

# The association of low-dosage sex hormone replacement therapy and the aging brain using 3.0T MR scanner

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## Objectives:

To investigate whether longtime low-dosage sex hormone replacement therapy (HRT) has an effect on preventing degeneration of the brain by monitoring the high signal abnormalities on FLAIR serial MRI images and the volume of hippocampus.

## Methods and Materials:

155 postmenopausal women (PMW) were studied by 3.0T MRI (GE Signa 3.0T VH3), 72 of them (aged 65.17±7.10) who took low-dosage HRT for more than four years composed HRT group, the other 83(aged 66.50±8.00) who never took HRT composed control group. According age, the PMW were divided into 3 subgroups(50-59; 60-69 and over 70ys). The scanning protocol include axial T2 weighted image, matched FLAIR image, T1 weighed image(oblique coronal, vertical to the hippocampus; slice thickness 3mm, without gap, and including the whole body of hippocampus), and 3D image including the whole brain. High signal abnormalities were rated by three experienced neuroradiologists on T2WI or FLAIR images. The sites and grades of hyperintensities were described in Table 1. Volume of bilateral hippocampus was manually measured (using GE workstation, first draw the contour of the hippocampus in each slice of oblique coronal T1WI image, add all the area and then multiple slice thickness, so can get volume of hippocampus) and then calculate the ratio of hippocampus and the whole volume of the brain. The statistics work were performed by SPSS for windows 13.0. Chi-square test and t-test were used to analyze the high signal data and volume of hippocampus.

Table 1 Visual rating of signal hyperintensities

Lesions	Score	
DWMH	0=none	1= $\leq 5$ lesions
	2= $> 5$ lesions or confluent	3=confluent
PVH:	0=none	
	1= $\leq 5$ lesions or thin rim	
	2=contiguous $\leq 25\%$ of white matter or $> 5$ punctate lesions	
	3=contiguous $> 25\%$ of white matter	

DWMH: deep white matter hyperintensities; PVH: periventricular hyperintensities

## Results:

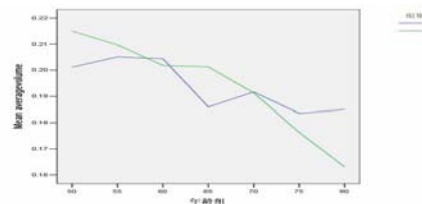
In the analysis of DWMH high signal abnormalities, in over 70ys PMW group, the grade of DWMH in HRT group is much lower than control group, a significant difference was found ( $P=0.015$ ), and there was no significant difference in other years group (picture 1). The PVH grade has no significant difference in each two group. About volume of hippocampus, there is no significant difference between each group, but the rate of atrophy is much slower in HRT group than control group especially in over 70ys group according to the curve (picture 2).

## Conclusions:

These findings suggest that longtime low-dosage HRT may postponed the sclerosis of small cerebral vascular in PMW. long-term low dose HRT can avoid hippocampus atrophy, which is beneficial to maintaining function of brain and prevention of AD.

×±± \* DWMH \* YG1 Crosstabulation

Count		DWMH				Total	
YG1		0	1	2	3		
50.00	×±±±	1	8	5	6	19	
	±±±±	2	9	9	1	19	
	Total	17	14	7		38	
60.00	×±±±	1	6	13	13	0	32
	±±±±	2	9	15	8	2	34
	Total	15	28	21	2	66	
70.00	×±±±	1	5	8	6	1	20
	±±±±	2	3	3	20	4	30
	Total	8	11	26	5	50	



Picture1: DWMH in different groups, in over 70ys PMW group, there is a Significant difference.

picture2: the decline trend of hippocampus volume of each group the rate of atrophy is much slower in HRT group than control group especially in over 70ys group