Clinical Policy: Ferriscan R2-MRI

Reference Number: LA.CP.MP.53 Coding Implications
Date of Last Revision: 2/22 Revision Log

See Important Reminder at the end of this policy for important regulatory and legal information.

Description
FerriScan® R2-MRI is a magnetic resonance imaging (MRI)-based solution for measuring liver iron concentration (LIC) in patients with iron overload.

Policy/Criteria
I. It is the policy of Louisiana Healthcare Connections that the FerriScan® R2-MRI is **medically necessary** for the measurement of liver iron concentration in suspected cases of iron overload due to the following conditions:
- **A.** Hereditary hemochromatosis;
- **B.** Iron-loading anemias with or without multiple transfusions:
  1. Thalassemia major or thalassemia intermedia;
  2. Sideroblastic anemia;
  3. Chronic hemolytic anemias (e.g., sickle cell disease);
  4. Inherited or acquired aplastic anemia;
  5. Myelodysplastic syndromes;
- **C.** Dietary iron overload;
- **D.** Iron overload in liver diseases:
  1. Hepatitis C or B;
  2. Alcohol-induced liver disease;
  3. Porphyria cutanea tarda;
  4. Fatty liver disease;
  5. Gestational alloimmune liver disease
- **E.** Neonatal iron overload;
- **F.** Aceruloplasminemia;
- **G.** Repeated hemin infusions for acute porphyrias.
- **H.** Hemodialysis for end stage renal failure.

Background
Iron overload is a potentially life-threatening problem that is commonly overlooked due to nonspecific symptoms that tend to develop slowly over time. Excess iron does not only affect the liver, but can also accumulate in, and damage other organs like the heart, skin and endocrine organs, as well as joints. Clinical issues resulting from excess iron include tissue damage, inflammation, and fibrosis. Left untreated, iron overload can result in organ toxicity, end-organ damage and dysfunction due to oxidative stress resulting in excess oxygen radicals and injury from tissue peroxidation. Once identified, iron overload is treated with phlebotomy and chelation therapy as well as exchange transfusion in sickle cell disease.[4,5]

Disorders associated with hepatic iron deposition include:[4,5]
- Hereditary hemochromatosis;
- Syndromes of ineffective erythropoiesis such as beta thalassemia, sideroblastic anemia and other inherited anemias;

- Chronic liver disease;
- Alcoholic liver disease;
- Hepatitis;
- Nonalcoholic fatty liver disease;
- Cirrhosis;
- Wilson disease;
- Porphyria cutanea tarda;
- Hematopoietic stem cell transplantation,
- Myelodysplastic syndrome,
- Dialysis;
- Blood transfusions for sickle cell disease.

FerriScan® is a non-invasive technology based on MRI. It has a high sensitivity and specificity for the measurement of liver iron concentration (LIC) over the entire range encountered in clinical practice. It can be set up on most 1.5 Tesla MRI scanners (the most common type of clinical scanner). FerriScan works by making a map of the liver iron concentration and calculates the mean LIC. The results are unaffected by the presence of fibrosis or cirrhosis. Image data is acquired on an MRI scanner and is electronically transmitted to a data analysis center. All data is analyzed to ensure correct acquisition and the LIC results are transmitted back to the originating MRI center.

Measurements have been shown to have a high degree of sensitivity and specificity for liver iron concentration measured by biopsy. FerriScan images give information on liver iron distribution. The mean LIC value given in the FerriScan report is then used to guide chelation therapy.

The operational principle of the R2-MRI Analysis System is based on fitting signal decay curves to the image signal intensities (e.g. of the liver) at the different echo times for the MR data set on a voxel-by-voxel (3-D pixel) basis to determine transverse relaxation rate (R2) images. These may be further transformed by a defined calibration to provide a quantitative measure of liver iron concentrations.

Although magnetic resonance evaluation for hepatic iron concentration is improved compared with older programs, this type of imaging will not detect cellular liver damage due to iron overload.

The American College of Radiology's 2020 Practice Parameter for the performance of MRI of the liver states that indications for MRI of the liver include, but are not limited to, evaluation and noninvasive quantification of iron, fat, and fibrosis in chronic liver disease, such as hemochromatosis, hemosiderosis, nonalcoholic steatohepatitis, (NASH) and hepatitis in adults and pediatric patients. Additionally, multiple studies have confirmed the clinical utility of R2 MRI in the measurement of LIC for iron-overloading conditions such as thalassemia[8] and sickle cell anemia.[9] A study of R2 MRI results vs. simulated liver biopsy results found R2 MRI to be superior to liver biopsy for serial LIC observations.[10] Furthermore, a review of the current state of liver iron quantification by MRI states that R2 MRI provides validated measurement of LIC, and has advantages over liver biopsy, in that it is non-invasive.[11]

The R2-MRI Analysis System (Inner Vision Biometrics PTY LTD) received FDA 510(k) clearance (K043271) on January 21, 2005. In January 2013, the FDA authorized the FerriScan R2-MRI to be marketed as an imaging companion diagnostic device for the safe and effective use of Exjade in patients with non-transfusion-dependent thalassemia.

Coding Implications

This clinical policy references Current Procedural Terminology (CPT®). CPT® is a registered trademark of the American Medical Association. All CPT codes and descriptions are copyrighted 2019, American Medical Association. All rights reserved. CPT codes and CPT descriptions are from the current manuals and those included herein are not intended to be all-inclusive and are included for informational purposes only. Codes referenced in this clinical policy are for informational purposes only and may not support medical necessity. Inclusion or exclusion of any codes does not guarantee coverage. Providers should reference the most up-to-date sources of professional coding guidance prior to the submission of claims for reimbursement of covered services.

CPT® Codes	Description
76498	Unlisted MRI procedure

ICD-10-CM Diagnosis Codes that Support Coverage Criteria

ICD-10-CM Code	Description
B16.0-B1.9	Acute hepatitis B
B17.10-B17.11	Acute hepatitis C
B18.0	Chronic viral hepatitis B, with delta -agent
B18.1	Chronic viral hepatitis B without delta-agent
B18.2	Chronic viral hepatitis C
B19.10-B19.11	Unspecified viral hepatitis B
B19.20-B19.21	Unspecified viral hepatitis C
D46.0	Refractory anemia without ring sideroblasts, so stated
D46.1	Refractory anemia with ring sideroblasts
D46.20-D46.22	Refractory anemia with excess of blasts
D56.1	Beta thalasemia
D61.01- D61.9	Other aplastic anemias and other bone marrow failure syndromes
D64.0	Hereditary sideroblastic anemia
D64.1	Secondary sideroblastic anemia due to disease
D64.2	Secondary sideroblastic anemia due to drugs and toxins
D64.3	Other sideroblastic anemia
D64.4	Congenital dyserythropoietic anemia
E80.1	Porphyria cutanea tarda
E83.10	Disorders of iron metabolism, unspecified
E83.110	Hereditary hemochromatosis
E83.111	Hemochromatosis due to repeated red blood cell transfusions
E83.118	Other hemochromatosis
K70.0-K70.9	Alcoholic liver disease

ICD-10-CM Code	Description
K76.0	Fatty (change of) liver, not elsewhere classified

Reviews, Revisions, and Approvals	Revision Date	Approval Date
Converted corporate to local policy.	08/15/2020	
References reviewed and updated. Replaced "member" with "member/enrollee" in all instances. Annual review. Added "Hemodialysis for end stage renal failure" as an indication. References reviewed and updated. Changed "review date" in the header to "date of last revision" and "date" in the revision log header to "revision date." Updated background with no clinical significance. Added "and may not support medical necessity" in coding implications. Reviewed by specialist.	2/22	2/22

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Important Reminder

This clinical policy has been developed by appropriately experienced and licensed health care professionals based on a review and consideration of currently available generally accepted standards of medical practice; peer-reviewed medical literature; government agency/program approval status; evidence-based guidelines and positions of leading national health professional organizations; views of physicians practicing in relevant clinical areas affected by this clinical policy; and other available clinical information. LHCC makes no representations and accepts no liability with respect to the content of any external information used or relied upon in developing this clinical policy. This clinical policy is consistent with standards of medical practice current at the time that this clinical policy was approved.

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