# Abstract

Drug hypersensitivity reactions induced by drugs and substances using to perform anesthesia are not frequent, but very serious in the course and prognosis of anesthesia. Among many pharmacological substances used in the perioperative period, the using of neuromuscular blocking agents, in particular rocuronium, is the most common cause of hypersensitivity reactions. Due to the fact that hypersensitivity reactions to volatile anesthetics have not been demonstrated, only volatile induction and maintenance of anesthesia (VIMA) do not pose a risk of hypersensitivity reactions.

Rocuronium - a steroid neuromuscular blocking agent, due to its favorable pharmacokinetic and pharmacodynamic parameters, is widely used in anaesthesiology. Many reports indicate the highest proportion of this agent in triggering hypersensitivity reactions during general anesthesia. Therefore, the aim of the study was to assess the effect of volatile induction and maintenance of anesthesia with the using of rocuronium on serum tryptase concentration - the main mediator of hypersensitivity reactions. The study also examined the correlations between serum tryptase concentrations during anaesthesia and patient’s anthropometric indicators and factors related to the course of surgery andanesthesia.

The study was conducted in a group of 126 patients above 18 years old, without co-existing allergic disorders, mastocytosis and with a negative history of hypersensitivity reactions during anesthesia. The study group consisted of 66 patients qualified for gynecological surgeries undergoing general anesthesia by volatile induction and maintenance of anesthesia with

sevoflurane and a muscle relaxant - rocuronium. The control group consisted of 60 patients qualified for goiter surgery using intraoperative identification of the laryngeal nerves. In this group of patients general anesthesia was performed using the VIMA method without the using of neuromuscular blocking agents.

The pre-operative clinical examination included the assessment of the general condition, associated perioperative risk according to the ASA scale and the determination of anthropometric indicators. Circulatory, ventilatory and respiratory parameters were monitored during anesthesia. In all patients, the duration of anesthesia, the duration of surgery, the amount of applied fluid therapy and the total dose of opioids were determined. In the study group, the following values associated with the using of rocuronium: the intubation dose, the infusion dose, the total dose and the duration of the infusion, were additionally noticed. In the postoperative period, the general condition was assessed based on the Aldrete and Steward scales.

In all patients blood samples before induction and after anesthesia were taken for the determination of serum tryptase concentration. In the group of patients undergoing volatile anesthesia with rocuronium, blood was also taken to perform the tryptase determination at the end of its infusion. The obtained results were subjected to statistical analysis.

In all patients, serum tryptase levels were the highest before anesthesia and were significant reduced after completion of anesthesia. In group I, the median pre-operative serum tryptase concentration was 2.92 μg/L, and after anesthesia was significantly reduced to 2.61 μg/L, (p=0.03). In group II, the serum tryptase concentration before anesthesia was the highest among all

studied patients - the median was 3.27 μg/L, and there was also a significant decrease after its completion to 2.79 μg/L, (p=0,02). Analysis of the changes of serum tryptase concentration during anesthesia in group I showed decrease the level of this enzyme, which reached the lowest value after completion of anesthesia. In the group of patients undergoing volatile induction and maintenance of anesthesia with the using of rocuronium, the serum tryptase concentration was lower after completion of rocuronium infusion with reference to the value before anesthesia by 10.0% (p=0.01). The highest difference in serum tryptase concentration was found in patients undergoing volatile induction and maintenance of anesthesia without the using of neuromuscular blocking agents recorded between measurements before and after completion of anesthesia - a 14.7% reduction. The serum tryptase concentrations in the analyzed stages of anesthesia did not show significant differences between the groups. It was found that among all patients, the serum tryptase concentration did not present any correlation to anthropometric indicators as well as factors resulting from the course of surgery and anesthesia.

The results of the conducted research allowed to present the following conclusions:

1. The using of rocuronium during volatile induction and maintenance of anaesthesia did not result in changes in serum tryptase concentrations compared to method without the using neuromuscular blocking agents.
2. The rocuronium doses did not affect the serum tryptase concentration during volatile induction and maintenance of anesthesia.
3. Anthropometric indicators of the patients as well as factors resulting from the course of surgery and anesthesia did not affect the values of serum tryptase concentrations.
4. The presented method of volatile induction and maintenance anaesthesia and the using of rocuronium ensured stable circulatory and respiratory parameters.
5. The using of rocuronium as a component of volatile induction and maintenance of anaesthesia was safe and did not cause peri-operative hypersensitivity reactions assessed by changes in serum tryptase concentrations.
6. Due to the selection of the study group, the explanation of the rocuronium effect on the serum tryptrase concentration requires testing on a larger and more diverse group of patients.