Diagnosis of mucopolysaccharidoses in the UK

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Introduction

The mucopolysaccharidoses (MPSs) are a group of rare, life-limiting lysosomal storage diseases.

Prompt diagnosis is essential for early access to appropriate care and where disease modifying treatment is available, to prevent irreversible tissue and organ damage.[1,2]

In the UK, MPSs are not included in newborn screening panels and due to the rarity of these conditions, diagnosis can take a number of years from the point where parents first raise their concerns to a healthcare provider.[2]

Aim

We conducted a study to determine the age at diagnosis for MPS in the UK.

Methods

The MPS Society UK has systematically collected data on its members since 1987 and holds a database containing records on over 900 MPS patients.

- This database was searched in August 2020 for all records of patients with an MPS disease
- Patients with missing data were identified (no date of birth or no date of diagnosis)
- MPS Society archives were searched and patients or family contacted to fill data gaps

Patient numbers

Date of birth and date of diagnosis was available for 760 MPS patients in total (Table 1).

Table 1. Number of patients by type of MPS

Type of MPS	Number of patients
MPS I	201
MPS II	155
MPS III	272
MPS IV	90
MPS VI	41
MPS VII	1

References

1. Kubaski F, de Oliveira Poswar F, Michelin-Tirelli K, Burin MG, Rojas-Malaga D, Brusius-Facchin AC, et al. Diagnosis of Mucopolysaccharidoses. Diagnostics. 2020; 10 (3): 172
2. Department of Health and Social Care. UK Rare Diseases Framework. [Internet]. London: UK Government; 2021 January 09 [cited 2021 January 28]. Available from: https://www.gov.uk/government/publications/uk-rare-diseases-framework

Results

Age at diagnosis

The earliest date of diagnosis recorded was in 1966. The age at diagnosis ranged from pre-natal to 52 years. Variability was seen between the different types of MPS (Figure 1):

- Overall, those with MPS I were diagnosed earlier than patients with other types of MPS
- Median age at diagnosis for MPS II and MPS IVA was similar and at an earlier age than MPS VI
- MPS III patients were generally older at diagnosis than those with other types of MPS
- The MPS VII patient was diagnosed early due to the presence of hydrops fetalis

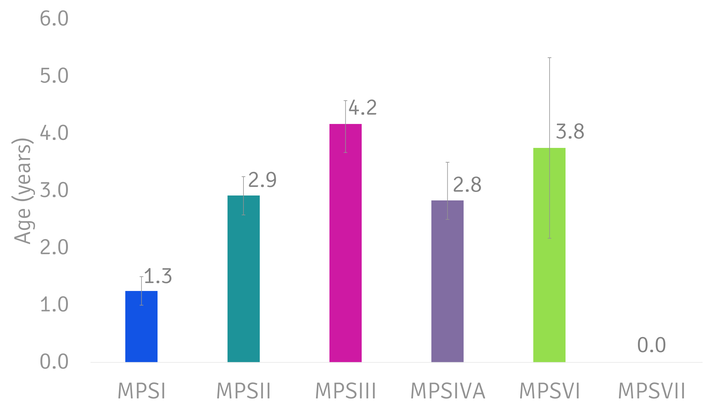


Figure 1. Median age at diagnosis (95% CI) in years

Variability within each type of MPS was also seen (Figure 2). In particular, those with an attenuated phenotype may not be diagnosed until adulthood (Figure 3).

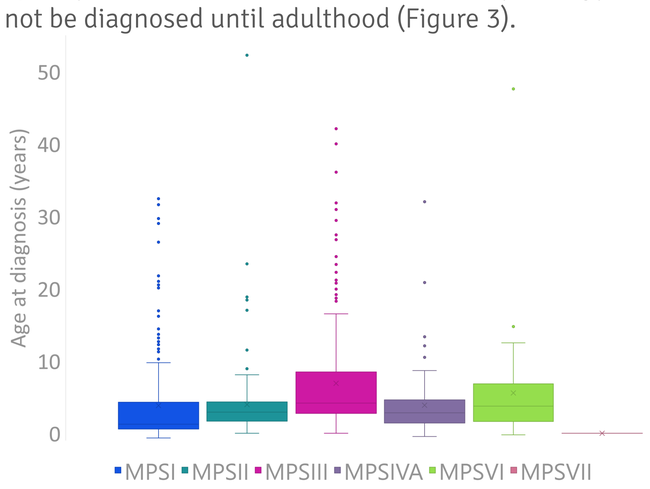


Figure 2. Age at diagnosis by type of MPS

For MPS I, where phenotype was recorded in the database, those with more severe disease (Hurler) were generally diagnosed at an earlier age than those with the less severe Hurler Scheie and Scheie phenotypes (Figure 3).

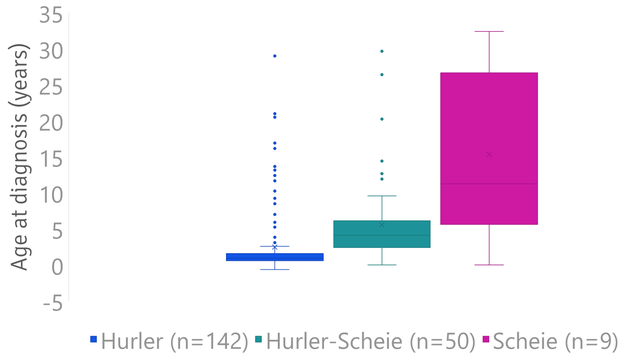


Figure 3. Age at diagnosis versus severity in MPS I

Diagnosis in the last 30 years

The MPS Society held records for 623 patients who had been diagnosed since 1990. Over this period there was a slight trend towards diagnosis at an earlier age (Figure 4).

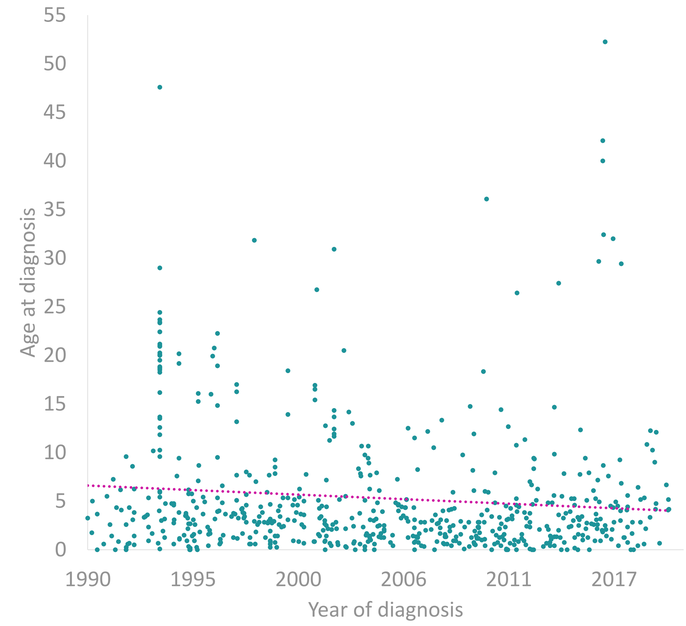
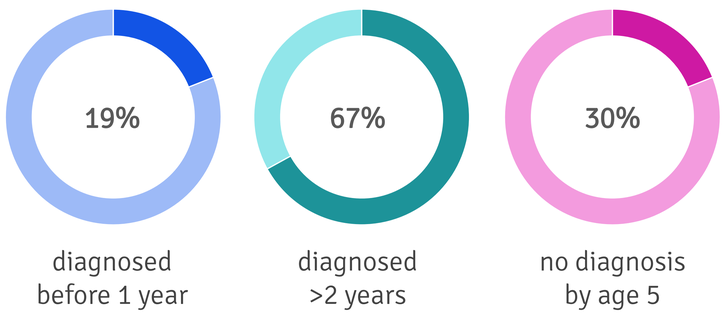


Figure 4. Age at diagnosis by date of diagnosis for all MPS

Since 1990, less than one fifth of patients were diagnosed before the age of one year and almost a third had no diagnosis by the age of 5 years.



Conclusions

There has been very little change in the age at diagnosis of MPS over the last 30 years. This illustrates the difficulty healthcare providers have in recognising the early signs of these rare diseases. With the continued development of disease modifying treatments that have the potential to address the devastating effects of MPS if treatment is started early enough, there is a continued need to identify these patients at an earlier age.