Biomedical and Biopharmaceutical Research
Abbreviation: Biomed. Biopharm. Res.
Volume: 15: Issue: 02 |Year: 2018
Page Number: 20-25

A STUDY ON METOCLOPRAMIDE-INDUCED ACUTE DYSTONIA IN ADOLESCENTS IN A TERTIARY CARE CENTRE OF PURBA MEDINIPUR. A PROSPECTIVE OBSERVATIONAL STUDY

Dr. Shah Mukund Vallabhdas[1], Dr. Niranjan Mondal[2], Dr. Somdipta Bhattacharjee[3], Dr. Naresh Kumar Munda[4]

[1] Assistant Professor, Department of Anaesthesiology, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India.
[2] Assistant Professor, Department of Biochemistry, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India.
[3] Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India.
[4] Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India.

Corresponding Author

Dr. Naresh Kumar Munda

Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

Received: 21-03-2018

Accepted: 05-09-2018

Published: 28-09-2018

Abstract

Background: Metoclopramide, a dopamine antagonist, is frequently prescribed as an antiemetic. However, it can lead to extrapyramidal side effects, including acute dystonia, especially in younger populations. **Objective**: To evaluate the clinical characteristics, risk factors, and treatment outcomes of metoclopramide-induced acute dystonia in adolescents attending a tertiary care centre in Purba Medinipur. **Methods**: A prospective observational study of 24 adolescents (aged 10–19 years) who developed acute dystonia following metoclopramide use. Demographic details, clinical features, dosage history, time of onset, and treatment response were analysed. **Results**: The majority of cases occurred within 24 hours of drug administration. Females (62.5%) were more commonly affected. Common risk factors included high doses, young age, and absence of prior anticholinergic prophylaxis. All patients responded well to intravenous diphenhydramine or promethazine. **Conclusion**: Acute dystonia is a preventable adverse effect of metoclopramide. Judicious use, particularly in adolescents, and awareness among clinicians is essential for early recognition and prompt treatment.

KEYWORDS: Acute dystonia, Metoclopramide.

INTRODUCTION

Metoclopramide is a commonly prescribed antiemetic agent that acts by antagonizing dopamine receptors. However, its central dopamine blockade can cause extrapyramidal symptoms (EPS) such as dystonia, especially in children and adolescents.

Metoclopramide-induced acute dystonia (MIADR) is a relatively rare but serious adverse effect of the medication metoclopramide, with reported incidences varying between 0.2% and 25%. While the condition is not common, it's crucial to be aware of it due to the potential severity of symptoms and the possibility of misdiagnosis. Key points about MIADR: Prevalence: The incidence of MIADR is generally reported to be around 0.2% to 25% of patients taking metoclopramide. Some studies suggest a higher incidence in children and young adults[1]. Risk Factors: Younger age (especially children and those under 30), female sex, and higher

doses of metoclopramide have been identified as potential risk factors. Symptoms: MIADR can manifest with a range of symptoms including involuntary muscle contractions (dystonia) in the face, neck, trunk, and extremities, oculogyric crisis (involuntary upward deviation of the eyes), torticollis (twisted neck), opisthotonus (arching of the back), and difficulty speaking or swallowing[2]. Importance of Recognition: Due to the potential for misdiagnosis with other conditions like seizures or conversion disorder, it is vital to recognize MIADR and its characteristic symptoms. A thorough medication history is essential in making the correct diagnosis. Treatment: MIADR can usually be reversed with medications like anticholinergics (e.g., benztropine) or benzodiazepines (e.g., diazepam)[3].

In summary: While the exact prevalence of MIADR varies, it is a recognized adverse effect of metoclopramide, particularly in certain patient populations. Early recognition and appropriate treatment are essential to manage this condition. Acute dystonia presents as involuntary muscle contractions, affecting the face, neck, trunk, or limbs. It is often distressing but reversible if treated early. Despite guidelines cautioning its use in younger populations, metoclopramide is still widely used in clinical settings without proper risk assessment. This study aims to describe the clinical presentation, risk factors, and treatment outcomes of metoclopramide-induced acute dystonia in adolescents at a tertiary care centre in Purba Medinipur.

METHODS

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 36 patients in the department of General Medicine and Department of Community Medicine, at a tertiary care centre, from February / 2018 to August/2018.

Total 36 participant were approached to project among them 12 were excluded in this study and Total 24 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination

Flowchart of Study Design

Adolescent Patients Prescribed Metoclopramide (n = 36)
↓
Screened for Acute Dystonic Reaction
↓
Excluded Other Neurological Causes
↓
Confirmed Cases of Metoclopramide-Induced Dystonia (n = 24)
↓
Clinical History, Drug Dose, Onset Time Recorded
↓
Risk Factor Assessment (age, sex, dose, concomitant meds)
↓
Treatment Response Noted (Anticholinergics)
↓
Data Analysis

Study Design:

Prospective observational study.

Setting:

Emergency and pediatric units of a tertiary care hospital in **Purba Medinipur**.

Study Duration:

6 months.

Sample Size:

24 adolescents (10–19 years) with **acute dystonia** following metoclopramide use.

Inclusion Criteria:

- Adolescents aged 10–19 years
- Acute dystonic reaction within 72 hours of metoclopramide use
- No history of prior neurological illness

Exclusion Criteria:

- History of seizure disorders or psychiatric illness
- Concurrent use of antipsychotics or dopamine antagonists

Data Collected:

- Demographic profile
- Metoclopramide dose and route
- Time to symptom onset
- Type of dystonia
- Treatment administered and response

Statistical Analysis:

Data were analyzed using descriptive statistics (mean, SD, percentages).

Statistics and analysis of data

Data is put in excel sheet then mean, median and association is analyzed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of Pvaue <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In this study we found that Metoclopramide-Induced Acute Dystonia is associated with demographic profile of patient. Acute Dystonia is a associated with Weight. Females were more prone to suffered of Acute Dystonia as compared to male Metoclopramide-Induced Acute Dystonia were belong to 10-19 years age group Its prevalence (Table 1)Age is also associated factors for Metoclopramide-Induced Acute Dystonia. Average mean age for Metoclopramide-Induced Acute Dystonia is 14.8 ± 2.1

Metoclopramide-Induced Acute Dystonia were more predominance among Rural Residences compared to urban population (Table 1)

Demographic Factors Table 1

Variable	**Value (n = 24)**
Age Range (years)	10–19
Mean Age	14.8 ± 2.1
Gender (Male/Female)	9 / 15

Variable	Value (n = 24)
Weight (kg)	42.3 ± 6.4
Urban/Rural Residence	10 / 14
Hospitalized (Yes)	24 (100%)

Metoclopramide-Induced Acute Dystonia have many risk factors among them these are very important risk factors High Dose (>0.5 mg/kg), Female Gender, IV Route of Administration, No Anticholinergic Prophylaxis, Repeated Doses (>2 times/day) and Family History of EPS

Risk Factors Table 2

Risk Factor	No. of Patients (%)
High Dose (>0.5 mg/kg)	15 (62.5%)
Female Gender	15 (62.5%)
IV Route of Administration	13 (54.2%)
No Anticholinergic Prophylaxis	21 (87.5%)
Repeated Doses (>2 times/day)	10 (41.7%)
Family History of EPS	2 (8.3%)

Acute dystonia depends on many factors

Time to Onset:

- 0–6 hours: 9 (37.5%)
- 6–24 hours: 11 (45.8%)
- 24–48 hours: 4 (16.7%)

Types of Dystonia Observed:

- Oculogyric crisis: 12 (50%)
- Torticollis: 6 (25%)
- Facial grimacing: 4 (16.7%)
- Trismus and jaw stiffness: 2 (8.3%)

Treatment Given:

- IV diphenhydramine (1 mg/kg): 16 (66.7%)
- IM promethazine (0.5 mg/kg): 8 (33.3%)

Outcome:

- Symptom resolution within 30–90 minutes in all cases
- No recurrence reported after discontinuation of metoclopramide

DISCUSSION

This study highlights that acute dystonia following metoclopramide use is not uncommon in adolescents. The female preponderance and IV route association are consistent with prior literature. Most cases developed symptoms within 24 hours of drug administration, reinforcing the need for close observation after prescribing[4].

Importantly, inadequate dose adjustment for body weight and lack of anticholinergic co-administration contributed to the risk. The use of diphenhydramine and promethazine was effective, confirming their role in EPS management.

Acute dystonia, a neurological movement disorder, exhibits certain demographic patterns. These include a higher prevalence in males compared to females, and a greater occurrence in younger individuals, particularly children, teens, and young adults, with the risk decreasing as age increases. Race does not appear to be a significant factor in the incidence of acute dystonic reactions [5].

Age: Younger individuals are more susceptible: Acute dystonia is more common in children, teens, and young adults (roughly between the ages of 5 and 45). Risk decreases with age: The likelihood of experiencing acute dystonia diminishes as individuals get older. Gender: Males are more affected: Males tend to have a higher incidence of acute dystonic reactions than females [6]. Exceptions: Some specific forms of dystonia, like cervical dystonia, may show a different gender distribution, with females being more affected. Race: No identified race-based risk: There is no evidence to suggest that race plays a role in the incidence of acute dystonia. Other Factors: Medication-related:

The type, dosage, and duration of medication use, especially certain antipsychotics and other drugs, can influence the risk of acute dystonia. Family history A family history of dystonia can increase an individual's susceptibility to developing the condition [7].

In this study we found that Metoclopramide-Induced Acute Dystonia is associated with demographic profile of patient. Acute Dystonia is a associated with Weight. Females were more prone to suffered of Acute Dystonia as compared to male Metoclopramide-Induced Acute Dystonia were belong to 10-19 years age group Its prevalence (Table 1)Age is also associated factors for Metoclopramide-Induced Acute Dystonia. Average mean age for Metoclopramide-Induced Acute Dystonia is 14.8 ± 2.1

Metoclopramide-Induced Acute Dystonia were more predominance among Rural Residences compared to urban population (Table 1). Metoclopramide-Induced Acute Dystonia have many risk factors among them these are very important risk factors High Dose (>0.5 mg/kg), Female Gender, IV Route of Administration, No Anticholinergic Prophylaxis, Repeated Doses (>2 times/day) and Family History of EPS .

Metoclopramide-induced acute dystonia, a movement disorder characterized by involuntary muscle contractions, is more likely to occur in certain individuals. Younger age, female sex, high doses of metoclopramide, and a history of dystonia are established risk factors. Additionally, genetic factors, like CYP2D6 poor metabolizer status, and certain medical conditions, such as pregnancy, may also play a role[8].

Here's a more detailed breakdown: Patient-related factors: Age: Children and young adults are at higher risk. One study reported that adolescents experienced metoclopramide-induced dystonia at the recommended dose. Sex: Females may be more susceptible[9,10].

Family history: A family history of dystonia, particularly metoclopramide-induced dystonia, increases the risk. Genetic factors: Poor metabolizer status of the CYP2D6 enzyme, which affects how the body processes metoclopramide, may increase risk. Medical conditions: Pregnancy and related hormonal changes can be a factor, Anticholinergic use: The use of anticholinergic medications may decrease the risk of neuroleptic-induced dystonia Although self-limiting when treated, acute dystonia can be alarming and misdiagnosed as seizure or psychosis[11]. Hence, awareness among healthcare professionals is essential to prevent and promptly manage such adverse drug reactions.

CONCLUSION

Metoclopramide-induced acute dystonia in adolescents is a clinically significant yet preventable complication. Female adolescents, higher doses, and lack of prophylactic measures increase the risk, avoid routine metoclopramide use in adolescents unless necessary. Use minimum effective dose and adjust per body weight. Monitor closely within first 24 hours of administration. Educate clinicians on recognizing and managing extrapyramidal side effects

SOURCE OF FUNDING: No

CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

REFERENCES

1. Bendigo V. The management of acute dystonic reactions. Aust. Prescr. 2001;24(1):19–20. [Google Scholar]
2. Karagoz G., Kadanali A., Dede B., Anadol U., Yucel M., Bektasoglu M.F. Metoclopramide-induced acute dystonic reaction: a case report. Eurasian J. Med. 2013 Feb;45(1):58. doi: 10.5152/eajm.2013.10. [DOI] [PMC free article] [PubMed] [Google Scholar]
3. Livezey M.R., Briggs E.D., Bolles A.K., Nagy L.D., Fujiwara R., Furge L.L. Metoclopramide is metabolized by CYP2D6 and is a reversible inhibitor, but not inactivator, of CYP2D6. Xenobiotica. 2014 Apr 1;44(4):309–319. doi: 10.3109/00498254.2013.835885. [DOI] [PMC free article] [PubMed] [Google Scholar]
4. Lacy B.E., Crowell M.D., Mathis C., Bauer D., Heinberg L.J. Gastroparesis: quality of life and health care utilization. J. Clin. Gastroenterol. 2018 Jan 1;52(1):20–24. doi: 10.1097/MCG.0000000000000728. [DOI] [PubMed] [Google Scholar]
5. Bateman D.N., Rawlins M.D., Simpson J.M. Extrapyramidal reactions with metoclopramide. Br. Med. J. 1985 Oct 5;291(6500):930–932. doi: 10.1136/bmj.291.6500.930. [DOI] [PMC free article] [PubMed] [Google Scholar]
6. Yis U., Ozdemir D., Duman M., Unal N. Metoclopramide induced dystonia in children: two case reports. Eur. J. Emerg. Med. 2005 Jun 1;12(3):117–119. doi: 10.1097/00063110-200506000-00004. [DOI] [PubMed] [Google Scholar]
7. van der Padt A., van Schaik R.H., Sonneveld P. Acute dystonic reaction to metoclopramide in patients carrying homozygous cytochrome P450 2D6 genetic polymorphisms. Neth. J. Med. 2006 May;64(5):160–162. [PubMed] [Google Scholar]
8. Tianyi F.L., Agbor V.N., Njim T. Metoclopramide induced acute dystonic reaction: a case report. BMC Res. Notes. 2017 Jan;10(1):32. doi: 10.1186/s13104-016-2342-6
9. Tianyi FL, Agbor VN, Njim T. Metoclopramide induced acute dystonic reaction: A case report. BMC Res Notes 2017;10:32.
10. 3. Sheikh Hassan M, Ahmed Nor M. Metoclopramide induced acute dystonic reaction: A case report. Ann Med Surg (Lond) 2022;74:103248.
11. Yis U, Ozdemir D, Duman M, Unal N. Metoclopramide induced dystonia in children: Two case reports. Eur J Emerg Med 2005;12:117–9.