Impaired Thinking in Patients with Breast Cancer and Depression

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original shape of a ball, does not include the loss of substance or mass. Children learn to master these transitional tasks at the age of 6-10 years [17]. According to the classical models of cognitive development, early stages before age 6 are characterized by such a cognitive and perceptual bias, leading to this incorrect performance. This bias should to be overcome when higher executive networks in the anterior cingulate cortex and the prefrontal cortex develop at the age of 6-10 [18-20].

We conducted this cross-sectional study to examine cognitive dysfunction in breast cancer patients with depression, by employing a validated cognition test for short-term (STM) and long-term memory (LTM) and applying the Piaget tasks in an unusual way. In addition, we investigated the influence of various factors like BDNF, IL-6 and demographic factors on depression and cognition in this metastatic setting.

Patients and Methods

Patients with advanced metastatic breast cancer were evaluated at bedside for symptoms of depression. All patients were receiving their current course of chemotherapy at time of evaluation. The same investigator collected the blood samples and performed the cognition tests like the MMSE, VLMT and the Piaget tasks. In addition, demographic data like age, Karnofsky Performance Status (KPS), hormone receptor status, location and number of metastasis, prior adjuvant treatments, prior number of chemotherapy line was collected.

This study was approved by the institutional ethics committee, all

Statistical Methods

Descriptive analysis included absolute and relative frequencies for categorical variables, as well as mean, standard deviation, median and range for numerical measurements. For univariate group comparisons between categorical variables and patients groups (depression vs. no depression), the Chi square test, for small sample sizes, the Fisher's Exact test were applied, as appropriate.

T e Wilcoxon-Test for independent samples was used to assess the degree of variance of continuous variables between the two patient groups (depression vs. no depression). Correlations were evaluated using the Spearman's correlation coe f cient. All results were considered signi f cant at $p<0.05$ (two-tailed).

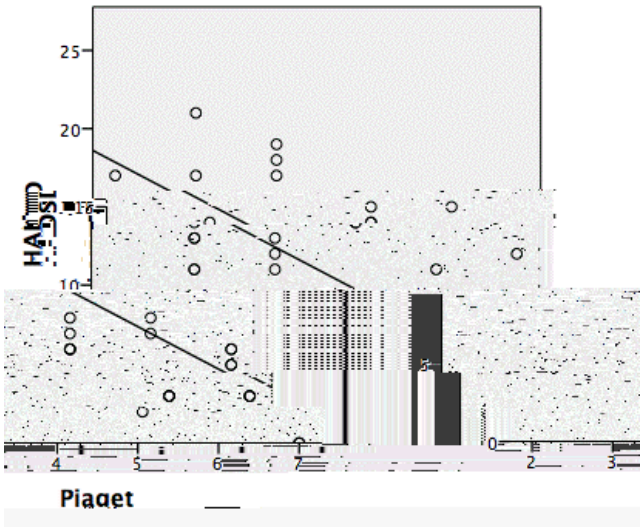
A multiple logistic regression analysis was performed to identify independent predictors (IL-6, BDNF, age, KPS, Tumor activity) for depression. In addition, linear regression was applied to determine the independent in f uence of various variables on BDNF and the ability to perform the Piaget tasks. T e resulting models were obtained a f er forward and backward selection. For comparability, standardized regression coe f cients are presented as well.

Results

Twenty-nine patients were diagnosed with clinical depression and 27 matched cancer patients with no history of depression were recruited for comparison. All 29 patients identi f ed

Characteristic	Depression (n=29)	No Depression (n=27)	P value
HADS-D-Score (0-21)	13.7 Ñ 2.7	4.5 Ñ 2.2	p<0.001
Age (years)	61 Ñ 10.9	59 Ñ 9.5	p=0.52
			p=0.03
KPS[1] (%)	63 Ñ 10.7	70.4 Ñ 12.7	
Number of prior chemotherapy lines%			
1	11	13	
2	57	46	
3	20	25	p=0.71
4	12	16	
Hormone receptor status			
Positive	19	16	p=0.49
Negative	10	11	
Tumor-status			
SD[2]	8	12	p=0.002
PD[3]	21	15	
IL-6 (Y			

Linear regression analysis showed that performance of the Piaget tasks was predicted in-dependently only by BDNF level and short-term memory (b=0.23, p=0.043 and b=0.46, p=0.001, respectively). The prior number of chemotherapy lines (b=-1.1; p=0.42), KPS (b=1.4; p=0.51) or age (b=-1.8; p=0.12), had no influence on the ability to perform the Piaget tasks. Only LTM was reduced by a poor KPS (b=-0.31; p=0.03).



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