Characterizing drug-induced stuttering: implications for speech fluency assessment and treatment

Alyssa Stowe, BSc[1], Ala Refai, BSc[1], Luc De Nil, PhD[1,2]
[1]Department of Speech-Language Pathology, University of Toronto; [2]Rehabilitation Sciences Institute, University of Toronto

INTRODUCTION

Acquired neurogenic stuttering refers to stuttering that has its onset following a neurological event or disease (1). People with acquired stuttering may or may not have a history of developmental stuttering.

A subtype of acquired neurogenic stuttering is drug-induced stuttering. Publications of drug-induced stuttering are most frequently reported in the form of case studies. Reports include a variety of drugs, influencing multiple different neurotransmitter systems (2). For individuals who have developmental stuttering, acquiring drug-induced stuttering typically results in an exacerbation of their baseline stuttering behaviours (3).

The neurological underpinnings of drug-induced stuttering remain unknown. Additionally, most authors have been inconsistent with the level of detail in case reports, making it challenging to increase our understanding of this area.

OBJECTIVES

To review current literature in the field of drug-induced stuttering and identify what is known as well as what is not known, to identify areas where future research is needed. The implications of seeming gaps in the literature are discussed with consideration for the impact of this knowledge gap on assessment and treatment.

METHODS

A literature search using Scopus and Ovid was performed to find recent publications in the area of drug-induced stuttering. 30 papers published since 2000 were considered for this project. Assessment and outcome data were extracted from each report and systematically analyzed and compared. Most publications were single case reports, but some included multiple cases. In total, 52 cases were analyzed in this review. Articles that were not available in English, and publications that included only an abstract were not included.

DEMOGRAPHICS

Most commonly, drug-induced stuttering was observed among individuals who experienced other health issues, particularly treatment-resistant mental health disorders (e.g., schizophrenia, depression). Drug-induced stuttering was observed at any age (mean=41.5yr; range=4-86yr) and affected men more often than women (M=36, F=15).

WHAT WE KNOW

CLASSIFICATION OF DRUGS

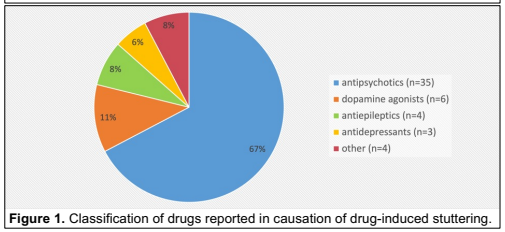

Figure 1. Classification of drugs reported in causation of drug-induced stuttering.

Similar to previous findings by Nikvarz & Sabouri (4) and Trenque et al. (5), our review indicated increased incidence of drug-induced stuttering for antipsychotics, antidepressants, and antiepileptics, as well as from the influence of multiple drug interactions.

DOSE FOR STUTTERING

For any given drug, the dosage resulting in stuttering varied significantly. It is likely the exact dose varies based on individual factors, for example gender, weight, and age, as well as from interactions with other drugs. In many cases, there was a threshold for stuttering, and a reduction in dose would result in a decrease or resolution of stuttering symptoms.

ONSET OF STUTTERING

Stuttering onset varied between individuals, but most commonly occurred immediately (within 24 hours) or within the first few weeks of commencing a drug treatment or an increased dosage of a drug. For 21% of individuals (n=11), no clear information about timing of stuttering onset was reported. The timing of stuttering onset did not appear to be associated with the classification of drug. For some subjects on clozapine, stuttering onset was also associated with seizures, which were presented as a possible cause for the stuttering symptoms (6).

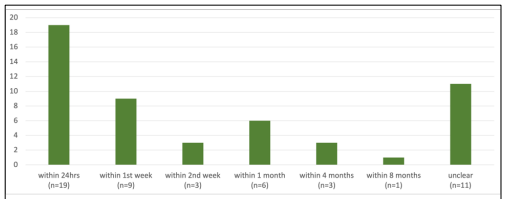

Figure 2. Occurrence of stuttering onset, relative to drug administration.

WHAT WE DO NOT KNOW

NEUROTRANSMITTERS

These drugs are implicated in altering the signalling of several different neurotransmitters (NTs). While some drugs increase signalling of these NTs, others decrease signalling (2). It is unclear why all of the drugs resulted in increased stuttering, despite some of them having opposite drug actions.

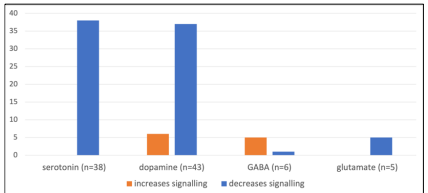

Figure 3. Direction of drug action on corresponding neurotransmitter system (n=individuals on a drug interacting with the NT signalling).

DEFINITION OF STUTTERING

Many case reports do not distinguish true stuttering from "stutter-like dysfluencies" or from "speech disturbances." For many case reports, it is unclear if the subject is experiencing stuttering, or if their difficulties with speech fluency may be due to tics or other motoric symptoms. This is particularly common for cases of clozapine-induced stuttering.

ASSESSMENT OF STUTTERING

A comprehensive stuttering assessment should include a variety of factors beyond speech fluency and stuttering behaviours, including the speaker's reaction to the stuttering as well as the impact of stuttering on the speaker's quality of life (7). Many medical professionals are not trained to formally assess stuttering, which can lead to misclassification of drug-induced speech disturbances (8). When combined with inconsistencies in reporting details about the severity and type of stuttering, this makes it hard to determine whether these cases are consistent with true stuttering, whether they show characteristics that are more similar to motor speech-type difficulties, or whether they reflect increased occurrence of typical dysfluencies.

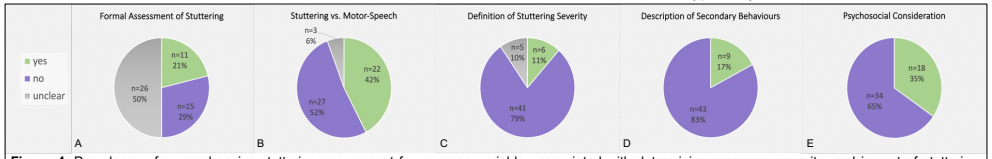

Figure 4. Prevalence of comprehensive stuttering assessment for common variables associated with determining presence, severity, and impact of stuttering. A) Percentage of reports that included a formal assessment of stuttering, including specific speech tasks and criteria for diagnosis. B) Percentage of reports that indicated the stuttering behaviours as distinguished from other types of dysfluencies. C) Percentage of reports that indicated stuttering severity. D) Percentage of reports that indicated presence of secondary stuttering behaviours. E) Percentage of reports that considered impact of stuttering on psychosocial factors, including social participation and quality of life.

TREATMENT OF STUTTERING

Of the 52 cases reviewed, 39 decreased or stopped the dose of the drug. Of these, 38 resulted in decreased stuttering or resolution of stuttering. In 5 cases, it was not possible, or medically appropriate, to use another drug to treat the medical issue (e.g., treatment-resistant schizophrenia) and drug use was continued, despite the stuttering. In 4 cases, stuttering symptoms resolved over time while the dosage remained consistent. In 8 other cases, a different drug was introduced to treat the stuttering (e.g., valproic acid, haloperidol), which resulted in decreased stuttering for 4 cases. Of the 52 cases reviewed, only 2 individuals were referred for speech-language pathology treatment, but no follow-ups to assess the efficacy of clinical speech intervention were reported.

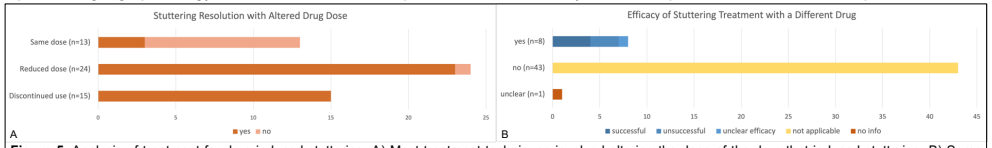

Figure 5. Analysis of treatment for drug-induced stuttering. A) Most treatment techniques involved altering the dose of the drug that induced stuttering. B) Some treatment techniques involved introducing a different drug to treat the acquired stuttering.

CONCLUSIONS

Our review of the literature revealed that most papers provide only general statements about presence of stuttering, without findings from a formal speech fluency assessment or indication about whether a formal assessment was completed. In addition, many reports do not include an assessment of other factors, such as client attitudes, perceptions, or quality of life. The absence of these data as part of an individual's assessment limits a holistic understanding of drug-induced stuttering and impacts decision-making regarding appropriate intervention strategies for the individuals who continue to stutter, despite the current treatment options.

FUTURE DIRECTIONS

Acquired stuttering can affect an individual's communication and interpersonal interactions. In addition, it often occurs in the context of other health concerns, presenting a complex condition that requires a collaborative interdisciplinary approach to treatment. This makes increased patient advocacy especially important. It is important to facilitate interprofessional collaboration between speech language pathologists, physicians, and psychiatrists, in order to determine the risk-benefit ratio of modifying drug treatments for each individual. Future research of drug-induced stuttering should include the expertise of speech-language pathologists, to help augment speech intervention and patient care. More consistencies among the research and case studies being published in this field can have significant positive impacts on assessing, treating, and understanding drug-induced stuttering.

REFERENCES

1. Theys, C., & De Nil, L. (in print). Acquired stuttering: Etiology, symptomatology, identification, and treatment. In: Zebrowski, et al (eds) Stuttering: Characteristics, Assessment and Treatment (pp. 260-276) Elsevier Ltd.
2. Ekhart, C., van Hunsel, F., van Harten, P., van Baarsen, J., Tan, Y. Y., & Bast, B. (2021). Drug-induced stuttering: Occurrence and possible pathways. *Frontiers in Psychiatry, 12*, 692568.
3. Netski, A. L., & Plasecki, M. (2001). Lithium-induced exacerbation of stutter. *The Annals of Pharmacotherapy, 35*(7-8), 961.
4. Nikvarz, N., & Sabouri, S. (2022). Drug-induced stuttering: A comprehensive literature review. *World Journal of Psychiatry, 12*(2), 236–263.
5. Trenque, T., Morel, A., Trenque, A., & Azzouz, B. (2020). Drug induced stuttering: Pharmacovigilance data. *Expert Opinion on Drug Safety.*
6. Duggal, H. S., Jagadeesan, K., & Nizamie, S. H. (2002). Clozapine-induced stuttering and seizures. *Am J Psychiatry, 159*(2), 315.
7. Brundage, S. B., Ratner, N. B., Boyle, M. P., Eggers, K., Everard, R., Franken, M., et al. (2021). Consensus guidelines for the assessments of individuals who stutter across the lifespan. *American Journal of Speech-Language Pathology, 30*(6).
8. Gupta, A., & Lang, A. E. (2010). Drug-induced cranial myoclonus. *Movement Disorders, 25*(13), 2264-2265.