

DOMPERIDONE VS METOCLOPRAMIDE: COMPARATIVE EVALUATION OF EFFICACY IN TREATING DIABETIC GASTROPARSIS

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Abstract: Diabetic gastroparesis, a common complication of diabetes mellitus, presents a challenging clinical scenario characterised by delayed gastric emptying and symptoms such as nausea, vomiting, abdominal pain, and bloating. **Objectives:** The primary aim of the study is to compare domperidone vs metoclopramide to evaluate their efficacy in treating diabetic gastroparesis. **Methods:** This comparative study was conducted in DHQ Hospital Nowshera Khyber Pakhtunkhwa—from June 2022 to June 2023. Data was collected from 190 patients from both genders. Patients meeting the inclusion criteria are randomised into Group A (Domperidone) and Group B (Metoclopramide). The severity of gastroparesis symptoms is assessed using validated symptom-scoring tools before treatment initiation and at regular intervals throughout the study. **Results:** Data was collected from 190 patients suffering from DM. The mean age of the patients in group A was 52.4 ± 8.2 years and in group B, 53.1 ± 7.5 years. There were 105 female and 185 male patients. The mean duration of DM is 12.3 ± 4.1 years and 11.8 ± 3.8 years in groups A and B, respectively. Group A (Domperidone) and Group B (Metoclopramide) demonstrated significant improvement in symptom scores from baseline to the final assessment. Group A exhibited a substantial reduction in symptom score from 18.2 ± 4.5 at baseline to 8.7 ± 3.2 at the end of the study ($p < 0.001$), while Group B showed a decrease from 17.9 ± 4.3 to 9.5 ± 3.8 ($p < 0.001$). Moreover, both groups experienced notable reductions in gastric emptying time. **Conclusion:** It is concluded that both domperidone and metoclopramide are effective in managing diabetic gastroparesis, with nuances in their safety profiles.

Keywords: Diabetes Mellitus, Type 2, Gastroparesis, Domperidone, Metoclopramide, Comparative Study

Introduction

Diabetic gastroparesis, a common complication of diabetes mellitus, presents a challenging clinical scenario characterised by delayed gastric emptying and symptoms such as nausea, vomiting, abdominal pain, and bloating. Management of diabetic gastroparesis aims to alleviate symptoms and improve the quality of life for affected individuals. Among the various pharmacological interventions, domperidone and metoclopramide have emerged as prominent treatment options (1).

Domperidone and metoclopramide belong to the prokinetic class of drugs, acting to enhance gastrointestinal motility and facilitate gastric emptying. While both medications share this common therapeutic goal, they differ in their mechanisms of action and side effect profiles (2). Domperidone primarily acts as a dopamine receptor antagonist, exerting prokinetic effects by blocking inhibitory impulses in the gastrointestinal tract. In contrast, metoclopramide functions as a dopamine receptor antagonist and a serotonin receptor agonist with additional antiemetic properties (3). Various prokinetic agents, such as dopamine D2 antagonists like metoclopramide and domperidone, the cholinomimetic cisapride, and macrolide antibiotics like erythromycin, have been employed with varying success in diabetic gastroparesis (DG) treatment (4).

However, only metoclopramide has received approval for treating diabetic gastroparesis in the United States.

Metoclopramide therapy has proven effective in alleviating DG symptoms but comes with notable central nervous system (CNS) effects, affecting 10% of diabetic patients with symptoms like drowsiness, restlessness, lassitude, and fatigue (5). Additionally, extrapyramidal reactions may limit its use. In contrast, a multicenter trial demonstrated the efficacy of domperidone in treating DG in insulin-dependent diabetic patients, showing significant symptom improvement with domperidone compared to baseline (6). Unlike metoclopramide, domperidone's limited ability to cross the blood-brain barrier reduces the likelihood of CNS-associated adverse effects related to dopaminergic receptor blockade, making it a potentially more favourable option in managing DG (7). Thus, the primary aim of the study is to compare domperidone vs metoclopramide to evaluate their efficacy in treating diabetic gastroparesis.

Methodology

This comparative study was conducted in DHQ Hospital Nowshera Khyber Pakhtunkhwa from June 2022 to June 2023. Data was collected from 190 patients from both genders.

Participants eligible for inclusion in the study must have a confirmed diagnosis of either type 1 or type 2 diabetes mellitus. Additionally, these patients should exhibit evidence of delayed gastric emptying, as confirmed by

diagnostic tests such as gastric scintigraphy, demonstrating the presence of gastroparesis.

Excluded from the study are women who are pregnant or breastfeeding, individuals with a known allergy or hypersensitivity to domperidone or metoclopramide, and those with severe liver or kidney dysfunction, as indicated by abnormal liver function tests or impaired renal function. Patients meeting the inclusion criteria are randomised into Group A (Domperidone) and Group B (Metoclopramide). Group A patients receive oral domperidone, while Group B patients receive oral metoclopramide. The severity of gastroparesis symptoms is assessed using validated symptom-scoring tools before treatment initiation and at regular intervals throughout the study. Adverse events, particularly central nervous system-related side effects such as extrapyramidal symptoms and tardive dyskinesia, as well

as other medication-related adverse events, are monitored and recorded throughout the study period.

Data was analysed using SPSS 27. Descriptive statistics summarise baseline characteristics, and inferential statistics and t-tests compare outcomes between the two treatment groups.

Results

Data was collected from 190 patients suffering from DM. The mean age of the patients in group A was 52.4 ± 8.2 years and in group B, 53.1 ± 7.5 years. There were 105 female and 185 male patients. The mean duration of DM is 12.3 ± 4.1 years and 11.8 ± 3.8 years in groups A and B, respectively (Table 1).

Table 1: Baseline data of patients

Characteristic	Group A (Domperidone)	Group B (Metoclopramide)
Age (mean ± SD)	52.4 ± 8.2	53.1 ± 7.5
Gender (Male/Female)	95/55	90/50
Duration of Diabetes (years)	12.3 ± 4.1	11.8 ± 3.8
Gastric Emptying Delay (min)	98.7 ± 15.2	99.5 ± 16.8

Group A (Domperidone) and Group B (Metoclopramide) demonstrated significant improvement in symptom scores from baseline to the final assessment. Group A exhibited a substantial reduction in symptom score from 18.2 ± 4.5 at baseline to 8.7 ± 3.2 at the end of the study (p < 0.001), while Group B showed a decrease from 17.9 ± 4.3 to 9.5 ±

3.8 (p < 0.001). Moreover, both groups experienced notable reductions in gastric emptying time. In Group A, the baseline gastric emptying time of 98.7 ± 15.2 minutes decreased to 76.5 ± 12.1 minutes (p < 0.05), and in Group B, the baseline gastric emptying time of 99.5 ± 16.8 minutes decreased to 80.2 ± 14.5 minutes (p < 0.05) (Table 2).

Table 2: Symptom relief score and gastric emptying time in both groups

Group	Baseline Symptom Score (mean ± SD)	Final Symptom Score (mean ± SD)	p-value
Group A (Domperidone)	18.2 ± 4.5	8.7 ± 3.2	<0.001
Group B (Metoclopramide)	17.9 ± 4.3	9.5 ± 3.8	<0.001
Group	Baseline Gastric Emptying Time (min)	Final Gastric Emptying Time (min)	p-value
Group A (Domperidone)	98.7 ± 15.2	76.5 ± 12.1	<0.05
Group B (Metoclopramide)	99.5 ± 16.8	80.2 ± 14.5	<0.05

The incidence of adverse events in Group A (Domperidone) and Group B (Metoclopramide) was assessed. Gastrointestinal discomfort was reported by 8% in Group A and 12% in Group B. Headache occurred in 5% of Group A and 10% of Group B. Dizziness was experienced by 3% in Group A and 15% in Group B. Fatigue was reported by 6% in Group A and 8% in Group B. Nervousness occurred in

2% of Group A and 9% of Group B. Extrapyramidal Symptoms (EPS) were noted in 7% of Group A and 15% of Group B (Table 3). Tardive Dyskinesia was not reported in either group. % compared to 45% in Group B (Metoclopramide). Similarly, Group A exhibited a more significant improvement in gastric emptying at 22% compared to 18% in Group B (Table 4).

Table 3: Adverse events in both groups

Adverse Event	Group A (Domperidone)	Group B (Metoclopramide)
Gastrointestinal discomfort	8%	12%
Headache	5%	10%
Dizziness	3%	15%
Fatigue	6%	8%
Nervousness	2%	9%
Extrapyramidal Symptoms (EPS)	7%	15%
Tardive Dyskinesia	0%	0%

Table 4: Therapeutic efficacy of both drugs

Group	Symptom Relief (%)	Improvement in Gastric Emptying (%)
Group A (Domperidone)	52%	22%
Group B (Metoclopramide)	45%	18%

Discussion

The results demonstrate that both domperidone and metoclopramide effectively relieved symptoms of diabetic gastroparesis and improved gastric emptying rates. Symptom relief, as indicated by the reduction in symptom scores, was notably significant in both groups, with a slightly greater reduction observed in the domperidone group (52% vs. 45%) (8). This finding aligns with the peripheral action of domperidone, emphasising its potential advantages in symptom management (9). Gastric emptying rates significantly improved in both groups, further supporting the prokinetic effects of both medications. Domperidone exhibited a slightly more significant improvement in gastric emptying rates (22% vs. 18%), indicating its potential as an effective prokinetic agent in diabetic gastroparesis (10, 11). Upon targeted patient inquiries, it was discerned that the frequency and intensity of central nervous system (CNS) adverse events commonly associated with metoclopramide were notably lower in individuals administered domperidone than those receiving metoclopramide (12). These findings align with a prior double-masked, placebo-controlled crossover study investigating domperidone and metoclopramide, where 11 metoclopramide-treated patients reported side effects such as dizziness, depression, and lethargy, contrasting with only two domperidone-treated patients and three placebo-treated patients (13-15). This observed distinction is likely attributed to metoclopramide's ability to penetrate the blood-brain barrier, in contrast to the limited permeability of domperidone through this barrier. The safety assessments revealed that both medications were generally well-tolerated (16-18). However, metoclopramide was associated with a higher incidence of extrapyramidal symptoms (EPS) compared to domperidone (15% vs. 7%). This finding is consistent with the known side effect profile of metoclopramide, which acts centrally and has been associated with movement disorders (19, 20).

Conclusion

It is concluded that both domperidone and metoclopramide are effective in managing diabetic gastroparesis, with nuances in their safety profiles. Domperidone may offer a slightly more favourable safety profile, emphasising the importance of individualised treatment decisions considering both efficacy and potential adverse effects.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate.

Approved by the department concerned. (letter No.362 dated 12.10.21)

Consent for publication

Approved

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Conflict of interest

The authors declared an absence of conflict of interest.

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