Journal of Gynecology Obstetrics and Human Reproduction 49 (2020) 101714

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

Review

Pelvic inflammatory diseases: Updated French guidelines

Jean-Luc Brun[a,*], Bernard Castan[b], Bertille de Barbeyrac[c], Charles Cazanave[c], Amélie Charvériat[d], Karine Faure[e], Stéphanie Mignot[d], Renaud Verdon[f], Xavier Fritel[d], Olivier Graesslin[g], on behalf of the CNGOF[h] and the SPILF[i]

[a] Service de Chirurgie Gynécologique et Médecine de la Reproduction, Centre Aliénor d'Aquitaine, Hôpital Pellegrin, CHU de Bordeaux, Place Amélie Raba Léon, 33076 Bordeaux, France
[b] Antenne de Conseil en Infectiologie Départementale, 80 avenue Georges Pompidou, 24000 Périgueux, France
[c] Centre National de Référence des Infections Sexuellement Transmissibles bactériennes, CHU de Bordeaux, Place Amélie Raba Léon, 33076 Bordeaux, France
[d] Service de Gynécologie-Obstétrique et Médecine de la Reproduction, CHU de Poitiers, 2 rue de la Milétrie, 86000 Poitiers, France
[e] Service des Maladies Infectieuses, CHRU de Lille, 2 avenue Oscar Lambret, 59000 Lille, France
[f] Service de Maladies Infectieuses et Tropicales, CHRU de Caen, avenue de la côte de Nacre, 14000 Caen, France
[g] Service de Gynécologie-Obstétrique, Institut Mère Enfant Alix de Champagne, 45 rue Cognacq-Jay, 51092 Reims, France
[h] Collège National des Gynécologues et Obstétriciens Français (CNGOF), 91 boulevard Sébastopol, 75002 Paris, France
[i] Société de Pathologie Infectieuse de Langue Française (SPILF), 21 rue Beaurepaire, 75010 Paris, France

ARTICLE INFO

Article history:
Received 2 November 2019
Accepted 3 February 2020
Available online 20 February 2020

Keywords:
Pelvic inflammatory disease
Bacteriological sampling
Antibiotics
Tubo-ovarian abscess
Follow-up

ABSTRACT

Pelvic inflammatory diseases (PID) must be suspected when spontaneous pelvic pain is associated with induced adnexal or uterine pain (grade B). Pelvic ultrasonography is necessary to rule out tubo-ovarian abscess (TOA) (grade C). Microbiological diagnosis requires endocervical and TOA sampling for molecular and bacteriological analysis (grade B). First-line treatment for uncomplicated PID combines ceftriaxone 1 g, once, IM or IV, doxycycline 100 mg ×2/day, and metronidazole 500 mg ×2/day PO for 10 days (grade A). First-line treatment for complicated PID combines IV ceftriaxone 1–2 g/day until clinical improvement, doxycycline 100 mg ×2/day, IV or PO, and metronidazole 500 mg ×3/day, IV or PO for 14 days (grade B). Drainage of TOA is indicated if the pelvic fluid collection measures more than 3 cm (grade B). Follow-up is required in women with sexually transmitted infections (STIs) (grade C). The use of condoms is recommended (grade B). Vaginal sampling for microbiological diagnosis is recommended 3–6 months after PID (grade C), before the insertion of an intrauterine device (grade B), and before elective termination of pregnancy or hysterosalpingography. When specific bacteria are identified, antibiotics targeted at them are preferable to systematic antibiotic prophylaxis.

Contents

* Corresponding author.
E-mail address: jean-luc.brun@chu-bordeaux.fr (J.-L. Brun).

http://dx.doi.org/10.1016/j.jogoh.2020.101714
2468-7847/

1. Introduction

Pelvic inflammatory disease (PID) comprises all infections of the upper genital tract, including endometritis, salpingitis, purulent pelvic fluid collections, and pelvic peritonitis of genital origin. These infections can be serious and cause long-term sequelae [1,2]. Uncomplicated PID can be simple (compatible with outpatient management) or intermediate (requiring hospitalization for diagnostic uncertainty, symptom intensity, difficulties with oral antibiotics, previous treatment failure, or psychosocial distress). PID complicated by a tubo-ovarian abscess (TOA) or pelvic peritonitis requires intervention.

The objective of these guidelines, issued jointly by the French National College of Gynecologists and Obstetricians (CNGOF) and the French-language Society for Infectious Diseases (SPILF) is to describe in detail the methods of clinical and microbiological diagnosis of PID [3,4], the treatment of its uncomplicated [5] and complicated [1] forms, its management in the postpartum period [6], antibiotic prophylaxis [7], and subsequent follow-up [2].

These guidelines were developed according to the methods described by the French national authority for health (*Haute Autorité de Santé*, HAS) [8]. The documentary research was systematic, hierarchical, and structured. Each scientific article retained was analysed according to the principles underlying critical reading of the literature, that is, by focusing first on evaluating the study methods used, then the results, and finally the benefit or risks for the woman. The scientific rationale is based on the critical analysis and synthesis of the literature performed by the authors [2–10] and on the opinions of the working group. Its members (see the list of authors) met several times to develop guidelines based on the scientific rationale and then submitted them to the reading group (list of reviewers in the appendix). Recommendations are graded according to the level of the evidence (LE) underlying them: grade A (recommendations are based on good and consistent scientific evidence: LE1); grade B (recommendations are based on limited or inconsistent scientific evidence: LE2); grade C (recommendations are based on weak scientific evidence: LE3/4). The members of the working group revised and validated the final version of these guidelines. CNGOF and SPILF funded and disseminated this work.

2. Methods of diagnosis

Most cases of PID involve spontaneous pelvic pain developing for more than 4 days (LE1). If associated with rectal signs, it suggests PID complicated by an abscess of the pouch of Douglas (LE1). The patient must be questioned specifically about the risk factors for PID (sexually transmitted diseases or STIs, and postabortion and postpartum intrauterine manoeuvres), the type and forms of onset of pelvic pain, the existence of leucorrhoea, abnormal uterine bleeding, shivering, urinary signs, dyspareunia, pain in the right hypochondriac region, or rectal signs and symptoms (grade B). Risk factors for STIs among sexually active women include an age ≤25 years, a history of STIs, two or more partners within the past year, a recent change of partner, and a partner diagnosed with an STI [9].

Induced adnexal pain and pain on uterine mobilization are the clinical signs enabling a positive diagnosis of PID (LE2). Signs associated with it (fever, leucorrhoea, and vaginal bleeding) reinforce the clinical diagnosis (LE2). Among women consulting for symptoms compatible with PID, a pelvic examination is recommended to test for adnexal pain and pain on uterine mobilization (grade B).

When PID is suspected, hyperleucocytosis associated with a high C-reactive protein (CRP) level suggests a complicated form or a differential diagnosis such as acute appendicitis (LE3). Neither the absence of hyperleucocytosis nor a normal CRP concentration rules out a diagnosis of PID (LE1). When PID is suspected, a complete blood count and a CRP assay are advised (grade C).

Chlamydia trachomatis, *Neisseria gonorrhoeae* and *Mycoplasma genitalium* are recognized as the principal STI agents responsible for PID (LE1). When PID is clinically suspected, endocervical samples (after speculum placement) and, in the case of an intervention, intraperitoneal fluid collection by interventional imaging guidance or by laparoscopy) are recommended to obtain a microbiological diagnosis (grade B). In situations where speculum placement is impossible, vaginal samples must be performed by default (Fig. 1).

The objective of these microbiological samples is to allow a direct test or a standard culture, to search for *N. gonorrhoeae* and opportunistic bacteria, with an antibiogram, and nucleic acid amplification techniques (NAAT) to test for *N. gonorrhoeae*, *C. trachomatis*, and if possible *M. genitalium* (test not reimbursed in France) (Fig. 1).

When the clinical examination has suggested a diagnosis of PID, positive microbiological results from the endocervical samples support it. On the other hand, negative microbiological results do not rule out this diagnosis (LE1).

Serology for *C. trachomatis* is not useful for diagnosing PID in the acute phase or for monitoring the disease course (LE1).

A pelvic ultrasound will not contribute to a positive diagnosis of uncomplicated PID, because its sensitivity and specificity are both poor (LE3). Nonetheless, it is recommended to look for signs of complicated PID (polymorphous fluid collections) or a differential diagnosis (grade C). Awaiting the performance of an ultrasound scan must not delay the start of antibiotic therapy.

In the case of diagnostic difficulty, abdominopelvic computed tomography (CT) with contrast product injection is useful for the

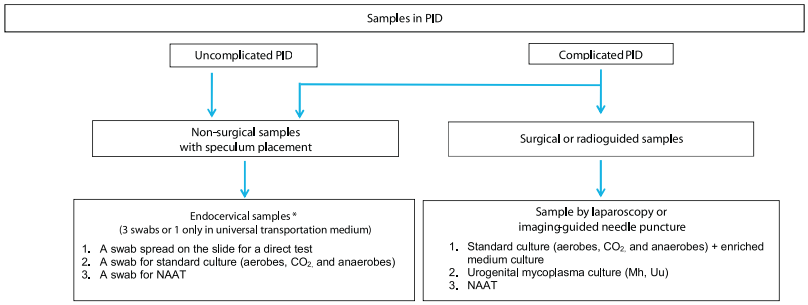

Fig. 1. Sampling methods of bacteriological testing in PID.
Notes: CT: *Chlamydia trachomatis*; MG: *Mycoplasma genitalium;* NG: *Neisseria gonorrhoeae;* NAAT: nucleic acid amplification techniques; Mh: *Mycoplasma hominis*; Uu: *Ureaplasma urealyticum.*
*In situations where speculum placement is impossible, vaginal samples must be taken by default.

differential diagnosis of urinary, gastrointestinal, or gynecological origin (LE2).

The performance of laparoscopy is not recommended for the sole purpose of obtaining a positive diagnosis of PID (grade B).

3. Treatment of uncomplicated PID

Delay in the treatment of PID is associated with an increase in the risks of ectopic pregnancy and tubal factor infertility (LE3). Antibiotic therapy enables a cure in 80–90% of cases (LE1). Antibiotic treatment is indicated once the clinical diagnosis of PID is probable, after microbiological samples are taken (grade A).

In the case of simple PID, inpatient antibiotic treatment has no advantages over outpatient treatment and does not modify the subsequent prognosis (LE1). Outpatient antibiotic treatment is recommended for simple PID (grade B).

The antibiotic therapy for PID considers the STI bacteria involved, the bacteria of the vaginal microbiota, including anaerobes, and must be adapted to developments in bacterial epidemiology. First-line antibiotic therapy for simple uncomplicated PID (treated on an outpatient basis) is ceftriaxone 1 g, once by intramuscular (IM) or intravenous (IV) administration, with doxycycline 100 mg ×2/day and metronidazole 500 mg ×2/day orally (PO) for 10 days (grade A) (Table 1).

First-line antibiotic therapy for intermediate uncomplicated PID (requiring hospitalization) is ceftriaxone 1 g, once by IV administration, together with doxycycline 100 mg ×2/day, IV or PO, and metronidazole 500 mg, ×2/d, IV or PO; IV doxycycline and metronidazole should be replaced by PO administration at the same dosage, as soon as possible for a total of 10 days overall (grade A).

Because neither efficacy nor tolerance has varied significantly in any of the protocols studied, the following alternatives (Table 1) are possible (especially for women with allergies) (grade B). According to the European Medicines Agency (EMA), fluoroquinolones must be used only when no other antibiotic is possible [10].

Women treated as outpatients must be seen again between 3 and 5 days after the initial management, to verify the clinical course, tolerance, adherence, and microbiological results (grade C). Identification of *N. gonorrhoeae* or *M. genitalium* requires verification of the coherence of the initial antibiotic regimen. If the clinical course is unfavourable, the antibiotic therapy must be adjusted to the microbiological results. Adherence to follow-up at 3 days is improved by individualized reminders to the women, such as text messages (LE2).

The same treatment protocols as those used for patients infected with HIV should be applied (grade B).

In cases of uncomplicated PID in women with an intrauterine device (IUD), its removal is not systematically necessary (grade B), but should be discussed in complicated cases or when no improvement is seen in the 3–5 days after the start of antibiotic therapy (grade B).

If PID is associated with an STI, screening for other STIs (HIV, hepatitis B and syphilis) is recommended for the woman and her partner or partners, who must receive antibiotic therapy appropriate for the STI identified in the woman (grade B).

4. Management of complicated PID

Complicated PID includes pelvic peritonitis and TOA, regardless of size, with or without signs of severity (rupture of abscess, generalized peritonitis, and septic shock). In the absence of signs of severity, the failure rate for treatment of TOA larger than 3–4 cm increases if they are not drained, and serious complications can occur (LE2). TOA larger than 3–4 cm must be drained (grade B) by imaging-guided puncture (grade B) or laparoscopy (grade C). It is recommended that the start of antibiotic therapy and TOA drainage not be delayed once the diagnosis is made (grade B).

Table 1
Antibiotic therapy protocols for uncomplicated PID.

	Antibiotics	Dosage[a]	Route	Duration[b]	Comments
Outpatient First-line	ceftriaxone + doxycycline + metronidazole	1 g 100 mg ×2/d[a] 500 mg ×2/d	IM PO PO	Once 10 days 10 days	regimen covering NG, CT and anaerobes, as well as Gram-negative bacteria and streptococci for 24–48 h
Outpatient Alternatives	ofloxacin + metronidazole +/- ceftriaxone[c]	200 mg ×2/d 500 mg ×2/d 1 g	PO PO IM	10 days 10 days Once	marketing authorization for ofloxacin to 400 mg/day, rather than the 800 mg/day reported in the literature
	levofloxacin[d] + metronidazole +/- ceftriaxone[c]	500 mg/d 500 mg ×2/d 1 g	PO PO IM	10 days 10 days Once	no marketing authorization for levofloxacin, as efficacious as ofloxacin
	moxifloxacin[e] +/- ceftriaxone[c]	400 mg/d 1 g	PO IM	10 days Once	marketing authorization for moxifloxacin, broad spectrum, but precautions for use must be followed
Hospitalisation 1st line	ceftriaxone + doxycycline[f] + metronidazole[f]	1 g/d 100 mg ×2/d 500 mg ×2/d	IV IV, PO IV, PO	Once 10 days 10 days	regimen covering NG, CT and anaerobes, as well as Gram-negative bacteria and streptococci for 24–48 h
Hospitalisation Alternatives	doxycycline + cefoxitin *then replaced by* doxycycline + metronidazole	100 mg ×2/d 2 g ×4/d 100 mg ×2/d 500 mg ×2/d	IV, PO IV PO PO	10 days 10 days	replace by oral administration after 24 h of improvement; cefoxitin efficacious for anaerobes
	clindamycin + gentamicin *then replaced by* clindamycin	600 mg ×3/d 5 mg/kg/d 600 mg ×3/d	IV IV PO	<3 days 10 days	clindamycin efficacious for CT and anaerobes; gentamicin efficacious for Gram-negative bacteria and NG

CT: *Chlamydia trachomatis*; NG: *Neisseria gonorrhoeae; d: day.*

[a] The dosages are proposed based on a weight <80 kg and a presumably normal renal function.

[b] This is the total duration of treatment; although there are no comparative studies of antibiotic therapy duration in PID, its reduction to 10 days is proposed by the SPILF guidelines group (grade C).

[c] Outpatient protocols including fluoroquinolone (does not act on more than 40 % of *N. gonorrhoeae*) leave open the possibility of administering ceftriaxone from the start in cases of STI risk factors or of adding it secondarily should fluoroquinolone resistance to *N. gonorrhoeae* be detected by antibiotic susceptibility testing when available from day 3 to day 5. Do not represcribe fluoroquinolones if they have been administered during the past 6 months.

[d] Based on pharmacological data and clinical trials, levofloxacin at 500 mg ×1/day can replace ofloxacin.

[e] The use of moxifloxacin requires verification of ECG, the absence of pro-arrhythmogenic conditions and of the co-prescription of drugs that risk QT prolongation; the presence of either is a contraindication to moxifloxacin treatment.

[f] The excellent oral bioavailability of metronidazole and doxycycline indicates they should be administered PO as soon as the clinical situation permits.

Transvaginal drainage is preferred to laparoscopic drainage (grade C) because its feasibility is excellent, and it can be performed from the outset (grade B) with simple sedation and repeated if necessary (grade C). It is not necessary to leave a drain in place.

When signs of severity are present, surgical management of complicated PID must be envisioned rapidly after probabilistic antibiotic therapy has begun and appropriate conditions are in place (grade B). The surgery must be performed by laparoscopy if possible (grade C). Drainage is preferable to excision (grade C).

The first-line antibiotic regimen recommended for treating complicated PID is ceftriaxone 1–2 g/day IV (2 g if signs of severity are present or weight >80 kg) until clinical improvement, together with doxycycline 100 mg ×2/day, IV or PO, and metronidazole 500 mg ×3/day, IV or PO; IV doxycycline and metronidazole should be replaced by PO administration at the same dosage for a total of 14 days (grade B) (Table 2). Inpatients must be re-evaluated to verify their clinical course, tolerance of treatment, and microbiological results.

Other protocols have been evaluated and found to have similar efficacy and tolerance; they can also be used (Table 2), especially in cases of allergy (grade B). According to the EMA, fluoroquinolones must be used only when no other antibiotic is possible [10].

5. Management of postpartum endometritis

The markers of postpartum endometritis are abdominopelvic pain, fever, and/or foul-smelling lochia (LE2). The diagnosis is confirmed by clinical examination when uterine pain is induced and the woman's temperature ≥38 °C (LE2). In the case of non-response after 72 h of appropriate antibiotic therapy, imaging must be performed to look for a complication (grade B). The clinicians must be alert to the difficulties of interpretation of intrauterine ultrasound images.

Antibiotic therapy of postpartum endometritis takes into consideration the efficacy data, the current epidemiology of bacterial resistance, in particular for anaerobic bacteria and streptococci, and the tolerance data. First-line antibiotic therapy of postpartum endometritis combines amoxicillin and clavulanic acid, 3–6 g/day according to weight, IV or PO (grade C). Treatment continues until 48 h after the fever has ended, and the pain can no longer be induced.

In the case of a serious allergy to penicillin, a combination of clindamycin (600 mg ×4/day) and gentamicin (5 mg/kg ×1/day) by the IV route is recommended to treat postpartum endometritis (grade A). This combination is not advised for breastfeeding women. A specialist's opinion is indicated to select an appropriate antibiotic therapy in breastfeeding women allergic to penicillin.

CT or magnetic resonance imaging with injection of a contrast product should be performed if fever persists despite appropriate antibiotic therapy prescribed for postpartum endometritis, to look for pelvic thrombophlebitis or a deep abscess (grade B).

In cases of pelvic thrombophlebitis associated with postpartum endometritis, the treatment must combine appropriate antibiotic therapy with heparin treatment at a hypocoagulating dosage (grade C). The usual duration of this hypocoagulation treatment is 6 weeks.

6. Antibiotic prophylaxis and PID prevention

Antibiotic prophylaxis is systematically recommended for caesarean deliveries (grade A). It must be administered, if possible, 30 min before the incision (grade A). It is based on a single IV administration of cefazolin 2 g or cefuroxime 1.5 g (grade A). The cephalosporin dose must be doubled if the prepregnancy weight exceeded 100 kg or the prepregnancy body mass index was greater than 35 kg/m^2. In the case of anaphylaxis to beta-lactams, the alternative is clindamycin at a dosage of 900 mg by slow IV infusion for an hour with continuous surveillance of the maternal heart rhythm.

Routine antibiotic prophylaxis routine is not recommended for the performance of hysterosalpingography (HSG) (grade B). Before HSG, screening for *C. trachomatis* and *N. gonorrhoeae* infection is advised for women at risk of STI; it is preferable to have these screening results before performing the HSG.

Antibiotic prophylaxis is not recommended after diagnostic or surgical hysteroscopy because the risk of PID is low and there is no evidence of its efficacy (grade A).

The risk of PID after insertion of an IUD is less than 1% (LE2). Asymptomatic vaginal carriage of *N. gonorrhoeae* or *C. trachomatis* at the moment of IUD placement does not appear to increase the risk of PID (LE2). There is no reason to propose antibiotic prophylaxis for IUD insertion (grade B).

Among the women at risk of an STI, before or at the moment of IUD placement, screening of STI agents must be proposed (grade B). There is no reason to delay IUD insertion while awaiting these screening results.

Manual removal of the placenta and manual uterine examinations increase the risk of pelvic infection, but there is no evidence supporting a recommendation for antibiotic prophylaxis during these procedures, which must in any case be performed in conditions of surgical asepsis (grade A).

Table 2
Protocols for antibiotic therapy for complicated PID.

	Antibiotics	Dosage	Route
Inpatient induction treatment hospitalization[a] First-line	ceftriaxone + metronidazole[b] + doxycycline[b]	1–2 g/day 500 mg ×3/day 100 mg ×2/day	IV IV, PO IV, PO
Inpatient induction treatment hospitalization[a] Alternatives	cefoxitin + doxycycline[b]	2 g x 4/day IV 100 mg ×2/day	IV IV, PO
	clindamycin + gentamicin	600 mg ×4/day 5 mg/kg ×1/day	IV IV
Replace by oral route	doxycycline[b,c] + metronidazole[c]	100 mg ×2/day 500 mg ×3/day	PO PO
	clindamycin[c]	600 mg ×3/day	PO
	ofloxacin + metronidazole	200 mg ×3/day 500 mg ×3/day	PO PO
	levofloxacin[d] + metronidazole	500 mg ×1/day 500 mg ×3/day	PO PO
	moxifloxacin[e]	400 mg ×1/day	PO

The total duration (induction and oral route) is 14 days; outpatient oral replacement is proposed after frank improvement under parenteral antibiotic therapy after at least 24 h; the total duration of treatment can nonetheless be prolonged to 21 days as a function of the course, on a case-by-case basis.

[a] For signs of severity, add gentamicin adapted to renal function 5 mg/kg ×1/day IV ≤5 days and adapt to renal function; opinion of intensivist.

[b] The excellent oral bioavailability of metronidazole and doxycycline indicates they should be administered PO as soon as the clinical situation permits.

[c] Antibiotics validated by clinical studies, but does not provide coverage of aerobic Gram-negative bacilli and offers suboptimal coverage of streptococci; recourse to a regimen with fluoroquinolone or the addition of ceftriaxone must be proposed if non-covered bacteria (streptococci, Gram-negative bacteria) are found.

[d] Based on pharmacological data and clinical trials, levofloxacin at 500 mg ×1/day can replace ofloxacin.

[e] The use of moxifloxacin requires verification of ECG, the absence of pro-arrhythmogenic conditions and of the co-prescription of drugs that risk QT prolongation; the presence of either is a contraindication to moxifloxacin treatment.

Screening for *C. trachomatis* and *N. gonorrhoeae* infection is recommended for women requesting an elective abortion [9]. Antibiotic therapy targeted for the bacteria identified is recommended and must also be proposed to partners.

Antibiotic prophylaxis is not indicated for elective medical abortions (grade B).

7. Advice after PID

PID recurs in 15–21% of women. These recurrences are linked to a substantial reinfection rate (20–34%) and increase the risk of infertility and of chronic pelvic pain (LE2). Follow-up of women with an STI reduces the reinfection rate (LE2). Follow-up after PID associated with an STI is recommended (grade C).

A microbiological examination by NAAT (*C. trachomatis, N. gonorrhoeae*<– –> *+/- M. genitalium*) of a vaginal sample 3–6 months after treatment of PID associated with STI is recommended to eliminate persisting infection or reinfection (grade C). There is no evidence supporting the routine performance of a check-up bacteriological examination if the PID was not associated with an STI.

The use of condoms is recommended after PID associated with an STI to reduce the risks of recurrence and sequelae as long as the STI risk factors persist (grade B).

In the absent of symptoms after PID treatment, none of routine pelvic ultrasound, HSG, or laparoscopy is recommended.

The benefit of oral contraception on the severity of the infection, chronic pain, and the risk of infertility is uncertain; the prescription of oral contraception after PID cannot be recommended solely to reduce these risks.

After an episode of treated PID, IUD insertion is not contraindicated in asymptomatic women (grade B). In women with a history of PID, a microbiological examination by NAAT (*C. trachomatis, N. gonorrhoeae, +/- M. genitalium*) of a vaginal sample is recommended before or at the moment of IUD insertion.

Women who want to conceive after PID must be warned about the risk of ectopic pregnancy and alerted to the clinical signs that call for medical consultation.

An epidemiologic association exists between a history of PID and serous ovarian carcinoma (LE2). The relative risk is modest (1.2–1.5), and no causal link between PID and ovarian cancer has been demonstrated. There is no evidence supporting a specific screening or monitoring strategy of the adnexa in women with a history of PID.

8. Comments

A notable change from the preceding guidelines [11] is the introduction of a new classification of uncomplicated PID, separated into simple and intermediate forms. Specifically, not all uncomplicated PID can be managed on an outpatient basis, and the individual conditions of each woman must be considered to optimize her therapeutic management. Clinical examination is now considered sufficient for diagnosis, and ultrasound is useful only to rule out complications by TOA. The bacteriological sampling has been simplified, with one swab placed in a universal transportation medium, as long as it was taken from the endocervix after a speculum was placed.

The most significant modification of the antibiotic protocols is that quinolone should not be used as first-line treatment, in view of the EMA alert to restrict prescriptions when alternatives are possible; its side effects can be severe, and the emergences of *N. gonorrhoeae* resistance has been observed [10]. The US guidelines issued in 2015 had already limited fluoroquinolone to second-line use and advised a regimen combining ceftriaxone 250 mg IM in a single dose with doxycycline and metronidazole for 14 days for uncomplicated PID [12]. We have both increased the dosage of ceftriaxone IM to 1 g in a single dose to enable coverage of Enterobacteriaceae and reduced the duration of oral antibiotic therapy to 10 days in view of the current trend to de-escalate treatment duration.

In complicated PID, drainage of pelvic fluid collections remains essential, preferentially by interventional imaging guidance rather than by laparoscopy, to reduce surgical morbidity. The antibiotics are the same as those used for uncomplicated PID (ceftriaxone, doxycycline and metronidazole).

For postpartum infections, although the reference treatment has been a combination of clindamycin and gentamicin for decades, the first-line treatment is now amoxicillin with clavulanic acid because of current bacterial epidemiology, better tolerance, and its compatibility with breastfeeding.

Because most treatments are administered on an outpatient basis or during a short hospitalization, women must be followed up during the first week of antibiotic therapy and then 3–6 months later to confirm the absence of recurrence of the initial STI.

9. Conclusion

The diagnosis and treatment of PID require simple examinations (pelvic ultrasound, endocervical samples for bacteriological testing) and a triple antibiotic therapy (ceftriaxone, doxycycline, and metronidazole), possibly combined with drainage of pelvic fluid collections. This management is therefore reproducible everywhere in the world.

Funding

This work was supported by the Collège National des Gynécologues et Obstétriciens Français (CNGOF), and the Société de Pathologie Infectieuse de Langue Française (SPILF).

Acknowledgements

The authors would like to thank the following peer reviewers: K. Ardaens (gynecologist, university hospital, Lille, France), B. Bercot (microbiologist, university hospital, Paris, France), E. Bille (microbiologist, university hospital, Paris, France), N. Bornzstein (general practitioner, private hospital, Evry, France), T. Brillac (general practitioner, private hospital, Toulouse, France), É. Canouï (infectious disease specialist, university hospital, Clichy, France), C. Carvalho (infectious disease specialist, university hospital, Tours, France), C. Charlier-Woerther (infectious disease specialist, university hospital, Paris, France), S. Diamantis (infectious disease specialist, public hospital, Melun, France), G. Giraudet (obstetrician-gynecologist, university hospital, Lille, France), C. Huchon (obstetrician-gynecologist, university hospital, Poissy, France), P. Judlin (obstetrician gynecologist, university hospital, Nancy, France) D. Lebrun, infectious disease specialist, public hospital, Charleville, France), X. Lescure (infectious disease specialist, university hospital, Paris, France), P. Lesprit (infectious disease specialist, private hospital, Suresnes, France), J. Leroy (infectious disease specialist, university hospital, Besançon, France), L. Maulin (infectious disease specialist, public hospital, Aix-en-Provence, France), S. Matheron (infectious disease specialist, university hospital, Paris, France), C. Mathieu (gynecologist, university hospital, Bordeaux, France), P. Panel (obstetrician-gynecologist, public hospital, Versailles, France), S. Patrat-Delo (infectious disease specialist, university hospital, Rennes, France), D. Poitrenaud (infectious disease specialist, public hospital, Ajaccio, France), A. Proust (obstetrician-gynecologist, private hospital, Antony, France), J. Raymond (microbiologist, university hospital, Paris, France), M. Turck (obstetrician-gynecologist, university

Hospital, Caen, France), V. Vitrat (infectious disease specialist, university hospital, Nancy, France), F. Vuotto (infectious disease specialist, university hospital, Lille, France).

References

[1] Graesslin O, Koskas M, Raimond E, Garbin O, Verdon R. Management of tubo-ovarian abscesses and complicated pelvic inflammatory disease: CNGOF and SPILF Pelvic Inflammatory Diseases Guidelines. Gynecol Obstet Fertil Senol 2019;47:431–41.

[2] Ah-Kit X, Hoarau L, Graesslin O, Brun JL. Follow-up and counselling after pelvic inflammatory disease: CNGOF and SPILF pelvic inflammatory diseases guidelines. Gynecol Obstet Fertil Senol 2019;47:458–64.

[3] Charvériat A, Fritel X. Diagnosis of pelvic inflammatory disease: Clinical, paraclinical, imaging and laparoscopy criteria. CNGOF and SPILF Pelvic Inflammatory Diseases Guidelines. Gynecol Obstet Fertil Senol 2019;47:404–8.

[4] Cazanave C, de Barbeyrac B. Pelvic inflammatory diseases: microbiologic diagnosis - CNGOF and SPILF pelvic inflammatory diseases guidelines. Gynecol Obstet Fertil Senol 2019;47:409–17.

[5] Verdon R. Treatment of uncomplicated pelvic inflammatory disease: CNGOF and SPILF pelvic inflammatory diseases guidelines. Gynecol Obstet Fertil Senol 2019;47:418–30.

[6] Faure K, Dessein R, Vanderstichele S, Subtil D. Postpartum endometritis: CNGOF and SPILF pelvic inflammatory diseases guidelines. Gynecol Obstet Fertil Senol 2019;47:442–50.

[7] Castan B. Prevention of postoperative or associated of care pelvic inflammatory diseases: CNGOF and SPILF Pelvic Inflammatory Diseases Guidelines. Gynecol Obstet Fertil Senol 2019;47:451–7.

[8] Haute Autorité de Santé, France. Recommandations pour la pratique clinique. 2010. www.has-sante.fr//portail/jcms/c_431294/recommandations-pour-la-pratique-clinique-rpc.

[9] Haute Autorité de Santé, France. Réévaluation de la stratégie de dépistage des infections à Chlamydia trachomatis. 2018.

[10] European Medicines Agency. Disabling and potentially permanent side effects lead to suspension or restrictions of quinolone and fluoroquinolone antibiotics. 2018. www.ema.europa.eu/documents/referral/quinolone-fluoroquinolone-article-31-referral-disabling-potentially-permanent-side-effects-lead_en.pdf.

[11] Brun JL, Graesslin O, Fauconnier A, Verdon R, Agostini A, Bourret A, et al. Collège National des Gynécologues Obstétriciens Français. Updated French guidelines for diagnosis and management of pelvic inflammatory disease. Int J Gynaecol Obstet 2016;134:121–5.

[12] Workowski KA, Bolan GA. Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2015. MMWR Recomm Rep 2015;64(RR-03):1–137.