Assessment of Cognitive Dysfunction in Mast Cell Activation Syndrome

Daniel L. Rosenberg M.D., Ravi K. Viswanathan M.D., and Sameer K. Mathur M.D., Ph.D.
University of Wisconsin-Madison, Department of Medicine, Division of Allergy, Pulmonary and Critical Care

Abstract

Rationale: An increasing number of patients are being referred to Allergy clinics for evaluation of mast cell activation syndrome (MCAS). A commonly cited complaint in this disorder is a non-specific condition commonly described as "brain fog." Similar complaints have been noted in postural orthostatic tachycardia syndrome, and studies have found possible objective evidence of cognitive dysfunction in this disorder. Our overall goal is a quality improvement initiative to quantify symptom burden in patients with MCAS. For this part of the project, our aim is to evaluate whether cognitive dysfunction can be identified and monitored in a cohort of patients referred for MCAS.

Methods: In an ongoing quality improvement project (IRB exempt), patients referred to a University of Wisconsin Allergy clinic for evaluation of MCAS are being administered symptom questionnaires. Executive cognitive function is assessed via a previously validated computer battery (CogState), with individual tests including Detection, Identification, One Card Learning, One Back, and Groton Maze Learning. A PHQ-9 questionnaire is also administered to assess co-morbid depression.

Results: In a cohort of patients with presumed MCAS in the University of Wisconsin Allergy clinic, 25% of patient have self-reported symptoms of cognitive dysfunction and approximately one-third have physician-diagnosed or self-reported depression.

Conclusions: Referrals to the Allergy clinic for MCAS are increasing in number, and the diagnosis, monitoring and management of the disease remains challenging. Given the frequency of self-reported cognitive concerns, establishing objective measures is of utmost importance in monitoring and management of this disease.

Introduction

- Mast cell activation syndrome (MCAS) referrals to primary allergy clinics are significantly increasing
- Up to 30% of such patients report "brain fog"
- Cognitive dysfunction has been demonstrated in patients with postural orthostatic tachycardia syndrome (POTS) via computer testing battery (Cogstate)
- 20-40% of MCAS patients self-report symptoms of depression or anxiety

Goals

- Assess for cognitive dysfunction in patients with MCAS
- Evaluate for depression and anxiety in patients with MCAS

Methods

- Data collected from Quality Improvement project (IRB-exempt)
- Patients diagnosed with MCAS in a UW Allergy Clinic completed Cogstate testing to assess cognitive function
- Patients completed a Patient Health Questionnaire-9 (PHQ-9) to assess for depression, and a General Anxiety Disorder-7 (GAD-7) to assess for anxiety

Results

Characteristics of Patients with MCAS

Patient Demographics (n=12)	
Age (average)	39.5 years (23-69)
Male	1
Female	11
Tryptase > 10	3
Positive NMH	3
Positive LTE4	1
Positive BPGF2a	2
No positive biomarker	6

Table 1. Patients previously diagnosed with MCAS at a UW Allergy clinic were recruited to complete a computer battery of previously validated cognitive testing (Cogstate), PHQ-9, and GAD-7. Baseline data on mast cell activation markers including tryptase level and 24 hour urinary collections was abstracted from the medical record. Abbreviations as follow: NMH = n-methylhistamine, LTE4 = leukotriene E4, BPGF2a = 11 beta prostaglandin.

Cogstate Testing Results

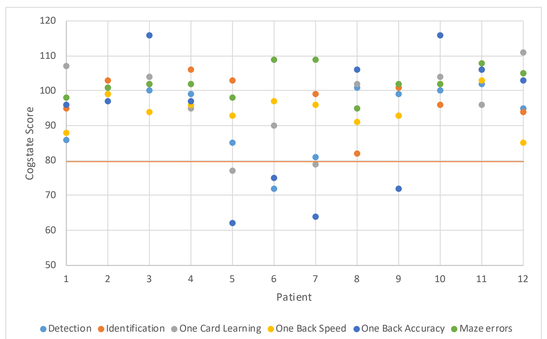
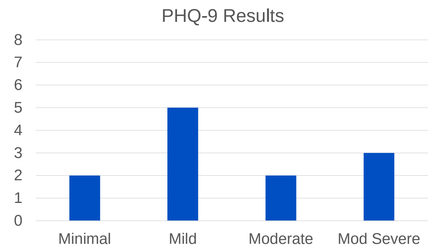


Figure 1: Patients completed a battery of six tests via Cogstate software. Normal values of this previously validated battery are > 80 for all tests performed, as indicated by red line above.

Depression and Anxiety Scoring



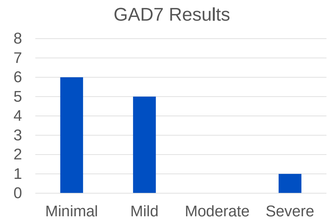


Figure 2: PHQ-9 scores were categorized as minimal (0-4), mild (5-9), moderate (10-15), and moderately severe (15-19). GAD-7 scores were categorized as minimal (0-4), mild (5-9), moderate (10-14), and severe (>15).

Characteristics of Patients with Cognitive Dysfunction

Age + Sex	Tryptase > 10	Urinary Marker	Test < 80	PHQ-9	GAD-7
69 YOM	Yes (17.8)	None	One card learning (77) One back accuracy (62)	Minimal	Minimal
42 YOF	Yes (22.7)	NMH, LTE, P	Detection (72) One back accuracy (75)	Mild	Mild
39 YOF	No	P	One card learning (79), One back accuracy (64)	Mod Severe	Mild
29 YOF	No	NMH	One back accuracy (72)	Mod Severe	Severe

Table 2: Patients who scored <80 on at least on Cogstate test are listed, along with accompanying data on biomarkers, PHQ-9, and GAD-7 scores

Summary

- 4 of 12 (33%) patients had evidence of cognitive dysfunction on testing, with 3 of 10 (30%) scoring < 80 on two tests
  - All 4 patients with evidence of cognitive dysfunction had a least one positive biomarker
  - 3 of these patients had at least mild symptoms of depression and anxiety
- 10 of 12 (83%) had at least mild depression, with 3 qualifying as moderate to severe
- 6 of 12 (50%) had at least mild anxiety, with 1 qualifying as severe

Conclusions

- Objective deficits in cognitive function can potentially be measured in MCAS
- Evaluation for depression and anxiety is important in MCAS
- We plan to pursue a research project to evaluate these outcomes compared to control populations

Acknowledgements

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References

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