

Evaluation of antidepressant effects of rosuvastatin in male albino mice by tail suspension model

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Abstract

Objective: To evaluate the antidepressant activity of Rosuvastatin in male albino mice.

Method: Thirty male swiss albino mice were selected for tail suspension model. There were five groups and each group had six animals. The control group received Normal saline (10ml/kg I.P), the standard Imipramine (10mg/kg I.P), the 3 test group received Rosuvastatin (10mg/kg, 15mg/kg, 20mg/kg I.P) respectively. The test was conducted 30mins after injecting the drugs. Duration of immobility was noted. Statistical analysis was performed using Mean +/- SEM. One way ANOVA followed by Tukey's post hoc test was done $P < 0.05$ was considered statistically significant.

Results: Rosuvastatin produced significant antidepressant effect at all the doses, as indicated by reduction in the duration of immobility compared to the control and standard with significant p value of < 0.0001 .

Conclusion: The results of the present study indicates the antidepressant like activity of Rosuvastatin in male albino mice.

Keywords: Rosuvastatin, Antidepressant, Albino mice.

Introduction

Depressive disorders are very common in clinical practice, with approximately 11.3% of all adults. Depression is characterized by disturbances in sleep and appetite as well as deficits in cognition and energy. Approximately two-thirds of the depressed patients respond to the currently available treatments (Tricyclic antidepressants, Selective serotonin reuptake inhibitors, etc) Magnitude of improvement is still disappointing. These drugs have unusual side effects. Search for more effective drugs with fewer side effects is continuing. Antidepressant medications work by normalizing the levels of neurotransmitters, notably serotonin and norepinephrine. They include monoamine oxidase inhibitors, selective and non-selective monoamine reuptake inhibitors. Statins are effective and commonly prescribed drugs for hypercholesterolemia. Relation between cholesterol and depression has been suggested in both Clinical and preclinical studies. The recently proposed entity of 'vascular depression' provides indirect support for hypercholesterolemia as a risk factor in the pathophysiology of depression. Hence this study was undertaken to find out its role in animal models of depression. Chandrashekar K et. al. has studied the antidepressant activity of statins in albino mice in an experimental study.⁽¹⁾ Fatma S. Kilic et. al has studied the acute antidepressant and anxiolytic effects of simvastatin and its mechanisms in rats.⁽²⁾ Perry F Renshaw et. al. has studied the potentiating antidepressant activity of Fluoxetine by Lovastatin in rats.^(3,4)

Aims and Objectives

- To study the antidepressant activity of Rosuvastatin in male albino mice by tail suspension model.
- To compare the antidepressant activity of Rosuvastatin with tricyclic antidepressant imipramine as standard

Materials and Methods

The study was conducted in the Department of Pharmacology, J.J.M Medical College, Davangere between 8:00 A.M. to 4:00 P.M. The laboratory was equipped with standard fluorescent lighting. Male Swiss albino mice weighing 20-30 g, inbred in the central animal house of the Department were selected for study. Ethical approval was taken from IAEC.

Drugs used were Normal saline (Control): 10ml/ kg i.p., Imipramine (Standard): 10mg/kg i.p., Rosuvastatin (test): 10 mg/kg, 15 mg/ kg, 20 mg/ kg i.p. The experiment was conducted 30 minutes after injecting the drug.

Male Swiss albino mice weighing between 20-30g of 3-4 months old with healthy and normal behaviour and activity were included in the study. Mice weighing $< 20g$ and $> 30g$ and age < 3 months and > 4 months and female mice were excluded. Animals previously used in other experiments were also excluded. Five groups of six animals each were made and kept under controlled temperature of $21 \pm 3^\circ C$, with a 12 hour light: 12 hour dark cycles were evaluated for antidepressant activity using forced swim model.

Treatment protocol

- Group A: 10ml/kg Normal saline i.p. (control)
- Group B : Imipramine 10 mg/kg i.p.(standard)
- Group C : 10mg/kg Rosuvastatin i.p. (test)

- Group D : 15mg/kg Rosuvastatin i.p. (test)

- Group E: 20mg/kg Rosuvastatin i.p. (test)

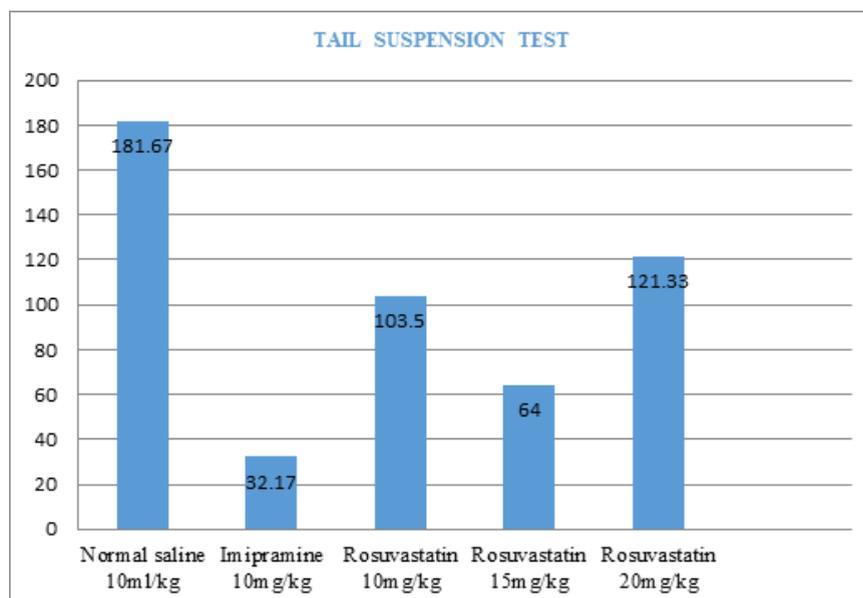
Animals were suspended upside down on a metal rod at a height of 55 cm from the ground with the help of an adhesive tape placed approximately 1 cm from the tip of the tail. The animal was considered immobile when it did not show any movement of body and hanged passively. The immobility displayed by rodents when subjected to this kind of unavoidable and inescapable stress has been hypothesized to reflect behavioural despair which in turn may reflect depressive disorders in humans. The total duration of immobility was noted during 6 minute period.

Statistical analysis: One way ANOVA was applied for total duration of immobility. Tukey's Post Hoc Analyses was done for the same parameter to compare between the groups.

Results

Different groups	Mean total duration of immobility
Normal saline 10ml/kg	181.67s
Imipramine 10 mg/kg	32.17s
Rosuvastatin 10 mg/kg	103.50s
Rosuvastatin 15 mg/kg	64s
Rosuvastatin 20 mg/kg	121.33s

The differences in the immobility period among different groups was very highly significant ($p < 0.0001$).



Discussion

The present study shows rosuvastatin has antidepressant activity in laboratory animals. All three doses i.e. 10,15,20mg/kg produced significant antidepressant activity in FST model. Chandrashekar K et. al. has shown the antidepressant activity of statins in albino mice in an experimental study.⁽¹⁾ Fatma S. Kilic et. al has studied the acute antidepressant and anxiolytic effects of simvastatin in rats.⁽²⁾ Perry F Renshaw et. al. has shown that the antidepressant activity of Fluoxetine will be potentiated by Lovastatin in rats.⁽³⁾ The results of the present study correlates with the above mentioned studies.

Conclusion

The results of the present study have shown that rosuvastatin has antidepressant activity. Further studies may help to elucidate the possible mechanisms of action of statins in depression.

References

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