Diagnostic Imaging Pathways - Pelvic Inflammatory Disease (Suspected)

Population Covered By The Guidance

This pathway provides guidance on the investigation of adult patients with suspected pelvic inflammatory disease.

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Quick User Guide

Move the mouse cursor over the PINK text boxes inside the flow chart to bring up a pop up box with salient points.
Clicking on the PINK text box will bring up the full text.
The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

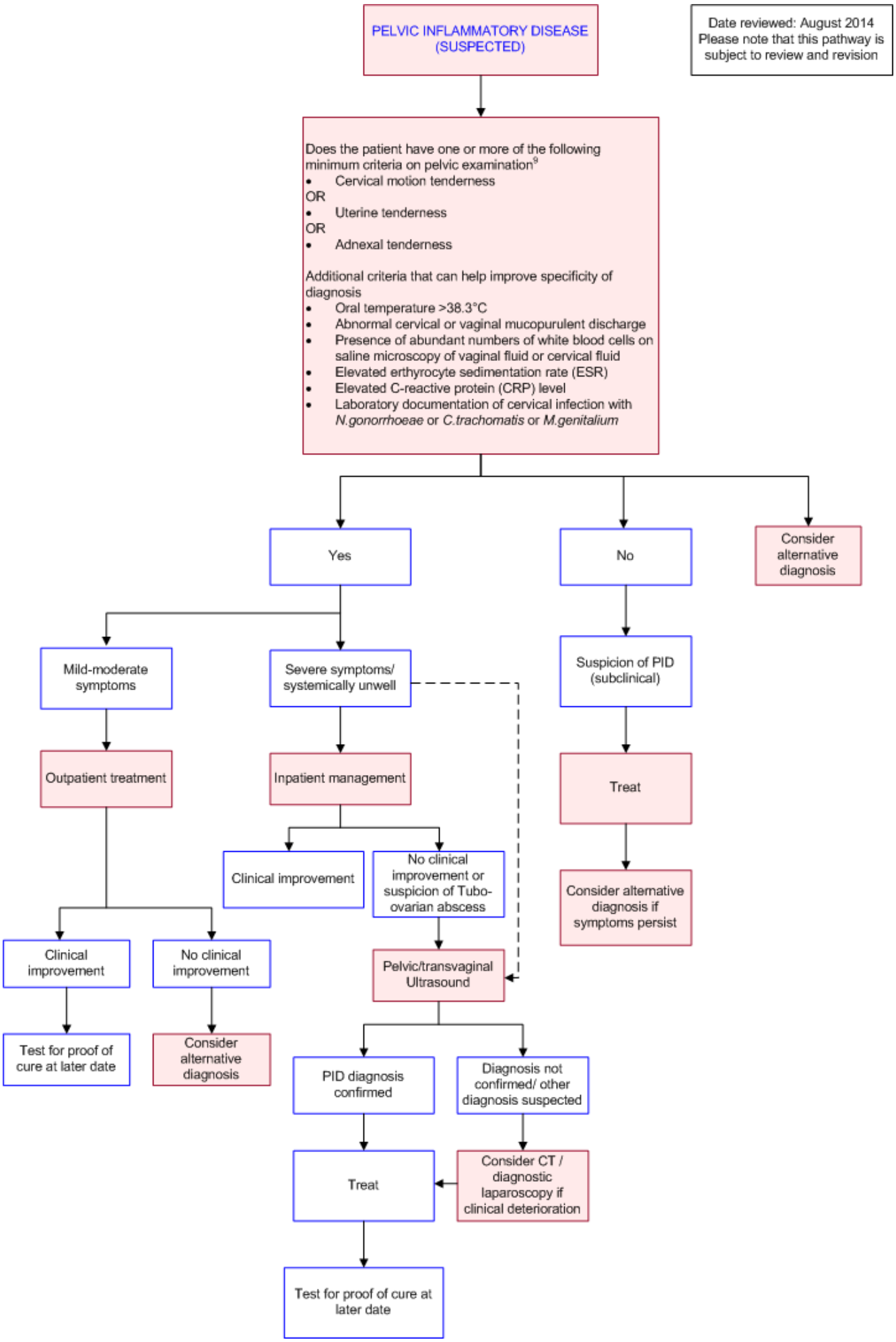

Image Gallery

Coming Soon

Teaching Points

- The diagnosis of PID is mainly made on clinical grounds with the use of imaging not commonly indicated
- Ultrasound is an accepted modality for the investigation of clinically suspected PID where patients are classified as being systemically unwell/severe symptoms and are refractory to treatment or where tubo-ovarian abscess is suspected. CT/Laparoscopy are rarely indicated
- Sub-clinical PID is a clinically distinct entity
- Before initiating treatment microbiological aetiology should always be attempted to be ascertained
- *N.gonorrhoeae* and *C.trachomatis* are the main microbiological aetiologies for PID but there is now a growing acknowledgement of the contribution *M.genitalium* to PID

Pelvic Inflammatory Disease (PID)

- Pelvic Inflammatory Disease (PID) is a pathological condition that is comprised of a variety of upper genital tract infections including endometritis, tubo-ovarian abscess, salpingitis and pelvic peritonitis. The presence of PID is associated with lower genital tract conditions such as bacterial vaginosis, cervicitis and leucorrhoea 1
- The differential diagnosis for lower abdominal pain in young women include 2
    - Ectopic pregnancy
    - Acute appendicitis
    - Endometriosis
    - Irritable Bowel Syndrome (and less commonly, other gastrointestinal disorders)
    - Complications of an ovarian cyst such as rupture or torsion
    - Urinary tract infection
    - Functional pain (pain of unknown physical origin)
- Acute PID is well accepted to be polymicrobial in aetiology and results from ascending spread of microorganisms from the vagina and/or endocervix to related structures such as fallopian tubes, endometrium or other geographically related structures 3
- *N.gonorrhoeae* and *C.trachomatis* are the main microbiological aetiologies for PID but there is now a growing acknowledgement of the contribution *M.genitalium* to PID 4
- Sub-clinical PID is a separate entity 5,6 to acute PID which occurs more commonly in females with lower genital tract infections. It is now recognized that not only is sub-clinical PID as common as acute PID but also that it is responsible for a greater proportion of the longer term consequences of PID than the clinically evident form of the disease. 7 Long term consequences of PID include ectopic pregnancy, tubal factor infertility and the development of chronic pelvic pain from adhesive disease
- The gold standard for sub-clinical PID is the endometrial biopsy 7,8
- Laparoscopy is generally regarded as the gold standard for the diagnosis of acute PID although due to logistical and clinical considerations is rarely conducted 9
- PID remains a largely clinical diagnosis with more invasive forms of diagnosis like laparoscopy and

endometrial biopsy reserved for difficult cases. 10 A 2002 study compared the accuracy of diagnostic techniques in PID and found that clinical diagnosis had the best sensitivity of 87 percent, laparoscopy followed with a sensitivity of 81 percent , with transvaginal ultrasound and endometrial culture having sensitivities of 30 percent and 83 percent respectively. Laparoscopy had the best specificity of 100 percent. 11 A 1991 study into the accuracy of laparoscopy for PID found a sensitivity of 50 percent and specificity of 80 percent compared with pathological evaluation of fimbrial biopsy 9

Centre for Disease Control and Prevention (CDC) Criteria for PID

- The clinical diagnosis for PID is based on guidelines developed by the Centre for Disease Control and Prevention (CDC). The following are the diagnostic criteria 12

Minimum Criteria (At least 1 needed for diagnosis)	Additional Criteria (Support for a diagnosis of PID)	Definitive Criteria (Confirm the diagnosis of PID)
Cervical motion tenderness Uterine tenderness Adnexal tenderness	Oral temperature > 38.3°C Abnormal vaginal or cervical discharge White blood cells on saline wet mount (>10 polymorphonuclear leukocytes per high power field) Elevated Erythrocyte Sedimentation Rate (> 15mm/hr) Elevated C-Reactive Protein Elevated white cell blood count higher than 10,000 cells/ml Laboratory evidence of *Neisseria gonorrhoeae* or *Chlamydia trachomatis*	Histopathologic evidence of endometritis Imaging showing thickened, fluid tubes, with or without pelvic free fluid or tubo-ovarian complex Doppler studies suggesting pelvic infection Intra-abdominal findings consistent with PID on laparoscopy

Treatment

- Treatment regimes vary according to local practice and policy. In Western Australia the ‘Guidelines for Managing Sexually Transmitted Infections’ can be found here and guide clinicians in the treatment of PID
- The CDC also produces guidelines for the treatment of STIs which can be found View the guidelines
- The efficacy of treating patients in the outpatient setting for mild-moderate PID has been established by the Pelvic Inflammatory Disease Evaluation and Clinical Health (PEACH) trial. 13 In this trial patients with mild to moderate PID had no appreciable difference in cure rate and long term consequences like fertility, PID recurrent and development of chronic pelvic pain in regards to being treated as outpatients or inpatients with oral/intramuscular and IV/oral regimes respectively. Subsequent 84 month follow-up of patients confirmed these results 14
- The CDC recommendations for inpatient management of PID are as follows
    - Surgical emergencies cannot be ruled out

- Pregnancy
- Lack of clinical response to oral antimicrobial PID therapy after 72 hours
- Inability to tolerate or comply with outpatient management
- Severe illness, high fever, nausea, vomiting
- Presence of tubo-ovarian abscess

Imaging in Pelvic Inflammatory Disease (PID)

- The diagnosis of PID is mainly made on clinical grounds with the use of imaging not commonly indicated
- Where PID is the primary diagnosis it should be presumptively treated as such but before initiating treatment appropriate microbiological testing should be completed to accurately elucidate the relevant organisms contributing to the diagnosis of PID

Ultrasound

- The use of ultrasound in the investigation of PID is an accepted modality where imaging is thought to be required to assist in making the diagnosis
- In one study 15 using transvaginal sonography the presence of thickened fluid filled tubes was found to have a sensitivity of 85 percent and specificity of 100 percent for PID when compared to endometrial biopsy as the reference standard. Other studies assessing the diagnostic accuracy of US in PID have given sensitivities ranging from 30 percent to 85 percent. 11,15,16 A recent literature review of sonographic features used to assess PID similarly found thick fluid filled tubes the most accurate feature with a sensitivity of 100 percent. 17 The identification of thickened, fluid filled tubes sonographically detected is considered a definitive criteria for the diagnosis of PID by the CDC
- In another study comparing MRI with US and laparoscopy, US was found to have a sensitivity of 81 percent and specificity of 78 percent in the detection of acute PID 18
- US can be useful for sonographically assessing for the presence of PID and also to assist in deciding to proceed to diagnostic laparoscopy 19
- US also has been used in the assessment for Tubo-Ovarian Abscess (TOA) which is considered a serious complication of PID, associated with a high morbidity. TOAs have been reported to occur in up to a third of women hospitalized with PID. 20,21 The studies assessing US for TOA have sensitivities ranging from 56 percent to 93 percent and specificities of 86 percent to 98 percent. 18 ,22-26 TOAs should not be confused with a tubo-ovarian complex which is considered an inflammatory pelvic mass without the presence of pus within a defined cavity, here the ovarian and tubal structures can still be recognized 27
- The typical features of a TOA are as following 26,28,29
    - Adnexal mass of varying echogenicity with septations, debris and irregular margins
    - Pyosalpinx
    - Loculated or speckled, echogenic fluid located in the cul-de-sac
    - Loss of normal boundaries that delineate the fallopian tube and ovary due to oedematous and pus filled tissue
- In the following study, 28 these sonographic features were identified in patients with acute PID and chronic PID
    - Incomplete septum of the tubal wall was present in 92 percent of cases either chronic or acute, this was found to be the best indicator of tubal inflammatory disease and indicative of an oedematous and tortuous tube
    - In acute disease, thickening of walls was present in 100 percent of cases and in cross section the presence of a cogwheel structure was present in 86 percent of cases

    - In chronic disease thin walls were present in 97 percent of cases
- Information for consumers about ultrasound InsideRadiology

Computed Tomography (CT)

- CT has a limited role in the assessment of PID due radiation exposure in a predominantly younger age group
- It can be helpful to differentiate between conditions that may mimic PID like appendicitis where its efficacy is proven, however it is generally rarely used due to the aforementioned radiation exposure
- CT has been used to diagnose TOA where US has been inconclusive with sensitivities ranging from 78 percent – 100 percent in the literature 30,31
- Information for consumers about CT InsideRadiology

Magnetic Resonance Imaging (MRI)

- In clinical practice MRI is rarely used to assist in the diagnosis of PID mainly from a logistical perspective
- MRI is diagnostically more accurate than US for the assessment of PID. MR was found to have a sensitivity of 95 percent and specificity of 89 percent compared to US with a sensitivity of 81 percent and specificity of 78 percent 18
- These results were further confirmed in a recent study assessing MRI and PID where conventional MR imaging was 90.7 percent sensitive and 93.3 percent specific in the assessment of PID. The addition of diffusion weighted imaging increased the diagnostic accuracy to a sensitivity of 91.2 percent and specificity of 98.4 percent 32
- Information for consumers about MRI InsideRadiology

Nuclear Medicine Imaging

- Nuclear medical imaging is another modality that is rarely used, but available for the assessment of PID. Similar to MRI the use of nuclear imaging is limited by logistical and clinical considerations
- Scintigraphy using leucocytes labelled with 99mTc hexamethylpropylenamine oxime (99mTc-HMPAO) was used to assess the ability to detect patients with acute PID. 33 In this study a sensitivity of 100 percent and specificity of 90 percent was achieved in the detection of PID
- In a similar study using 99mTc-HMAPO to assist in diagnosing TOA caused by PID, a sensitivity of 100 percent and specificity of 91.6 percent was achieved 34
- Limitations with integrating these imaging modalities into clinical practice include the requirement for repeat scan protocols, local expertise, radiation exposure and availability of resources
- Information for consumers about Nuclear Medicine InsideRadiology

References

Date of literature search: July 2014

The search methodology is available on request. Email

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. Download the document

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