

Article

Heart rate variability after craniofacial surgery simulation

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Abstract: Each article is accompanied by a summary. The summary should be extended and contain no more than 450 words. The summary of the original article should be structured as follows: the purpose of the study; material and methods; results; conclusion. The summary of the review article should contain a summary and be consistent with the structure of the article.

A summary of the Clinical Case article includes relevance, description of the clinical observation, and conclusion. The resume is followed by keywords (when choosing keywords, we recommend using the MeSH keyword dictionary).

Keywords: HRV, rats, septoplasty, anesthesia, ECG, autonomic nervous system, stress..

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1. Introduction

Septoplasty is a powerful surgical stressor [1-3]. After surgical interventions in the nasal cavity in the body of animals, stress reactions occur [4-6], due to an increase in predominantly nociceptive impulses that occur at the site of injury [7, 8]. Aims: to evaluate the heart rate variability after simulation of septoplasty in rats under various general anesthesia schemes.

2. materials and Methods

The study was carried out on system (ANS), an analysis of heart rate variability (HRV) was carried out in rats before surgery (control data) and on the second, fourth and sixth days after surgery. All rats were divided into two groups of 12 animals each. In group 1, phthorothane was used for anesthesia and in group 2, zoletil was used. The operation was performed by 2-sided zig-zagscarification of the nasal septum mucosa. Interpreted 30-second fragments of records containing an average of 189 RR intervals without artifacts. Isolation of a 30 second fragment took place in the Biopac Student Lab 4.1 software. After that, the parameters of spectral analysis were calculated in the Kubios HRV program. The spectral component of heart rate variability was assessed using the Wilcoxon test for connected samples.

3. Aims

Aims to evaluate the heart rate variability after simulation of septoplasty in rats under various general anesthesia schemes.

4. Results

In both groups, STD RR increased slightly (group 1 (5.12 ± 0.56 ms) (p > 0.05); group 2 (5.27 ± 0.57 ms) (p > 0.05). day STD RR increased in group 1 (6.38 ± 0.74 ms) (p < 0.01), while in group 2 it decreased (4.0 ± 0.39 ms) (p < 0.01), compared with control (4.76 ± 0.5). On the sixth day in both groups, STD RR returned to preoperative values (4.32 ± 0.77 ms and 4.31 ± 0.72 ms, respectively) (p > 0.05). On the second day, Mean HR increased in groups 1 and 2 (411.35 ± 9.89 bpm and 411.23 ± 10.32 bpm, respectively) (p < 0.001). On the fourth day, Mean HR in group 2 increased (423.04 ± 11.56 beats / min) (p < 0.001), and in group 1 Mean HR decreased, but still remained above the control (396.88 ± 11.02 beats / min) (p < 0.01). On day 6, Mean HR in both groups increased (428.11 ± 12.31 bpm and 437.95 ± 10.81 bpm, respectively) (p < 0.05). On the second day after surgery, RMSSD increased in group 1 (5.28 ± 0.7 ms) (p < 0.001), while in group 2 RMSSD decreased (3.36 ± 0.35 ms)

($p < 0,05$). On the fourth day, positive dynamics was noted in group 1 (6.59 ± 0.65 ms) ($p < 0,05$), and in group 2, negative dynamics of changes in RMSSD (2.73 ± 0.25 ms) ($p < 0,001$). In group 1, on the sixth day, RMSSD decreased (5.25 ± 0.77 ms) ($p < 0,05$), and in group 2, RMSSD decreased (3.41 ± 0.69 ms) ($p < 0,01$), reaching the values before the surgery.

5. Discussion

Experimental work on the nasal septum in rats is carried out to study the effect on the surrounding tissues of grafts replacing the cartilage of the septum, new methods of hemostasis and prevention of postoperative nosebleeds, in order to develop manual skills of the surgeon [9, 10, 11], etc. Despite these facts, the simulation of septoplasty in small rodents, as classical experimental animals, on a non-deviated nasal septum can show the role of traumatic as well as surgical damage in the manifestation of stress reactions. In previous studies, we have shown that surgical damage to the nasal such traumatization is sensory deprivation of the olfactory analyzer, which, in turn, can cause changes in the cytoarchitectonics of the hippocampus [12, 13].

6. Conclusions

The use of phthorothane is preferable and gives a more pronounced increase in the tone of the parasympathetic division of the ANS, in comparison with zoletil. This helps to reduce stress-related hyperactivation of the sympathetic nervous system in the postoperative period.

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Conflicts of Interest: The authors declare no conflict of interest.

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