

Female Patient in Pain - The Evaluation

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📁 Nursing

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Objectives

1. Describe the differential diagnosis for a female patient that presents with pelvic pain.
2. Explain how ultrasound can be useful in diagnosing some of the different causes for pelvic pain.
3. Discuss some of the "pitfalls" that can be encountered when evaluating patients who present with pelvic pain.

Article

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Introduction

Ultrasound frequently is the first imaging test performed when pelvic pain is intense enough or of a long-term duration to warrant medical evaluation. The results of this procedure therefore, play a pivotal role in directing the patient to surgical or medical consultation or just watchful waiting. Therefore, it is important for nurses to be aware of the differential causes of pelvic pain and how ultrasound may be utilized in making the diagnosis. A correct diagnosis at an earlier, less complicated stage could possibly save the patient from a catastrophic outcome. Thus the healthcare personnel that are involved in the evaluation should have a firm understanding of the general symptomatology behind the various etiologies of pelvic pain.

Initially, the most important aspect of the evaluation is taking the patient's history. This will help guide and focus the procedure that might be utilized in making the diagnosis. Supplying this information to the radiology department will improve the accuracy of the study results.

Not all pain in the pelvic region is caused by ovarian cysts. Cysts are very common and the majority do not cause pain. It is therefore important to think beyond the cyst. The healthcare provider should have a general expectation based upon the history of what might be found. To that extent, the following categorization is presented, with the caveat that at all times one should expect the expected as well as the unexpected.

Sudden Intense Localized Pain

The differential for this category is:

1. ruptured ovarian cyst
2. pelvic inflammatory disease
3. torsion of the ovary
4. ectopic pregnancy
5. necrosis of a fibroid
6. appendicitis
7. kidney stone

8. epiploic fat infarction
9. ovarian vein thrombosis

A ruptured ovarian cyst will most often be associated with an acute onset of pain, "like a knife" localized to one side or the other. At times the pain will travel from one side to the other, depending upon where the blood "pools" in the pelvis (if bleeding has occurred). Therefore, bleeding (if present) may not be seen on the same side as the symptoms. If the involved cyst is a corpus luteum cyst, a "ring of fire" flow surrounding the cyst is often seen on color ultrasound imaging. If there is a great deal of bleeding, the pain may be seen in the upper abdomen, but this is rare. For most patients with a ruptured cyst, the pain is localized and severe.

For certain practice localities, pelvic inflammatory disease (PID) represents the most frequent cause of pelvic pain. This is a serious condition possibly leading to adhesions, small bowel obstruction, peritonitis, pyosalpinx, and infertility. In the initial phases of PID, an ultrasound exam may appear normal. The subtle findings of "echogenic" edema, tubal fluid, and ovarian enlargement may precede the more obvious tube dilatation and complex masses that are seen with abscess formation. With significant and/or repeated PID, ultrasound findings of tubal dilatation will persist.

Another consideration in this category is torsion of the ovary. Usually the pain is so severe that these patients bypass an ultrasound study. This diagnosis should be considered if the ovary appears enlarged and "boggy" and painful to gentle probe pressure. As the torsion progresses, lymphatic, venous, and then arterial flow cease. Because the ovary can sometimes untwist by the time of the study, Doppler ultrasound evaluation may not be helpful.

The acute onset of pain may also occur when an ectopic pregnancy ruptures. Usually there is a period of time in which the pelvic pain is somewhat vague. Pressure in the area of an ectopic pregnancy by a transvaginal ultrasound probe will give additional clues to the location. Patients with this disorder usually have a positive pregnancy test (a positive HCG – human chorionic gonadotropin). When the HCG levels are obtained 48 hours apart, about 85% of normal intrauterine pregnancies will have a 66% or more increase in the HCG level and about 85% of ectopic pregnancies will not. However, this means that 15% of ectopic pregnancies can also have a 66% or more increase and about 15% of normal pregnancies do not. Thus, the HCG level can be helpful but is not diagnostic. The main purpose of an ultrasound examination in a woman with a positive HCG is to determine (if possible) whether the pregnancy is in the uterus. A woman with a normal intrauterine pregnancy can still have pain due to other causes listed above. The diagnosis of ectopic pregnancy is often challenging, and may need the input of several healthcare providers.

At times, necrosis of a fibroid may present as an acute onset of localized pain. In these patients, the pain is usually described as "deep", and there may be associated "cramping". The ultrasound image may show a uterine myoma having decreased echodensity compared to what is expected for the normal appearance of a myoma. Enlargement of the fibroid compared to previous studies is also an important clue to this entity (figure 1).

Appendicitis may present by waking the patient up from sleep with intense lower abdominal pain. Other patients will experience a vague feeling in the periumbilical region with indigestion followed by a more intense pain in the right lower quadrant. Depending upon the location of the appendix, the center of pain may be more midline or even to the left of midline. Patients can oftentimes direct the healthcare provider to the exact location of the appendix. In the examination, look at the position of the right leg, as often the irritation of the psoas muscle region will prompt the patient to bend the right knee to relieve this discomfort. Appendicitis patients will often look the most apprehensive. While the diagnosis of appendicitis can still be challenging by ultrasound, persistence will usually identify the thick tubular structure, without peristalsis, surrounded by inflammatory echogenic deep tissues. A transvaginal ultrasound study will frequently show a deep appendix perhaps obscured from a more anterior approach (figures 2 and 3).

Care is needed for patients with Crohn's Disease and other inflammatory bowel problems because generalized bowel inflammation may involve the appendix. Please note that patients who are status post appendectomy may have inflammation of the "stump" years after surgery. In addition, epiploic fat infarction may occur in the area of the appendix or other regions of the lower colon resulting in the acute onset of focal pain. This disorder, though rare, can also be identified by ultrasound.

A kidney stone causing ureteral obstruction may present with an acute onset of intense pain, sometimes radiating into the lower pelvic area. The most common symptom of a renal stone is flank pain. At times, a pelvic ultrasound will be ordered. However, if the history suggests a possible stone, one should also evaluate the kidneys. Many kidney stone obstructions will only demonstrate relatively mild ureteral dilatation, with the stone itself being obscured by bowel in the mid to lower abdomen. The

transvaginal ultrasound probe is ideal for showing a calculus lodged in the distal ureter or within the urinary bladder.

In association with a recent pregnancy and delivery, a consideration of ovarian vein thrombosis with localized pain should also be entertained. Here the ovary may also appear enlarged and "boggy", but it is seen in conjunction with a clotted tubular ovarian vein that is adjacent to the ovary.

Localized Pain, Not Severe and Not Sudden in Onset

The differential for this category is:

1. diverticulitis
2. hernias
3. endometrioma
4. necrosis within a lipoma
5. localized muscle tear
6. nerve compression
7. neuroma

Many patients will pinpoint an area of pain, often pointing with a finger to the exact "trigger" location. In such cases, one should question if the pain is deep or is related to a superficial feeling. Superficial pain may direct the examination to using higher-level ultrasound transducers to evaluate for a possible hernia. Patients with hernias, depending on the location, may experience pain localized to the abdominal wall, or at times down the anterior portion of the leg or into the mons pubis region. Dynamic imaging with deep Valsalva maneuvers, and having the patient stand may demonstrate the herniation of bowel. At times, muscle laxity in a region without a hernia can be seen.

Diverticulitis most often affects the descending (left side) and sigmoid colon regions and therefore can frequently be discovered by a careful ultrasound exam. These patients will usually have nagging deep pain, sometimes worse with walking, which tends to "grab" them at times with more intensity. A previous history of this diagnosis may at times be present. Patients can usually pinpoint the area well, and ultrasound can often show a focal diverticulum with calcification surrounded by inflammation. Inflammation may appear as a focal increased echogenicity of the tissues with poorly defined borders. The ultrasound evaluation may also identify tracts of pus or abscess formation. Of note, color imaging may help enhance the diagnosis due to an increased flow to the inflammatory region. Normal pericolic fat does not show flow (figure 4).

Superficial subcutaneous endometriomas are most often rounded and have medium echodensity, may have peripheral flow to a minor degree, and will usually produce pain around the time of the woman's menstrual cycle. Other causes for localized pain that is not sudden in onset include neuromas, necrosis within a lipoma, a localized muscle tear, and nerve compression.

Pain Not Localized and Not Sudden in Onset

The differential for this category is:

1. numerous bilateral ovarian cysts
2. endometriosis
3. large benign ovarian tumors
4. ovarian cancer
5. pelvic congestion syndrome
6. small bowel disorders
7. vascular compromise
8. occult arteriovenous (AV) malformation

In this category, patients will sometimes describe the findings as being bilateral. The most frequent finding for pre-menopausal patients relates to bilateral ovarian cysts that are too numerous to count and often less than 1.5 cm in size. Patients with polycystic ovaries, however, usually do not present with pelvic pain and have more rounded, numerous peripheral cysts that are all less than 1 cm in size with increased flow to the central portion of each ovary.

Pain that is recurrent around the time of the menstrual cycle that can be quite debilitating and severe may be related to endometriosis. This condition produces a wide scope of pain profiles, with many patients having pain at the beginning or at the end or even throughout their cycle. Many times the pain is localized. Others may have pain only during sexual intercourse. On ultrasound, endometriomas may have medium density changes often seen within the ovaries (figure 5). Recent reports suggest that the pain associated with endometriosis is most often related to adhesions, and less so with the size of the endometrioma. Not finding an endometrioma on ultrasound does not exclude this diagnosis. Many times, this diagnosis can only be determined by a laparoscopic study.

Occasionally, a teratoma (dermoid) and other benign tumors can grow large enough to give a vague feeling of bilateral discomfort. Rarely they can present with more intense pain, which is often associated with partial or complete torsion.

One of the most common complaints of patients with ovarian cancer is a vague feeling of bloating and discomfort. Many patients describe a vague feeling of "something wrong" often without a true focal complaint. In one series of 72 stage I ovarian cancer patients, 32% reported feeling bloated, 35% had pelvic pain, and about 18 % had no pelvic symptoms at all. Therefore, one should always consider ovarian cancer as a possible etiology for virtually all patients, and to be diligent in trying to define it as early as possible. Early stage I cancers may have subtle ultrasonic clues of vascular wall nodules and focal thickening (figure 6). Any ovarian mass should be carefully evaluated for signs of cancer.

Chronic lower pelvic pain may be related to "pelvic congestion syndrome", especially for the patient who has had several pregnancies. Ultrasound demonstration of an abundance of pelvic veins may give a clue to this etiology. In addition, the Valsalva maneuver or tilting the examination bed to a head up position can often produce significant retrograde flow.

Other rare causes of vague chronic pelvic pain may include small bowel disorders, an occult arteriovenous (AV) malformation, or vascular compromise.

A Pitfall Warning

Not all pelvic cysts discovered in patients who are in pain are gynecologic in origin. One should also consider peritoneal cysts, congenital bowel wall duplication cysts, vaginal wall cysts, obstructed occult pelvic kidneys, and anterior meningoceles arising from the anterior spine.

Summary

A significant percentage of pre-menopausal pelvic ultrasound studies are ordered because of pain. Ovarian cysts are not the cause of all pain in the pelvis, even when cysts are present. It is therefore important for healthcare providers to look beyond the cyst and consider other etiologies for pelvic pain, many of which are not gynecologic.

While the emphasis of most pelvic pain in women revolves around the presence of cysts and fibroids, etc., the individual patient seen is in fact a complex set of diagnostic problems and probabilities. It is only after obtaining a history from the patient and a sense of the type of pain present that can determine if ultrasound technology can be beneficial in making the diagnosis. Pelvic ultrasound studies should thoroughly document the uterus and ovaries, but the superior examination will evaluate the bowel, adjacent structures, spaces, and at times even the kidneys and upper abdomen, in an attempt to find the source of the patient's complaint. Remember too, that pain can be evolutionary over time. Therefore, a repeat study in 1 to 2 days if pain persists may aid in the diagnosis. One should approach each patient as a diagnostic dilemma, taking in all clues available to help arrive at the proper diagnosis. Ultrasound is a marvelous diagnostic tool, that when optimally used, can be an extension of the classic physical examination.

Figures

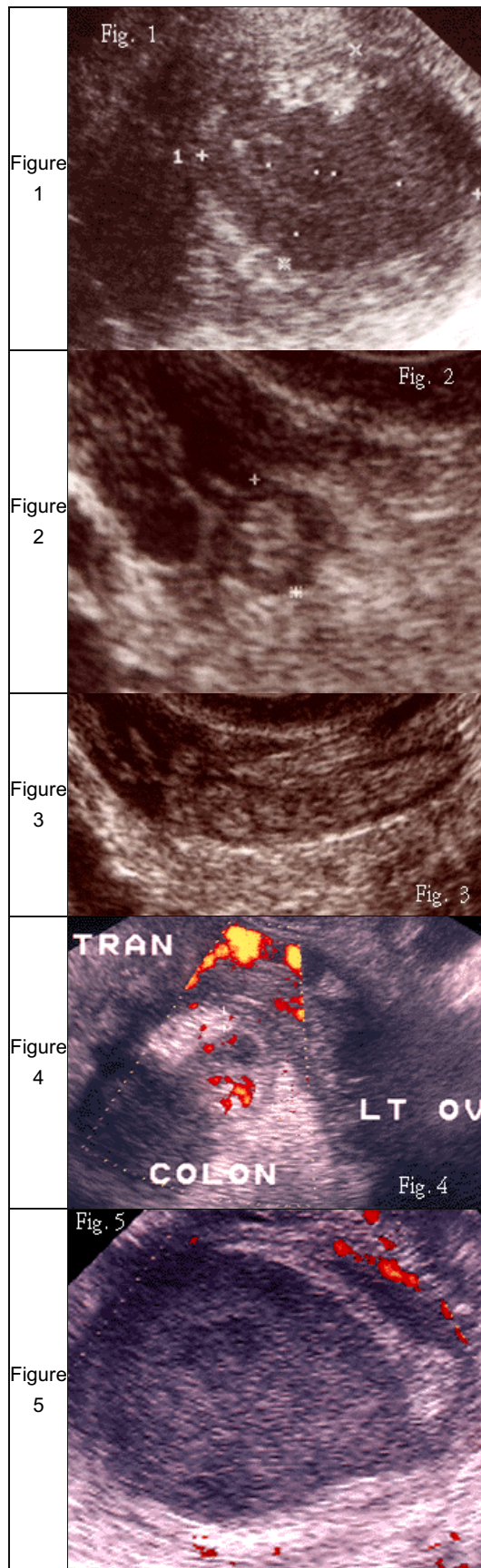
1 Sudden onset of pain associated with cramping – the ultrasound depicts a bleed into a fibroid.

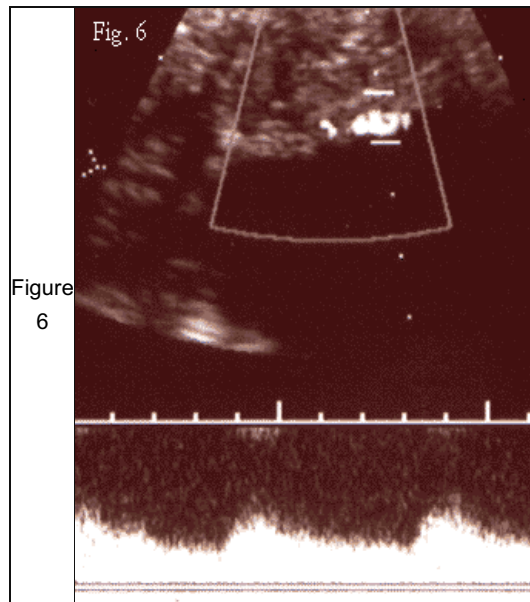
2 & 3 Appendicitis – note the tubular structure (no motion on real time study), with a subtle rim of increased surrounding density, representing inflammation.

4 Diverticulitis – note the out pocketing from the wall of the colon and the surrounding inflammation.

5 Appearance typical for an endometrioma with an irregular density region surrounded by ovarian tissue.

6 Irregular vascularity within a wall nodule found inside an ovarian cyst that was associated with high diastolic flow. These characteristics suggest the possibility of early ovarian cancer.





References or Suggested Reading:

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About the Author(s)

Dr. Crade has been a practicing Ultrasonologist / Radiologist for more than 20 years. He was director of the ultrasound department at Long Beach Memorial Medical Center in California for 5 years of that time. He is an active member of AIUM and the American Roentgen Ray Society. He has published more than 55 articles on various ultrasound topics and has lectured at many different venues to technologists, nurses, medical students, residents, fellows and other physicians.



