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REVIEW ARTICLE

CHALLENGES IN POSITIVE ANESTHETIC ALLERGIC TESTING

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Abstract

Allergy is becoming very often medical problem all over the world, especially during anesthesia. There are increased numbers of allergy tests, due to positive anamnestic facts obtained from patients that are planning operations. Every patient with positive allergic reactions to 2 groups of medications or allergic reactions in previous anesthesia, are usually tested for allergic reaction for all the medications we use in anesthesia. We noticed that there is increased number of patients that are positive on some anesthetic drugs. There are patients allergic to muscle relaxants depolarizing like Suxamethonium - (Succinylcholine) or non-depolarizing drugs especially on rocuronium, also on opioids and other drugs such as Propofol, Ketamine. We would like to discuss a few cases and the way we solve the difficulties. Finding out the cause of an allergic reaction is complicated. A person can experience an allergic reaction to other factors or medications (such as antibiotics, muscle relaxants or latex) than anesthesia. If a medical professional administers anesthetic medications to a person who is allergic to them, they will develop anaphylaxis. We take these reactions very seriously and whenever we have these patients, we prepare anesthesia protocols in advance. There is not a general rule for all the patients. What approach we will choose, depends on operation, medicaments that are available in that moment, and consensus of the patient for anesthesia acknowledging all the difficulties, as well as accepting the operation and anesthesia protocols that he will have to challenge.

Key Words: *allergy, allergy tests, anesthesia*..

Introduction

In the early 2000s, the European Academy of Allergology and Clinical Immunology proposed to define acute nosological entity called allergy as "a severe, life-threatening, generalized or systemic hypersensitivity reaction" primarily mediated by type E immunoglobulins (IgEs) (1). This clinical entity was defined by the second National Institute of Allergy and Infectious Disease/ Food Allergy and Anaphylaxis Network symposium. They gave a definition of anaphylaxis as "Anaphylaxis is a serious allergic reaction that is rapid in onset and may cause death (2). The European Academy of Allergology and Clinical Immunology committee

recommended that the term anaphylactoid, that is used for non–IE-mediated anaphylactic reactions, should no longer be used (1). We are also aware that this suggestion was not always accepted. The pathophysiological mechanism is known. On re-exposure on some allergens, the multimeric allergen cross-links two specific IgE receptors are creating a bridge between two IgE. These two IgE receptors aggregate and start a transduction cascade. Due to this cascade, there are lot of mediators that are systemically released. These mediators are histamine, neutral proteases (tryptase, chymase) and proteoglycans (heparin). They are releasing from intracellular granules in the cells, and then enter the blood stream within tissues and blood. Some of these mediators, for example histamine, can initiate increasing of production of nitric oxide. Then there are new proinflammatory phospholipid-derived mediators. They are to be released very soon. After that, mast cells release chemokines and cytokines. These substances start to recruit and to activate inflammatory cells. The target organs are cardiovascular, respiratory, CNS - Central Nervous System, skin and mucosa and gastrointestinal system. The cardiovascular system can initiate symptoms like diaphoresis, dizziness. The signs are cardiac arrest, hypotension, collapse decrease in Et CO2, tachycardia, bradycardia, dysrhythmias.
The respiratory system has symptoms like acute shortness of breath, chest discomfort, wheezing. The clinical signs are acute respiratory failure, bronchospasm, decreased compliance, edema of larynx stridor. Manifestations of skin and mucosa tissues are burning, itching, tingling. There are signs such as erythema, flushing, edema urticaria. The patients with allergic reactions have neurological symptoms like increasing sense of doom, malaise with signs (if they are awake and not in general anesthesia) like loss of consciousness and confusion. Gastrointestinal tract has symptoms like cramps, nausea with signs of diarrhea, vomiting. Clinical manifestations can be graduatted in four severety grades. The most danagoures is the grade four – when cardiac arrest appear.
The most frequently reported drugs that are causing allergic reactions are antibiotics, neuomuscular blocking agents. Less frequently reported are latex, gelatins, hypnotics, opioids, contrasts that are used in radiological investigations. Allergies on local anesthetics are rarely reported.
Allergy is becoming very often medical problem all over the world, especially during anesthesia. There are increased numbers of allergy tests that are taken, due to positive anamnestic facts obtained from patients that are planning operations. Every patient with positive allergic reactions to two groups of medications or allergic reactions in previous anesthesia, are usually tested for allergic reaction for all the medications used in anesthesia. We noticed in recent years that there is increased number of patients that are positive on some anesthetic drugs. Very often they are positive on two or three groups of anesthetics drugs. There is increased number of patients allergic to opioids like fentanyl and remifentanil. Also, there are patients allergic to muscle relaxants depolarizing like Suxamethonium - (Succinylcholine) or non-depolarizing drugs especially on rocuronium. Also, there are patients that are allergic on sedatives like Propofol, Ketamine. There is no need to have doubts on the dermatological testing. During Prick’s tests,

anesthetic drug is diluted three to four times. If on the diluted drugs that are tested, patient has positive reaction, that means that the patient will be allergic on that drug without any doubt. We would like to discuss a few cases that we encountered in our daily practice and the way we solve the difficulties.

The first case: Obese patient with body mass index -BMI 28 had previous operation for umbilical hernia. During that operation she had allergic reactions to opioids. She was admitted at our hospital for ventral hernia. We have done tests for allergy, and she was found to be allergic on opioids - Fentanyl, Remifentanil. Also, she was allergic on Ketamine, non-depolarizing muscle relaxants and nonsteroid anti-inflammatory drugs. She was not allergic on Paracetamol, Bupivacaine and Propofol. We decided to give her a high spinal anesthesia L1-L2 with 4ml of 0.5% Bupivacaine. Operation finished smoothly.

The second case: We had a patient with diverticulosis, who was planned to be operated. Hemicolectomy was suggested as an operation by the surgical team. She had anamnesis on allergies, and allergic reactions to Non steroid anti-inflammatory drugs - NSAID and Paracetamol. After the tests were done, she was found to be allergic on Fentanyl, Remifentanil, Ketamine, also on Paracetamol and NSAID. For the operation we decided to give her continuous epidural anesthesia with 0.25% Bupivacaine. She had her epidural on level L1-L2, and before intubation we gave her bilateral TAP - transversus abdominal block, and we intubated her with Propofol and rocuronium that was used to facilitate intubation. Anesthesia was maintained with sevoflurane and propofol which was administrated on continuous infusion with rate 60mcg/kg/min. Postoperatively she had Visual Analogue Scale (VAS) pain score 3 and had continuous epidural analgesia.

The third case: We also had a patient who was admitted at our hospital for Cholecystectomy with allergic on opioids - Fentanyl, Remifentanil. We decided to give her opioid free anesthesia. After O2 supply we started with slow infusion (during10 minutes) of dexmedetomidine 20μg, followed by 10mg dexamethasone, ketoprofen 160mg, paracetamol 1g, lidocaine 100mg and MgSO4 2.5g. We continued with the introduction of anesthesia with Ketamine 20mg and Propofol 170mg and preformed intubation. Anesthesia was maintained with continuous application of dexmedetomidine 4μg/ml to rate of 8ml/h, MgSO4 200mg/ml (1ml/h) and lidocaine 1% (10mg/ml) in rate of 5ml/h. Also, sevoflurane to MAC 0.6 was used. At the end of the surgery the patient was smoothly extubated, after giving neostigmine 2.5mg and 1mg Atropine. Vital signs remained stable in postoperative monitoring and pain score in Visual Analogue Scale - VAS was 4 in the first hour after surgery. Metamizole sodium 2.5g was given prior discharge from recovery room. On the first day after surgery VAS pain score vas 2, Ketoprofen 160 twice a day and Paracetamol 1g three times a day were given.

Discussion

Having patients with positive allergic reaction is a challenging issue. Patients could have an allergic reaction to medications, such as antibiotics, muscle relaxants, opioids, sedatives etc. If a

medical professional administers anesthetic medications to a person who is allergic to them, they will develop anaphylaxis. Anaphylaxis during anesthesia occurs in 1 in 200,000 cases (3). Anaphylaxis is a life-threatening situation. Anaphylaxis initiates the body to release chemicals which can initiate anaphylactic shock. The patients who overcame anaphylactic shock successfully, can develop cardiovascular, respiratory and cognitive disorders after the recovery. It is essential to prevent these events, especially in elective operations and investigations. Each patient has a unique approach and should be prepared very thoroughly.

Conclusion

We found that there are very often patients with allergy positive tests. We take these reactions very seriously and whenever we have these patients, we prepare anesthesia protocols in advance. There is not a general rule for all the patients. What approach we will choose, depends on operation, medicaments that are available at that moment, and consensus of the patient for anesthesia - acknowledging all the difficulties, and accepting the operation and anesthesia protocols that he will have to challenge (4,5).

Authors' contribution

Our goals are to use new not used previously medications like cis-atracurium, which we hope will be started to use very soon, or performing non-opioid anesthesia in allergic reactions on opioids, also as much as possible to use regional anesthesia whenever it is possible. It is our opinion that sharing our problems and demonstrating our solutions can be usefully used in overcoming our problems.

References:

1. Muraro A, Worm M, Alviani C, Cardona V, et al. European Academy of Allergy and Clinical Immunology, Food Allergy, Anaphylaxis Guidelines Group. EAACI guidelines: Anaphylaxis (2021 update). Allergy. 2022 Feb;77(2):357-377. doi: 10.1111/all.15032. Epub 2021 Sep 1. PMID: 34343358.
2. Sampson HA, Muñoz-Furlong A, Campbell RL, et al. Second symposium on the definition and management of anaphylaxis: summary report--Second National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis Network symposium. J Allergy Clin Immunol. 2006 Feb;117(2):391-7. doi: 10.1016/j.jaci.2005.12.1303. PMID: 16461139.
3. Mertes PM, Ebo DG, Garcez T et al. Comparative epidemiology of suspected perioperative hypersensitivity reactions. Br J Anaesth 2019; 123: e16e28.

4. Harper NJN, Cook TM, Garcez T et al. Anaesthesia, surgery, and life-threatening allergic reactions: epidemiology and clinical features of perioperative anaphylaxis in the 6th National Audit Project (NAP6). Br J Anaesth 2018; 121: 159e71.
5. Mirakian R, Ewan PW, Durham SR et al. BSACI guidelines for the management of drug allergy. Clin Exp Allergy 2009; 39: 43e61.