

The Role of Local Alterations in Blood Circulation of the Brain in Anxious Patients Before and after Cognitive Group Therapy Through Radio Isotopic Studies in Spect Method in Taleghani Hospital, Tehran (Iran)

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Abstract: Although anxiety is a factor of motivation, when extending beyond necessary, it becomes a factor of disorder in behavioral system. In the present study and regarding the hypotheses and goals of the research the method of single photon emission computed tomography (SPECT) was used on patients with anxiety for the first time in Iran, in Taleghani hospital, Tehran. The statistical universe includes all clients who suffer from anxiety disorders, coming to Karaj well-being counseling center for help from June to September 2005. Due to limitations existing in (SPECT) method, the statistical sample includes only five patients with anxiety (without taking medicine), who are in the age range of 18 to 40. The research approach is quasi-experimental with pretest and post-test with a single group and devices such as: Self Assessment Anxiety cycle (SAS), single photon Emission computed tomography (SPECT), diagnosis by psychiatrists and by clinical psychologists, observation and interview and assessment criteria based on DSM-IV has been used. Finally, after scoring the tests and comparison between the scans taken before and after treatment, necessary data and findings were acquired as follows: 1) Cognitive group therapy is effective in cure of patients with anxiety. 2) There was a meaningful difference between the amount of blood in the left frontal lobe before and after group therapy, but there was no meaningful difference in other lobes and areas of the brain.

Key words: Spect • Local blood circulation • Anxiety • Temporal lobe • Frontal lobe • Occipital lobe • parietal lobe

INTRODUCTION

Anxiety is an alarming sign and it must be mentioned that a little degree of it is essential for existence and self-protection against dangers and threatening factors. But if it extends beyond some limits, anxiety may become a factor of disorder and collapse of behavioral system [1]. There are different etiological theories on anxiety, one of which has attracted many medical specialists and neuropsychiatrists, physiologists, psychiatrists and even clinical psychologists, is the study of neuroimaging structural and functional studies of the mind such as computer tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), electroencephalography (EEG) and single photon emission computed tomography (SPECT), each show findings and images from different places of the brain. These images

illustrate abnormalities in the frontal cortex, occipital cortex and temporal cortex. Thus according to the importance of the case (SPECT) was used for the first time in Iran in order to consider the alterations in local blood circulation in patients with anxiety and its relation with cognitive processes. Cognitive therapy method was devised in Western countries in the late 1950s and it is used to cure many difficulties from psychological problems and psychiatric disorders, control of anger and anxiotic disorders to therapy of schizophrenia. Various scientific findings obtained within last years have proved cognitive therapy as the most effective way to cure many disorders. In this method the emphasis is mainly on identification of irrational and negative thoughts, beliefs and defective assumptions and the patients are trained how to think positively and with optimism. Cognitive therapy is used in two ways, namely, individual and group

method by great people such as Beck and Ellis and has got a lot of advocates. In this research also, the cognitive group therapy has been used [2]. On the other hand, research done with PET, MRI and SPECT in patients with anxiety in Western countries indicates that these people show additional metabolic activity of blood circulation in their frontal lobe and basal ganglia particularly caudate [3]. Regarding that studies done on this field have led to contradictory outcomes and the effect of drug therapy has been emphasized rather than no drug therapy and as there existed no record of research on this case, here, attempt has been done to consider the effect of cognitive group therapy on local blood circulation in the brain before and after group therapy and examine whether behavioral cognitive group leads to any alterations in the blood circulation of patients with anxiety. We will also answer the following questions:

- Blood circulation alterations refer to which area of the patients' brain?
- Can SPECT method be used as an objective tool to get therapic outcomes?
- Are the outcomes obtained from inventories, cognitive tests and (SPECT) method congruent?

MATERIALS AND METHODS

The present research is of the type of pretest and post-test with a single group. In this research, the statistical universe includes all clients suffering from anxiety who have come to Karaj well-being counseling center for help from June to September 2005. The statistical sample was chosen by available sampling. Individuals were within the age range of 18 to 40 without taking any medicine and due to the following limitations, they were reduced from fifteen people to five:

- The difficulty of finding patients with anxiety who didn't take medicine.
- Opposition of parents and families of the patients to perform (SPECT) on them because of unfamiliarity with this method.
- Reduction of ten members who had taken part in the first stage (SPECT), but later gave it up for different reasons such as remoteness from Tehran, occupational problems, unwillingness of their husbands and so on.
- Avoidance of healthy people from partaking (as control group) because of unfamiliarity with this method.

Therefore, in this research also, eight sessions of short-term cognitive group therapy [2] was used for the period of two months (each week a two hour-session). In this method the clients are assisted to realize the relation between thoughts, feelings and behavior in order to identify negative inference and replace it with ideal and effective cognitive approaches. Induction of ideas, vertical arrow, identification and classification of beliefs, cognitive suitcase analogue and conducted Imaginative relaxation also was applied in this procedure. In the present research the Self Assessment Anxiety cycle (SAS) and single photon emission computed tomography (SPECT) system and diagnosis of patients by clinical psychologists were used as tools. The method of taking scans by (SPECT) is one of the methods used in nuclear medicine in which the target organ is studied in transversal, vertical and horizontal sections after being exposed to radio-activity. In (SPECT) method the amount of radioactive material concentration or count is measured. Each count is a standard for this amount which is assessed by computer, both quantitatively (numerically) and qualitatively (by observing stained places).

The amount of radioactive material or count which is obtained by contact gamma-ray, is measured in comparison with cerebellum. For example:

Cerebellum (after treatment)		Cerebellum (before treatment)	
Right	7690	Right	10100
left	8104	left	11282
Frontal lobe (after treatment)		Frontal lobe (before treatment)	
Right	80623	Right	63735
left	70212	left	56293

$$\frac{\text{The amount of the blood in the front lobe before treatment}}{\text{The amount of radioactive material concentration in the right frontal lobe before treatment}} = \frac{\text{The amount of radioactive material in the right cerebellum before treatment}}{63735} = 8.28$$

In Eysenck test, the following formula is used to obtain the score of anxiety for patients: amount of anxiety

$$\frac{\text{Crude Score obtained}}{80} \times 100$$

Score 25 to 44	is in the normal range
Score 45 to 59	is moderate anxiety
Score 60 to 79	is severe or considerable anxiety
Score upper than 74	is very severe (the most severe amount of anxiety)

The research stages will be explained in short in the following:

- Eysenck anxiety test was done on clients in Karaj well-being counseling center.
- After scoring and interpreting the Eysenck tests, fifteen patients were chosen as individuals who didn't use medicine.

- In a two hour-session every thing was explained about (SPECT) method and cognitive group therapy to the patients.
- The patients were taken to Taleghani hospital in Tehran in order to interview and cerebral scanning.
- After interviewing and the first cerebral scanning on all patients, cognitive group therapy sessions were held once a week.
- At the end of group therapy session, the Eysenck anxiety test was done again.
- In this stage for the reasons mentioned before, some patients didn't come for cerebral scanning.
- Five patients who were ready for cerebral scanning were taken to Taleghani hospital.
- Finally, after scoring and comparison of tests and scanning after and before treatment, necessary information was obtained.

RESULTS

After obtaining descriptive and biographic information on the sample group, the data acquired from psychological tests and cerebral scanning were studied and compared by nuclear medicine specialists and psychologists in Taleghani hospital, Tehran. Then the stage of analysis and interpretation of findings started by above-mentioned specialists. In order to test the research hypotheses, the results were compared by t-test of correlated group and the following findings were acquired:

- Cognitive group therapy is effective in treatment of patients with anxiety.
- A meaningful difference was seen between the amount of blood in left frontal lobe before and after group therapy.
- There wasn't any meaningful difference between the amount of blood in the right frontal lobe before and after group therapy.
- There wasn't any meaningful difference between the amount of blood in the left temporal lobe before and after group therapy.
- There wasn't any meaningful difference between the amount of blood in the right temporal lobe before and after group therapy.
- There wasn't any meaningful difference between the amount of blood in the left parietal lobe before and after group therapy.
- There wasn't any meaningful difference between the amount of blood in the right parietal lobe before and after group therapy.

- There wasn't any meaningful difference between the amount of blood in the left occipital lobe before and after group therapy.
- There wasn't any meaningful difference between the amount of blood in the right occipital lobe before and after group therapy.

DISCUSSION

Contemporary psychology deals with scientific study of behavior and its processes rather than subjective and implicit concepts. In other words, it is better to use the term "ethology" instead of "psychology", because nowadays most psychologists and psychiatrists and specialists in behavioral sciences have resorted to research, diagnosis and treatment of objective and explicit aspects of behavior. For example there are various approaches on anxiety among which nuclear medicine has a great role with its neuroimaging application of such tools as PET, MRI, SPECT, EEG ... greatly helps the behavioral and human science specialists by representing objective images and evidence to cure mental disorders. Studies done on different kinds of patients with anxiety have led to valuable outcomes. But these outcomes seem to have some kind of contradiction and ambiguity. For instance, the research done by Stewart and Devous [4] showed that the amount of blood in predominant hemisphere increased in both, patients with socio phobia and the control group, though these alterations were not statistically meaningful, while Bremner and Innis [5] performed very careful research using SPECT method and the results indicated that patients with phobia disorder faced with relative reduction of blood amount in frontal and occipital lobes and some hippocampus areas. Also in another research done by Malizia [6] in Bristol University on patients with anxiety disorders, the results showed increase in blood amount in right anterior area, preanterior cortex and left thalamus and also decrease of blood amount in right brain amygdale. The data obtained from this research have given some congruent and sometimes disparate results in comparison with similar research on this filed, as the following:

- The results obtained by Stewart and Devous [4] (increase of blood amount in predominant hemisphere) are not congruent with the result from the present research.
- The results from the present research are congruent with outcomes got by Bremner and Innis [5], e.g. relative decrease of blood amount in occipital. Frontal and parietal lobes.

- The results obtained by Atef *et al.* [7] in Iran Psychiatry Institute on patients with anxiety (effectiveness of cognitive group therapy in reduction of anxiety) are completely congruent with findings and first hypothesis of the present research. It seems that these differences and contradictions have root in neuroimaging studies, cultures, applied therapic methods, clinical knowledge of the therapist and, more important than these, the nature of SPECT method because as mentioned before, these tools have some limitations (for example, these tools can only identify the amount of blood stream and for this reason more effective tools such as PET, MRI, EEG are used in nuclear medicine).

Therefore, regarding the limitations in the present research such as resistance of patients against being spected and brain scanning, lack of control group, existence of few samples..., it is suggested that researchers on behavioral and human science fields, use more control groups and samples and more advanced neuroimaging methods like PET, MRI, etc. to achieve etiology, diagnosis and therapy of mental disorders. The findings of the present research have got applied aspects for patients with anxiety from point of instructional view and the application of neuroimaging studies in hospitals is advisable. Thus valuable steps may be taken to improve the well- being and social welfare in the country. We express hopes that the findings of this research can pave the way for provision of compiled programs of mental hygienic instructions for patients with anxiety all over our country.

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