Anderson-Fabry Disease: An AHP Guide

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1. Introduction

Anderson-Fabry disease (AFD) is a rare X-linked lysosomal storage disorder caused by deficiency of the enzyme α-galactosidase A. This leads to systemic accumulation of globotriaosylceramide (Gb3), especially in vascular endothelium, myocardium, and renal tissue, leading to ischaemia and infarction. Cardiac involvement is a major cause of morbidity and mortality.

Fabry cardiomyopathy can mimic hypertrophic cardiomyopathy (HCM), but with distinct imaging signatures. The hallmark findings are symmetric LV hypertrophy, preserved or mildly reduced function, low native T1 values (due to lipid accumulation), and late gadolinium enhancement (LGE) typically in the basal inferolateral wall.

CMR is critical in both diagnosis and disease monitoring, offering non-invasive tissue characterisation that helps differentiate AFD from other causes of LV hypertrophy such as HCM, amyloidosis, or hypertensive heart disease.

2. CMR Protocol

	Sequence/Technique	Notes
1	Anatomy (Localisers)	Scout images to plan standard cardiac views
2	LV & RV function – cine SSFP	Long & short axis to assess morphology, function, wall thickness
3	Native T1 mapping	Identify lipid accumulation; native T1 is reduced in early/mid-stage AFD
4	LGE Imaging	Identify typical inferolateral mid-wall scar; rule out other cardiomyopathies
5	Post contrast T1 mapping (ECV)	Assess myocardial fibrosis and ECV expansion

3. Reporting Checklist

- LV: EDV, ESV, SV, EF (indexed to BSA)
- RV: EDV, ESV, SV, EF (indexed to BSA)
- LV Wall Thickness – Concentric LV hypertrophy – relatively late disease manifestation (3rd decade men, 4th decade women). Patterns of hypertrophy can mimic that of those in HCM
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- T1 Mapping (Native) – Low values (<940 ms at 1.5T) in early disease; may normalize or increase in late disease with fibrosis
- LGE – Typically mid-wall or subepicardial enhancement in the inferolateral wall of mid to basal LV. Associated with LVH
- ECV (if available) – May be decreased

4. Key Diagnostic Criteria

- LV Hypertrophy – Typically symmetric, without LV outflow obstruction
- Reduced Native T1 Values – Reflect lipid storage; key distinguishing feature from other LVH causes
- Characteristic LGE Pattern – Mid-myocardial, inferolateral basal wall (non-coronary distribution). Present in 50% cases. Pseudonormalisation of native T1 normal/ increase possible if effects of replacement fibrosis exceed the fatty-related T1 decrease.
- ECV Changes – typically decreased
- Sex-Dependent Expression – Males typically show earlier and more severe involvement; females may present with milder or isolated cardiac signs

5. Tips & Tricks for Allied Health Professionals

- Use high-resolution cine imaging to assess subtle hypertrophy and papillary muscle involvement.
- Pre-contrast T1 mapping is critical – plan basal, mid, and apical short-axis slices for full coverage.
- Native T1 values for Fabry – these are typically low early on, unlike in HCM or amyloidosis.
- Ensure accurate LGE nulling – fibrotic areas may enhance subtly; basal inferolateral wall must be well visualized.
- Remember: absence of LGE does not exclude Fabry – especially in earlier stages.
- AFD typically underdiagnosed – prevalent in dialysis patients, late-onset “HCM”

Reference

Herzog, B. A., Greenwood, J. P., Plein, S., Garg, P., Haaf, P., & Onciul, S. (2017). Cardiovascular magnetic resonance pocket guide. Eur Soc Cardiol.