The Importance of Pharmacist Involvement in Laboratory Adherence for Patients on Disease Modifying Therapy for Multiple Sclerosis, Utilizing a Clinical Dashboard

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Background

- Within Geisinger, clinical pharmacists working in Medication Therapy Disease Management (MTDM) developed a laboratory (lab) monitoring protocol for disease modifying therapies (DMTs) for treatment of multiple sclerosis (MS).
- MS is a chronic disease in which patients are often prescribed high risk DMTs.
- Patients on DMTs not monitored appropriately can be at risk for thyroid abnormalities, prolonged lymphopenia, liver damage, and progressive multifocal leukoencephalopathy (PML).[1, 2]
- The protocol was developed to improve the monitoring of patients on DMTs and prevent serious adverse events.
- A clinical dashboard was developed to track and evaluate outcomes of lab adherence while on DMTs.

Objectives

- To develop an improved, effective process for safety monitoring and tracking of lab adherence outcomes while on DMTs.
- To show an improvement in the percentage of patients meeting lab adherence to DMTs based on an implemented protocol while utilizing a clinical dashboard.

Methods

- Prospective cohort study of clinical dashboard data extracted from electronic health records (EHR) in a large integrated health system.
- Comparison of lab adherence between those followed by MTDM and those not followed by MTDM pharmacists using a clinical dashboard.
- Inclusion criteria:
  - Patients were included in the dashboard if identified with a diagnosis of MS (ICD-9 340 and ICD-10 G35)
  - Seen at least once in neurology clinic
  - At least one order for a prescribed DMT
- All statistical analysis performed using SAS 9.4 and R 3.0.3

Table 1. Laboratory monitoring protocol for DMTs

Disease Modifying Therapy	Routine Laboratory Monitoring
Interferon beta-1a, interferon beta-1b, peginterferon beta-1a	CBC/D, CMP every 3 months for 1 year, then every 6 months; TSH yearly
Dimethyl fumarate, fingolimod	CBC/D, CMP every 3 months for 1 year, then every 6 months
Teriflunomide	CBC/D, CMP every month for 6 months, then every 6 months
Rituximab, ocrelizumab	CBC/D, CMP every 3 months
Natalizumab	CBC/D, CMP every 3 months; JCV every 6 months

CBC/D = complete blood count with differential, CMP = comprehensive metabolic panel, JCV = John Cunningham Virus, TSH = thyroid stimulating hormone

Results

Table 2. Laboratory adherence for patients on a DMT who follow with MTDM for MS

Disease Modifying Therapy	Total patients	CBC/D current	CMP current	JCV current	TSH current
Avonex, Rebif (interferon beta-1a)	64	(51) 79.7%	(54) 84.4%	N/A	(56) 87.5%
Betaseron (interferon beta-1b)	26	(22) 84.6%	(23) 88.5%	N/A	(24) 92.3%
Plegridy (peginterferon beta-1a)	4	(3) 75%	(3) 75%	N/A	(3) 75%
Tysabri (natalizumab)	56	(48) 85.7%	(50) 89.3%	(49) 87.5%	N/A
Rituxan (rituximab)	61	(54) 88.5%	(54) 88.5%	N/A	N/A
Ocrevus (ocrelizumab)	144	(104) 72.2%	(102) 70.8%	N/A	N/A
Gilenya (fingolimod)	133	(126) 94.7%	(124) 93.2%	N/A	N/A
Tecfidera (dimethyl fumarate)	218	(200) 91.7%	(202) 92.7%	N/A	N/A
Aubagio (teriflunomide)	130	(121) 93.1%	(123) 94.6%	N/A	N/A

Table 3. Laboratory adherence for patients on a DMT who do not follow with MTDM for MS

Disease Modifying Therapy	Total patients	CBC/D current	CMP current	JCV current	TSH current
Avonex, Rebif (interferon beta-1a)	105	(30) 28.6%	(36) 34.3%	N/A	(24) 22.8%
Betaseron (interferon beta-1b)	19	(6) 31.6%	(8) 42.1%	N/A	(7) 36.8%
Plegridy (peginterferon beta-1a)	8	(2) 25%	(2) 25%	N/A	(1) 12.5%
Tysabri (natalizumab)	10	(1) 10%	(2) 20%	(2) 20%	N/A
Rituxan (rituximab)	0	(0) 0%	(0) 0%	N/A	N/A
Ocrevus (ocrelizumab)	0	(0) 0%	(0) 0%	N/A	N/A
Gilenya (fingolimod)	28	(6) 21.4%	(8) 28.6%	N/A	N/A
Tecfidera (dimethyl fumarate)	45	(11) 24.4%	(11) 24.4%	N/A	N/A
Aubagio (teriflunomide)	6	(2) 33.3%	(3) 50%	N/A	N/A

Table 4. Difference in laboratory adherence for those on DMT category type who follow with MTDM vs those who do not follow with MTDM

	Injectables (Avonex, Rebif, Betaseron, Plegridy)			IV Infusions (Tysabri, Rituxan, Ocrevus)			Orals (Gilenya, Tecfidera, Aubagio)		
	MTDM (n=94)	Non-MTDM (n=132)	p-value	MTDM (n=261)	Non-MTDM (n=10)	p-value	MTDM (n=481)	Non-MTDM (n=79)	p-value
CBC/D, N (%) completed	76 (81%)	38 (29%)	<0.0001	206 (79%)	1 (10%)	<0.0001	447 (93%)	19 (24%)	<0.0001
CMP, N (%) completed	80 (85%)	46 (35%)	<0.0001	206 (79%)	2 (20%)	<0.0001	449 (93%)	22 (28%)	<0.0001
JCV, N (%) completed	--	--	--	49* (88%)	2 (20%)	<0.0001	--	--	
TSH, N (%) completed	83 (88%)	32 (24%)	<0.0001	--	--	--	--	--	

*JCV testing only required for 56 out of 261 IV infusion patients on Tysabri.

- Total cohort: N=1,057 (836 in MTDM group and 221 in non-MTDM group)
- Higher percentage for each oral DMT meeting lab adherence followed by MTDM:
  - Dimethyl fumarate: adherence to CBC/D and CMP are 91.7% and 92.7% for MTDM and 24.4% and 24.4% for non-MTDM, respectively
  - Fingolimod: adherence to CBC/D and CMP are 94.7% and 93.2% for MTDM and 21.4% and 28.6% for non-MTDM, respectively
  - Teriflunomide: adherence to CBC/D and CMP are 93.1% and 94.6% for MTDM and 33.3% and 50% for non-MTDM, respectively
- Greater percentage on natalizumab meeting lab adherence followed by MTDM:
  - Adherence to CBC/D, CMP, and John Cunningham Virus (JCV) testing are 85.7%, 89.3%, and 87.5% for MTDM and 10%, 20%, and 20% for non-MTDM, respectively
- Significantly improved lab adherence by DMT category type followed by MTDM:
  - Injectables: greater percentage completing CBC/D, CMP, TSH at 81%, 85%, and 88% for MTDM and 29%, 35%, and 24% for non-MTDM, p<0.0001
  - Orals: greater percentage completing CBC/D, CMP at 93% and 93% for MTDM and 24%, and 28% for non-MTDM, p<0.0001
  - Infusions: greater percentage completing CBC/D, CMP, JCV testing at 79%, 79%, and 88% for MTDM and 10%, 20%, and 20% for non-MTDM, p<0.0001

Conclusions

- An MS clinic patient population on different DMTs showed that patients followed by MTDM had better lab adherence to the written protocol.
- Those followed by MTDM on injectable, oral, and infusion DMTs had significantly improved lab adherence.
- Improved lab adherence to DMTs, including JCV testing while on natalizumab, helps prevent serious adverse events.

References

1. Wingerchuk DM, Carter JL. Multiple sclerosis: current and emerging disease-modifying therapies and treatment strategies. Mayo Clin Proc. 2014;89:225-240.
2. Hutchins Thomas R, Wakefield RA. Oral disease-modifying therapies for relapsing-remitting multiple sclerosis. AM J Health-Syst Pharm. 2015;72:25-38.