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2010

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Wattmo, C., Jedenius, E., Minthon, L., & Wallin, Å. (2010). *Plasma concentration of galantamine - influence of dose and body mass index in Alzheimer's disease..* Poster session presented at 11th International Geneva/Springfield Symposium on Advances in Alzheimer Therapy, Geneva, Switzerland.

Total number of authors:

4

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Plasma concentration of galantamine in Alzheimer's disease - influence of dose and body mass index



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Conclusions

Galantamine plasma concentration demonstrated a strong relationship with dose. The dose did not differ between genders, whereas the impact of body mass index on plasma concentration was important only among the males.

Background and objectives

Patients with Alzheimer's disease (AD) are at present treated with galantamine without actual knowledge of plasma concentration levels. The aim of this presentation is to analyse the relationship between galantamine plasma concentration, dose, demographic factors and body mass index (BMI).

Methods and subjects

The Swedish Alzheimer Treatment Study (SATS) is a 3-year ongoing, open-label, non-randomized, prospective, multicentre study in a routine clinical setting. A total of 84 AD patients treated with galantamine and recruited at the Memory Clinic in Malmö were included in this study. They were assessed with several cognitive and functional rating scales at baseline and every 6 months over the course of 3 years. After 180 of these assessments, blood samples were obtained for the analysis of plasma galantamine concentration. Efficacy measures including Mini Mental State Examination (MMSE), Instrumental activities of daily living scale (IADL) and BMI were simultaneously evaluated. The dose, as well as the time from drug intake to plasma extraction was investigated.

One-way Analysis of Variance (ANOVA) with Bonferroni correction was used to compare the mean differences between the groups based on galantamine dose, and T-test was computed for analyses between genders. Pearson's correlation coefficient was calculated investigating any linear associations between plasma concentration and the variables dose, age and BMI, respectively. A general linear model with plasma concentration as the dependent variable was used to study the multivariate impact on the independent variables.

Baseline characteristics	
Number of patients (n)	84
Gender (males / females)	29% / 71%
Age at onset ^a	73.9 ± 7.1
Age at start of treatment ^a	76.7 ± 7.0
Illness duration, years ^a	3.0 ± 1.8
MMSE, range 0 - 30 ^a	22.7 ± 4.0
IADL, range 8 - 31 ^{a, b}	13.4 ± 5.0

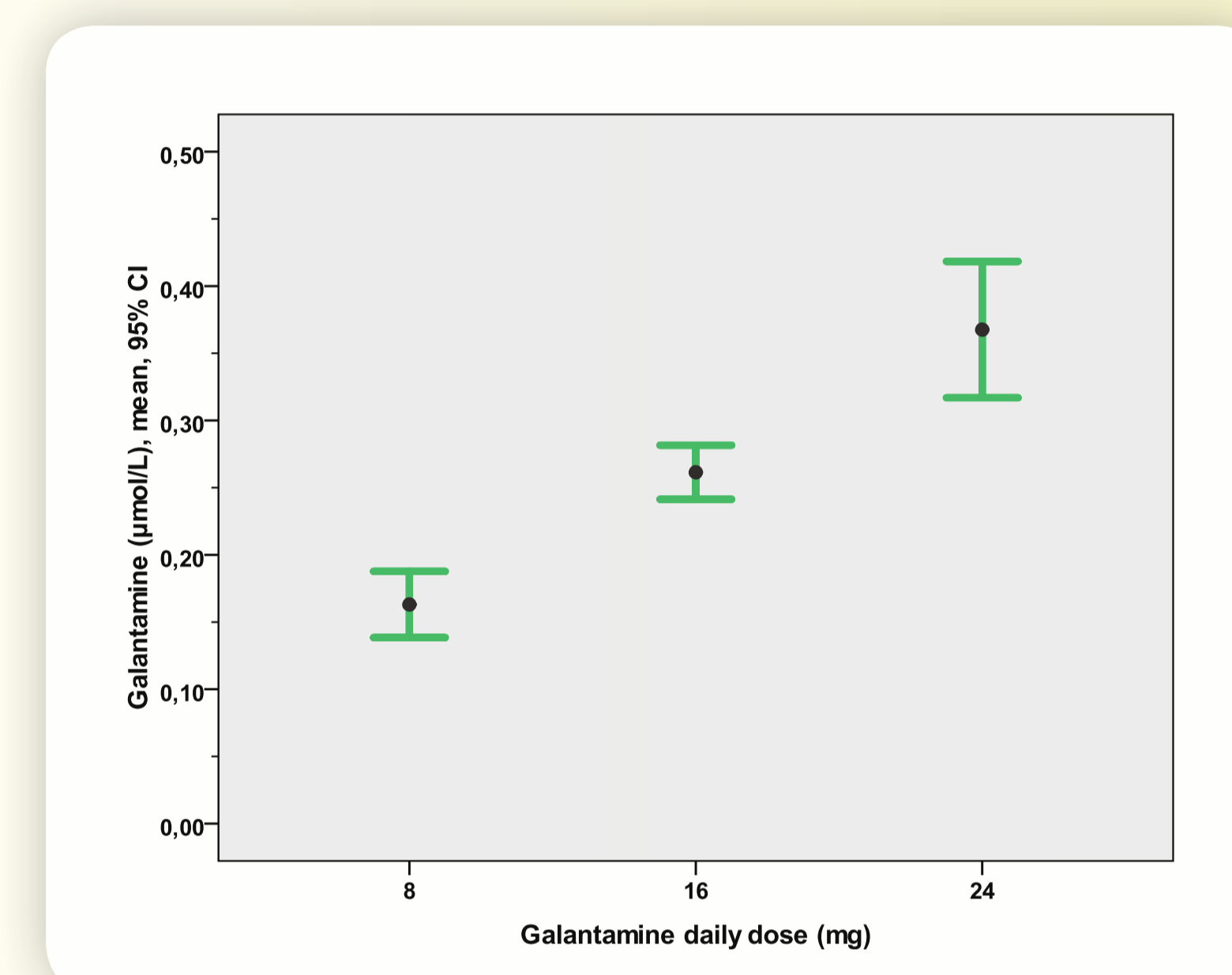
^amean ± SD, ^bIADL – 8 (no impairment) to 31 (severe impairment).

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Poster presented at the 11th International Geneva/Springfield Symposium on Advances in Alzheimer Therapy. Geneva, March 24-27, 2010.

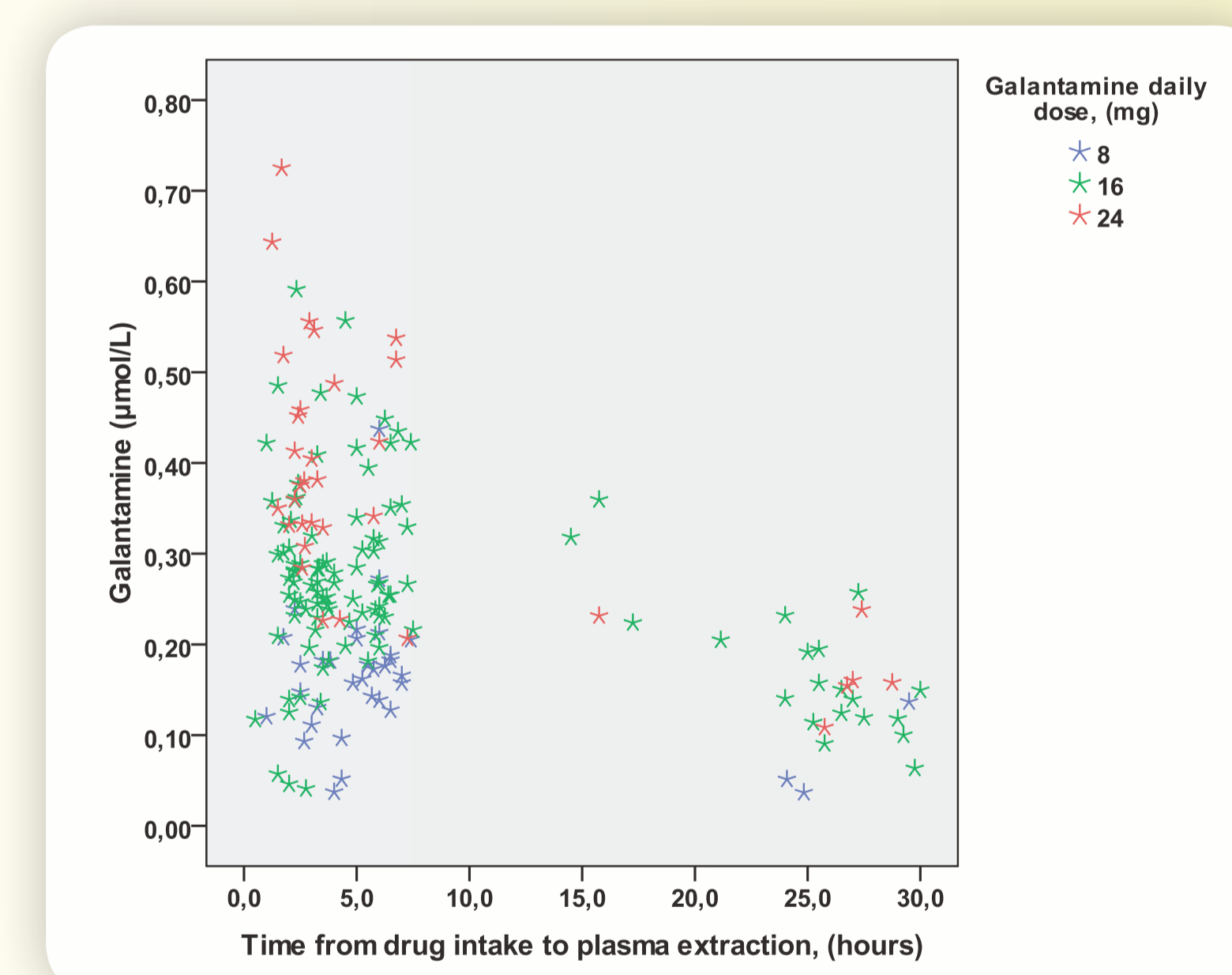
Results

Fig 1 Association between galantamine plasma concentration and daily dose.



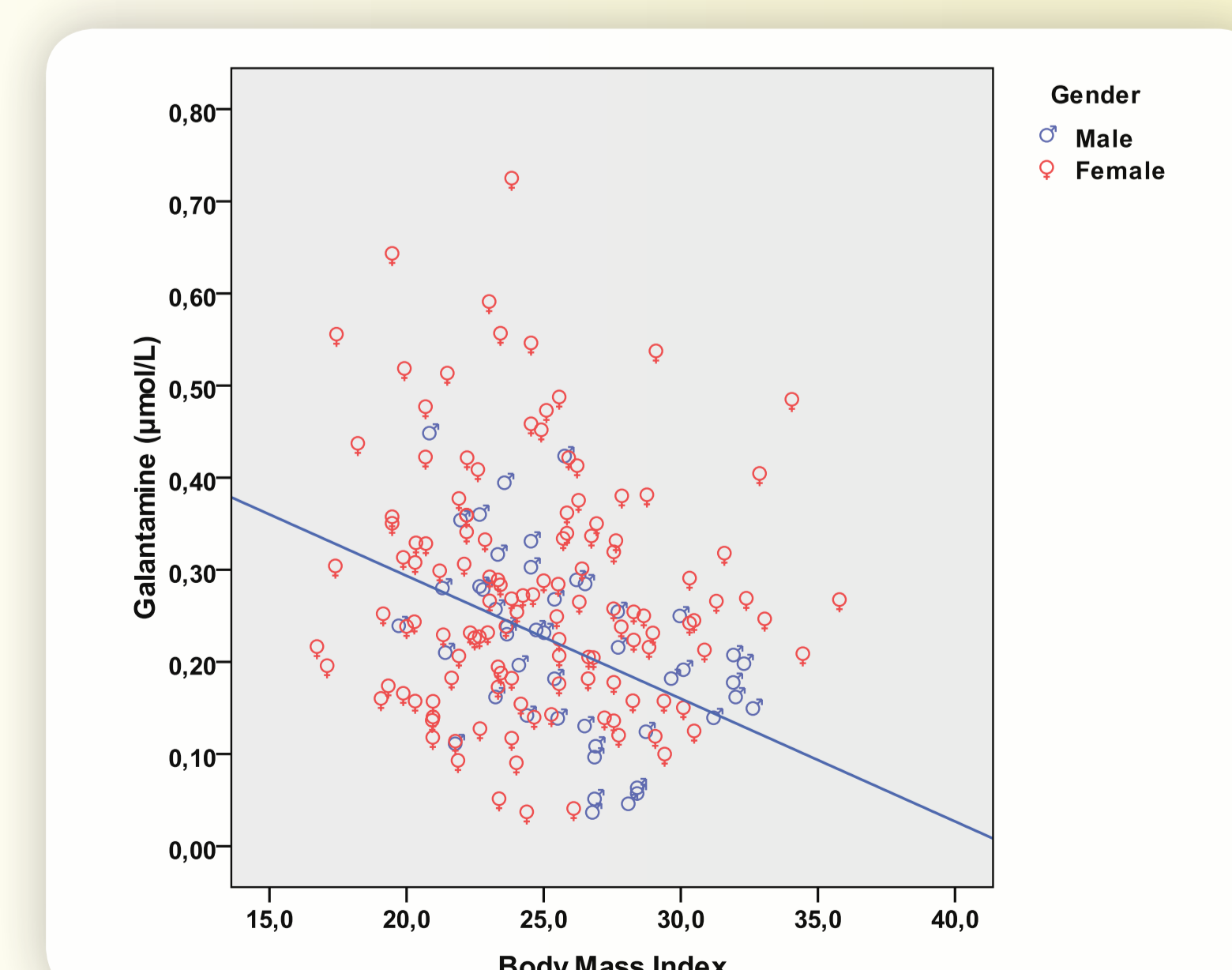
Mean galantamine plasma concentration demonstrated strong positive linear association with dose ($r_s = 0.51, p < 0.001$). The mean ± SD plasma concentration levels (µmol/L) differed significantly between the patients with the respective daily doses; 8 mg: 0.163 ± 0.073 , 16 mg: 0.261 ± 0.105 , 24 mg: 0.368 ± 0.145 ($p < 0.001$). No gender differences regarding dose were observed.

Fig 2 Galantamine plasma concentration level depending on time from drug intake.



The galantamine plasma concentration level showed a steady decline over the time from drug intake to plasma extraction. The patients with a daily dose of 24 mg indicated a more rapid decline in plasma concentration.

Fig 3 Relationship between galantamine plasma concentration and body mass index



There was no linear relationship between galantamine plasma concentration and body mass index (BMI) in the entire cohort. When investigating the impact of gender, a negative linear association ($r = -0.45, p = 0.001$) between concentration and BMI was found in the male group but not in the female. Larger men showed lower plasma concentration levels.