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The use of RHLB battery for the evaluation of the lingual and social skills among psychiatric patients – case study

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Summary

Prosody plays an important role in the process of verbal communication, complementing and emphasizing the linguistic and emotional aspects of language. Disturbances of speech prosody are rarely recognized, although aprosodia occurs frequently in patients with schizophrenia. Prosodic disturbance of speech can significantly impair verbal communication and social functioning of the patients with schizophrenia. Right-hemisphere is connected with emotional prosody deficits and left-hemisphere with linguistic prosody. The aim of the study is to describe The Right Hemisphere Language Battery by Karen L. Bryan in the examination of patients with schizophrenia.

Key words: right hemisphere, schizophrenia, lingual and social skills

The right hemisphere is responsible for speech understanding, automatic language skills and the so-called emotional speech. What is more, there is a connection between the right hemisphere and the subjective awareness of oneself, which is a result of the integration the information coming from all parts of our body. This awareness takes part in transformation of complex visual-spatial information and cognitive processes [1]. Over the last few years, the importance of the right hemisphere in emotional behavior regulation has been strongly emphasized. Specialists pointed out its dominating role in that process or just its definite part in controlling negative emotions (according to that hypothesis, the left hemisphere is responsible for the emotional response to positive stimuli) [2].

The basic language skills connected with the right hemisphere are lexical-semantic processes, transformation of complex language information and emotional prosody. Lexical-semantic disorders are connected with e.g. difficulties in understanding an-

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tonyms (e.g. words: salt – pepper) and contextual information. The process of transformation of complex language information comprises the ability to understand and create discourse, draw conclusions, integrate information, understand metaphors and emotional or ambiguous information [1, 3]. The word "prosody" pertains to the non-language aspects of speech, which are significant to the communication process. These are: intonation, the rate of speech, pauses, rhythm, accent, melody. Language prosody (called linguistic prosody) is connected with correct accentuation of: the syllables in word, the words in sentences and the intonation in all types of utterances (affirmative statement, question, negation, order). Emotional prosody (called affective prosody) shows one's emotional state [4].

The ability to use appropriate prosodic information has a huge importance for the understanding of one's intensions and emotional state. Emotional prosody strengthens or undermines the message conveyed by means of speech. If they have contradictory meaning, the most reliable is prosodic information rather than language [4]. Perisylvain area (located in the right hemisphere) is involved in process of emotional prosody. It is analogical to the left hemisphere areas, which are involved in functioning of verbal speech. Prior to this, a part of the brain analogical to Broca's area is responsible for proper understanding of the emotional information, and for comparing – the region analogical to Wernicke's area [5]. Emotional prosody is a developmental trait and it precedes language development. Children under the age of 1 (who are in the "melody" period) use their voice to express feelings. Moreover, they are able to decipher the prosodic elements of the speech which surrounds them [4].

The aim of this paper is to demonstrate the application of The Right Hemisphere Language Battery by Karen L. Bryan in E. Łojek adaptation (RHLB-PL) among patients with diagnosed schizophrenia. That battery is used to diagnose neuropsychological disorders, especially language and communication disorders, in patients with right hemisphere disorders. RHLB-PL is comprised of eleven tests (table 1). The subject of tests is varied and consists of description of situations, pictures and recordings of nonsensical sentences. Results from all the tests and The Main Result are the most important quantitative indicators of the battery. It is also possible to analyze the results in other five areas: linguistic, cognitive, perceptual-logical, social and emotional or self-controlling areas [1,6]. In Łojek's opinion, the most healthy people get The Main Result above 70 points. Fewer points means some specific language disorders.

Case report

A 29-year patient, psychiatrically hospitalized for the first time, was directed from the neurological ward with the diagnosis: functional gait abnormality. The patient has not been previously treated psychiatrically. He is single, without a partner and he has been living with his grandmother for the last 10 years. Both parents are alive. He has completed vocational education and he began high school education, but he did not graduate. He denies any head injury and being addicted to alcohol. For the last 2 years, the following have been observed: a motor skills disorder (weakness of lower limbs, difficulties with changing direction, moving from one wall to another, he stops in front

of the threshold before going through the door), and a deterioration in interpersonal and social skills. There are no meningeal symptoms, nor focal damage in neurological examination. After a 2-month hospitalization, the patient was discharged from the ward with the diagnosis: simple schizophrenia (F 20.6). Only a slight improvement has been achieved in general activation and motor skills disorder. During the hospitalization, he was given: Zalaxa 5mg, Anafranil SR 75.

The patient was calm during the psychological examination, aware of the time and place with correct self-psychical orientation, he maintained eye contact, he was in neutral mood and apathy. Patient answered the questions in a perfunctorily way. He denied having any symptoms. During the hospitalization, he was asking all the time for the next psychological session. The tests have shown a visible intensification of compulsive behavior: correcting the position of the chair, playing with fingers, ordering the tests and other documents. The patient confirmed frequent repetition of: checking the order in cabinets, closing the window, turning off water or gas.

In clinical examination, the clinical methods (interview and observation) and the psychometric methods were used. The tests which were carried out were: auditory -verbal learning test by Łuria (AVLT), the Bender Visual-Motor Gestalt Test (raw score=53), The Benton Visual Retention Test (version C, method A, score=3;+3), The Ray-Osterrieth Complex Figure Test (raw score copy=36), The Trail Making Test (part A=100 seconds, part B=239 seconds), The Stroop Test (the RCNb part = 30 seconds, the NCWd part = 65 seconds, 2 mistakes), the verbal fluency test (animals = 20 words, sharp objects = 6 words, the letter K = 7 words). The results of The Right Hemisphere Language Battery are shown in table 1 and 2.

The results obtained by the patient in psychological tests indicate a reduction in the efficiency of working memory and executive functions, reduction in the efficiency of direct memory, attention processes and verbal fluency. The efficiency of visual-motor coordination and the ability to plan and organize the material is normal.

Table 1. **The Right Hemisphere Language Battery – patient's test results**

Test name	Raw score	Converted result
Interference Test It is required to understand written text and to draw logical conclusions based on information hidden in the text, confronted with own general knowledge.	14	7
Lexical-semantic Test It is required to understand the words heard and to indicate its graphic designates. To complete the task, the lexical-semantic knowledge, phonemic hearing and visual-spatial analysis are necessary.	13	10
Humour Test It measures the ability to understand complex language material and to find jokes hidden in the text. Behavior specific for the patient in a given situational context is evaluated.	3	2

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Comments Test Evaluation of patient's behavior while making spontaneous remarks and comments.	2	5
Picture Metaphor Test It evaluates the comprehension of commonly used metaphors. It measures the ability of abstract thinking, based on visual-spatial analysis of information.	9	8
Written Metaphor Test The ability to understand the commonly used metaphors is evaluated. It measures the ability of abstract thinking, based on complex language material transformation.	7	4
Picture Metaphor Explanation Test It is required to understand metaphors and to explain them based on own general knowledge.	6	4
Written Metaphor Explanation Test It is required to understand metaphors and explain them based on own general knowledge.	6	4
Emotional Prosody Test It measures the ability to understand emotional intonation (happiness, sadness, anger) with which illogical sentences are uttered.	15	9
Linguistic Prosody Test It measures the ability to understand the grammatical mode (question, statement, order), with which illogical sentence are uttered.	12	7
Discourse Analysis It measures the ability to interact and converse with others.	40	5
Total result	65	10

In 10-score scale: 1-2=very low, 3-4=low, 5-6=medium, 7-8=high, 9-10=very high

Table 2. **Factors in RHLB-PL – patient's test results.**

Test name	Raw score	Converted result
Language Factor Semantic transformation, understanding of relations between the words and sentences.	13	4
Cognitive Factor Integration of incoming information.	15	5
Perceptual-logical Factor Process of visual-spatial analysis.	18	8

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Socio-emotional Factor It evaluates ones' behavior in specific situations, understanding of emotional messages.	14	7
Self-control Factor The ability to control oneself.	5	3

In 10-score scale: 1-2= very low, 3-4=low, 5-6=medium, 7-8=high, 9-10 =very high

Discussion

According to ICD-10 (International Classification of Disease) an emotional rate is not the basic criterion necessary to diagnose schizophrenia. On the other hand, impaired recognition, experience and emotion expression disorders have been observed in this group of patients. In comparison with healthy people, individuals with schizophrenia are much less emotionally open in the following areas: verbal, auditory and facial expressions, anhedonia, and significant tendency to express negative feelings [7]. It should be noticed that correct emotional process (e.g. an appropriate interpretation of other people's feelings and awareness of own emotions) is the foundation of appropriate social relationships. The knowledge and ability to express feelings make it possible to build relationships with others, and the ability to interpret one's emotional states is necessary to realize what feelings one has or in what emotional state one is [8]. According to ICD-10 (DSM-IV), it is social dysfunctions that are the main behavioral trait in schizophrenia. Functional difficulties in children genetically prone are often observed before the first psychosis symptoms. It is possible to identify these symptoms in the first episode of schizophrenia, and what is more, they can be observed despite taking neuroleptics or may even get worse [9]. In Scholten and co.'s opinion [10], women suffering from schizophrenia have less pronounced emotional disorders than men.

In Czernikiewicz's opinion [11], attention should be paid to speech disorganization or to language disorders, which are not the only symptoms of abnormalities in thinking. In the diagnosis of schizophrenia, language disorders may be understood as much more specific indicator than the primary symptoms [12]. Patients' utterance may be different from generally accepted statements, they are often incoherent and illogical. The most common functional traits are: poor content, breakdown of discourse (deviation of utterance from the topic), articulation and intonation disorders, prosody disorders (dysarthria, lack of fluency, prosodic speech, in which intonation does not change) [13]. Kucharska-Pietura [2] analyzed the emotional prosody in patients suffering from paranoid schizophrenia in their early and late stage of disease (100 patients), in patients with the right hemisphere damage (60 patients) and in healthy individuals (50 people). The results confirmed emotional prosody disorder in schizophrenia patients and in patients with the right hemisphere damage. Moreover, a significantly lower degree of fear and aversion perception was observed. In Bach and co. study [14], patients with schizophrenia also had worse results in emotional prosody than healthy people

or even patients suffering from depression. Furthermore, it was observed during the episodes of remission [15]. Kalkstein and co. [16] and Leitman and co. [17] also wrote about emotional prosody in their studies.

It is "The mind theory" [18] that explains the connection between emotional functioning with social dysfunctions. The term was introduced by D. Premarck and G. Woodruff. It means the ability to assign to oneself and to others various psychical states to provide and explain all actions. Such explanation is possible by observing other people's behavior, their verbal and non-verbal statements and the awareness of one's state of mind. This ability is necessary for the correct understanding and predicting the partner's behavior. If it does not come as an automatic process, the communication seems to be difficult or impossible. In the case of the mind theory disorder, we may observe a lack of ability to understand the point of view of other people, their feelings or actions. What is more, patients are not able to understand jokes [19]. The mind theory a developmental trait which shapes between the age of 1 and 4. In this period, two types of representation are created: representation of things and their real existence in the world (1st order representation) and meta-representation, thanks to which it is possible to imagine and use abstract associations, which are created in the psychical sphere (2nd order representation) [20]. While performing the tasks connected with the mind theory, the activation of the medial prefrontal cortex and the orbitofrontal left hemisphere has been observed [9]. In Russell's opinion [21], patients with negative symptoms of schizophrenia, have much more deficits in the mind theory. However, the correlation between the intensity of negative or positive symptoms, the general intelligence and emotional deficit has not been confirmed in any of the studies [22].

Also, functional disorders and amygdala reduction have been diagnosed in some patients suffering from schizophrenia [23, 24, 25]. It is known that amydgala and hippocampus are the emotional control center. Both, through various pathways, are linked with adequate neocortex areas: the hippocampus is linked with dorsal-lateral prefrontal cortex regions (it analyzes the meaning and spatial organization of new stimuli and adjusts the individual's level of motivation), the amygdala is linked with orbital regions and ventro -lateral regions of frontal cortex (selection of emotional reactions in accordance with incoming information). From the evolutionary perspective, the limbic system specializes in perception, evaluation, responding to the stimuli important to survive. The amygdala is involved in recognizing and receiving emotionally important stimuli, facial expression, vocalization, gesticulation, posture, planning and selection of adequate actions according to situations (starting from motor responses, e.g. escape from danger, through complex social behavior) [26,27]. Amygdala hypertrophy in the right hemisphere is connected with self-destructive behavior in patients with schizophrenia [28]. In Leitman and co.'s opinion [29], the structural and functional changes in the primary auditory cortex may have an effect on emotional and language disorders.

Polish research is worth mentioning in which genetic factors are sought that correlated with emotional disorder in schizophrenia. Tylec and co. [7] have shown the association between Va1158Met COMT polymorphism and emotional disorders (empathy disorder) in patients with paranoid schizophrenia. However, no correlation has been discovered between Va1158Met COMT and VNTR MAO-A polymorphism

in promoter region and diagnosis of schizophrenia. Patients with Val/Val genotype Va1158Met COMT polymorphism have much more emotional disorders, while patients with 4/4 genotype VNTR MAO-A polymorphism in promoter region have much more empathy disorders. Also, among the patients tested, progressing disorders of emotional recognition have been discovered, which may be related to the history of schizophrenia, to institutionalization, or to negative reactions to the classically used antipsychotic drugs.

In our case report, the RHLB-PL results demonstrate the patient's ability to understand read and heard texts, to think correctly based on visual-spatial material, and to properly interpret the emotional intonation. The patient received low scores in: the ability to understand and transform complex language material and jokes hidden in the text and to use the acquired knowledge. The result obtained in the cognitive factor may suggest difficulty in integrating information in communication. Striking is the lack of visible prosodic deficits; however, the remaining elements of the test correspond to the characteristics of patients with diagnosed schizophrenia as described above. The results are consistent with the results of other psychological tests, which also showed frontal dysfunction.

To sum up, it is worth noting the underestimated role of emotional and social functioning in patients with schizophrenia, which may be related to the patient's history of schizophrenia. What is more, they could become prognostic factors pertaining to treatment results and rehabilitation possibilities. The Right Hemisphere Language Battery makes it possible to evaluate these skills.

Использование батерии RHLB – The Right Hemisphere Language Batery для оценки лингвистических и коммуникацийных функций пациентов с психическими нарушениями – описание наблюдения.

Содержание

Прозодия исполняет важную функцию в процессе понимания при словесном контакте, дополняя и подчеркивая лингвистические и эмоциональные аспекты языка. Нарушения прозодии речи редко бывают предметом заинтересованности диагностов .хотя они принадлежат к частым симптомам шизофрении. Эти нарушения могут значительно затруднять словесную коммуникацию и общественное функционирование пациентов больных шизофренией. Правое мозговое полушарие связано с эмоциональной прозодией, а левое с прозодией языка.

Заданием работы является представление использования Батерии тестов для исследования функции языка и коммуникации правого мозгового полушария –Автора батерии Карен Л. Брайан в адаптации Е. Лойек (RHLB-PL, The Right Hemisphere Language Batery) при исследовании пациентов с диагнозом шизофрении.

Слова-ключи: правое мозговое полушарие, шизофрения, языковые и общественные способности.

Anwendung von RHLB – Testbatterie zur Beurteilung der linguistischen und kommunikativen Funktionen der psychiatrischen Patienten – Fallbeschreibung

Zusammenfassung

Prosodie spielt eine wichtige Rolle bei der verbalen Kommunikation, ergänzt und betont die linguistischen und emotionellen Aspekte der Sprache. Die Störungen der Prosodie werden selten

diagnostisch betrachtet, obwohl sie zu häufigen Symptomen der Schizophrenie gehören. Die Störungen können signifikant die Kommunikation und soziale Funktionsweise der schizophrenen Patienten stören. Die rechte Hemisphäre ist mit der emotionellen Prosodie verbunden und die linke mit der sprachlichen Prosodie. Das Ziel der Arbeit ist die Darstellung der Anwendung der Right Hemisphere Language Battery – Testbatterie von Karen L. Bryan in der Version von E. Łojek (RHLB-PL, The Right Hemisphere Language Battery) bei der Untersuchung der Patienten mit der Diagnose der Schizophrenie.

Schlüsselwörter: rechte Hemisphäre, Schizophrenie, linguistische und soziale Fähigkeiten

L'usage de la batterie RHLB pour évaluer les aptitudes linguistiques et sociales des patients psychiatriques – description d'un cas

Résumé

La prosodie joue le rôle important dans le processus de la communication verbale en complétant et en soulignant les aspects linguistiques et émotionnels du langage. Les troubles de la prosodie de l'expression orale sont diagnostiqués rarement bien qu'ils constituent les symptômes fréquents de la schizophrénie. Ces troubles rendent plus difficiles la communication verbale et le fonctionnement social des patients schizophrènes. L'hémisphère droit de la cervelle se lie avec la prosodie émotionnelle, l'hémisphère gauche – avec la prosodie linguistique. Ce travail vise à présenter l'usage de la batterie RHLB (The Right Hemisphere Language Battery – version polonaise d'E. Lojek) pour examiner les patients schizophrènes.

Mots-clés : hémisphère droit, schizophrénie, aptitudes linguistiques et sociales

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