Austin Journal of Psychiatry and Behavioral Sciences

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Austin Publishing Group

Research Article

Psychiatric Thought Disorder Detection by Quantum Resonance Spectrometer Applied to Psychotic Symptom-Based Objective Diagnosis

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Received: August 10, 2015; **Accepted:** October 08, 2015; **Published:** October 28, 2015

Abstract

To evaluate reliability and psychiatric clinical value of Quantum Resonance Spectrometer (QRS) in thought disorder detection, as psychotic symptom-based objective diagnosis. We studied 1014 schizophrenic patients, 155 patients with bipolar disorders patient, and 100 normal controls. Thought disorder symptoms of same subjects obtained from QRS test and psychiatrists' diagnoses were compared. Also thought disorder symptoms of renumbered 65 schizophrenia patient and 100 normal controls were discriminated using QRS test. Kappa values were more than 0.65 in 6/9 symptoms of schizophrenia, and more than 0.74 in all 3 symptoms of bipolar disorder. Same consistency could also be seen in Pearson R value, and ROC AUC. In the discriminated analysis, sensitivity, specificity, positive predictive value and negative predictive of delusion, looseness of thought and paralogism thinking detected utilizing QRS are more than 0.70 compared with psychiatrists' diagnoses. In summary, QRS is a predictor of psychiatric thought disorders, and an objective identification and diagnosis instrument. Psychiatric thought disorder detection by QRS could be applied to psychotic symptom-based objective diagnosis.

Keywords: Quantum resonance spectrometer (QRS); Symptom; Thought disorder; Schizophrenia; Bipolar disorder; Detection; Diagnoses

Introduction

Schizophrenia is one of the most severe and chronic forms of mental illness. A complex interplay between genetic and environmental factors appears to be critical in its pathogenesis. Ranking among the ten most frequent causes of disability in developed countries, schizophrenia affects roughly one percent of the world's population. The current psychiatric classification systems, the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) [1], and the Diagnostic and Statistical Manual of Mental Disorders 4th Edition (DSM-IV) [2], base the diagnosis of schizophrenia exclusively on its clinical symptomatology. Clinical diagnosis of schizophrenia is based on patient interviews and observation of the patient's behavioral patterns, is subjective. More and more instruments [3] began to consider used in the diagnosis of psychiatric disorders with the progress of science and technology, which would be more objective and controlled. According to the interview and observation, schizophrenia is symptomatically characterized by hallucinations, delusions, disorganized thinking or negative symptoms, etc. These symptoms may be based on a neurobiological brain dysfunction associated specifically with schizophrenia. The need for more precise and reliable diagnostic markers is underscored by a well established association between the duration of untreated psychosis and an unfavorable clinical outcome of schizophrenia [4-6]. Therefore, in addition to the interview and observation of the patient, a biological marker related to the brain dysfunction or brain potentials of schizophrenia may also be useful in determining the clinical diagnosis of schizophrenia [3,7-9].

In order to find a biological marker of schizophrenia, many researchers have performed psycho physiological or cognitive neuroscience tests related to the potential brain dysfunction of schizophrenia [5,10]. The method including symptomatology, Cerebro Spiral Fluid (CSF)-biochemistry, Computed Tomography (CT)-scan, neurophysiologic and psycho physiologic (Electro dermal activity, EDA) parameters before antipsychotic treatment was initiated during a 20-year period [5,11]. At the same time human body is an aggregate of numerous cells, which continuously grow develop, split, regenerate and die. In the process of cellular split-up and renewal, the charred bodies of nucleus and extra nuclear electrons as the basis unit of a cell are moving and changing ceaselessly at a high speed as well, emitting electromagnetic waves without interruption. The signals of electromagnetic waves emitted by human bodies represent the specific condition of human body and therefore, different signals of electromagnetic waves will be emitted by the conditions of good health, sub-health, diseases, etc [12,13]. The conditions of life can be analyzed if such specific electromagnetic wave signals can be analyzed [14,15]. The electro dermal tests also be tried to evaluate the diagnostic accuracy of in allergic subjects [11,16]. So, we have studied quantum resonance of schizophrenics and normal people while subjects freely holding the sensor. This method is called exploratory quantum resonance test. Therefore, the above physiological or neuroscience defects, the change of electromagnetic wave signals [8,17], may show promise as biological markers of schizophrenia [18,19]. The aim of the research was to develop an easily available and easily replicable biological objective system, Quantum Resonance Spectrometer (QRS), which could be used as predictor of psychiatric

Citation: Shi J, Zhang Y, Liu F, Dai Z , Yue X , Zhang H, et al. Psychiatric Thought Disorder Detection by Quantum Resonance Spectrometer Applied to Psychotic Symptom-Based Objective Diagnosis. Austin J Psychiatry Behav Sci. 2015; 2(2): 1038.

diagnoses, and could attenuate subjective ratings [20]. In our previous studies, only psychiatric cardinal symptoms have revealed consistent distribution as diagnosis of psychiatrist [21-24]. The detection result obtained from QRS in the specific symptoms such as: hallucination symptom, attention disorder, impaired memory and affective disorders, or in common psychiatric symptoms both has good sensitivity and accuracy. Based on these findings, we have proposed that the QRS test may be useful as a biological marker for the clinical diagnosis of psychiatric disorders [21-24]. Jianguo Shi et al. [21] performed also tried to discriminate 37 hyperthymic from 58 depressed patients and 27 healthy controls using QRS data, and obtained a high rate of discrimination with both the sensitivity being over 70%. Zhifang Guo et al. [24] also tried to evaluate detection of the hallucination symptom in 241 schizophrenics using QRS. The auditory hallucination symptom was detected by QRS with a sensitivity of approximately 98% and an accuracy of approximately 90%. These results [25,26] suggested that QRS might be useful for clinical diagnosis of schizophrenia affective and thought disorders; however, the sample size of these studies was not very large. Thus, replicated studies with larger samples were needed to confirm these findings. Also we used a sample in the discriminant analysis between schizophrenics and non-schizophrenics using the QRS data. According to results of the discriminant analysis, we examined an application of the QRS for the clinical diagnosis of schizophrenia thought disorder in this study.

Method

Subjects

We studied 1014 schizophrenic patients, 155 patients with bipolar disorders, and 100 normal controls. The patients were in/outpatients recruited from the Mental Health Institute of Xi'an (Xi'an, PR China). Diagnoses were made by experienced psychiatrists according to the ICD-10 criteria for research [1]. The control subjects were also recruited from the Mental Health Institute of Xi'an. Most controls were employees of the hospital. Show the demographic characteristics of the subjects. There were significant differences between the groups in age, and gender, except duration of illness. Psychiatric patients who had a history of alcohol abuse or illicit substance abuse, or head injury were excluded from the study; also excluded were those with convulsive, neurologic or ophthalmologic disorders.

The normal controls were healthy volunteers without physical, ophthalmologic, neurological or psychiatric disorders, and there was no family history of psychiatric disorders as distant as third degree relatives. This study was approved by the Ethics Committees of Xi'an Institute of Mental Health. Written informed consent was obtained from all participants, after the procedures and possible risks of the study were fully explained.

Procedure

For this study, we explored and developed a biological wave sensing device, a QRS (TJQ-D, Chongqing, PR China) (Figure 1), in psychiatric examination. It comprised a biological wave detection unit, a biological operation control unit, a power, and a follower, wherein, a contact of the biological operation control unit is connected with an input end of the follower, and the other contact is connected with an cathode of the power, the biological wave detection unit is made of conductors, and connected with the cathode of the power, or the input end of the follower. This system automatically recorded the special biological wave and could effectively transform message into electrical signals which can be dealt by computers, to get resonance score.

Figure 1: Quantum resonance spectrometer (TJQ-D).

The subject sat on a chair and was freely holding the sensor in his/her hand. The special biological wave of subject was collected and transformed electrical signals compared with computer control data. Then the resonance score were obtained by computer (Figure 1). Measurement and analysis released by the brain the size of the vibration frequency (a weak magnetic field fluctuations in energy), to determine whether there is a psychiatric symptoms, score ≤ -6 as normal values, -7 as mildly abnormal, -8 as moderate abnormalities, -9 or more as severe abnormalities, and compared with equipment standards set by the magnetic field to distinguish between normal or abnormal on thought disorder.

Statistical analysis

As mentioned above, there were no significant differences between the groups in the demographic data (gender and duration of illness). Thus, concordance for each thought disorder symptoms were tested by Kappa analysis, correlation coefficient and ROC curve compute with no covariate. Kappa was characterized values < 0 as indicating no agreement and 0~0.20 as slight, 0.21~0.40 as fair, 0.41~0.60 as moderate, 0.61~0.80 as substantial, and 0.81~1 as almost perfect agreement [27]. The AUC of ROC curve was equal to the probability that a classifier will rank a randomly chosen positive instance higher than a randomly chosen negative one [28], and was characterized values < 0.5 as indicating no diagnostic practical situation and 0.50~0.70 as low diagnostic value, 0.71~0.90 as moderate, 0.91 as higher diagnostic value. For pair wise multiple comparisons, Bonferroni adjustment was used (SPSS manual). Statistical significance was set at $P < 0.01$. All statistical analyses were performed using SPSS for windows version 17.0.

Results

QRS detection and psychiatrists diagnoses comparisons of the thought disorder

To evaluate QRS performance on thought disorder detection,

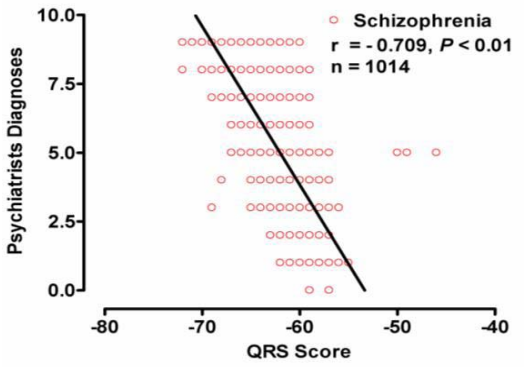

Figure 2: Score of QRS detection and psychiatrists' diagnoses in schizophreni.

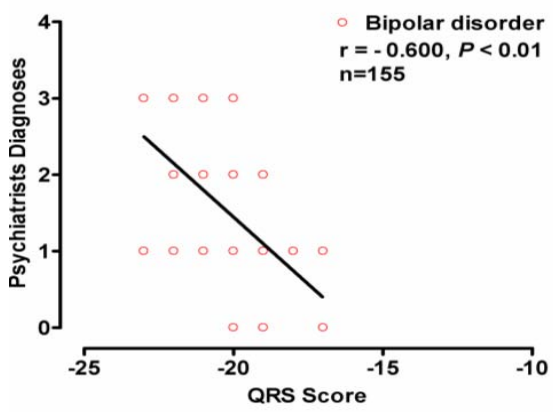

Figure 3: Score of QRS detection and psychiatrists' diagnoses in bipolar disorder.

we studied 9 thought disorder symptoms of 1014 schizophrenic patients and 3 thought disorder symptoms of 155 bipolar disorders. While the diagnoses of thought disorder symptoms were made by experienced psychiatrists according to the ICD-10 criteria. Diagnose of one symptom was characterized 1 as there was one symptom, 0 as there was no symptom. On the other side, QRS data were collected by researchers who did not know the result of diagnoses. Finally, Symptoms summary, Kappa value, Pearson R value, and ROC AUC of QRS detection and psychiatrists' diagnoses were analyzed in. Kappa value of thought disorder detection and diagnosed were with good consistency, were more than 0.65 in 6/9 symptoms of schizophrenia, and more than 0.74 in all 3 symptoms of bipolar disorder. Same consistency could also be seen in Pearson R value, and ROC AUC.

Consistency of total score of QRS detection and psychiatrists diagnoses

Total score of examined symptoms were listed in the. Psychiatrists diagnose was characterized 1 as there was one symptom. The higher the score values mean the more symptoms. But QRS Score (≤ - 6 as normal values, -7 as mildly abnormal, -8 as moderate abnormalities, -9 or more as severe abnormalities) was that the smaller the score values mean the more symptoms. So, "r" of linear correlation of two methods was negative, both of schizophrenia and bipolar disorder were lower than -0.60 (Figure 2 and 3). Total score of thought disorder by QRS detection and psychiatrists' diagnoses in schizophrenia and bipolar disorder were also with good consistency.

Discriminant analysis

In the discriminant analysis, we studied 5 thought disorder symptoms of 65 schizophrenic patients and 100 normal persons, which had been renumbered. Looseness of thought, paralogism and delusions were selected from as the valid parameters for discriminating between schizophrenics and non-schizophrenics. Sensitivity, specificity, positive predictive value and negative predictive value of QRS in delusion, looseness of thought and paralogism thinking detection are more than 0.70 compared with psychiatrists' diagnoses. Also flight of thought and splitting of thought as other two thought disorder symptoms were also selected. Using these as predictive parameters, we performed data analysis to discriminate that whether the numbered person had above 5 symptoms or might be the schizophrenic. Utilizing and QRS data, we discriminated 48 patients with flight of thought, 52 patients with splitting of thought, 64 patients with looseness of thought, 58 patients with paralogism thinking and half of subjects with delusions. Except delusions, the subject number of each symptom was not more than 65, which was the schizophrenic number.

Discussion

In most previous studies, there were no normal individuals or patients with non-schizophrenic psychosis in the study, in whom the parameters of the QRS test might not be similar to those of schizophrenic patients. Only schizophrenic patients have consistently shown disorders of the QRS. Moreover, we discriminated schizophrenics from non-schizophrenics with a high probability using QRS thought disorder data. Therefore, we hypothesized that the QRS test may be specific to thought disorder of schizophrenia. However, the samples used in our previous studies were not very large. Thus, the findings of those studies required cautious interpretation and additional studies with larger samples were needed to confirm our findings. In our previous studies, one of the most important reasons that we initially used smaller samples was based on the prevailing method and existing technology. The previous method only relied on symptoms, not related with psychiatric disorders. We devoted a substantial amount of time to performing the test and analyzing the data [21-26]. Now we started to study related-symptom of psychiatric disorders. Consequently, we did the first large sample study to confirm our previous findings. Thus, in addition to the above physiological or neuroscience defects, QRS disorder may also be a biological marker of schizophrenia.

As a result, we obtained the following discriminated thought disorder symptoms: splitting of thought, flight of thought, looseness of thought, inhibition of thought, poverty of thought, blocking of thought, thought insertion, pressure of thought, paralogism thinking, delusions and experience of being revealed total 11 symptoms of Schizophrenia; as well as flight of thought, inhibition of thought and delusions total 3 symptoms of Bipolar disorder. These symptoms were all higher value in. Some of them almost perfect agreement with psychiatrists' diagnoses. But the problem could be found in the Kappa value of QRS detection in flight of thought was so low, and delusions symptom might exist in normal persons. Although Kappa coefficient, sensitivity, specificity, positive predictive value, negative

predictive value and the you den value could show some meaning, schizophrenia detection of QRS probably more effective was using special thought disorder symptoms.

There were always doubts on a new method development [29]. We need to be more professionals; pay more attention to details and spend more time to research the new idea. May be we still doubt after run a long way. So, we studied 1014 schizophrenic patients. There were 65 patients in discriminant analysis that mainly aim to equal with the normal persons. In all the used examples of thought disorder symptom, the optimum discriminator is QRS score obtained in Looseness of thought or paralogism thinking. The results indicate that Kappa coefficient, sensitivity, specificity, positive predictive value, negative predictive value and the you den value of QRS in above two thought disorder symptoms may be of predictive value and are compatible with psychiatrists' diagnoses of schizophrenia.

These clinical symptoms include positive symptoms, negative symptoms and social withdrawal as well as thought disorder. Presently, this phenomenological diagnostic approach is without an alternative due to a lack of clear biological markers for the disorder. The need for more precise and reliable diagnostic markers is underscored by a well established association between the symptom detection of QRS and psychiatric disorders. QRS is an objective diagnosis instrument and could promote psychiatric clinical diagnosis development. QRS in schizophrenic symptoms detection possess higher authenticity, consistency, and diagnostic value, especially for uncooperative patients, dumb and deaf patients in psychiatric examination.

Conclusion

In summary, that thought disorders detected using QRS seem to have a predictable value for outcome in schizophrenia and bipolar disorder, early identification of them might be a challenge for our future treatment strategies. QRS might become a novel schizophrenic assistant diagnoses tool, also an objective diagnosis instrument, be used in psychotic symptom-based objective diagnosis. Discovery of this new method could help psychiatrists' diagnosis fast and objective.

Acknowledgement

The current study is supported by a Xi'an science and technology projects fund (HM1122 (1)), for which the corresponding author Jianguo Shi author is the principal investigator. Dr. Jianguo Shi designed the study. Dr. Yan Zhang wrote the analysis plan, extracted and cleaned the data. Feihu Liu performed the data analysis, with input and data interpretation from all authors. Mr. Shi and Yan Zhang wrote the first draft of the manuscript and all authors commented extensively and approved the final draft.

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Austin J Psychiatry Behav Sci - Volume 2 Issue 2 - 2015
ISSN : 2381-9006 | www.austinpublishinggroup.com

Citation: Shi J, Zhang Y, Liu F, Dai Z , Yue X , Zhang H, et al. Psychiatric Thought Disorder Detection by Quantum Resonance Spectrometer Applied to Psychotic Symptom-Based Objective Diagnosis. Austin J Psychiatry Behav Sci. 2015; 2(2): 1038.