Characterization of the Rheumatologist-Extended Role Practitioner Model of Care in an Inpatient Tertiary Care Network

Lena Nguyen; Marie-Andree Brosseau, PT; Nancy Granger, MScPT, MSc; Julia Ma, MPH; Andrew Chow, MD, FRCPC; and Stephanie Tom, MD, FRCPC

Introduction:

Models of care (MOC) have become crucial to address rheumatologist workforce shortages and increasingly complex patient needs. In Canada, leveraging the involvement of extended role practitioners (ERP) in outpatient rheumatology settings has been shown to decrease wait times.[1-2] The first Canadian rheumatologist (MD)-ERP MOC for inpatients was introduced at Trillium Health Partners (THP) in 2015. Our ERPs are physiotherapists who completed the Advanced Clinician Practitioner in Arthritis Care (ACPAC) program.

Methods:

We undertook a retrospective, cross-sectional chart review of all patients referred to the rheumatology inpatient consultation service at THP, which includes the Mississauga Hospital (MH) and Credit Valley Hospital (CVH) sites, to characterize the modern inpatient rheumatology consultation service where they were assessed by the ERP-MD team from January 1, 2015 to December 31, 2019. A retrospective chart review was conducted using the hospital's electronic medical records system and descriptive analyses performed.

Results:

A total of 2,361 patients were seen by the MD-ERP team between January 2015 and December 2019. The overall cohort had a median age of 72 and included more females (59%) than males (41%). The majority of rheumatology referrals (96%) came from wards (hospitalist, internal medicine, surgery); only a few were from intensive care or coronary care units (3%). Most consults were new patients with no prior rheumatology contact (69%). The most common reason for hospitalization was a musculoskeletal (MSK) diagnosis (30%), which included possible rheumatologic or orthopedic etiology, followed by neurologic (19%) and infectious (16%) admission diagnoses (Table 1).

Table 1:
THP Rheumatology Consultation Population

Number of patients	**2,361**
Patient age (median, [IQR])	**72[52,82]**
Patient sex, Number (%)	
Female	1,397 (59.2)
Male	964 (40.8)
Referral service, Number (%)	
Internal Medicine	2,254 (95.5%)
Intensive/Cardiac/Neurosurgery Critical Care	69 (2.9%)
Other	38 (1.6%)
Rheumatology care prior to admission	
No previous rheumatologist	1,637 (69.3%)
Already has rheumatologist	724 (30.7%)
Number of admission diagnoses	
1	2,277 (96.4%)
2+	84 (3.6%)
Type of admission diagnosis, Number (%)	**2,445**
MSK	738 (30.1%)
Neurologic	453 (18.5%)
Infectious	381 (15.6%)
Cardiovascular	248 (10.1%)
Abdominal/GI	180 (7.4%)
Renal	121 (4.9%)
Respiratory	104 (4.3%)
Undifferentiated	101 (4.1%)
Hematology/Endocrinology	69 (2.8%)
Malignancy	50 (2.0%)
Patient status at discharge	
Alive	2,213 (93.7%)
Deceased	148 (6.3%)

Table 2:

Rheumatology Inpatient Consultation Service

Number of patients	**2,361**
Number of rheumatologic diagnoses	
0	258 (10.9%)
1	1,934 (81.9%)
2	169 (7.2%)
Rheumatologic diagnoses	
Crystal Disease	646 (28.4%)
MSK pain/OA	622 (27.3%)
Systemic Autoimmune Rheumatic Disease	347 (15.2%)
Inflammatory Arthritis	309 (13.6%)
Vasculitis	262 (11.5%)
Infectious	87 (3.8%)
Number of Interventions	
0	49 (2.1%)
1	719 (30.5%)
2	791 (33.5%)
3	695 (29.4%)
4+	107 (4.5%)
Interventions	
Bloodwork	1,622 (68.7%)
Medication	1,329 (56.3%)
Imaging	1,097 (46.5%)
Injection	675 (28.6%)
Non-pharmacologic	89 (3.8%)
Referrals	
Medicine specialty	146 (6.2%)
Surgery	145 (6.1%)
Allied Health	25 (1.1%)
Radiology	26 (1.1%)
Other	5 (0.2%)
Outpatient follow-up required	
No	1,360 (57.6%)
Yes	1,001 (42.4%)

Supplementary Table A:

Patients Requiring Follow-up According to Rheumatologic Diagnoses

	Follow-up	
	Yes	**No**
Number of Patients	**1,001**	**1,360**
Crystal disease	167 (16.7%)	479 (35.2%)
MSK pain/OA	94 (9.4%)	528 (38.8%)
Systemic Autoimmune Rheumatic Disease	279 (27.9%)	68 (5.0%)
Inflammatory arthritis	269 (26.9%)	40 (2.9%)
Vasculitis	200 (20.0%)	62 (4.6%)
Infectious	32 (3.2%)	55 (4.0%)

The most common rheumatologic diagnoses were crystal disease (28%) followed by osteoarthritis (OA)/MSK-related pain (27%). Less common were systemic autoimmune rheumatic diseases (15%), inflammatory arthritis (14%), vasculitis (12%), and infection (4%). Of the 169 patients with concurrent diagnoses, the most common concomitant diagnoses were crystal disease and OA/MSK-related pain (50%). Nearly all rheumatology consultations required interventions (98%), which included bloodwork (69%), medication (56%), imaging (47%), and/or intra-articular injection (29%), with most requiring more than one intervention (Table 2).

Of all the consulted patients, 42% required outpatient follow-up (Table 2), particularly those with systemic autoimmune rheumatic disease (28%), inflammatory arthritis (27%), and vasculitis (20%) (Supplementary Table A).

Discussion:

With the goals of addressing unmet inpatient needs and sustainability of hospital-affiliated community practice, THP implemented the first Canadian inpatient MD-ERP MOC. Most patients had no previous contact with rheumatology and only required intervention during their hospitalization. The most common rheumatologic diagnoses were crystal disease and OA/MSK-related pain which corresponds to their prevalence in the general population.[3]

Although it is important to have rheumatologic management in high acuity inpatient situations (i.e. life-threatening vasculitis), the modern rheumatology service also includes OA/MSK-related pain and crystal disease management. Crystal disease was the most common rheumatologic diagnosis, an observation that aligns with studies reporting gout and pseudogout as the main causes of hospitalizations related to crystal arthropathies.[4-6] Notably, several studies draw links between deficits in pre-hospital care[7-9] and lack of urate-lowering therapy among hospitalized patients.[10-12] OA was another common reason for rheumatologic consultation likely due to comorbidity (i.e. the impact of OA on gait safety and discharge planning). Due to many rheumatologists' practice scope being focused on inflammatory conditions to cope with human resource shortages.[13] OA/MSK-related issues and crystal disease are typically managed by primary care providers pre-and post-admission.

Characterization of the Rheumatologist-Extended Role Practitioner Model of Care in an Inpatient Tertiary Care Network

continued from page 13

Conclusion:

With the increasing burden of rheumatic diseases and too few rheumatologists, ERPs are integral to supporting inpatient rheumatology care. Our study provides a benchmark for future implementations of similar MOCs and highlights an opportunity to improve outpatient management of chronic conditions to mitigate future disease burden. More research is required to evaluate the economic impact of rheumatology consultation and inpatient MD-ERP MOC.

Acknowledgements:

Thank you to our patients, their families, and their healthcare provider teams for making this study possible and to Dr. Judith Versloot for her expertise and input on research analysis.

Declaration of Interest Statement:

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research was completed for quality improvement purposes to evaluate our current MOC.

References:

1. Ahluwalia V, Lineker S, Sweezie R, Bell MJ, Kendzerska T, Widdifield J, Bombardier C, Allied Health Rheumatology Triage Investigators. The effect of triage assessments on identifying inflammatory arthritis and reducing rheumatology wait times in Ontario. *The Journal of Rheumatology*. 2020; 47(3):461-7.
2. Passalent L, Hawke C, Lawson DO, et al. Advancing early identification of axial spondyloarthritis: an interobserver comparison of extended role practitioners and rheumatologists. *The Journal of Rheumatology*. 2020; 47(4):524-30.
3. Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*. 2020; 396(10258):1204-22.
4. Zleik N, Elfishawi MM, Kvrgic Z, et al. Hospitalization increases the risk of acute arthritic flares in gout: a population-based study over 2 decades. *The Journal of Rheumatology*. 2018; 45(8):1188-91.
5. Villion A, Arinzon Z, Feldman J, et al. Crystal-Induced Arthropathy in Elderly Patients Hospitalized for Acute Conditions. *The Israel Medical Association Journal: IMAJ*. 2017; 19(3):183-5.
6. Lim SY, Lu N, Oza A, et al. Trends in gout and rheumatoid arthritis hospitalizations in the United States, 1993-2011. *JAMA*. 2016; 315(21):2345-7.
7. Kuo CF, Grainge MJ, Mallen C, et al. Rising burden of gout in the UK but continuing suboptimal management: a nationwide population study. *Annals of the rheumatic diseases*. 2015; 74(4):661-7.
8. Neogi T, Hunter DJ, Chaisson CE, et al. Frequency and predictors of inappropriate management of recurrent gout attacks in a longitudinal study. *The Journal of Rheumatology*. 2006; 33(1):104-9.
9. Singh JA, Hodges JS, Toscano JP, et al. Quality of care for gout in the US needs improvement. *Arthritis Care & Research: Official Journal of the American College of Rheumatology*. 2007; 57(5):822-829.
10. Wright S, Chapman PT, Frampton C, et al. Management of gout in a hospital setting: a lost opportunity. *The Journal of Rheumatology*. 2017; 44(10):1493-8.
11. Nitichaikulvatana P, Upchurch KS, Harrold LR. The Impact of Deficits in Gout Care on Hospitalizations. *Journal of clinical rheumatology: practical reports on rheumatic & musculoskeletal diseases*. 2011; 17(7):389.
12. Hutton I, Gamble G, Gow P, et al. Factors associated with recurrent hospital admissions for gout: a case-control study. *JCR: Journal of Clinical Rheumatology*. 2009; 15(6):271-4.
13. Barber CE, Jewett L, Badley EM, et al. Stand up and be counted: measuring and mapping the rheumatology workforce in Canada. *The Journal of Rheumatology*. 2017; 44(2):248-57.

Lena Nguyen
Medical student,
Faculty of Medicine
University of Toronto
Toronto, Ontario

Marie-Andree Brosseau, PT
Advanced Practice Physiotherapist,
Trillium Health Partners
Mississauga, Ontario

Nancy Granger, MScPT, MSc
Advanced Practice Physiotherapist,
Trillium Health Partners
Mississauga, Ontario

Julia Ma, MPH
Biostatistician,
Institute for Better Health
Trillium Health Partners
Mississauga, Ontario

Andrew Chow, MD, FRCPC
Rheumatologist,
Trillium Health Partners
Mississauga, Ontario
Lecturer, University of Toronto
Associate Professor, McMaster University
Hamilton, Ontario

Stephanie Tom, MD, FRCPC
Division Head, Rheumatology
Trillium Health Partners
Mississauga, Ontario
Lecturer, University of Toronto,
Toronto, Ontario