

# An audit on the use of MRI in the monitoring and management of patients with Multiple Sclerosis

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## Introduction

MRI is used routinely in clinical practice to establish the diagnosis and disease burden and inform prognosis of MS patients. It is used to monitor response to disease modifying treatment (DMT), measure disease activity and in pharmacovigilance for DMTs like natalizumab. MAGNIMS and the consortium of MS centres have produced guidelines on the MRI protocols for monitoring in MS in different clinical contexts in 2015 and 2018 respectively.

## Aim and Methods

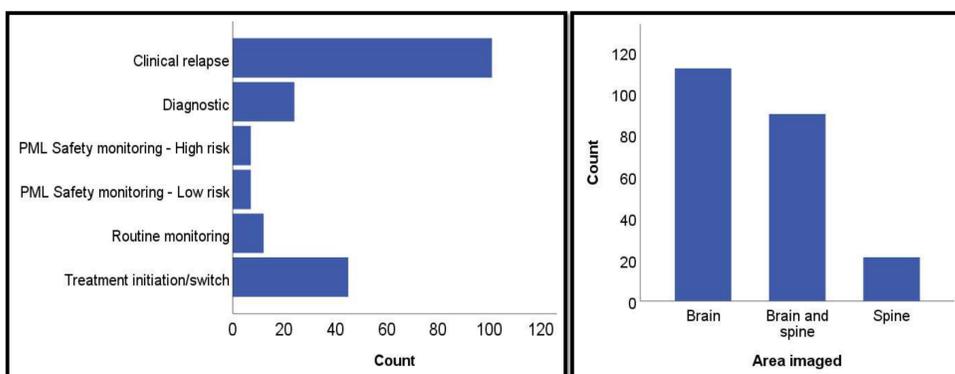
This retrospective audit aims to identify the current use of MRI in the monitoring and management of patients with MS and how this compares to available guidelines.

Consecutive MS cases seen in clinics run by MS doctors and MS nurses from 1st September 2019 in Leeds Teaching Hospitals NHS Trust, a tertiary neuroscience centre, were collected. This limited the impact of COVID on scanning schedules. Patients attending Relapse, Transitioning, Rehabilitation, and continence clinics were included. Dates of the three most recent three MRI scans for each patient were recorded. Information on scan indication, use of contrast and area imaged was collected for the most recent scan. Ambulation status was recorded as with or without aids. Research patients and those without a diagnosis of MS were excluded.

The audit results at Leeds were compared to the national audit that took place at the same time and was carried out following the same protocol as the local audit at Leeds.

## Results

- ❖ 270 cases were collected with a female : male ratio of 211 : 59.
- ❖ Average age was 49 years (S.D 12.5)
- ❖ Average time with an MS diagnosis was 12 years (S.D 8.7)

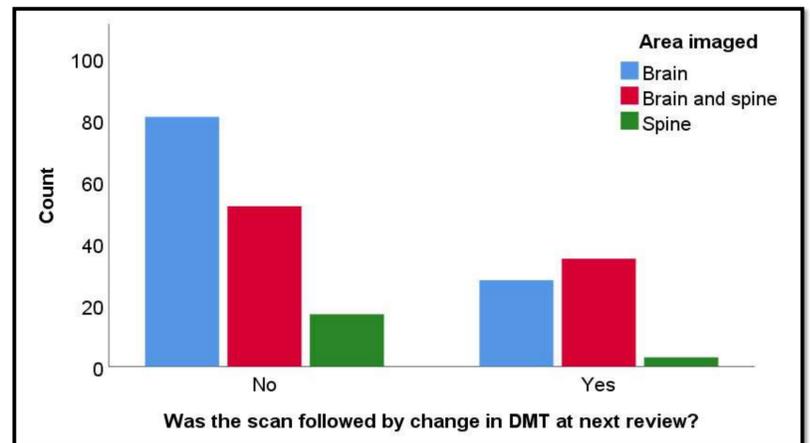


**Figure 1.** Primary indication for the most recent MRI scan and the frequency of scans split by the area of the central nervous system that was imaged

Audit criteria	Compliance
Ambulant people with RRMS should have MRI monitoring every 12 - 36 months	43% (87 / 201) of ambulant RRMS patients had an MRI scan within 3 years of their last scan
Spinal imaging during follow-up should be performed only if there are new symptoms applicable to the spinal cord	45% (90 / 202) of scans included spinal sequences in addition to the brain
High risk and low risk PML should have MRI monitoring every 6 and 12 months respectively	50% (7 / 14) cases who had a scan for PML surveillance had a scan interval of more than 12 months between the two most recent scan
Contrast administration should be limited in routine monitoring and used only in select cases	50% (107 / 215) of cases had gadolinium administered for their most recent scan

**Table 1.** Audit criteria based on MAGNIMS and consortium of MS centres and the local compliance demonstrated based on the audit sample at Leeds

## Results



**Figure 2.** Change in DMT during the next clinic review after the most recent scan, based on the area imaged

Scan Indication	Percentage scans given gadolinium	Number of cases
Clinical relapse	55.6%	99
Deterioration of condition	0.0%	0
Diagnostic	30.4%	23
PML Safety monitoring	76.9%	13
Rebaseline	0.0%	0
Routine monitoring	66.7%	12
Treatment initiation/switch	55.6%	45

**Table 2.** Percentage of scans that had contrast administered based on the scan indication

Scan indication	Cases (%) with new T2 lesions	Total cases	Cases (%) with Gad +ve lesions	Total cases given Gad
Clinical relapse	67%	78	17.6%	51
Deterioration of condition	0%	0	0.0%	0
Diagnostic	86%	7	28.6%	7
PML Safety monitoring	31%	13	0.0%	10
Rebaseline	0%	0	0.0%	0
Routine monitoring	40%	10	0.0%	8
Treatment initiation/switch	59%	39	16.7%	24

**Table 3.** Number of scans that had new T2/enhancing lesions based on scan indication

The average interval between MRI scans for RRMS patients at Leeds was 32 months (SD. 32.8). The majority of these scans were performed when clinical relapse was suspected. In this audit sample there were no scans that had gadolinium enhancement that didn't also have new T2 lesions, suggesting a redundancy in the use of gadolinium as the sole marker of radiological disease activity. Addition of spine to brain imaging did not significantly affect the subsequent decision of DMT change at the clinical review following the scan.

## Recommendations to be implemented

- ❖ Spinal imaging should not be included in addition to brain imaging when scanning people with an established diagnosis of MS for routine monitoring purposes. Inclusion of spinal imaging didn't show any additional effect on DMT change at subsequent clinic review.
- ❖ Contrast enhancement sequences should only be used in select clinical circumstances (e.g., for diagnostic purposes and when linked to DMT eligibility criteria) and not routinely when scanning people with MS for monitoring purposes.
- ❖ Imaging for routine monitoring in people with progressive MS is less frequently associated with a subsequent DMT change, due to the limited treatment options in this cohort, and should be considered on a case by case basis. This may change in the near future due to the recent introduction of new DMTs for active SPMS and PPMS.
- ❖ Scanning intervals for routine monitoring of RRMS patients on DMTs should be brought in line with recommendations (i.e., between 12 and 36 months for patients on DMTs)
- ❖ PML surveillance scanning intervals should be better adhered to with those patients in the high-risk group requiring more frequent scans.

## References

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