

Influence of N₂O₄ on multifocal electroretinogram in winstar mice

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Foundation item: Supported by a grant from Medicine and Health of Equipment Headquarters of Chinese PLA, China (No.yy2003015) Department of Ophthalmology, No. 306 Hospital of PLA, Beijing 100101, China

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Received:2010-06-15 Accepted:2010-08-10

Abstract

• **AIM:** To record multifocal electroretinogram from different dosage of N₂O₄ injected mice. In order to provide a foundation for further study.

• **METHODS:** Normal winstar mice which were injected by different dosage of N₂O₄ were studied for recording multifocal electroretinogram in the same time in the evening after N₂O₄ injection.

• **RESULTS:** The latency and amplitude density of "b" wave of each ring of multifocal electroretinogram was studied. The latency of "b" wave of each ring of multifocal electroretinogram of each group varies to each other. But the difference of the amplitude of "b" wave of multifocal electroretinogram of each ring between each group had no significance.

• **CONCLUSION:** Recording multifocal electroretinogram of N₂O₄ injected mice will give more support for further study in related science and clinic research.

• **KEYWORDS:** multifocal electroretinogram; mice; N₂O₄

DOI:10.3980/j.issn.2222-3959.2010.03.05

Hu LN, Qiu CY, Yan HX, Luo L, Zhao J, Guo HL, Gao FL, Li ZS, Ma N. Influence of N₂O₄ on multifocal electroretinogram in winstar mice. *Int J Ophthalmol* 2010;3(3):203-204

INTRODUCTION

N₂O₄ was widely used at spaceflight industry and military factory. The rescue of persons poisoned by N₂O₄ was a very important work in a spaceflight accident. We didn't find any paper about how to cure the poisoned retinal disease. Here we studied multifocal electroretinogram (MERG) of poisoned mice in order to give a foundation for further science and clinical research work.

MATERIALS AND METHODS

Materials

Animals Male winstar mice graded two (supplied by center of beijing experiment animal), weighted 200±20g, were fed with abundance water and food under normal day and night alternation and room temperature, and were divided into two groups. Mice in group one poisoned by 7.5g N₂O₄ through abdomen injection. Mice in group two poisoned by 15g N₂O₄ through abdomen injection. All experiment animals finished MERG test after 1 hour from N₂O₄ injection. Comparison animals were injected with normal solution and tested under same condition. All the tests were finished at the fixed evening time.

Instrument GT2000NV visual physiology electrision detector made by Chongqin Medical Equipment Ltd. displayed by 21 inch video. Maxual luminance was 140cd/m². Differentiate rate was 640 ×480. Contrast was 96%. Refurbish was 127 hertz.

Methods

Test parameter Stimulate graph was concentric. The stimulate unit were 63. The max angle of view was 29.75 degree. Stimulate lightness was 140cd/m². Wave time was 142 milliseconds. The sampling frequency was 1KH. The magnify power of the amplifier was 40 thousand. The transmission bands was between 1 and 75Hz. Sixteen recurrence were taken to record first lay MERG response. Each record time was 47 seconds. The stimulate light was white.

Record method^[1-3] When tested, all mice were dark-adapt for two hours. Anaesthesia by benzene barbital were taken to all mice. When test began all mice were put on a test table where the cornea edge of the mice were placed parallel to the video and 20cm from the video.

Data collection and analysis Summation response: we analyzed the latency and amplitude density of "a" wave and "b" wave. As for each ring response, we analyzed the latency and amplitude density of "b" wave.

RESULTS

The difference of the latency of "b" wave of summation response and each ring response obtained from different

Table 1 p quantity of t-test of the latency of "b" wave of multifocal electroretinogram between N₂O₄ injected mice and normal mice

	a wave	b wave	Ring 1	Ring 2	Ring 3	Ring 4	Ring 5
Normal-7.5mg/1hour	0.801	0.000	0.000	0.000	0.000	0.000	0.000
Normal-15mg/1hour	0.132	0.007	0.034	0.027	0.003	0.015	0.005

Table 2 p quantity of t-test of amplitude of "b" wave of multifocal electroretinogram between N₂O₄ injected mice and normal mice

	a wave	b wave	Ring 1	Ring 2	Ring 3	Ring 4	Ring 5
Normal-7.5mg/1hour	0.516	0.638	0.549	0.749	0.764	0.644	0.654
Normal-15mg/1hour	0.243	0.183	0.501	0.027	0.167	0.074	0.127

Table 3 p quantity of t-test of multifocal electroretinogram difference between different group of different dose of N₂O₄ injected mice

	a wave	b wave	Ring 1	Ring 2	Ring 3	Ring 4	Ring 5
Latency	0.732	0.005	0.087	0.016	0.001	0.001	0.029
Amplitude	0.145	0.153	0.814	0.02	0.133	0.06	0.089

group. The difference of the latency of "b" wave of summation response and each ring response between group one or group two and control group were significance. The probability of "t" test are listed on Table 1.

The difference of the amplitude density of "b" wave of summation response and each ring response obtained from different group. The difference of the amplitude density of "b" wave of summation response and each ring response between group one or group two and control group had no significance. The probability of "t" test are listed on Table 2.

The difference of MERG obtained from group one and group two. The difference of the latency of "b" wave of summation response and each ring response between group one and group two are significance. The difference of the amplitude density of "b" wave between group one and group two had no significance. The probability of "t" test are listed on Table 3.

DISCUSSION

MERG was put forward by Sutter etc around 1990. It's a ideal tool to value the function of macula and the back polar retina [4]. The difference of the latency of "b" wave of summation response and each ring response between group one in which every mice was given 7.5mg N₂O₄ or group two in which every mice was given 15mg N₂O₄ and control group were significance. This indicates that 7.5 or 15mg N₂O₄ has significant influence to the latency of "b" wave of summation response and each ring response of MERG of mice [5]. The difference of the amplitude density of "b" wave of summation response and each ring response between group one or group two and control group had no significance. This indicates that N₂O₄ has less influence to the amplitude density of MERG of mice. The difference of the latency of "b" wave of summation response and each ring response between group one and group two were significance. While the difference of the amplitude density of "b" wave between group one and group two had no

significance. This indicates that different dosage of N₂O₄ has different influence to the MERG of mice. The difference exists largely in the latency of "b" wave of summation response and each ring response [2-4,6,7].

Through this experiment, we find N₂O₄ by abdomen injection can lead significant change to MERG of experiment mice. Especially to the latency of MERG. This indicates N₂O₄ by abdomen injection can cause the conduction of visual electricity of experiment animal more slow. And its influence related to the dosage. And it also related to the recover time from injection [8]. This experiment gives an impersonal experiment data for retinal malfunction due to poison of N₂O₄ in spaceflight accident. We wish this experiment can give more support to the prevention and cure of this kind of poison and its further study.

Acknowledgement: Grateful to Doctor Jian-Zhong Li of our hospital for preparing N₂O₄ solution for the experiment.

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