Abdominal MRI for 15 Year Old Adolescent Male with Sickle Cell Disease who has Received Multiple Prior Transfusions

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Clinical Presentation

15 year old male with a history of HbSS with a past medical history of stroke in 2020 and asthma. He received chronic transfusions and has had poor adherence to his oral chelation therapy. He currently receives Deferoxamine infusions 2x per week. Most recent Ferritin measured 4,119 from 1 month prior. Following images are from a MRI of abdomen without intravenous contrast with a gradient echo sequence.

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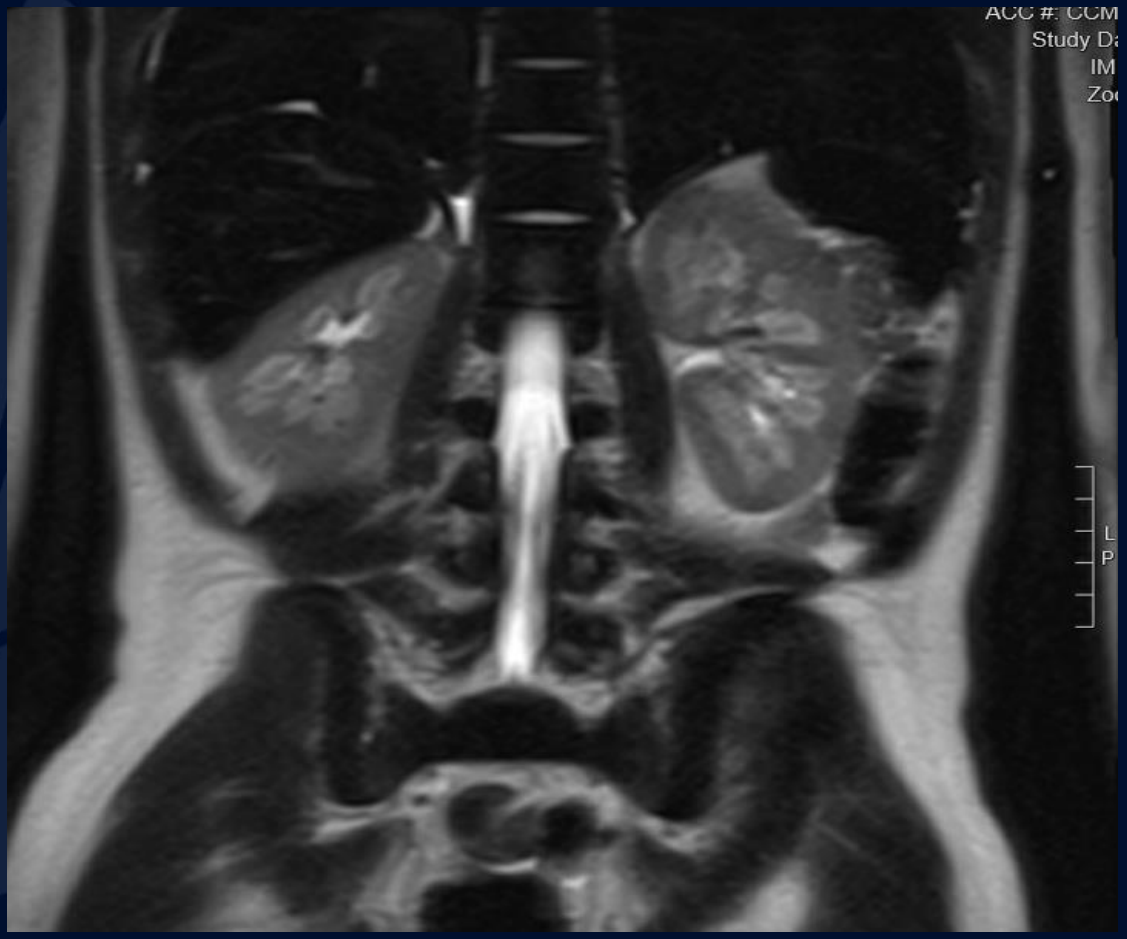
Coronal T2 HASTE of Abdomen



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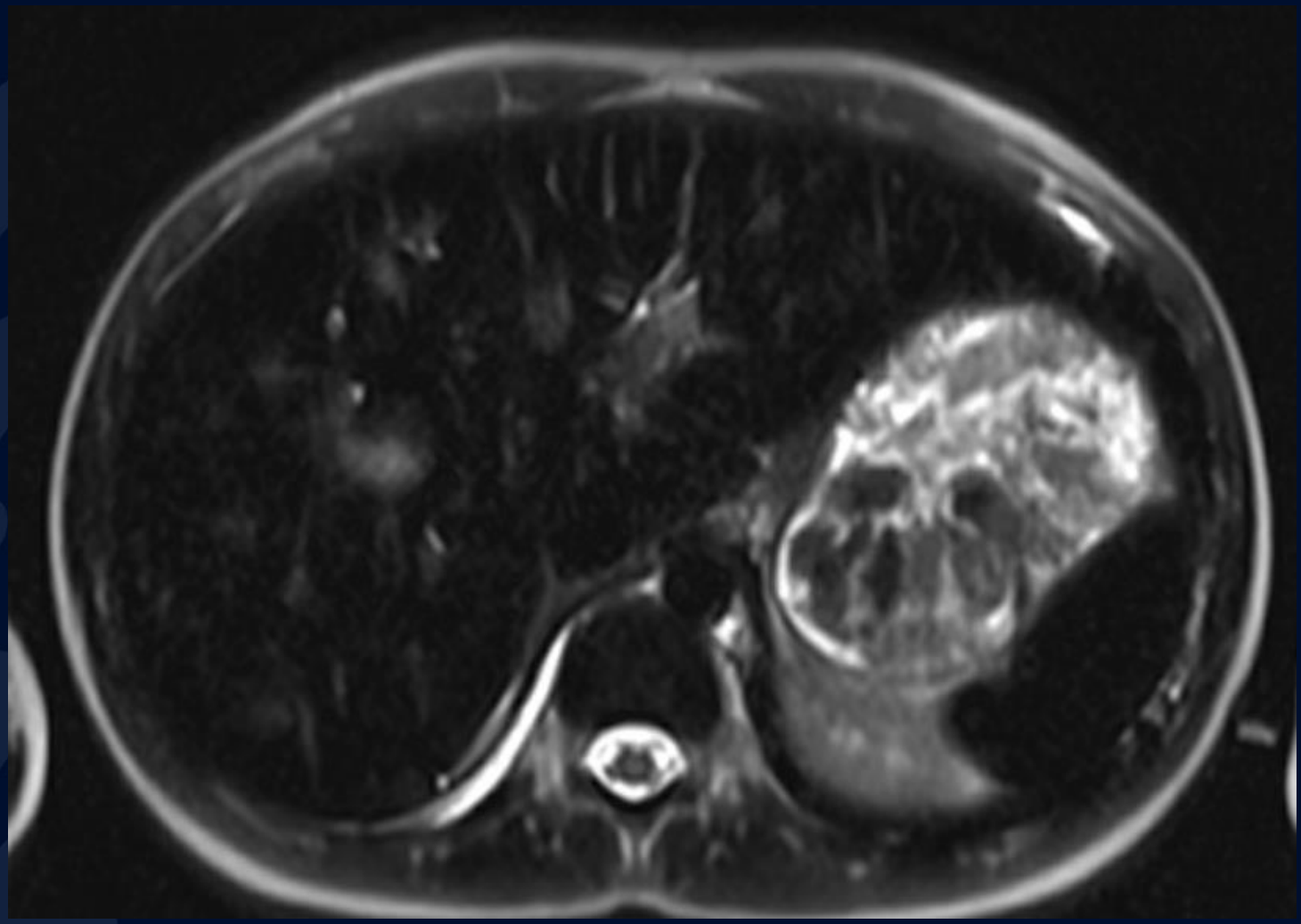
T2 HASTE of the Abdomen



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Diagnosis?

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Hemosiderosis / Iron Overload Secondary to Multiple Transfusions

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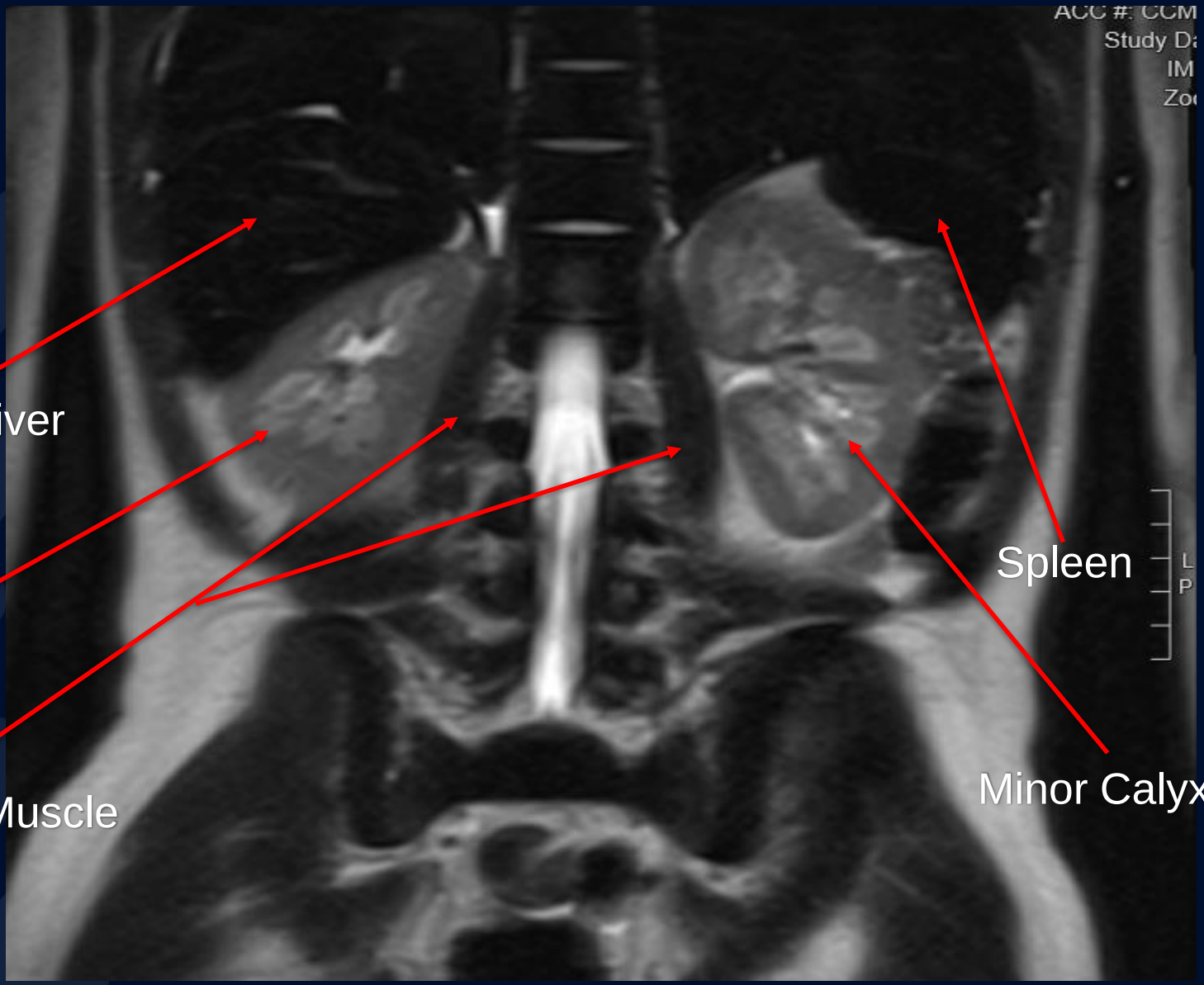

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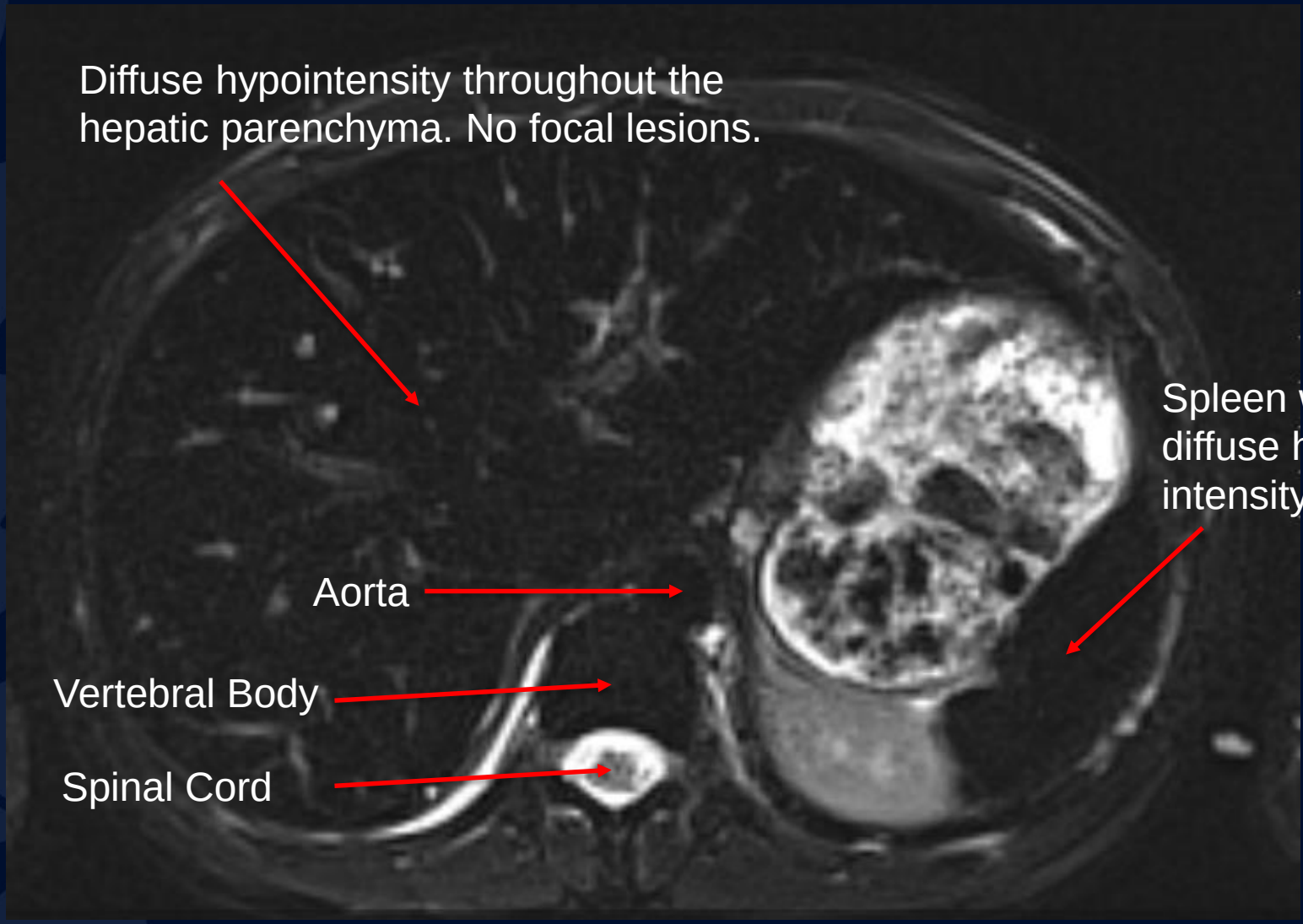

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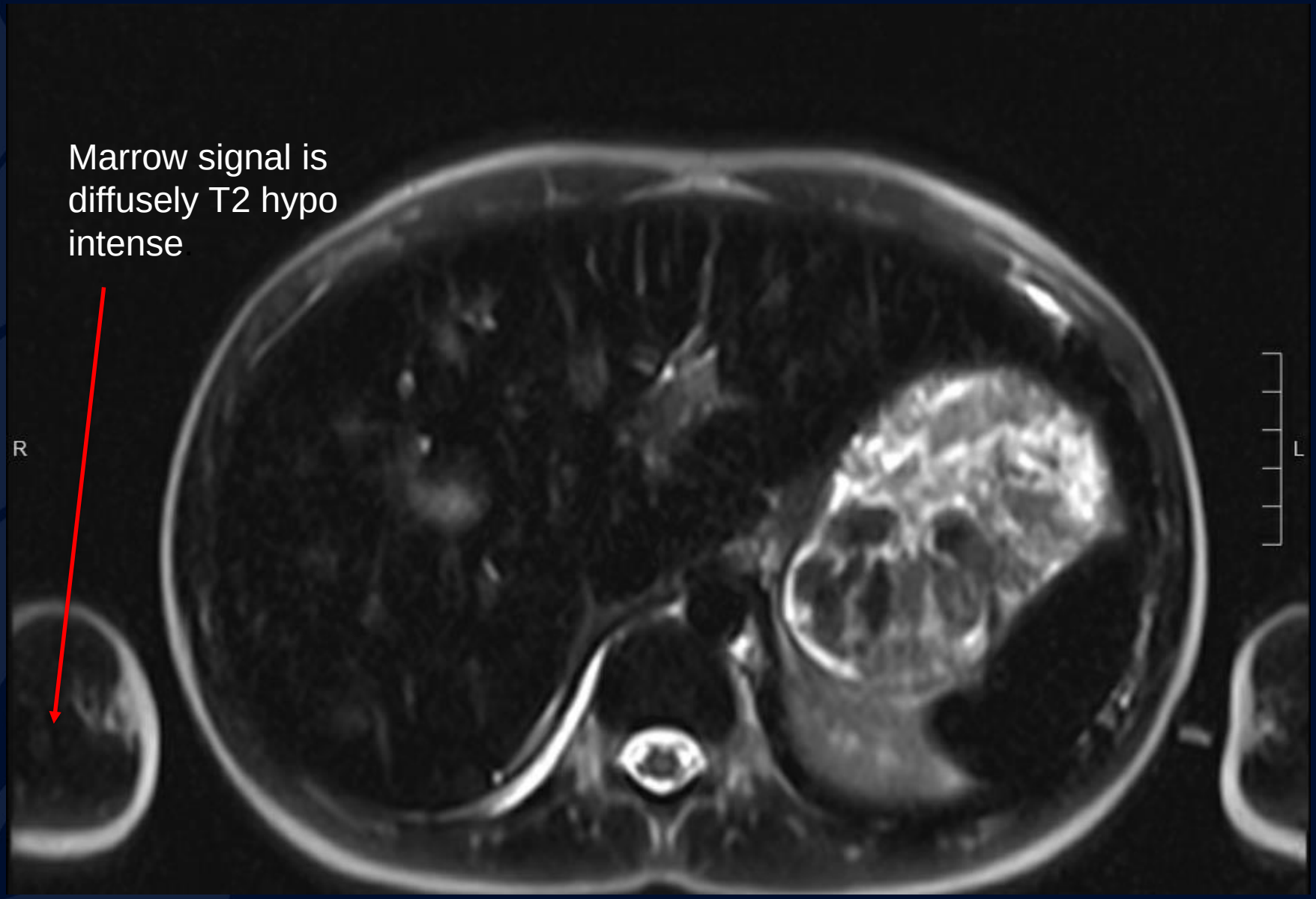

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Iron Overload

- Causes may be Primary (Hereditary Hemochromatosis) or Secondary (transfusion iron overload)
- Magnetic resonance (MR) is highly sensitive and specific imaging modality for the diagnosis of iron overload.
  - Accumulation of Iron leads to signal loss in affected tissues, which are most noticeable with the **T2* weighted sequences.**
  - Signal loss is proportional to iron deposition in organs.
- **Gradient-echo (GRE) sequences with T2* weighing** is a specific method that is utilized to detect and quantify iron overload.

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Iron Overload

- Deposition patterns vary between different causes of hemochromatosis.
- Iron overload secondary to transfusions occurs ***within the reticuloendothelial system*** (liver, spleen and bone marrow).
  - Estimated Hepatic Iron Concentration for pt. was estimated to be **18.2 me Fe/g** dry liver, which is severe. **3.2 mg Fe/gram dry liver** is optimal for patients recieving transfusions.
- Parenchymal deposition patterns occurs secondary to increased iron absorption, most notable within liver, and pancreas.
  - Associated with increased amounts of tissue damage compared to secondary causes.

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Iron Overload

- Chelation is the primary modality of treatment for iron overload.
- Goal of treatment is to prevent organ failure secondary to free radical buildup within organs.
- With intensive chelation therapy, liver iron concentrations can be reduced by as much as 50% in 1.5 months. Iron concentrations from other organs (heart) can take much longer.
- Most limiting factor for chelation therapy is patient adherence. Chelation infusion is an option for these patients.

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References

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