

Plain Language Summary

Periprosthetic Joint Infections of the Hip and Knee

Background

This plain language summary provides an overview of the diagnosis and prevention of periprosthetic joint infections (PJI) of the hip and knee.

What is a surgical site infection?

“Periprosthetic” simply means “around an implant” (such as an artificial knee or hip joint). “Joint infection” is microorganisms (e.g. bacteria) or “bugs” within the joint.

If an infection is diagnosed, the chance that the artificial joint can fail is high. Testing for infection should be based on whether patients have a high or low chance of having an infection, as determined by the following:

Higher Probability of Infection

One or more symptoms, AND at least one or more:

- 1) Risk factor OR
- 2) Physical exam finding OR
- 3) Early implant loosening

The following factors were found to be risk factors for PJI in patients who had a total joint replacement:

- Obesity
- Heart disease
- Weakened immune system
- Poor blood circulation
- Inflammatory arthritis
- Prior joint infection
- Kidney disease
- Liver disease

- Mental health disorders including depression
- Alcohol abuse
- Anemia
- Tobacco use
- Malnutrition
- Diabetes/uncontrolled diabetes

Additionally, the following factors may potentially increase your risk for PJI:

- Active infection
- Anticoagulation/active thromboprophylaxis status
- Diagnosis of human immunodeficiency virus (HIV)
- Prior weight loss surgery
- Hemophilia
- Nursing home residents
- Autoimmune disease

Conditions that harm or weaken the immune system:

- HIV
- Diabetes
- Hepatitis
- Chemotherapy or other similar medication
- Autoimmune diseases
- Inflammatory arthritis
- Renal disease
- Liver failure
- Malnourishment
- Lupus
- Ankylosing spondylitis
- Solid organ transplant

Lower Probability of Infection

Pain or joint stiffness only and **none** of the following:

- risk factors AND
- physical exam findings AND
- early implant loosening

Factors not considered a risk factor:

The following factors were found to not be risk factors for PJI in patients who have had a total joint replacement:

- Urinary tract infection
- Age
- Dementia
- Poor dental health

However, several days of wound drainage and hematoma (excessive blood inside the wound after surgery) might increase the chance of having a PJI.

Factors to help determine risk of infection

- Prior infection of the joint
- Superficial surgical site infection (hip and knee)
- Immunocompromising states in patients with a knee replacement (see above)
- Skin conditions
- Patients who are methicillin resistant *Staphylococcus aureus* (MRSA) carriers, or carriers of a specific type of bacteria in the nose
- Steroid injection prior to surgery (<3 months)
- Active infection in another location

Testing for PJI

There is strong evidence to support two blood tests for patients assessed for PJI: erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). However, there is only limited evidence that supports special imaging tests (such as CT or MRI) to help diagnose PJI.

There is also strong evidence against the use of intraoperative Gram stain (a special lab test) to rule out PJI.

Knee Aspiration

There is strong evidence to support taking fluid from the joint (joint aspiration) in patients with abnormal blood test (ESR and/or CRP) results. The fluid should be sent for the following tests: a culture (growing the

fluid in a flask), a white blood cell count of the fluid (leukocyte count), and a special percentage of white cells (polymorphonucleocyte percentage found in a cell differential). An abnormally high white blood cell count is suggestive of an infection.

Hip Aspiration

A selective approach should be taken to aspiration, or taking fluid from, the hip based on the patient's likelihood of having a PJI, and the results of the ESR **and** CRP. Repeat hip aspiration should only be performed when there is a discrepancy between the probability of PJI and the initial aspiration culture result. For example, if a patient has a high probability of developing a PJI and a negative culture result, then fluid should be taken from the hip again. If a patient has a low probability of PJI but has a positive culture result, then fluid should be taken from the hip again.

Antibiotics and Cultures

Patients should be off of antibiotics for a minimum of 2 weeks prior to taking fluid from a joint and sending it for culture.

Intra-Operative Procedures

There is strong evidence to support the use of frozen sections of joint tissues in patients who are undergoing surgery again for whom the diagnosis of PJI has either not been proven or ruled out. Frozen section is a special test where a doctor looks under the microscope at the tissue.

Insufficient information is available to determine the efficacy of frozen sections in patients with an underlying inflammatory arthropathy (a type of inflammation of the joints) such as rheumatoid arthritis.

There is also strong evidence that multiple cultures be obtained at the time of repeat surgery in patients being assessed for PJI.

Conclusion

There is no single test that can reliably diagnose an infection. Diagnosis usually depends on the combined use of many tests.