Gynaecological Surgical Emergencies

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Learning Goals

- List the five most common causes of gynaecological surgical emergencies across the world.
- Propose an approach to the management of pelvic pain in the female patient of reproductive age.
- Identify and solve immediately life-threatening gynaecological surgical emergencies.
- Provide an accurate and timely diagnosis in stable patients relying on clinical examination and simple tools such as emergency room ultrasound.
- Discuss the place of laparoscopy in the management of gynaecological surgical emergencies.
- Understand the need for protection of reproductive function in the course of management of all gynaecological surgical emergencies.

87.1 Introduction

Gynaecological surgical emergencies are frequent life-threatening conditions and are major contributors to morbidity and mortality worldwide [1]. Although the challenges of their diagnosis and management are not the same in various settings, their causes seem to have frozen over decades.

Whatever the setting of practice, the main objectives are almost always the same: identifying and resolving without delay immediately life-threatening situations, and in stable patients, providing an accurate diagnosis within a relatively short period of time to guarantee appropriate and timely management, permanently keeping in mind the need for preserving patient's procreation capabilities as this is often a major concern in reproductive ages in all settings. Health care providers located in low- and middle-income countries (LMICs) face a special challenge related to the need for ensuring equitable access to surgical care in frail health systems often characterized by limited technical background and the absence of minimal universal health coverage. They consequently need to be permanently inventive in defining strategies that will ensure provision of minimum standard care in the emergency settings with little equipment. When it comes to gynaecological emergencies, very often, it's NOT about what you have but how you use the little that you have. This chapter intends among other objectives

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to discuss some tips often used by providers facing such special challenges.

Often manifesting with abdomino-pelvic pain and/or non-menstrual vaginal bleeding [2–5], gynaecological surgical emergencies are usually centred on four major issues often overlapping in their clinical expression: ectopic pregnancies, acute complications of adnexal masses, pelvic inflammatory disease (PID; and its main complication: tubo-ovarian abscess [TOA]) and vulvo-vaginal trauma including genital mutilations [6, 7]. There is one additional problem which is a major burden in many low- and middle-income countries (LMICs) and worth discussing: complications of unsafe abortions. The discussion in this chapter will be centred on these frequent causes of gynaecological emergencies. However, while attending to a patient with pelvic pain, one should keep in mind the possibility of the involvement of a digestive or urologic component as they could be often misleading [8].

Over decades, routine practice has established the fact that combination of a careful clinical assessment and pelvic ultrasound permits the proper assessment and accurate diagnosis of a wide range of gynaecological surgical emergencies [8, 9]. Ultrasound is now often available even in the most remote areas, especially since the advent and expansion of portable ultrasound devices. If judiciously associated with some basic biological work-up also available nearly everywhere such as pregnancy test, inflammatory markers like erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), the diagnostic capabilities are almost completely covered. The possibility of obtaining additional information such as beta-human chorionic gonadotropin (β-HCG) levels and calcitonin levels could be a decisive advantage in some specific situations. **Sophisticated imaging tools and biological work-up are not required to efficiently face most gynaecological surgical emergencies!**

The overall philosophy of the management of gynaecological emergencies is now guided by two major concepts:

- The advent and massive development of minimally invasive surgical approaches.
- The increasing need to preserve pelvic organs and their contributions to reproductive function, with particular emphasis on Fallopian tubes and ovaries.

Their operative management is now largely dominated by the constant progress and the large diffusion of minimally approaches which, in a few decades, have overtaken centuries of routine gynaecological practice. They can now be used for the management of almost all related situations with very few exceptions [10, 11], and their scope keeps extending. They also represent the best option for the possibility of preserving procreation capabilities [10]. One specific aspect of this philosophy of gynaecological surgery is Natural Orifice Transluminal Endoscopic Surgery (NOTES) in Gynaecological in which the vagina could be used to access abdominal cavity and solve a wide range of clinical issues in gynaecology and general surgery leaving the patient with no scar [11, 12]. The implementation and diffusion of these approaches which have proven to be economically beneficial in various aspects should be considered a priority in countries lagging behind.

This chapter aims at reviewing timely diagnostic and management tips of most common gynaecological surgical emergencies form different angles and visions of clinical practice. We have chosen to exclude children and adolescent younger than reproductive age from this discussion.

87.2 Ectopic Pregnancy

87.2.1 Introduction

This happens when a fertilized egg is wrongly implanted outside of the uterine endometrial cavity. It is considered the most common gynaecological emergency as it could affect up to 2% of pregnancies worldwide [12, 13]. It MUST be considered whenever a female patient of reproductive age presents to the emergency department with a pelvic pain, especially when associated with an unusual pattern of bleeding [14]. Suspicion must

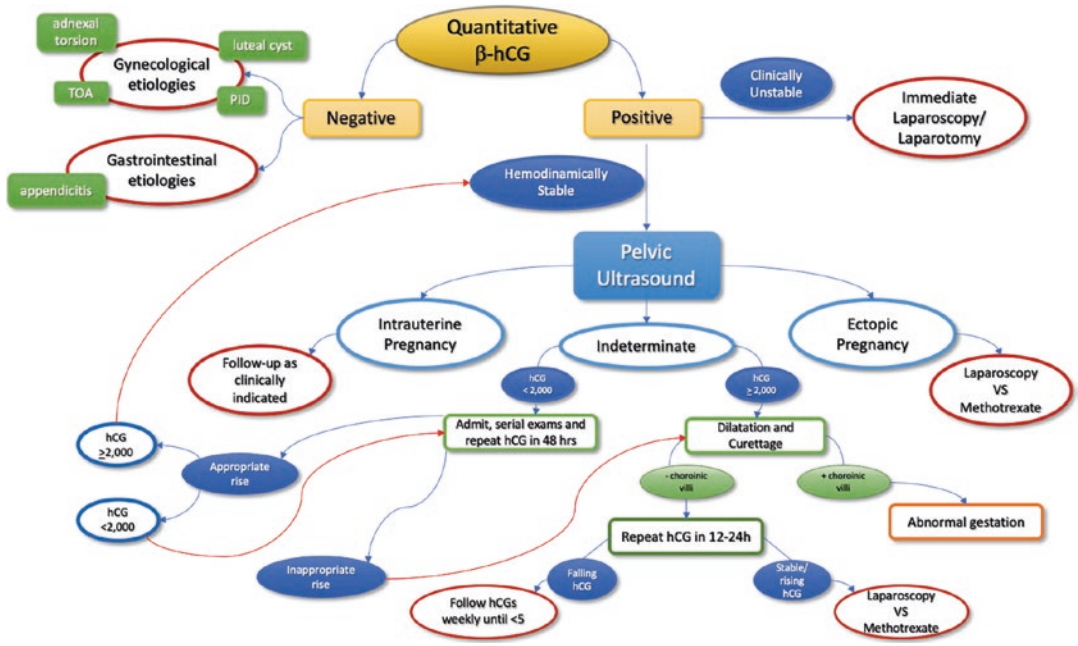

Fig. 87.1 Ectopic pregnancies diagnostic and therapeutic algorithm

be even greater in patients with current or past pelvic inflammatory disease (PID), past history of pelvic surgery including tubal ligation and history of abortion [15, 16]. The localization of the egg in this often life-threatening condition is extremely variable, from the very common and dangerous location in the Fallopian tube to the abdominal cavity. The advent of in vitro fertilization (IVF) seems to have favoured the arousal of more unusual localizations such as the myometrium or the scar of a segmental caesarean section [17, 18]. It has even been suggested that the absence of a uterus does not exclude the possibility of an ectopic pregnancy [19]. Sometimes, identifying the location seems really difficult in what is sometimes temporarily referred to as 'pregnancy of unknown location' [20].

Easy to handle when suspected and confirmed on time, it becomes immediately life-threatening when ruptured, especially when localized in the Fallopian tubes. Major disparities have been reported in the clinical presentations of ectopic pregnancies with unacceptable proportions presenting as the often-deadly ruptured form in numerous LMICs [21–23]. Under such conditions, ectopic pregnancy must be considered in every woman diagnosed with 'acute abdomen', especially when it is associated with signs of anaemia.

Figure 87.1 reports the suggested flowcharts for ectopic pregnancies management.

87.2.2 Diagnosis

It seems possible to diagnose ectopic pregnancy on clinical grounds alone in over 85% of cases, especially when it has ruptured [22]. A simple positive pregnancy test combined to suggestive clinical criteria strongly supports the diagnosis and guide a decision in the absence of imaging facilities or training. Ultrasound would confirm the absence of an embryo in the uterine cavity and often visualize the ectopic embryo, especially in the Fallopian tube. Using a vaginal probe makes it even more sensitive [14]. A baseline value of β-HCG should be obtained whenever possible as its trends in serial measurements might serve in diagnosis and follow-up of a non-surgical treatment [20].

87.2.3 Management

Most authorities still agree on the fact that all patients diagnosed with ectopic pregnancy (EP) must be admitted until considered safe [20]. Currently, three treatment options can be offered to the patient diagnosed with ectopic pregnancy: expectant management, conservative medical management with a single injection of methotrexate and surgical (operative) management.

A single intramuscular dose of methotrexate, which could be repeated once if the fall in β-HCG levels is not satisfactory, has been established for decades as a valid treatment option in early, non-complicated EP [16, 20, 24]. This is a grade A recommendation [24]. Patients undergoing this treatment option MUST display a drop of β-HCG levels indicating resolution of trophoblastic activity within 48 hours or be prepared to be moved to surgical treatment [25].

The concept of 'expectant management' arouse from the suggestion that spontaneous resolution is a possible natural course of EP. Several clinical trials have been conducted to compare this option to methotrexate injection. Recently, in meta-analysis and systematic review, Colombo et al. failed to demonstrate any significant differences between expectant management and medical treatment with methotrexate in terms of resolution of the EP and avoidance of surgery [26]. Consequently, caution is highly recommended when making a decision on which conservative option should be applied while waiting for results of more decisive randomized trials.

Obviously, conservative management should not even be envisaged in the absence of repeated ultrasound and serial β-HCG follow-up facilities.

Surgical management is generally indicated in ruptured EP and when conservative management is contraindicated. As indicated earlier, the salvation of Fallopian tube should always be envisaged as long as it does not seem to increase the risk of a future EP on the same tube. Ruptured ectopic pregnancy is considered an immediately life-threatening condition because of the associated, often massive haemoperitoneum and should be handled immediately. Timely diagnosis and management could result in 100% survival rate even in austere environments [27]. In almost all situations, this treatment can be performed through a laparoscopic approach now available in most countries at least in urban centres [16]. Situations of massive haemoperitoneum have not been considered a contraindication to laparoscopic approach for over two decades now [28].

Even in 2021, there is nothing wrong in managing EP, complicated or not, with a laparotomy, sometimes explorative in suspicious cases backed by a strong beam of clinical arguments and in the absence of the most basic imaging facilities such as ultrasound. If wrong, in such situations the surgeon will likely still discover another surgically correctable condition.

The future of the management of ectopic pregnancy might significantly depend on the possibility of more precocious and precise diagnosis based on novel 'metabolomics' profiling using new biological markers [29].

Dos and Don'ts

Dos:

- Ask about the last menstrual period.
- Always admit the patient with a suspicion of ectopic pregnancy, especially in places where they cannot be traced.
- Request a β-HCG from the time of suspicion as it will serve for diagnosis and follow-up. If not possible, a simple pregnancy test can help.
- Use laparoscopic approach whenever possible.
- Preserve the ovaries and the tubes whenever possible.

Don'ts:

- Request sophisticated investigations such as computed tomography (CT) scan or extensive biological work-up, except in really confusing situations.
- Apply expectant management until further evidence of its efficacy is provided.
- Apply conservative management if you do not have access to follow-up facilities (β-HCG measurements and ultrasound).
- Systematically perform salpingectomy for tubal ectopic pregnancies.

87.3 Adnexal Torsion

87.3.1 Introduction

This occurs following the rotation of one ovary on its vascular pedicle causing in a stepwise manner oedema, haemorrhagic infarction and necrosis of all adnexal structures if not timely and properly diagnosed and surgically treated. As adnexal torsion is relatively frequent in very young females, the preservation of adnexal structures and chances of procreation are at stake [30].

87.3.2 Diagnosis

Its diagnosis is challenging because of the extremely polymorphic and often misleading clinical presentation. In its acute form, it could combine pelvic pain, vomiting, fever, urinary symptoms and sometimes elevated white cell count, mimicking not only a number of other gynaecological conditions, but also digestive or urologic involvements such as pyelonephritis, appendicitis or urolithiasis [30, 31]. It also can take a more sluggish sub-acute, intermittent or even chronic form, mimicking a malignancy, especially in older patients [4]. Though it frequently involves a healthy ovary [4], it most often complicates a pre-existing adnexal mass of which the most common is any form of ovarian cyst. For all these reasons, diagnosis of adnexal torsion is not easy and it can easily be missed or confused with something else, turning in many situations in a discovery of surgical exploration often initiated for another indication.

In the absence of clear-cut, decisive clinical criteria as is often the case in up to half of patients [4], pelvic ultrasound plays a key role in guiding the diagnosis, especially if Doppler mode is available. If performed by a trained staff, it could detect adnexal torsion in the form of a pelvic mass in over 95% of cases [31]. However, the Doppler ultrasound cannot be used to guide clinical decision because it cannot be relied on to rule out torsion and ischaemia as vascular supply could be preserved due to the double origin of blood supply to the ovary. In such doubtful situations, CT scan or magnetic resonance imaging (MRI) could be discriminatory though they should not be proposed as first line [30, 32].

87.3.3 Management

All the diagnostic uncertainties explain why suspicion of adnexal torsion if often considered enough justification for surgical exploration. Laparoscopic approach represents the best option for an extensive exploration of the pelvis, including digestive and urologic differential diagnosis. The only limit to this approach seems to be the size of the mass at the origin of the torsion [31]. All surgical gestures including detorsion or untwisting, oophorectomy and adnexectomy are possible under laparoscopic approach, but the surgical management of adnexal torsion is now dominated by the attempt to preserve the ovary and tube at all cost despite the controversial suspicion of risk of sequelae such as post-operative adhesions and even tubal occlusion [33, 34]. Some suggest that the ovary be preserved regardless of its appearance except if it falls apart as the result of complete necrosis [4].

Dos and Don'ts

Dos:

- Perform bi-manual palpation during clinical assessment for a pelvic mass.
- Always request a pelvic ultrasound. Whenever possible, this should be performed by a trained staff that can use the Doppler mode.
- In the presence of a painful adnexal mass, surgical exploration is an acceptable option.
- Use laparoscopic approach whenever possible.

Don'ts:

- Remove ovary except if certain of its complete and irreversible necrosis.

87.4 PID and Tubo-Ovarian Abscess

87.4.1 Introduction

pelvic inflammatory disease (PID) and tubo-ovarian abscess (TOA) represent two stages of the same entity affecting females of reproductive age. PID is a relatively benign disease if timely identified and addressed and the main concern about it is usually the possible sequelae and their impact on procreation potential and risk of EP [35, 36]. The real challenge of PID is to be able to timely capture evolution towards TOA and take appropriate action.

87.4.2 Diagnosis

Often manifesting in patients who display a temporary reduction of the effectiveness of the barrier function of the cervix including carriers of an intrauterine device, its clinical presentation ranges from the severe acute pelvic pain warranting admission to much milder pictures [35–38]. Examination might reveal moderate signs of localized peritonitis. Imaging work-up does NOT contribute directly to the diagnosis of uncomplicated PID. However, obtaining a baseline value of ESR and CRP could help monitor evolution and guide decision. Whenever possible, an **ENDOCERVICAL** bacteriological sample obtained through speculum examination should be collected. **A sample obtained from the vagina or exocervix would be misleading!**

It is suggested that TOA is actually present in 15% of patients at the time they are diagnosed with PID [39]. This entity is much more dangerous and could be life-threatening in the event of rupture and development of sepsis [40]. Though its clinical presentation if highly variable, TOA should be suspected in every woman of reproductive age who displays the combination of fever, diarrhoea and leucocytosis, especially (but not only) if diagnosed with a PID [41]. Ultrasound must be requested and could contribute to identify the adnexal inflammatory mass and even guide decision as per the need for an invasive treatment [42]. Patients carrying an intrauterine device seem to develop much larger TOA on ultrasound though it does not result in an increase need for surgery [38]. Serial measurements of absolute values of CRP and ESR when available would also indicate failure of conservative management and sometimes guide decision of the need for an invasive action [43, 44].

87.4.3 Management

The effort for bacteriological documentation of the infection should not delay the start of empiric antibiotic therapy guided by the general biology of PID which is dominated by *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Streptococcus spp*, some anaerobes and gram-negative bacteria. *Mycoplasma genitalium* also seems to play an increasing role [37, 45]. The choice of antibiotics is of critical importance as antimicrobial resistance is developing as a worldwide community concern [46]. Current guidelines consider the combination of ceftriaxone-doxicycline-metronidazole as a good starting line of treatment. Intravenous administration should be preferred whenever possible at least for the first days. Fluoroquinolones combined to metronidazole could supplement for patients with allergy issues or contra-indications [45].

Antibiotic therapy based on the same regimen is still considered the first line treatment for TOA [38, 47]. It is estimated that this regimen will fail in 25% of patients who will require a more invasive treatment [39]. The decision to shift to a surgical treatment is generally guided by clinical assessment combined with ultrasound (large abscess, complex cystic image) and biological markers mentioned earlier [43]. Serum calcitonin levels also seem to play a role [39]. When surgical decision has been taken, it is highly suggested that imaging-guided drainage is superior to laparoscopic or open drainage as it ensues in significantly better results in terms of success of drainage, complication rate and duration of hospital stay [43, 47].

Recently, an objective score combining age at admission, leucocytosis on admission,

ultrasonographic measurement of TOA and bilaterality of the collection has been used in predicting antibiotic treatment failure in patients with TOA but still needs to be validated [48].

Dos and Don'ts

Dos:

- Obtain baseline CRP and ESR values whenever possible.
- Start empirical antibiotics targeting relevant germs as soon as possible.
- Use ultrasound-guided drainage rather than surgery for TOA whenever possible.

Don'ts:

- Take a sample in the vagina or exocervix for bacteriological diagnosis.
- Wait for results of bacteriological analysis before starting antibiotics.
- Use a single antibiotic for the treatment of PID.
- Apply a surgical option until clear signs of failure of antibiotic treatment.

87.5 Female Non-obstetric Genital Injuries

Female genitalia could get injured in three different ways: general traumatic mechanism, sexual activity (consensual and non-consensual) and ritual genital mutilations. Isolated genital injuries rarely result into death and thus tend to be minimized [49]. They represent only about 0.2% of cases in a national trauma data bank [50]. They, however, require specific attention because of their potential to generate disturbing consequences such as genital fistulas, chronic discomfort, dyspareunia and fertility problems [49]. Initial management in the emergency setting sometimes play a key role in avoiding these complications and providing emotional and mental support. Examination of a female displaying an injury to the genitalia should whenever possible be performed in a spirit of forensic analysis and history of injury is often misleading, especially when provided by someone else than the victim.

Non-sexual injury to female genitalia occurs following a wide variety of mechanism including blunt trauma, crush injury, burns of all types, impalement and straddle injury, falls, cow horn, sports injury and intentional injury using a variety of objects and often combined with sexual violence [51–53]. Though they most often involve anatomical structures of the vulva and vagina, possibilities of involvement of the anus, urethra, bony pelvis and even internal organs must be kept in mind during assessment in the emergency department [49].

Sexual violence remains a major worldwide concern, disproportionally affecting particularly vulnerable females such as adolescents and young adults [52, 54]. Examination of victims must be performed in the forensic spirit with the idea of collecting evidence to help action of justice, including information on the perpetrators who are often closed family members [52]. One should keep in mind that this examination cannot be limited to genitalia and anus as injuries to other body parts are often discovered, especially when the perpetrator used a weapon [52, 54, 55].

An increasing number of females are received in the emergency department for injuries sustained during consensual sex. Male-to-female disproportion and the practice of 'dry sex' seem to be major risk factors. Examination often discovers rupture of posterior fornix and vaginal lacerations generally requiring minor, but mandatory surgical repair [53, 56].

Female genital mutilation is still performed in many areas in the world, especially in Africa and middle-East [57, 58]. It could still be observed in western countries in immigrants [58]. According to WHO, it affects around 200 million women [59]. Lesions observed range from clitoridectomy to the extremely devastating infibulation [57, 59]. The major concern in the emergency department is the risk of bleeding which could be deadly and the need to prepare for the possible future reversal of the mutilation through plastic surgery.

Generally, surgical intervention is not always required following genital injury. This is particularly true for victims of sexual assault [50]. Whatever the treatment option selected, it is important to remember antibiotic prophylaxis and anti-tetanic prophylaxis in open, penetrating injuries involving the vagina and vulva, especially when a foreign object is involved [53].

87.6 Unsafe Abortions

Complications of unsafe abortions are still a tragedy in some areas and major contributors to maternal death and disability. Half of abortions in the world are conducted under conditions which are considered unsafe [60], especially in countries where abortion is still illegal. It is now generally admitted that restriction of access to abortion is the main explanation to the high burden of unsafe abortions. When performed in a clandestine setting, abortion frequently involves violent methods such as use of sharp curettage and insertion of objects in the genital tract [61]. Additionally, the illegal environment is incompatible with early consultation when complications develop, often interpreted as signs of success of the procedure. Consequently, patients tend to remain 'clandestine' until late in the course of developing these complications. Those requiring emergency surgery include retained product of conception often associated to bleeding of various severity, septic complications often requiring urgent surgical intervention for source control, injuries to the genital tract and sometimes to internal organs [62].

MCQs

1. Which of the following investigations is/are indispensable for the diagnosis of ectopic pregnancy?
   A. Ultrasound.
   B. β-HCG.
   C. Pelvic CT scan.
   D. All of the above.
   E. **None of the above.**
2. According to WHO, how many women are affected by female genital mutilations every year?
   A. 1 million.
   B. 5 million.
   C. 10 million.
   D. 100 million.
   E. **200 million.**
3. What proportion of patients with a PID actually have a TOA at the time of reception in the emergency department?
   A. 10%.
   B. **15%.**
   C. 20%.
   D. 25%.
   E. 30%.
4. Which of the following would be useful to decision making in cases of suspicion of adnexal torsion?
   A. Doppler ultrasound.
   B. CT scan.
   C. MRI.
   D. **All of the above.**
   E. None of the above.
5. In a case of ruptured ectopic pregnancy with minimal haemoperitoneum, which of the following options should be preferred?
   A. Single injection of Methotrexate.
   B. Expectant management.
   C. **Laparoscopy.**
   D. Laparotomy.
   E. All of the above.
6. Which of the following is often associated with an increased risk of ectopic pregnancy? (Select all that apply).
   A. **History of PID and TOA.**
   B. History of diffuse peritonitis.
   C. **History of previous ectopic pregnancy.**
   D. History of adhesive bowel obstruction.
   E. All of the above.
7. What proportion of patients with TOA will eventually require drainage?
   A. 10%
   B. 15%

C. **25%**
D. 50%
E. 100%.

8. Which of the following antibiotics could be included in combinations for empirical treatment in PID? (Select all that apply).
   A. Ampicillin.
   B. **Metronidazole.**
   C. **Doxycycline.**
   D. **Ceftriaxone.**
   E. **Ofloxacin.**
9. Which of the following approaches to gynaecological surgical emergency interventions leaves the patient with no scar?
   A. Laparotomy.
   B. Laparoscopy.
   C. Robotic surgery.
   D. Da Vinci.
   E. **NOTES.**
10. The following anatomical parts of female genitalia are often injured following coital injuries in the context of consensual sex, mandating surgical repair:
    A. Labia majora.
    B. Clitoris.
    C. **Posterior fornix.**
    D. **Vaginal walls.**
    E. Cervix.

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