

Z. kheladze, Zv. Kheladze, M. Metreveli, N. Kumaritashvili, M. Khvedelidze.
Electric-encephalographic changes by the influence of sound waves in
unconscious critical patients
Institute of Critical Care Medicine, Tbilisi, Georgia

Here are researches about 25 unconscious patients. According to Glasgo coma degree it was 3-8 points. Critical care condition was associated with brain infarcts, respiratory failures, coronary blood circulation failures, sepsis and other pathologies. After audio irritation with audiometer (5000 and 10 000Hz), majority of patients had bioelectric activity changes according to electroencephalography which were revealed in increasing of frequency and amplitude of slow waves of various diapason and episodically slow and sharp waves' bilateral relaxation, tending to generalization.

Key words: Critical patients, electroencephalography, sound waves, audiometer, unconscious condition

Introduction. From previous studies, we established, that classical music, also religious anthems and prayers cause some changes in electroencephalographic picture of critical care patients. (lit. .Z.Kheladzeand other 2012,2015,N.Nicabadze and other20143,2014, M.Metreveli and other 2014,2015). Unfortunately, during those works characteristic of sound waves were unable to evaluate, namely standard evaluation of amplitude and frequency. This fact prevents from calculating changes exactly. A normal provision of sound waves amplitude and frequency can be carried out by means of audiometer sound waves, consequently the aim of the work is to study changes that sound waves cause in critical care patients in unconscious condition.

Materials and methods: we studied 25 patients in critical care condition, age of patients were between 49-80 ages, among them 17 were male and 8 females. Critical condition was caused from hemorrhagic insult (4), ischemic insult (7), acute pneumonia (6), cardiac failure (5), sepsis (3). Coma degree according to Glasgo scale was 8 points. All of them suffered from hypertonic disease, diabetes and other accompanied diseases. Treatment included artificial nutrition, correction of water-electrolytic balance, enteric and parenteric nutrition, electric stimulation of marrow bone and other standard measurements. Provision of sound waves was conducted by audiometer)MA 31 GROSSES KLINISCHES). Duration of exposition complied from 5-10 minutes, frequency of wave was 5000-

10 000Hz. Encephalographic research was implemented by means of apparatus, 12 standard deviation before sound irritation was recorded and after the irritation. Results of the study was elaborated by variational method.

Results and discussion. According to received results, before sound wave irritation, encephalographic image in 20 patients (80% of total critical patients) was represented as low amplitude slow volume waves and was near to isoelectric line, in 5 patients, (20%) electroencephalographic image was expressed as average amplitude slow waves. After stimulation with 5000Hz volume waves in 18 patients (72%) immediately after stimulation high amplitude slow volume, sharp waves which have bilateral genesis were expressed and had tendency to generalization. These changes were statistically reliable. ($P>0,05$)

Unconscious patients N=31				EEG
Before sound stimulation		After sound stimulation		
Rx/wm	Mk/v	Rx/wm	Mk/v	EEG Rhythm
47.1±0.5 P<0.001	4.2±0.7 P<0.001	28.6±2.3 P<0.001	5.9±6.4 P<0.001	teta-rhythm
47.1±3.2 p>0.05	10.2±2.1 p>0.05	49.9±3.1 P<0.01	12.0±1.2 P<0.01	α -rhythm

This image was maintained in majority of patients during 20-30 minutes. In 7 of them while stimulation of 5000Hz no significant encephalographic changes were revealed. These were especially severe group of patients and all of them died. After stimulation of 1000Hz sound waves insignificant elevation of sound wave volume and amplitude that was not statistically reliable ($P < 0,005$). In perspective these data can be utilized in evaluation of critical patients' condition severity and also in determination of treatment scheme and diagnosis.

Conclusion. While stimulation with 5000 and 1000Hz sound waves by audiometer in the majority of critical patients had elevation of Theta waves volume and unit slow waves' bilateral discharge tending to generalization according to encephalograph.

References: 1.Z.Kheladze, Zv.Kheladze, V.Tkemaladze-“Georgian religious songs improve the cerebral blood circulation in unconscious critical patients and increase immunocompetent T-lymphocyte proliferation capacity in mono-directional mixed cultures -”Critical Care and Catastrophe Medicine” 2012,N9-10,33- 38.

2.N.Nikabadzxe,N.Ramishvili,Z.Kheladze,Zv.Kheladze-“The influence of music waves on electric activity of brain in unconscious critical patient”,”Critical Care and Catastrophe Medicine,2013,N11- 12,67-69.

3.N.Nikabadzxe,Z.Kheladze,Zv.Kheladze,D.Kalandia-“Influence of music of EEG in critical patient”,”Critical Care and Catastrophe Medicine,2014,N13-14,124 - 127.

4. M.Metreveli,Z.Kheladze,Zv.Kheladze –“Brain electrical activity manifestation in orthodox Christian patients during praying”-,”Critical Care and Catastrophe Medicine, 2014,N14-15 ,69-71.

5. Z.Kheladze, M.Metreveli, Zv.Kheladze, N.Kajaia

“[EEG disorders in unconscious critical patients with orthodox Christian religious praying](#)” - ,”Critical Care and Catastrophe Medicine, 2015, N16-17, 114-117.

ზ. ხელაძე, ზვ. ხელაძე, მ. მეტრეველი, ნ. ქუმარიტაშვილი, მ. ხვედელიძე
 აუდიომეტრის ბგერითი ტალღებით გამოწვეული ელექტრო-
 ენცეფალოგრაფიული ცვლილებები კრიტიკულ პაციენტებში.
 კრიტიკული მედიცინის ინსტიტუტი,თბილისი,საქართველო

აუდიომეტრით გამოწვეული 5000ჰც და 1000ჰც სიხშირის ბგერითი ტალღების გაღიზიანებისას კრიტიკულ პაციენტების უმრავლესობას ელექტროენცეფალოგრაფიულად აღენიშნებოდა თეტა ტალღების სიხშირის და ამპლიტუდის ზრდა და ერთეული ნელი და ტალღების ბილატერალური განტვირთვა მიდრეკილებით გენერალიზაციისკენ