



PELVIC PAIN IN THE FIRST QUARTER: DIAGNOSIS AND MANAGEMENT.

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Abstract .

During pregnancy, pain is one of the most representative discomforts since it can generally be derived from labor (6). This represents a great problem in the proper development of pregnancy, taking into account that between 20 and 30% of pregnant women present certain types of pain in the first half of pregnancy **General objective:** Define the diagnosis and management of pelvic pain in the first trimester of gestation pregnant patients through literature review. **Methodology:** narrative literature review of studies, meta-analysis, systematic reviews, controlled clinical trials, cohort studies, literature reviews that report information on pelvic pain in pregnant women in the first trimester from 2018 to 2023, in English and Spanish. **Results:** 21 articles were chosen, where we found that the most common obstetric causes of pelvic pain in pregnancy are abortion and ectopic pregnancy, the gynecological causes are fibroids, ovarian cyst, adnexal torsion, PID, uterine incarceration and round ligament pain, Non-gynecological causes are constipation, appendicitis, and nephrolithiasis. The most accessible diagnostic method to determine the cause of pelvic pain will be ultrasound. **Conclusions:** The goal in evaluating patients with pelvic pain is to quickly identify those who have a serious or even life-threatening etiology for their symptoms and require urgent intervention.

Keywords: diagnosis, pelvic pain, pregnancy, treatment.

INTRODUCTION

Acute pelvic pain is a non-specific symptom that is usually defined as discomfort in the lower abdomen (4). This can be diffuse or focal, where more commonly, the cause is some pelvic pathology, including disease of the gynecological, gastrointestinal and urological systems, it is important to note that a patient with chronic pelvic pain, of known or unknown etiology, may present an acute process arising de novo or an exacerbation of a chronic condition (5).

In pregnancy, pain is one of the most representative discomforts since it can generally be derived from labor (6). This represents a big problem in the proper development of pregnancy, taking into account that between 20 and 30% of pregnant women have some type of pain in the first half of pregnancy and 30% have it in the third trimester (7).

Pregnancy complicates the diagnosis and differential diagnosis of pelvic pain because the physiological changes associated with pregnancy can mimic the clinical features of the

medical/surgical disorders associated with these symptoms, thereby creating uncertainty in diagnosis. For example:

- At the beginning of pregnancy, normal stretching of the round ligament may be associated with mild pelvic pain, on the contrary, when the pain is more intense or defined only in one part of the pelvis, or when peritoneal signs such as rebound malice are added, it is not normal in gestation so these patients require further evaluation (20).

- The uterus during pregnancy is located in the abdomen from the second trimester, which can interfere with the location of pain, as it can impede physical examination, affect the normal location of the pelvic and abdominal organs, and mask or delay peritoneal signs (rebound, defense) (20).

- An enlarged uterus can compress the urinary tract, leading to mild hydroureter and hydronephrosis (usually) and thus mimicking some signs of nephrolithiasis (21).

- Enlarged uterus can cause aorto-caval compression, leading to lightheadedness or syncope when the patient is in the supine position, this physiological change resolves with a change of position (the left side is best), but the symptoms can be falsely attributed to internal bleeding due to an acute pathological process (22).

- High level of maternal progesterone during pregnancy results in reductions in LES tone, small bowel and colon motility, gallbladder emptying, and ureteral tone, these physiological changes are also important in the pathogenesis and diagnosis of diseases such as gastroesophageal reflux, constipation, cholelithiasis, and nephrolithiasis, all of which may be associated with abdominal pain (23).

The approach to pain in pregnancy is similar to that of the non-pregnant state, with some additional challenges, so the initial objective is to identify patients who have a serious or even life-threatening etiology for their symptoms and require urgent intervention, the effects of the changes that occur in pregnancy must also be considered. and keep in mind that the causes may be more common due to the state of pregnancy or related to obstetric complications and the effect of the disorder on the fetus, so the indicated imaging and diagnostic interventions should be performed, to avoid delay in diagnosis which can increase maternal and fetal mortality (11).

The goal of the evaluation of pregnant women with pelvic pain is to quickly identify those who have a severe or even life-threatening etiology for their symptoms and require urgent intervention (11). A history of any recent trauma is potentially relevant. Signs that point to a possible severe circumstance process include moderate or severe abdominal or pelvic pain, vaginal bleeding, new-onset hypertension, hypotension, vomiting, or fever (11).

The purpose of this research is to know the characteristics of patients who come to the emergency department for pain in the first trimester of pregnancy; to reorient preventive measures that contribute to reducing the frequency of these pathologies; Likewise, to propose other more complex investigations in each of these pathologies.

METHODS

Overall Objective

To define the diagnosis and management of pelvic pain in the first trimester of pregnancy in pregnant patients through a review of the literature.

Specific objectives

- To study the obstetric causes of pregnant women with pelvic pain by reviewing articles.
- To study the gynecological causes of pregnant women with pelvic pain by reviewing articles.
- To study the non-gynecological causes of pregnant women who present with pelvic pain by reviewing articles.

Study design: narrative literature review, a study that will be based on the review of scientific articles published during the last few years on the topic of pelvic pain in the first trimester.

Inclusion criteria:

- Full-text studies available

- Studies with retrospective study design.
- Studies with patients diagnosed with pelvic pain
- Studies with pregnant patients in the first trimester.
- Meta-analyses, systematic reviews, controlled clinical trials, cohort studies.

Exclusion Criteria

- Studies with patients in the puerperium period.
- Studies with pregnant patients in the second half of pregnancy.
- Studies with the presence of pelvic girdle pain.

Keywords: Pelvic pain, diagnosis, pregnancy, treatment.

Acquisition of evidence:

We conducted a literature review based on the databases of PubMed, NIH, Science direct, UpToDate, Google scholar, of articles that were relevant to us from 2018 to the present and previous dates that are relevant to the research, based on the inclusion criteria.

To select articles based on the above search terms, we also rely on inclusion and exclusion criteria, as well as access criteria to all free content, as well as proposed objectives. In addition, we select based on the PICO method and the analytical criteria defined by PRISMA.

RESULTS

Based on the terms MESH or keywords, the first search was developed and resulted in 88 initial articles, of which 53 articles were from Pubmed, 9 publications were from UpToDate, 14 from Science direct, 7 from Google scholar, 5 from Scielo. At the end of the process, we carried out an analysis in which 24 articles were excluded for duplicates, 11 for partially relevant, 19 for title or abstract screening, 6 for review of the full text, and finally after eliminating 7 that did not meet the inclusion criteria, leaving a total of 21 articles that were analyzed. (**Annex 1**)

The articles were chosen based on the significance, applicability, inclusion criteria and relevance of each one, this information was organized according to the author, year of publication, type of research, objectives, and results, information that was organized in a table shown in (**Annex 2**)

DISCUSSION

In pregnant women who go to emergency services, it is common to find that they present acute pelvic pain with non-specific symptoms, which is why it is important to identify what the most representative findings are (35). Finding the cause of the pain is a major challenge, as it has to be done An accurate differential diagnosis according to the age of the pregnant woman (36). Physical examination plus laboratory and imaging tests are crucial to reach a proper diagnosis, a detailed reproductive history should also be taken into account, specifically in young female patients presenting with pelvic pain (22).

Based on the objectives and to make the review more didactic, we will divide it according to the type of cause, whether obstetric, gynecological or non-gynecological, placing gastrointestinal and urological causes within the latter.

Obstetric causes

Among the obstetric causes, we will study abortion and ectopic pregnancy as etiologies of pelvic pain in pregnant women in the first trimester of pregnancy.

Most patients who undergo a medical abortion experience abdominal pain and, in one in four women, even severe pain (37). Kempainen in his article on pain during abortion found that when measured using the VAS scale, of all women, 57.7% experienced severe pain (VAS \geq 70) during abortion care and 93.5% of women required additional analgesics in addition to prophylactic analgesics(38).

Grossman in his study indicates that there is limited documentation on the pain and side effects associated with abortion, however, pain and side effects are important factors that can affect the

abortion experience of patients (39). Saurel reported in her study that the overall need for painkillers during medical abortion in early pregnancy ranges from 68 to 91 percent, with 2 to 29 percent of women needing additional narcotic pain relievers (40).

Dzuba, in her 2022 study studying abortion pain and side effects, reports that her findings support that a longer duration of pregnancy at the time of abortion is associated with reports of higher pain scores with the procedure, although the frequency of pain increased with gestational age. Pain intensity was similar across all gestational-age cohorts (41).

Arena, in her analysis of factors associated with the experience of pain in women with abortion in which she studied 242 patients, showed that 92 (38.0%) reported severe pain, women with higher initial levels of anxiety were more likely to experience pain with a Visual Analogue Scale ≥ 70 (OR = 3.33, CI95%: 1.43–7.76), and increased baseline anxiety levels, dysmenorrhea, and the absence of prior vaginal deliveries are associated with severe pain (42). Loeliger in his study conducted in 556 patients enrolled between June 2016 and October 2017; found that 283 (50.9%) had a maximum pain score of 8 (49.1%) in the case of abortion (43).

As for ectopic pregnancy, this is a known morbidity of gestation that can lead to a high degree of morbidity and mortality if not recognized and treated quickly (44). Women who have an ectopic pregnancy often complain of pelvic pain; However, not all ectopic pregnancies manifest with pain. Women of childbearing age who complain of pelvic pain/discomfort, abdominal pain/discomfort, nausea/vomiting, syncope, lightheadedness, vaginal bleeding, etc. should merit consideration for the possibility of pregnancy (44).

Barnhart in his study on ectopic pregnancy states that it can be totally asymptomatic or it can present with pelvic pain that worsens on one side (tubal abortion) or with severe hemorrhagic shock (tubal rupture), and the triad of symptoms of mild vaginal spotting in the first trimester, painful pelvic pain and secondary amenorrhea may indicate an extrauterine pregnancy. But it can also arise in an intact intrauterine pregnancy or as a result of an early miscarriage (45). On the contrary, Venkatraman in his study on pelvic pain in patients with ectopic pregnancy reports that This is a cause of morbidity and mortality in the first trimester, it does not always present classically with the triad of abdominal pain, vaginal bleeding, and adnexal injury (46).

Gynecological causes

One of the gynecological pathologies in which pelvic pain occurs is in fibroids, the same ones that They are very common and are often found within the uterus, including intramural, submucosa, and subserous locations(47). Although most cases have no symptoms, the rest can lead to significant symptoms that affect daily activities such as menstrual abnormalities, non-cyclic pelvic pain, pressure symptoms, and impaired reproductive function(48).

Most are asymptomatic, although some require definitive treatment(49). Conversely, fibroids can also be found in unique positions, such as the intraligament (broad ligament), cervix, and round ligament, although fibroids in these locations are rare and sometimes cause symptoms and defy differential diagnosis (50).

Estrocinturon mentions that many fibroids do not present symptoms during pregnancy, but degeneration can occur and it is more common with leiomyomas >5 cm in diameter and most pregnant women only have localized pain, although mild leukocytosis, fever, peritoneal signs, nausea and vomiting can occur, Degeneration can occur at any time during pregnancy, It is most likely to occur at the end of the first trimester or early second trimester (51).

Kilpatrick in his review on UpToDate, mentions several gynecological causes of pelvic pain among which we have round ligament pain, which, in early pregnancy, mild unilateral acute pelvic pain related to the "stretching" of one of the round ligaments is a common benign process. Pain is more common on the right side (as a result of right-handed rotation of the uterus) and can be bilateral, which can radiate to the groin and labia majora and this is also a clinical diagnosis of exclusion (14).

Yuka in her review reports 10 cases of pregnant women with suspicion of suffering from inguinal hernias in a clinical examination, after color Doppler ultrasound varicosities of the round ligament were diagnosed without clear signs of bleeding, where all patients were treated with conservative management and the symptoms disappeared, in all cases, after delivery (52).

Another cause of pelvic pain is the ovarian cyst, Kilpatrick mentions that the rupture of an ovarian cyst in the peritoneal cavity or the bleeding of the intraovarian cyst can be associated with the appearance of pelvic pain, this can occur at any time during pregnancy, but it is more common to occur in the first trimester, The pain begins during physical activity, and the bleeding is usually not severe enough to cause hemodynamic instability (14).

Webb states in his review that In a pregnant woman presenting with acute pelvic pain and an adnexal mass, pregnancy-related etiologies such as ectopic pregnancy or ovarian torsion are usually the first diagnoses to consider, however, many other causes of pelvic pain associated with an adnexal mass may occur in pregnant patients, some causes are benign and others require urgent management and treatment, Although clinical presentation and physical examination can be misleading during pregnancy (53).

A major concern for patients with pain and adnexal mass is the possibility of torsion, which can lead to necrosis and loss of the ovary, it is important to note that the presence of blood flow on Doppler examination cannot rule out adnexal torsion (54). This is evident in a case-control study conducted by Bridwell, with 55 confirmed cases and 48 controls showed normal Doppler flow in 27% of cases of left ovarian torsion and 61% of cases of right ovarian torsion, the persistence of normal Doppler flow in case of suspected torsion may be due to intermittent torsion or double blood supply to the ovary (55).

Smorgick in his retrospective study on ovarian torsion indicates that it can affect the ovary, fallopian tube or both structures and typically presents with right lateralized lower abdominal pain, frequently accompanied by nausea, vomiting, low-grade fever and/or leukocytosis, it can occur in all three trimesters, but is more frequent in the first 12 weeks and can occur after delivery. A presumptive diagnosis of torsion can be made with reasonable confidence in patients with acute pelvic pain and an adnexal mass with the characteristic ultrasound appearance (including Doppler studies) of torsion and after exclusion of other conditions (56).

One of the upper genital tract infections, known as pelvic inflammatory disease (PID), is most common in young, sexually active women, *Neisseria gonorrhoeae* and *Chlamydia trachomatis* are popular causative organisms (57). The sudden development of pelvic pain in women who are actively engaged in sexual activity is the hallmark of ILD, symptoms include mild bilateral pelvic pain that is exacerbated by sexual intercourse and may or may not present with abnormal uterine bleeding or dysmenorrhea, increased frequency of urination, menorrhagia, dysuria, or abnormal vaginal discharge (58).

Kilpatrick mentions that PID is rare during pregnancy because the cervical mucus plug and decidua form a barrier that protects the uterus from ascending bacteria. Other diagnoses should be considered prior to PID in pregnant patients with fever and lower abdominal pain (14).

As the ultimate gynecological cause of pelvic pain, Shnaekel in his study on the imprisonment of the gravid uterus mentions that Typically, patients with uterine incarceration present with symptoms related to pressure on the anatomical structures adjacent to the trapped uterus in growth between 14 and 16 weeks of gestation, the most common symptoms are pain and progressive difficulty urinating, and the pain may be abdominal, suprapubic or in the back, or may be limited to pelvic discomfort or a feeling of pelvic fullness (59).

Non-gynecologic causes

Non-gynecologic causes of abdominal pain may be useful in differential diagnosis, but it is not pathognomonic, especially during pregnancy, as uterine enlargement can distort normal anatomy.

Cullen mentions that constipation is common in pregnancy and can cause considerable abdominal discomfort, due to a mixture of factors, including pregnancy hormonal changes in the gastrointestinal tract, the mechanical effects of enlargement of the uterus, reduced physical activity, the intake of iron supplements or iron vitamins, and changes in diet (60).

As for acute appendicitis, Tamir in his review mentions that it is the most frequent cause of acute pain of surgical resolution during gestation, that is, pain in the right lower quadrant occurs at most a few centimeters from McBurney's point (61)

Kilpatrick mentions that the clinical diagnosis of appendicitis should be suspected in pregnant women who present abdominal pain that will be located in the right iliac fossa plus nausea, vomiting, fever, and neutrophilia, taking into account that in the third trimester the location of the appendix is in the cephalic direction of the uterus, the pain can be located in the upper abdomen, That's why it's only at the beginning of pregnancy that it presents as pelvic pain (14).

Another cause of non-gynecological pelvic pain is nephrolithiasis, according to Dai Symptomatic kidney stones during pregnancy affect less than 1% of pregnancies (62), Lee has reported that they are the most common non-obstetric indication for hospital admission in obstetric patients, where, the majority of patients (at least 80 percent) present with acute pain in the side, which often radiates to the groin or lower pelvis (63).

CONCLUSIONS

- The most common causes of pelvic pain in pregnancy are abortion and ectopic pregnancy
- The most common gynecological causes of pelvic pain in pregnancy are fibroids, ovarian cyst, adnexal torsion, PID, uterine incarceration, and round ligament pain.
- The most common non-gynecologic causes of pelvic pain in pregnancy are constipation, appendicitis, and nephrolithiasis.
- The most accessible diagnostic method to determine the cause of pelvic pain will be ultrasound.
- Treatment for pelvic pain will depend on the cause.
- The goal in the evaluation of patients with pelvic pain is to quickly identify those who have a severe or even life-threatening etiology for their symptoms and require urgent intervention.

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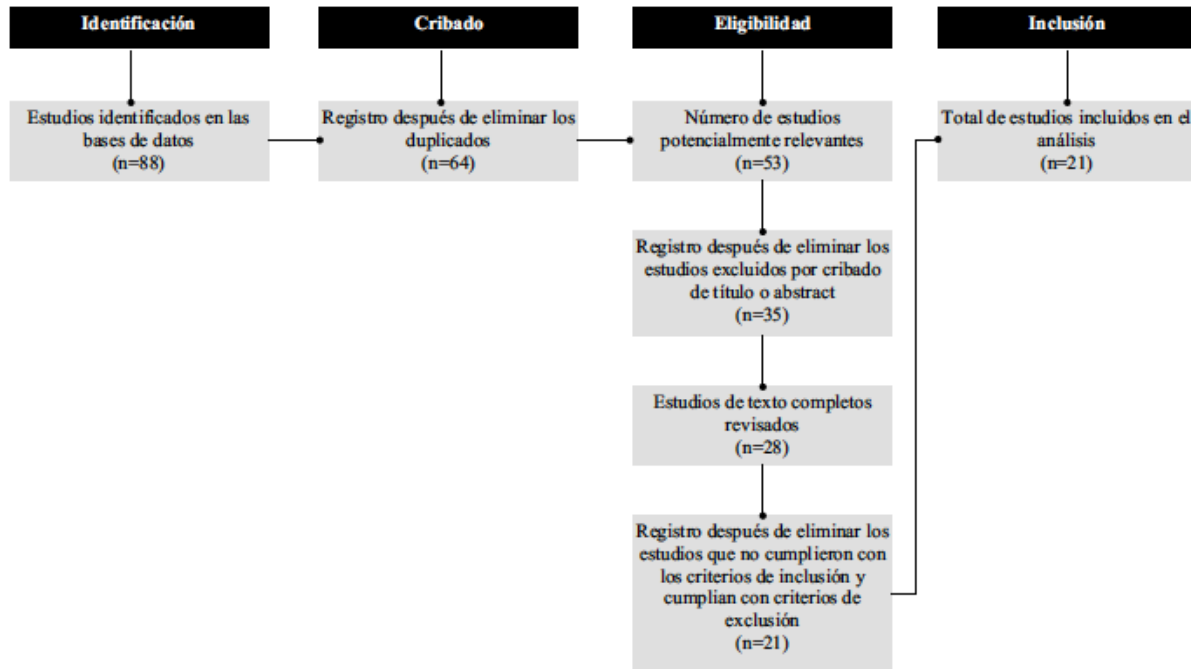
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ANNEXES

Annex 1: Flowchart



ANNEX 2

Author & Year	title	Objectives	Type of study	Finds
Kemppainen 2020	Pain During Medical Abortion in Early Pregnancy in Adolescent and Adult Women	Study the experience of pain and the need for analgesics during early medical abortion	Cases & Controls	Pain intensity was high in both adolescent and adult women undergoing medical abortion, but satisfaction with care was high.
Saurel 2015	Pain During Medical Abortion: A Multicenter Study in France	To compare the level of pain reported by women according to mifepristone dose	Observational	The average intensity of pain experienced by women undergoing medical abortion is high
Grossman 2011	Surgical and Medical Abortion in the Second Trimester in South Africa: A Cross-Sectional Study	Document the clinical and acceptability outcomes of medical and surgical abortion performed in public hospitals	Transverse	Pain and side effects are important factors that can affect a patient's abortion experience
Dzuba 2022	Pain, Side Effects, and Abortion Experience Among People Seeking Abortion Care	Document important factors affecting the abortion experience in patients.	Literature review	Although most respondents were prepared for the pain they experienced, some reported experiencing more pain than they expected
Nguyen 2022	Fear of the procedure and pain in people considering abortion	Exploring Procedural Abortion Concerns and Abortion-Related Pain in a Cohort Seeking Abortions Online	Qualitative study.	This study highlights the need for better preventive counseling and accessible resources to mitigate potential fears and misconceptions about abortion.

Jacques 2021	Surgical or medical abortion?	better inform decision-making about abortion methods by analyzing posts on Reddit	Exploratory study	Access to all medically appropriate abortion methods is essential.
Arena 2023	Factors Associated with the Experience of Pain in Women Undergoing Medical Abortion During the First Trimester	To investigate the risk factors for experiencing pain during medical abortion, focusing on women's psychological distress and anxiety levels.	Observational study	Increased initial anxiety levels, dysmenorrhea, and the absence of prior vaginal deliveries are associated with severe pain in women undergoing medical abortion
Loeliger 2002	Predictors of severe pain during medical abortion at ≤ 9 weeks gestation	To determine factors that predict severe pain among women undergoing abortion	Multicenter Trial	In addition to known risk factors, such as parity and length of gestation, this analysis identified new predictors of severe pain with medical abortion
Barnhart 2009	Clinical practice. Ectopic pregnancy	Determine the Clinical Signs of Ectopic Pregnancy	Literature review	The triad of symptoms of mild vaginal spotting in the first trimester, painful pelvic pain, and secondary amenorrhea may indicate an extrauterine pregnancy, but it can also arise in an intact intrauterine pregnancy or as a consequence of an early miscarriage
Venkatraman 2016	Acute pelvic pain in women with ruptured ectopic pregnancy		Literature review	Ectopic pregnancy does not always present classically with the triad of abdominal pain, vaginal bleeding, and adnexal injury
Shnaekel 2016	Incarceration of the gravid uterus	Describe the risk factors, clinical and radiographic criteria, and management of this rare complication of pregnancy.	Literature review	Gravid uterine incarceration is a rare but serious complication of pregnancy.
Kilpatrick 2023	Addressing Acute Abdominal/Pelvic Pain in Pregnant and Postpartum Patients	Review specific aspects of the diagnostic evaluation and treatment of acute abdominal/pelvic pain in pregnant and postpartum women	Literature review	The approach to acute abdominal/pelvic pain in pregnancy is similar to that of the non-pregnant state, with some additional challenges
Estruscinturon 1994	Natural history of uterine leiomyomas in pregnancy.	Determine the natural history of uterine leiomyomas during pregnancy	Prospective study	Most fibroids 5 cm or less in average diameter could no longer be seen during pregnancy
Smorgick 2009	The clinical features and ultrasound findings of maternal ovarian torsion during pregnancy.	To investigate the incidence, risk factors, and ultrasound findings of maternal ovarian torsion during pregnancy.	Retrospective study.	Ovarian torsion during pregnancy is most common in the first trimester and ovulation induction is a major risk factor.
Tamir 1990	Acute appendicitis in the pregnant patient		Literature review	Gestational physiological changes obscure the accurate diagnosis of acute appendicitis
Dai 2021	Nephrolithiasis in pregnancy	Review the literature on the epidemiology of lithiasis and develop a treatment algorithm based on current evidence and societal guidelines	Literature review	Symptomatic nephrolithiasis poses significant clinical challenges due to the need to minimize the risk to both mother and fetus with diagnostic and therapeutic interventions.

Read 2021	Management of Nephrolithiasis in Pregnancy	Standardize and simplify the clinical management of these complex scenarios for urologists.	Meta-analysis	A multidisciplinary approach to the treatment of obstetric patients with nephrolithiasis is critical, along with the availability of subspecialty expertise
Yuka 2017	Varicosities of the round ligament diagnosed as inguinal hernia during pregnancy		Clinical Case Report	To avoid unnecessary surgeries in pregnant women, surgeons must be aware of this entity and make an accurate diagnosis based on the findings of Doppler ultrasound.
Pietro 2022	Spontaneous Hematoma of the Round Ligament as an Unusual Cause of Pelvic Pain in a Young Female Patient	To demonstrate the role of magnetic resonance imaging in the diagnosis of round ligament hematoma.	Clinical Case Report	When it comes to adolescents suffering from acute pelvic pain, in the absence of other potential causes, spontaneous round ligament hematoma should be considered as an uncommon but potential diagnosis.
Webb 2003	Adnexal mass with pelvic pain	To describe adnexal masses in patients presenting with pelvic pain during pregnancy.	Literature review	In a pregnant woman presenting with acute pelvic pain and an adnexal mass, pregnancy-related etiologies, such as ectopic pregnancy or ovarian torsion, are usually the first diagnoses to consider
Bridwell 2022	High-risk and low-prevalence diseases: Ovarian torsion	To highlight the advantages and disadvantages of ovarian torsion, including presentation, evaluation, and management in the emergency department (ED) based on current evidence.	Literature review	Ovarian torsion is one of the most common gynecologic surgical emergencies and occurs with full or partial rotation of the ovary along the supporting ligaments, obstructing vascular flow