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HEART RATE VARIABILITY IN THE SIMULATION OF SEPTOPLASTY IN RATS USING DIFFERENT SCHEMES OF GENERAL ANESTHESIA

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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].

Purpose of the Study:

to assess changes in heart rate variability in the simulation of septoplasty in rats under the influence of phthorothane and zoletil.

MATERIALS AND METHODS

The study was carried out on 24 sexually mature outbred male rats weighing 185–250 g. To assess the state of the autonomic nervous 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 operations. 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 zigzag scarification 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.

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 operation.

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.

Keywords:

HRV, rats, septoplasty, anesthesia, ECG, ANS, stress.