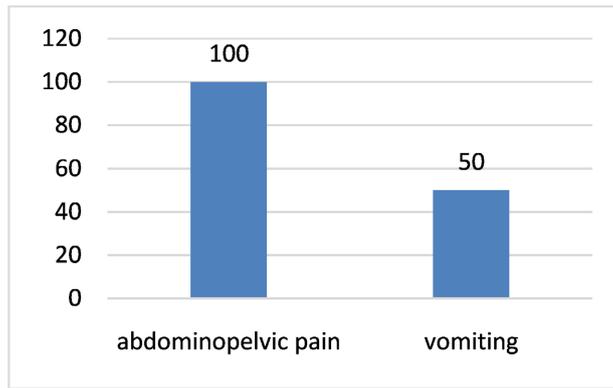
#### 4.1. Epidemiological aspects

Our series consisted of relatively young patients, in accordance with Ka *et al.* [5] with other risk factors for upper genital infection clearly identified in most studies such as multiple sexual partners (2 cases), invasive endouterine procedures in particular hysterosalpingography (two cases) and bacterial vaginosis (1 case) [2] [6]. Bacterial vaginosis (1 case) is quite common in STIs and considered to increase the risk of upper genital infection (OR = 2.03, CI 95%: 1.16 - 3.53) [7]. However, we noted that two of our patients were over 40 years old and had no other identified risk factors, which confirms the new trend in the epidemiology of upper genital infection [8].

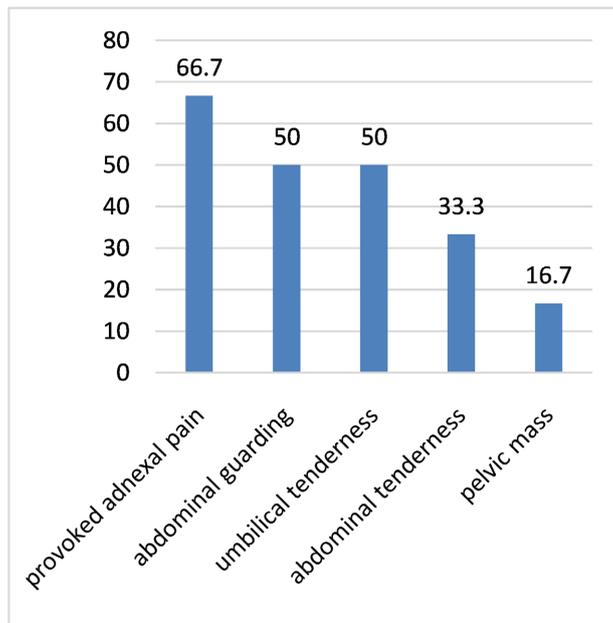
#### 4.2. Diagnostic aspects

##### 4.2.1. Clinics

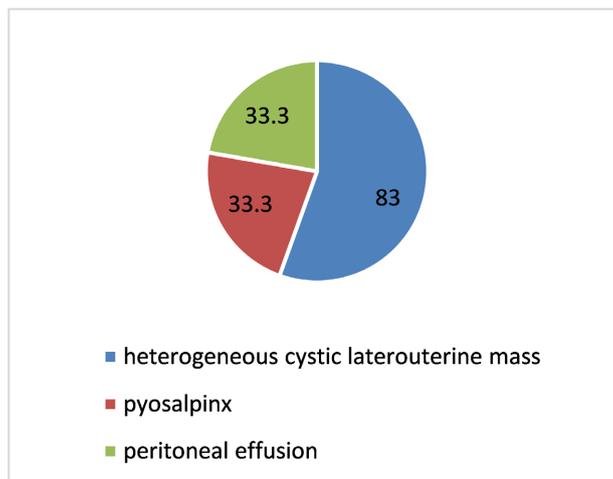
Acute abdominal-pelvic pain, signs of peritoneal irritation and adnexal tenderness were the main signs found. This supposes that the initial diagnosis was not obvious before the complementary examinations and the surgical act, it was thus necessary to eliminate the other causes of acute abdomen, such as a ruptured ectopic pregnancy, appendiceal torsion, and acute appendicitis, by performing a urine pregnancy test and a pelvic ultrasound. Many studies have shown high levels of sensitivity and specificity for these two signs in the diagnosis of complicated upper genital infection. According to Blake *et al.*, the sensitivity and specificity of spontaneous pelvic pain in the diagnosis of upper genital infection according to an observational study was 100% and 44% [9]. According to Fisher, 93% of patients with the diagnosis of upper genital infection had at least 1 of 3 symptoms (abdominal pain, dyspareunia, or abnormal vaginal bleeding) [10].



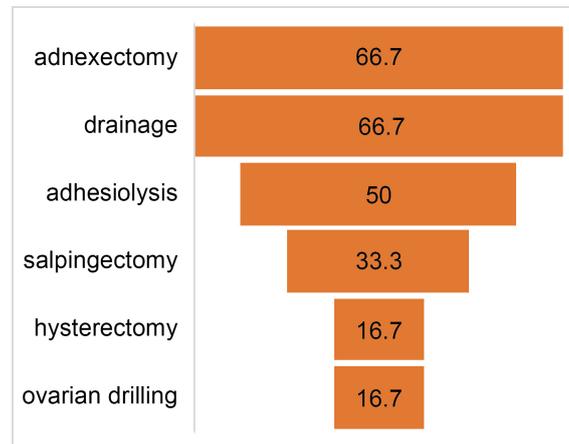
**Figure 8.** Distribution of functional signs on admission.



**Figure 9.** Distribution of physical signs at admission.



**Figure 10.** Distribution of ultrasound sign.



**Figure 11.** Distribution of surgical procedures.

In the systematic review done by Kahn, 14 studies were reviewed and adnexal pain on vaginal examination had a sensitivity of 95%, but a lower specificity of 74% for the prediction of upper genital infection [11]. The infectious syndrome was not constantly present (two) according to a study which found this sign in 40% of cases [12]. This could be due to the antibiotic therapy started early and the symptomatic treatments which bastardize the clinical picture.

#### 4.2.2. Biology

In our study we noticed a positivity of markers of inflammation with hyperleucocytosis in four patients (67%), an increase in CRP in all patients with an average of 122 mg/l and CA 125 in two patients. These results are confirmed by all major studies. Among the four studies done up by Kahn *et al.* an elevation of CRP was significantly predictive each time. Sensitivities ranged from 74% to 93%, and specificity from 50% to 90% [13]. The study of Demirates found that ESR > 19.5 mg/l and CRP 11.5 > mg/l were the best predictors of tubo-ovarian abscesses [14]. Hyperleukocytosis is found to be predictive of tubo-ovarian abscess in the study of Reljic with 90% of patients with tubo-ovarian abscess presenting a leukocytosis > 10,000/mm<sup>3</sup> versus 58.1% of patients without abscess ( $p = 0.03$ ) [15]. The CA 125 assay had a sensitivity of 71% and a specificity of 100% in the study by Moore *et al.* and its positivity is correlated with the degree of peritoneal inflammation [16]. The results of these markers of inflammation were decisive for the diagnostic hypothesis and the initiation of antibiotic therapy.

#### 4.2.3. Imaging

##### Ultrasound

Pelvic ultrasound suggested the diagnosis of a complicated form of upper genital infection with the presence of a heterogeneous cystic lateral-uterinmass found in 83% of cases, which suggested tubo-ovarian abscess. Peritoneal effusion was found in 50%, suggestive of pelvic peritonitis. This confirms the place of ultrasound in the literature for the diagnosis of complicated forms of upper genital infection. In a systematic review of the literature, 6 studies including one pros-

pective showed a sensitivity varying from 56 to 100% and a specificity varying from 83 to 99% for the diagnosis of complicated upper genital infection by ultrasound [11] [17] [18]. Indeed, an irregular and complex adnexal mass is very specific for the diagnosis of tubo-ovarian abscess. In a retrospective study including 25 patients with a tubo-ovarian abscess, it was shown that 100% of women had a lateral-uterine mass of more than 5 cm [11] [19].

#### **Abdominal & pelvic CT scan**

Abdominal & pelvic computed tomography was performed in four patients and confirmed the gynecological origin of the symptoms. The signs found were similar to the results found in the literature, including tubal thickening, fat infiltration and oophoritis [11].

#### **4.2.4. Microbiology**

The vaginal swab was only requested in three patients and positive in two patients; a case of *Gardnerella vaginalis* bacterial vaginosis and a case of unbalanced flora. Nucleic acid amplification tests on vaginal samples for *Neisseria gonorrhoea* research, *Mycoplasma genitalium* and *Chlamydiae trachomatis* were not performed according to recommendations. Cultures were positive in two patients with *Pseudomonas aeruginosa* and *Enterobacter cloacae* isolation.

*Pseudomonas aeruginosa* is a Gram-negative bacterium whose natural and permanent reservoir is the hydrophilic medium. It appears today as a major healthcare-associated pathogen, responsible for 10% of all nosocomial infections and up to 15% in intensive care units. Transport on admission and acquisition during hospitalization either through water points or by cross-transmission between patients are the two routes of contamination preceding the onset of infections [20]. These data from the literature are consistent with the clinical context of the patient concerned.

*Enterobacter cloacae*, a gram-negative bacillus, a species found in the environment, is a commensal germ in humans present in the digestive tract. It is able to pass from the commensal state to that of an opportunistic pathogen and has taken on increasing importance due to its involvement in infections in intensive care units, where prevalence is 5 to 10% [21]. However, its pathogenicity in the upper genital tract in our patient could be favored by the presence of bowel-parietal and entero-tubal adhesions. Therefore, we did not find data in the literature allowing us to better support this hypothesis.

#### **4.3. Therapeutic and Prognostic Aspects**

Combination of antibiotic therapy and drainage is considered the best option by many studies compared to antibiotic therapy alone [22] [23].

Bi-antibiotic therapy consisting of Ceftriaxone 2 g and Metronidazole 500 mg  $\times$  3/day was started at the time the diagnosis was suspected. Laparoscopy was not very accessible in our context as was radiological drainage and exploratory laparotomy was justified given the signs of acute peritonitis. The diagnosis of tubo-ovarian abscess complicated by pelvic peritonitis (2 cases) and acute gene-

ralized peritonitis (2 cases), bilateral tubo-ovarian abscess (1 case) and bilateral pyosalpinx (1 case) were found. The operators preferred radical surgery associated with drainage due to the severity of the lesions observed, with almost complete destruction of ovarian tissue. Ka *et al.* had adopted the same attitude [5]. Furthermore, many studies have shown that ultrasound-guided transvaginal puncture in the absence of major hemostasis disorders or severe sepsis is a less morbid alternative to surgery and offers high cure rates [22] [23]. However, it was not performed because the patients were admitted at the complicated stage and open surgery was the only alternative given the unavailability of laparoscopy.

The postoperative course was favorable in most patients, apart from the case we noted pneumopathy in the postoperative period that resolved under antibiotic therapy.

Hospitalization lasted an average of 15 days due to the delay in making the decision to operate. The decrease in CRP was well correlated with the clinical evolution of our patients in accordance with Ribak *et al.* [24].

Mortality was zero, unlike Takongmo *et al.* in Cameroon, which found a mortality of 23% in a study of 30 cases of genital peritonitis [25]. This is due to the large number of voluntary termination of pregnancy which leads to massive dissemination of aerobic and anaerobic germs and associated digestive complications.

## 5. Conclusion

Upper genital infections can be difficult to diagnose due to their clinical, biological and radiological polymorphism. The diagnosis is most often made in our context at the complicated stage. Efforts therefore remain to be made on the technical level, in particular laparoscopy, which would be a major contribution to both diagnosis and treatment; in order to better reduce the morbidity linked to open surgery.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## Abbreviations List

CRP: C-reactive protein

CA 125: Cancer antigen 125

CNGOF: College of French Gynecologists and Obstetricians

WBC: white blood cells

PLT: platelet rate

HGB: hemoglobin level

NAAT: nucleic acid amplification test