Carol E. Blenning, MD, John Muench, MD, and Dolores Zegar Judkins, MLS
Oregon Health and Science University, Portland

Which tests are the most useful for diagnosing PID?

Evidence-based answer

No single test has adequate sensitivity and specificity to reliably identify pelvic inflammatory disease (PID) and thus help to spare women serious sequelae, including infertility (strength of recommendation [SOR]: **B**, based on systematic reviews of cohort studies and individual cohort studies).

A large multisite US study found that using adnexal tenderness as a minimum clinical criterion raises the sensitivity of the Centers for Disease Control and Prevention (CDC) criteria from 83% to 95%.[1] However, even the modified 2002 CDC criteria fail to identify women with subclinical PID who are at roughly equivalent risk for PID sequelae as those with acute symptomatic disease[2] (SOR: **B**, based on individual cohort studies).

Clinical commentary

It's prudent to treat when there is a clinical diagnosis of PID

Women presenting with acute pelvic pain need thorough evaluation to rule out ectopic pregnancy, cystitis, pyelonephritis, appendicitis, and ovarian torsion. In my experience, a likely history of a sexually transmitted disease along with adnexal pain or cervical motion tenderness on examination is the most helpful in diagnosing PID.

An elevated white blood cell (WBC) count, erythrocyte sedimentation rate (ESR), or C-reactive protein (CRP) may help support the diagnosis. PID often becomes a diagnosis of exclusion if human chorionic gonadotropin (hCG), urine evaluation, and pelvic ultrasound are negative.

While PID is sometimes a frustrating diagnosis to make and is often viewed as a "wastebasket" diagnosis, empiric treatment may be beneficial. While we would love to know whether treating pending culture results reduces the risk of sepsis and infertility, it seems prudent to treat when we have made a clinical diagnosis of PID.

Kismet T. Roberts, MD
University of Nebraska Medical Center; Offutt Air Force Base Family Medicine Residency

FAST TRACK

One study found that the combination of symptoms for <1 week, adnexal tenderness, and elevated WBC was the most sensitive set of predictors

Evidence summary

Our search for articles that examined patient- and primary care–oriented PID diagnostic tests resulted in 2 systematic reviews, no randomized controlled trials, 4 data analyses, and 5 cohort studies, all of which were fair- to good-quality.

Systematic reviews don't show consistent results

One systematic review of 12 fair- to good-quality studies, based in Europe and the US, included urban populations treated in Ob/Gyn departments, emergency rooms, and sexually transmitted

CONTINUED

disease clinics. This review supports a thorough evaluation when more severe disease is suspected and the use of sensitive diagnostic tests for suspected mild disease—eg, CRP (74%–93% sensitivity) and ESR (64%–81% sensitivity for value >20 or 15 mm/h).[3]

Another systematic review of 19 fair- to good-quality cohort studies found a sensitivity of only 64% for laparoscopy, 50% to 87% for endometrial biopsy, and up to 80% for microbiological tests. Results were not consistent for the reported sensitivity of WBC, ESR, or CRP.[4]

Multivariate analyses of Swedish data come to different conclusions

We identified no randomized controlled trials that addressed the diagnosis of PID. Two multivariate analyses of the same Swedish data from the 1960s came to different conclusions.

The Lund analysis includes data collected between 1960 and 1969 at Lund University Hospital in Sweden on women with suspected PID, with about 625 cases included for these analyses. Simms et al[5] found insufficient evidence from these data for any existing diagnostic criteria.

Looking at the same data, Hagdu et al proposed the use of a clinical criteria model including low abdominal pain and 2 or more of the following other criteria: vaginal discharge, temperature greater than 38°C, vomiting, irregular menses, urologic or proctitis symptoms, pelvic tenderness, adnexal mass or swelling, and ESR ≥15.[6] This model had a reported sensitivity of 87%, specificity of 52.5%, and false-positive and false-negative rates of 21.2% and 33.3%, respectively.

Looking at adnexal tenderness aids sensitivity of other tests

Cross-sectional analysis of a multisite US randomized treatment trial supported using adnexal tenderness as a minimum clinical criterion to increase sensitivity.[1] Further analysis of that trial suggests that some asymptomatic women are at equivalent risk of developing sequelae compared with symptomatic women diagnosed with PID. Those asymptomatic women who met diagnostic criteria with a positive endometrial biopsy were more likely to have pelvic tenderness than asymptomatic women who were not diagnosed.[2]

Symptoms >1 week and elevated WBC also helpful

Two small, fair-quality cohort studies (N=61 and 176, respectively) investigated the use of clinical diagnostic criteria for PID. The smaller study compared clinical criteria to several reference standards (laparoscopy, histology, microbiological markers, and transvaginal ultrasound) and found clinical criteria, specifically adnexal tenderness, most sensitive (87%), and laparoscopy most specific (100%).[7]

In the second study, the authors evaluated 176 consecutive admissions for clinically diagnosed PID, 76% of which were laparoscopically confirmed. Reviewing clinical indicators, they found that a combination of adnexal tenderness, symptoms for <1 week, and elevated WBC was the most sensitive set of predictors (sensitivity 86.6%, specificity 45.7%) with positive predictive value of 0.84 and negative predictive value of 0.52.[8]

Useful lab indicators: C-reactive protein, serum CA-125

Three small cohort studies (N=50–152) of fair-quality evaluated various laboratory indicators in the diagnosis of PID. Each used a different reference standard: clinical criteria, laparoscopy, and endometrial biopsy, respectively.

One study found CRP >10 to be 93% sensitive and 83% specific in a cohort of women admitted to the emergency department with an acute gynecological disorder.[9] This population had a high baseline incidence of PID, pregnancy, and intrauterine device use.

A study of serum CA-125 levels showed a predictive value of 97% for values >16 U/mL in diagnosing salpingitis.

FAST TRACK

One review supports the use of C-reactive protein and ESR when you suspect mild PID

This test might therefore be useful in confirming peritoneal involvement when PID is suspected clinically.[10]

Another study developed a model using vaginal WBC (the single most sensitive factor at 78%), serum WBC (the single most specific factor at 88%), CRP, and ESR. The model was 100% sensitive if the diagnosis only required 1 positive test, although the specificity was only 18%. The positive predictive value was 65%. If all 4 were positive, specificity was 95%, with 29% sensitivity, a positive predictive value of 90%, and a negative predictive value of 47%. Prevalence was 60% in the group studied.[11]

Recommendations from others

The CDC recommends empiric treatment of women with lower abdominal or pelvic pain who are at risk for sexually transmitted diseases with uterine, adnexal, or cervical motion tenderness and no other identifiable cause.[12]

Clinical Evidence found no RCTs that compared empiric treatment of suspected PID with waiting for microbiological test results for guidance.[13]

The Agency for Healthcare Research and Quality recommends requiring the presence of lower abdominal, adnexal and cervical tenderness, without alternative diagnosis, for the diagnosis of PID. Temperature >101°F, cervical or vaginal discharge, elevated ESR, and positive gonococcal or chlamydia cultures all increase specificity of diagnosis.[14]

The United Kingdom's national guideline recommends maintaining a low threshold for empirical treatment, citing a lack of definitive diagnostic criteria and potential for sequelae, but does recommend testing for gonorrhea and chlamydia.[15] ■

FAST TRACK

Adnexal, lower abdominal, and cervical tenderness, without alternative diagnosis, should prompt a diagnosis of PID

References

1. Piepert JF, Ness RB, Blume J, et al. Clinical predictors of endometritis in women with symptoms and signs of pelvic inflammatory disease. *Am J Obstet Gynecol* 2001; 184:856–864.
2. Wiesenfeld HC, Sweet RL, Ness RB, et al. Comparison of acute and subclinical pelvic inflammatory disease. *Sex Transm Dis* 2005; 32:400–405.
3. Kahn JG, Walker CK, Washington AE, et al. Diagnosing pelvic inflammatory disease: a comprehensive analysis and considerations for developing a new model. *JAMA* 1991; 266:2594–2604.
4. Munday PE. Pelvic inflammatory disease: an evidence-based approach to diagnosis. *J Infect* 2000; 40:31–41.
5. Simms I, Warburton F, Westrom L. Diagnosis of pelvic inflammatory disease: time for a rethink. *Sex Transm Infect* 2003; 79:491–494.
6. Hagdu A, Westrom L, Brooks CA, et al. Predicting acute pelvic inflammatory disease: a multivariate analysis. *Am J Obstet Gynecol* 1986; 155:954–960.
7. Gaitan H, Angel E, Diaz R, et al. Accuracy of five different diagnostic techniques in mild-to-moderate pelvic inflammatory disease. *Infect Dis Obstet Gynecol* 2002; 10:171–180.
8. Morcos R, Frost N, Hnat M, et al. Laparoscopic versus clinical diagnosis of acute pelvic inflammatory disease. *J Reprod Med* 1993; 38:53–56.
9. Hemila M, Henriksson L, Ylikorkala O. Serum CRP in the diagnosis and treatment of pelvic inflammatory disease. *Arch Gynecol Obstet* 1987: 241:177–182.
10. Duk JM, Kauer FM, Fleuren GJ, et al. Serum CA 125 levels in patients with a provisional diagnosis of pelvic inflammatory disease. *Acta Obstet Gynecol Scand* 1989; 68:637–641.
11. Peipert JF, Boardman L, Hogan JW, et al. Laboratory evaluation of acute upper genital tract infection. *Obstet Gynecology* 1996; 87:730–736.
12. Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2006. *MMWR Recomm Rep* 2006; 55(RR-11):56–61.
13. Ross J. Pelvic infectious diseases. *Clinical Evidence* 2006. Web publication date December 1, 2005. Available at: www.clinicalevidence.com/ceweb/conditions/seh/1606/1606.jsp. Accessed on February 20, 2007.
14. *Common Gynecologic Problems: A Guide to Diagnosis and Treatment*. Boston, Mass: Brigham and Women's Hospital; 2002.
15. *United Kingdom National Guideline for the Management of Pelvic Inflammatory Disease*. London, England: British Association for Sexual Health and HIV; 2005.