INFORMATION for Cardiologists

Cardiac disease is found in the majority of MPS II patients and manifests in a number of different ways, so it is useful to monitor the heart regularly in these patients using a broad range of techniques, in order to manage the symptoms and prepare for complications.

This leaflet outlines:

- **the cardiac symptoms and complications of MPS II**
- **current opinion from the literature on how heart disease should be followed-up in MPS II patients**

This leaflet is a summary of the published information as of February 2018, is not exhaustive and does not constitute any recommendations. It is the responsibility of the cardiologist and the multidisciplinary team to determine the optimal follow-up for the individual patient.

Visit **Huntersyndrome.info** to learn more

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MPS II

Hunter syndrome (MPS II) is a rare genetic disorder that predominantly affects males, and is caused by a mutation that stops the lysosomal enzyme iduronate-2-sulfatase (I2S) from being produced. I2S normally breaks down molecules called glycosaminoglycans (GAGs); without I2S, GAGs accumulate, causing progressive, multisystemic disease, leading to early mortality.[1] The progressive accumulation of GAGs eventually disrupts multiple organ systems, so early multidisciplinary management is vital. Early symptoms include frequent otitis media, abdominal hernia, nasal obstructions, and enlarged tonsils/adenoids and tongue, and lead to repeated surgeries.[2]

Cardiac symptoms in MPS II arise due to GAG depositions in the heart, such as in the valves (in decreasing frequency: mitral, aortic, tricuspid, and pulmonary).[3] GAG depositions can contribute to pulmonary dysfunction, myocardial enlargement and valvular dysfunction in MPS II patients.[4] Cardiovascular involvement of some form affects 82% of MPS II patients, with valve disease and heart murmur being the most common symptoms, arising at an average age of 6 years old.[5] Other less frequent cardiac symptoms of MPS II include cardiomyopathy, tachycardia, hypertension, arrhythmia and congestive heart failure.[5]

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Clinical consequences

The decision to perform surgical valve repair or replacement may be delayed in MPS II patients because of the apparent absence of clinical effects due to cardiac involvement, and the high perioperative risks associated with general anaesthesia (including intubation difficulties and postprocedural airway oedema).[3,6] However, although respiratory/airway involvement is the primary cause of death in MPS II, the contributions from cardiac disease should not be underestimated; around 14% of deaths in MPS II are due to cardiac involvement, compared to 39% due to respiratory/airway involvement.[7]

Additionally, for 83% of MPS II patients, there is involvement from 4–5 organ systems at the time of death (including cardiovascular, pulmonary, airways, gastrointestinal and neurological systems) and it is likely that all organ pathologies contribute to premature mortality.[8] Therefore, cardiac monitoring and surgery are essential components of the multidisciplinary management of these patients.

The following summary describes the current opinion in the literature (as of February 2018), however, it is the responsibility of the cardiologist and the multidisciplinary team to determine the optimal follow-up plan for the individual patient.

Diagnosis and follow-up

The cardiologist should determine the best option for the individual patient, however, the current published opinion is that regular echocardiography, 12-lead electrocardiography and Holter monitoring (if indicated) are useful tools to monitor cardiac involvement in MPS II patients, and are typically performed every 1–3 years.[2,3] To detect right or left ventricular hypertrophy, chest X-rays are used, and cardiac MRI or CT scans may also add information, or else be able to detect valve failure. The literature also advises that a full cardiac assessment is essential particularly before any surgeries are performed on MPS II patients (cardiac or non-cardiac).[2]

INFORMATION for Cardiologists

Summary

Cardiac symptoms in MPS II arise due to GAG depositions in various parts of the heart, contributing to valvular dysfunction; 82% of MPS II patients suffer from cardiovascular involvement of some form, and 14% of deaths in MPS II are due to cardiac involvement.[4,5,7]

Cardiac monitoring and surgery are essential components of the multidisciplinary management of these patients, despite the associated risks in surgery. Cardiac monitoring of MPS II patients includes echocardiography, 12-lead electrocardiography and Holter monitoring if indicated, every 1–3 years.[2,3] Crucially, a full cardiac assessment should be conducted on MPS II patients before any surgeries are performed (cardiac or non-cardiac).[2]

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