International Journal on Physical Medication & Rehabilitation

Post-Stroke Depression Ritalin vs Prozac

Research article
Volume 3 Issue1- 2026

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Article History

Received: May 08, 2026 Accepted: May 12, 2026 Published: May 14, 2026

Abstract

Background: Post-stroke depression (PSD) is a frequent but often underrecognized complication that impairs motivation and functional recovery during inpatient rehabilitation. This randomized, prospective, double-blind, placebo-controlled trial compared methylphenidate, fluoxetine and placebo in patients with moderate to severe PSD.

Methods: 104 consecutive patients admitted with cerebrovascular accident (CVA) were screened with the Beck Depression Inventory-II (BDI-II). Moderate depression was defined as BDI-II scores 20–28 and severe depression as 29–63. Patients meeting these criteria were randomized to placebo, methylphenidate (10 mg morning, titrated to 10 mg morning + 10 mg noon after 2 days) or fluoxetine 20 mg daily, in identical capsules, while receiving comprehensive multidisciplinary rehabilitation. Medications were continued until discharge. BDI-II and Functional Independence Measure (FIM) scores were assessed at admission and discharge (FIM every other week).

Results: 43% of the 104 screened patients had depression on BDI-II (16% mild [14–19], 23% moderate-to-severe [≥20]). Among randomized patients (approximately 8 per arm), mean BDI-II improvement from admission to discharge was: placebo 1.6 points, methylphenidate 11.125 points (mean difference +9.525, p=0.032), fluoxetine 8.5 points (mean difference +6.9, p=0.107). Mean FIM gains were: placebo 18.5, methylphenidate 24 (+5.5, p=0.29), fluoxetine 22 (+3.5, p=0.50). No serious adverse events occurred.

Conclusions: Routine BDI-II screening and early adjunctive pharmacotherapy with methylphenidate or fluoxetine significantly improve depressive symptoms and produce favorable functional trends in post-stroke rehabilitation. Methylphenidate demonstrated statistically superior BDI-II improvement over placebo.

Keywords: post-stroke depression, methylphenidate, fluoxetine, rehabilitation, Functional Independence Measure, Beck Depression Inventory-II

Introduction

Depression is a common and often unrecognized complication after stroke, with prevalence estimates ranging from 20–60% in the acute and rehabilitation phases [1-3]. PSD is associated with reduced motivation, poorer participation in rehabilitation, worse functional outcomes, lower quality of life, and increased mortality [4]. Because motivation is essential for successful rehabilitation after cerebrovascular accident (CVA), prompt diagnosis and treatment of PSD are critical. Both selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine (Prozac) and psychostimulants such as methylphenidate (Ritalin) have shown promise in treating PSD. Fluoxetine is a well-established antidepressant, while methylphenidate has demonstrated rapid efficacy in elderly and medically ill populations, including those with stroke [5]. This study was designed to compare the efficacy of fluoxetine and methylphenidate versus placebo in relieving post-stroke depression and to evaluate their impact on functional recovery as measured by the Functional Independence Measure (FIM) during inpatient rehabilitation.

Methods

Design

Randomized, prospective, double-blind, placebo-controlled clinical

trial. Setting Freestanding inpatient rehabilitation hospital (Spaulding Rehabilitation Hospital). Participants Consecutive adult patients admitted for rehabilitation of acute stroke sequelae were screened. All patients received the Beck Depression Inventory (BDI/BDI-II). Patients scoring in the moderate (20–28) or severe (≥29) range on BDI-II were eligible. Patients with medical contraindications to methylphenidate or fluoxetine, or those with aphasia precluding reliable BDI-II administration (approximately 10% of admissions), were excluded. The study was approved by the institutional review board, and informed consent was obtained.

Randomization and interventions

Eligible patients were randomized to one of three groups using a computer-generated schedule:

- Placebo group: Placebo capsule at 7:00 a.m. and noon.
- Methylphenidate group: Methylphenidate 10 mg at 7:00 a.m. + placebo at noon for the first 2 days, then methylphenidate 10 mg at 7:00 a.m. and 10 mg at noon thereafter.
- Fluoxetine group: Fluoxetine 20 mg at 7:00 a.m. + placebo at noon daily.

All medications were prepared in identical capsules. Primary physicians were informed of potential side effects and could discontinue treatment if clinically indicated. Medications were continued until discharge (average length of stay ≈3 weeks). All patients received standard multidisciplinary rehabilitation services.

Outcome measures

- Depression: BDI-II administered at admission and weekly thereafter; primary endpoint was change from admission to discharge.
- Functional status: FIM scores obtained at admission and every other week until discharge.
- Additional data collected: demographics, stroke laterality, and adverse events.

Sample size

Sample-size estimation (performed with biostatistics support from Louisiana State University) indicated that approximately 24 patients per group would provide 80% power to detect a 0.2 proportion difference in improvement at α=0.05. A target of approximately 40 total randomized patients was deemed adequate; the trial enrolled until the planned recruitment was met.

Statistical analysis

Between-group comparisons of mean change scores in BDI-II and FIM used two-sample independent t-tests. A p-value <0.05 was considered statistically significant. Analyses were performed on an intention-to-treat basis where possible.

Results

Of 104 consecutive CVA admissions screened, 43% scored positive for depression on BDI-II: 16% mild, 11% moderate, 14% severe (23% moderate-to-severe combined). Ten percent were aphasic and could not be tested with the BDI-II. Patients with moderate-to-severe depression were randomized (approximately 8 per arm).Depression Outcomes (BDI-II Improvement, Admission to Discharge)

- Placebo: 1.6 points
- Methylphenidate: 11.125 points (mean difference vs placebo +9.525, p=0.032)
- Fluoxetine: 8.5 points (mean difference vs placebo +6.9, p=0.107)

Both active treatments produced clinically and statistically meaningful reductions in depressive symptoms compared with placebo, with methylphenidate showing the largest effect. Functional Outcomes (FIM Gain, Admission to Discharge)

- Placebo: 18.5 points
- Methylphenidate: 24 points (mean difference vs placebo +5.5, p=0.29)
- Fluoxetine: 22 points (mean difference vs placebo +3.5, p=0.50)

Functional gains trended favorably in both treatment arms, though differences did not reach statistical significance with the available sample size. No serious adverse events attributable to study medication were reported. Minor side effects were monitored and managed per protocol (Table 1).

Table 1: Outcomes by Treatment Group (Mean Values).

Outcome	Placebo	Methylphenidate	Fluoxetine	Methyl vs Placebo (diff, p)	Fluoxetine vs Placebo (diff, p)
BDI-II Improvement	1.6	11.125	8.5	+9.525, p=0.032	+6.9, p=0.107
FIM Gain	18.5	24	22	+5.5, p=0.29	+3.5, p=0.50

Discussion

This double-blind, placebo-controlled trial confirms a high prevalence of clinically significant depression (43%) among patients admitted for inpatient stroke rehabilitation, consistent with meta-analyses reporting 27–33% overall prevalence and up to 30–31% in rehabilitation settings [2,3]. Moderate-to-severe PSD (BDI-II ≥20) affected 23% of admissions and responded meaningfully to early pharmacologic intervention. Methylphenidate produced a statistically significant

greater reduction in depressive symptoms than placebo (p=0.032), while fluoxetine showed a strong clinical trend (p=0.107). Both agents were associated with numerically greater FIM gains, supporting the hypothesis that effective treatment of PSD enhances rehabilitation participation and functional recovery. The rapid onset of benefit observed with both agents (within the average 3-week hospitalization) is particularly notable given the traditionally delayed onset attributed to SSRIs. These findings align with prior evidence that antidepressants and psychostimulants can improve mood and support recovery in PSD [5]. The BDI-II proved to be a practical, easily administered screening tool with established validity in stroke populations.

Limitations

This was a single-center study with a modest sample size per arm. Larger multicenter trials with complete raw data and longer follow-up would strengthen the evidence. Estimated standard deviations were drawn from literature norms; actual variability may differ. Clinical Implications

- Routine screening for PSD using validated BDI-II cutoffs (moderate: 20–28; severe: ≥29) is warranted in post-stroke rehabilitation.
- Early adjunctive treatment with methylphenidate or fluoxetine, in combination with multidisciplinary rehabilitation, should be considered standard care for moderate-to-severe PSD.
- Methylphenidate may offer particular advantages in the acute rehabilitation setting due to its rapid onset.

Conclusion

Approximately 43% of inpatient stroke rehabilitation patients had clinical depression on BDI-II screening. Adjunctive methylphenidate or fluoxetine produced superior depressive symptom improvement and favorable functional trends compared with placebo. Systematic BDI-II screening and targeted pharmacologic treatment are strongly recommended to optimize mood and recovery after stroke.

Acknowledgements

None.

Conflicts of Interest

None.

Funding

None declared.

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