Basics Track - PSC 201: Test Results & Imaging

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PSC is an immune-mediated disease that leads to scarring and destruction of the bile ducts, primarily the large and medium-sized ones, progressing in most patients to cirrhosis and increasing the risk of liver cancer. Dr. Obi Aseem, a specialist in liver disease at Virginia Commonwealth University, shared key insights into the diagnosis, management, and ongoing research for this condition.

The Nature of PSC

PSC is a disease of the biliary system, the tree-shaped structure of ducts that drains bile from the liver into the small intestine. In PSC, these smooth, uniform bile ducts become scarred, developing a characteristic beaded pattern of strictured (narrowed) areas alternating with dilated segments. The primary pathological factor is this scarring, known as biliary fibrosis.

The exact cause of PSC remains unknown and is a subject of active research. Current understanding suggests a combination of genetic predisposition in the immune system and lifetime exposures (the "exposome"), such as potential infections. A key area of focus is the interaction between the gut and the liver, where the immune system may be primed in the gut before affecting the bile ducts.

PSC can be slowly progressive, with new data suggesting the time from diagnosis to end-stage liver disease or transplantation is often at least two decades. However, for some patients, the development of the first symptoms can lead to compounding effects, accelerating the time to the need for a liver transplant to between five to ten years.

Diagnosis and Testing

Approximately 50% of PSC patients are completely asymptomatic at diagnosis. When symptoms do occur, the most common are abdominal pain, fatigue, and itch (pruritus). Most frequently, PSC comes to attention due to persistently elevated liver tests identified during routine screenings, particularly alkaline phosphatase (ALP). ALP is synthesized by cells around the bile ducts, and its elevation suggests injury or obstruction. Other liver tests, such as ALT and AST, are generally not highly elevated in PSC unless there is a severe obstruction or infection.

Bilirubin is another important marker, usually increasing when there is a significant obstruction—like a stricture or stone—or in cases of very advanced liver disease where the liver's function is compromised.

Albumin and the INR (International Normalized Ratio) measure the synthetic function of the liver and typically only become abnormal in very end-stage liver disease.

The diagnosis of PSC is one of exclusion. It requires a complete clinical history, physical exam, and exclusion of other conditions that can mimic PSC, such as certain infections, autoimmune conditions, or drug toxicities.

The diagnostic method of choice is the specialized MRI study called MRCP (Magnetic Resonance Cholangiopancreatography). It is a non-invasive, radiation-free study used to visualize the bile ducts. Endoscopic Retrograde Cholangiography (ERCP) is *not* used for diagnosis anymore but is reserved for interventions.

To assess the extent of scarring, or fibrosis, non-invasive methods like FibroScan or MR Elastography, which measure liver stiffness, are used. A stiffer liver indicates more fibrosis.

Management and Complications

Management of PSC is complex and focuses on surveillance and intervention for complications.

Interventional Procedures and Strictures

ERCP is indicated when a dominant or relevant stricture is causing complications such as rising bilirubin, jaundice, infection (cholangitis), or severe itch. During an ERCP, a stricture may be dilated, and a stent may be placed. ERCP is also used to rule out cancer (cholangiocarcinoma) by taking brushings and biopsies of any strictures for testing. The risk of complications with ERCP, such as pancreatitis, is significant, which is why it's not a diagnostic tool.

Infection and Cancer Surveillance

Acute cholangitis (infection of the bile ducts) requires antibiotics, and recurrent episodes can be difficult to manage, sometimes requiring liver transplant.

Patients with PSC have a high risk of several cancers, mandating strict surveillance protocols.

- Cholangiocarcinoma and gallbladder cancer: Yearly MRCPs are recommended to look for strictures.

- Colon cancer: This is a significant risk, especially for the 70-80% of PSC patients who also have Inflammatory Bowel Disease (IBD). Patients with PSC and IBD should have a colonoscopy with random biopsies every one to two years starting at age 50. Patients with PSC alone should undergo a colonoscopy every five years.

General Management

PSC patients are at risk for deficiencies in fat-soluble vitamins (A, D, E, K) and mineral deficiencies, often requiring a multivitamin. Bone health must also be assessed at diagnosis and routinely thereafter.

Ursodiol is occasionally prescribed, though there's no solid evidence that it improves survival or transplant-free survival. It's used on an individualized basis, sometimes to see if it improves liver test numbers.

Advanced Disease

The MELD (Model for End-Stage Liver Disease) score is a calculated formula used to prioritize liver transplant candidates. A higher MELD score indicates a worse disease state and higher priority on the transplant list. Ultimately, liver transplant remains the treatment for those with advanced disease or refractory symptoms.

Questions from the Community

Frequency of Imaging and Testing: For patients in the earlier stages who are doing well, the general best practice is:

- MRCP (or MRI) every year.
- Colonoscopy (if IBD is present) every one to two years, or every five years if no IBD.
- Routine blood tests (liver tests) can be yearly if completely normal and stable, but may be more frequent (e.g., every six months) if there are abnormalities that need close monitoring.

Role of the CT Scan in Cholangitis Attacks: When a patient presents to the emergency room with a suspected cholangitis attack (infection of the bile ducts), a CT scan is typically done to rule out something else. The CT scan is not as good as the MRCP for visualizing the bile ducts in detail. If a patient has multiple recurrent cholangitis attacks, prophylactic antibiotics are often the preferred long-term strategy, especially if there are no strictures to intervene upon.

ERCP for Strictures: When is it necessary? ERCP is not performed just because a stricture is visible on the MRCP; it's reserved for interventions. The decision to perform an ERCP is based on clinical judgment. You might need an ERCP if:

- A stricture is high-grade (severe) on the initial MRI, requiring immediate assessment and potentially specimen collection to rule out malignancy.
- A stricture is getting worse over time, increasing in grade and causing more tightening of the bile duct's lumen.
- The stricture is causing symptoms (like worsening itch) or lab abnormalities.

False Positive PSC Diagnoses: The prevalence of false-positive diagnoses for PSC is currently unknown, and the data is not good. It is an ongoing concern because PSC is a diagnosis of exclusion, and other rare conditions—like sarcoidosis—can closely mimic PSC. It is difficult to distinguish these conditions without a liver biopsy, and even then, sampling can be poor.

A Note on Research

There is significant interest and resource investment in PSC research. Multiple clinical trials have recently been completed with promising results, leading to the hopeful expectation that a new treatment—though not a cure—will be available within the next five years to improve quality of life and potentially prolong the time to liver transplant for some patients.