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Anaesthetic Management of a Patient with Known Latex Allergy and Hypersensitivity to Multiple Drugs

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Abstract

The first case report of natural rubber-associated allergic reaction was described in Germany in the year 1927: a case of latex associated allergy by type I or immediate hypersensitivity [1]. Despite the increase of latex associated allergy in general population, severe anaphylactic reactions during some surgical procedures are still rare; however, they are associated with increased morbidity and mortality. Up to now, natural latex rubber is still the second most common cause for anaphylactic reactions during anesthesia [2]. Prevention, diagnosis, treatment, and follow-up of patients affected by this event represent a big challenge for anesthesiologists. The objective of this report was to describe the anesthetic management of a patient with known latex allergy and associated allergy to multiple drugs, food and fibres and to take measures to prevent life threatening allergic emergencies.

Keywords: Anaphylaxis; Contact Dermatitis; Latex Rubber.

Case Report

The following manuscript describes the perioperative management of a healthy 32 year old married Asian female, health worker by profession with a known history of latex hypersensitivity and allergy to multiple drugs and other allergens (food and fibres) diagnosed by skin prick and patch testing (Table 1) on allergist follow-up and was on immunotherapy posted as an elective case for laparoscopic Cholecystectomy. The patient had no other associated co-morbidities. The Patient was diagnosed for latex hypersensitivity 10 years back when she developed urticaria on multiple exposures to latex gloves as well as to the powder used in rubber gloves.

This patient was planned for an elective cholecystectomy one month back at a District hospital in view of her chronic cholecystitis with multiple gall stones. But she developed a severe anaphylactic reaction on the day of surgery in the preoperative room two hours after she was cannulated by a nurse in the ward without any intravenous drugs being given. The patient was resuscitated immediately with boluses of IV adrenaline, antihistamines and corticosteroids and was discharged after an overnight observation in that hospital. The cause of this severe allergic reaction was attributed to her previous history of latex allergy as none of the medical equipments used were confirmed to be latex free and that she did not receive any other drugs before the anaphylaxis occured. This patient was then referred to our superspeciality referral hospital for the perioperative management of her laproscopic cholecystectomy in view of her being a high risk case for developing latex associated severe allergic reactions.

At our hospital a thorough workup about the patients history and investigations was done in the preanesthesia evaluation clinic, the patient was referred to the immunologist for further evaluation and to know about cross sensitivity and reactions to other drugs to be used during her stay in the hospital. Skin prick testing and patch testing were done to ascertain and document the allergic reaction to latex and other allergens. On evaluation she was found to be allergic to a multitude of drugs, food and fibres (Table 1) was put on immunotherapy by the allergist for a period of 4 weeks before giving clearance for the anesthesia and surgery. She was also evaluated for allergy to anesthetic drugs which was found to be

negative. Since, this patient had a uneventful history of tooth extraction under local anesthetic lidocaine 7 years back.

The patient was given clearance for anesthesia and a high risk informed consent was taken for anesthesia and surgery. The theatre staff was notified a day before the surgery and all necessary preparations were done to minimize latex exposure to the operation theatre. The patient was kept first in the list in order to minimize the use of latex containing substances in the theatre to get a latex safe environment. On the morning of surgery patient received oral premedication Montelukast 10 mgs, Levocetrizine 10mg, Ranitidine 150 mgs and Metoclopromide 10mgs with a sip of water one hour before the scheduled surgery. The patient's latex allergy was documented in the case notes and the operation theatre was sealed for minimum flow of human traffic and the main door of theatre was notified as a restricted zone in order to minimize airborne latex exposure. All items containing latex were removed from the patient care area. Only non-latex medical supplies were used including, (Figure 1, 2 &3) but not limited to

- Gloves
- IV equipment
- Ventilation and airway equipment
- Catheters
- Surgical tape
- Tourniquets
- Medication containers without latex stoppers.

Anaesthetic circuit which was used was made of silicon and latex free PVC face mask were used. Patient was induced after attaching all the standard ASA monitoring. Airway was secured with size 4 latex free LMA, paper dressings were used for securing the intravenous cannula and fixing the LMA. A resuscitation trolley with resuscitation drugs and equipments was kept standby with prior notification to the ICU staff in order to avoid any catostrophe.

Table 1: *Allergic Skin Prick Testing Report:* Showing patient strongly positive for multiple allergens viz; D. Mite, F Salavius, R. nigricans,Penicillin Sp., few pollens, house dust, epithelial and Insects

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ALLERGEN SKIN PRICK TESTING REPORT

Name of the patient: Bhat Haseena Age/Sex:32/F MRD:024010

CC NO._____ Ward/Bed: OPD Previous Diag: Urticaria under Evaluation

Date of Testing:09/12/2015 Referred by Lab. No.581

S No.	Name of The Food Allergen	Result	S No.	Name of The Food Allergen	Result
1	Mite(D.pteronyssinus)	**P 6x6mm**	12	R.Nigricans	**P 5x2.5mm**
2	Pollens	**P 5x5mm**	13	Penicillin Sp.	**P6x5mm**
3	Fungi	**P5x5mm**	14	Asp. Few pollens	**P5x5mm**
4	Dust	**P5x2.5mm**	15	House dust	**P8x6mm**
5	Dog epithelia	**P8x6mm**	16	Mosquito	**P5x5mm**
6	Sheep wool	**P6x6mm**	17	Cucumber	**N**
7	Cockroach	**P5x5mm**	18	lemon	**N**
8	Spinach	**N**	19	Chocolate	**N**
9	Cheese	**N**	20	Cat epithelia	**P5x5mm**
10	Eggwhite	**N**	21	Peanuts	**N**
11	Peas	**N**	22	Prawns	**N**
	Positive Control (Histamine)			Negative Control (Normal Saline)	

POSITIVE : **Multiple Allergens viz, Drugs, Food, fibres, dust, pollens, insects and fibres.**

Sign of Resident Sign of Consultant

Table 2: *Food Allergen, Skin Prick and Patch Testing Report*: Suggests Latex allergy positive report

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FOOD ALLERGEN SKIN PRICK TESTING REPORT

Name of the patient: Bhat Haseena Age/Sex: 32/F MRD: 193017

CC NO._____ Ward/Bed: OPD Previous Diag: Chronic Urticaria, Asthma

Date of Testing: 07/09/2016 Referred by_____ Lab. No.90

S No.	Name of The Food Allergen	Result	S No.	Name of The Food Allergen	Result
1	Walnut	N	10	Egg white	N
2	Pista	N	11	Garlic	N
3	Raddish	N	12	Orange	N
4	Curd	N	13	Carrot	N
5	Almonds	N	14	Tomato	N
6	Fish	N	15	Rice	N
7	Saffron	N	16	milk	N
8	Spinach	N	17	Peanuts	N
9	Cheese	N	18	Latex	P6mmX5mm
	Positive Control (Histamine)	15mm P		Negative Control (Normal Saline)	NIL

*P-positive *N-Negative

Positive : **Latex**

Comments

Sign of Resident

Sign of Consultant

Fig 1: Anesthetic Drugs and antibiotics being used without latex impregnated rubber caps and(b) latex free Intravenous cannula

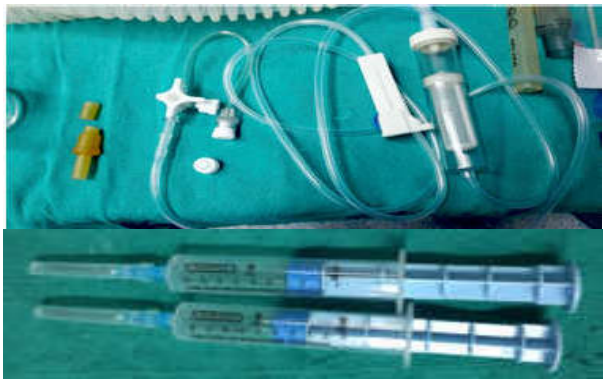

Fig. 2: Rubber material removed from the intravenous drip set to make it latex free. (b)Latex free syringes and arterial cannula

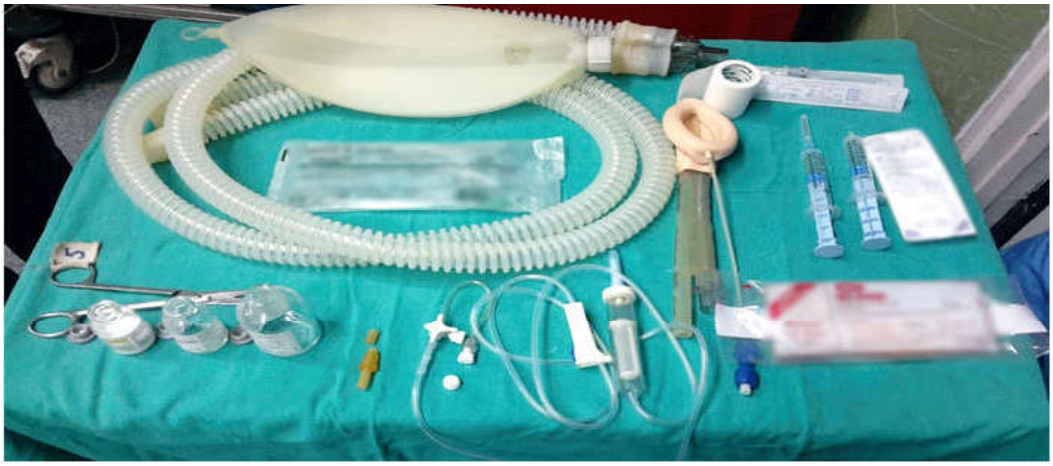

Fig. 3: Anesthetic Trolley with latex free drugs and equipments

Surgery was started 20 minutes after the initiation of anesthesia. No reactions or any other complications to anesthesia occurred during that period. After extubating, patient was shifted to the postoperative recovery (PACU) area for monitoring where she remained stable and was shifted to general surgery ward after being observed for 2 hours postoperatively. Patient was discharged after two days in a stable condition with uneventful post operative course.

Discussion

The clinical manifestations of exposure to latex is a well established spectrum ranging from mild allergic contact dermatitis, which is not mediated by the immune associated response, to late hypersensitivity reaction (type IV mediated by T cells and immediate hypersensitivity reaction type I), also known as anaphylactic or IgE-mediated reaction [3]. The degree of severity, type I reactions can be divided into: I) cutaneous-mucous reactions II) moderate multivisceral reactions III) life-threatening with mono- or multi-visceral reactions IV) cardiorespiratory arrest V) death occurring because of inadequate response to cardiorespiratory resuscitation maneuvers [4].

Severe allergic manifestations to natural latex rubber have been documented in the literature since the last two decades. Since then, the incidence of allergic reactions could be decreased considerably by avoiding rubber exposure during surgeries in the operation theatres, which is considered to be the most important measure to reduce such reactions in the vulnerable population. Despite this knowledge and documentation, natural latex rubber products are still in use because of the higher costs of latex-free products and their inferior quality. Incomplete manufacturer's specifications or labels on the surgical anesthetic equipments pose yet another problem in identifying the products containing latex.

The other important reasons for reducing the use of natural latex rubber were high-risk groups, such as patients with atopic syndrome or Spina bifida, surgery in infancy, and health professionals [5]. Prevalence is very high, and allergic reactions to natural latex rubber represent potentially life-threatening intraoperative complications [6]. Allergic reactions to natural latex rubber during anesthesia still amount a mortality rate from 5% to 7% [7]. Patients with atopic syndrome show a predisposition towards sensitization to natural latex rubber significantly, meaning a constant repeated contact with rubber containing materials [8]. Many affected patients have had history of multiple surgeries because of Spina bifida or anomalies of the urogenital tract in early infancy and thus high natural latex rubber exposure [9].

The medical history itself was conclusive taken from this patient as documented in this case report .The fact that the patient had been previously exposed to natural latex rubber- because she was a healthcare worker was ascertained on history and the available investigations and that she had received multiple immunotherapies so far (Table 1 and 2). Early exposure to natural latex rubber is a relevant factor for developing an allergy to latex in later life [9]. For preventing allergies to natural latex rubber, premedication with antihistaminics and corticosteroids has been suggested. Premedication with histamine receptor antagonists (Ranitidine-H2 blocker + Levocitrizine-H1 blocker) and leukotriene (LT4) receptor antagonist (Montelukast) was used in

our case. The cost of extensive pre-surgery screening is also not relevant for every patient [10]. However, the diagnosis was well established in our case pre operatively by skin prick and patch testing guided by strong positive allergic episodes. Preoperative diagnosis by means of 'skin prick method' is not required always but can aid in the diagnosis, particularly for patients with spina bifida (upto 44% show latex allergies), dysplasia of the genitourinary tract and atopic dermatitis aswell as for the patients with occupational exposure to latex and allergies to food(eg; figs, papayas, chestnuts and kiwis) [10].

In case of all precautionary measures, if an intraoperative anaphylactic reaction occurs, it is crucial to first stop the contact with the allergen. The following list of measures shows a short overview of necessary interventions to be done:

- Stop contact with the allergen:
  - ⊙ Gloves have to be taken off outside the theatre and clothes must be changed.
  - ⊙ All personnel wearing latex gloves have to leave the operating theatre immediately or as quickly as possible.
- All items containing latex should be removed from the theatre.
- Recruitment of personnel, such as physicians and nursing staff.
- Priorities are ist securing the airways, oxygen administration and maintaining normal haemodynamics by increasing volume intake and early adrenaline administration.

  Simultaneous corticosteroids and antihistamine administration. The authors of this case report suggest the following measures to be taken in case of an acute anaphylaxis- As per the hospital protocol in case of a severe allergic reaction of any kind.
- In case of a suspected airway swelling, administer nebulised adrenaline via a mask, intravenous corticosteroids and intubate as soon as possible if already not done so.
- Oxygenation with sufficient FiO2, bronchoconstriction needs to be treated with nebulised bronchodilators.

Additional intravenous cannulae, volume replacement, adrenaline boluses and cardiopulmonary resuscitation if necessary.

Second line-therapy- with H1/H2-antihistaminics.

Further physical examinations- reevaluation.

Conclusion

Regular and systematic education of patients, their families, healthcare workers and employers is an integral part of the management of latex allergy.

Patients and their family members who are diagnosed with latex allergy should be educated about the common symptoms and the management of this condition. They should also be made aware about the preventive measures to avoid future exposure of the offending allergen.

Healthcare workers should be imparted knowledge and trained about how to recognise the signs and symptoms of an allergic reaction and to treat an anaphylactic reaction.

Hospitals and healthcare centres should have set protocols and policies to ensure safety of both patients and the healthcare workers.

Natural latex rubber products can cause allergic reactions with a wide range of clinical signs and symptomatology, the spectrum ranging from mild eczema to severe and life threatening anaphylactic reactions. Furthermore, intraoperatively the diagnosis might get impeded by highly variable clinical symptoms, the ill response of patients, anesthesia-induced change in haemodynamics, blood loss during surgery. Therefore, prevention of exposure particularly in the high risk group seems to be even more important than raising awareness for allergies to natural latex rubber.

- Stopping the use of natural latex rubber or its by-products is the ist step to prevent a latex associated anaphylactic reaction.
- A standardized questionnaire on preoperative assessment about latex allergy or any previous exposures to latex should be documented before any anesthetic procedure.
- A list of latex containing equipments in the operation theatre should be compiled and replaced by non-latex containing material.
- A hospital based standardized protocol must be laid down about the treatment should a anaphylactic reaction occur at anytime in the perioperative period and such a policy be written down in a standard operating procedure (SOP).
- Simulations and continuous medical education about the management of an anaphylaxis can be exercised along with the

basic and advanced life support training in a hospital setting.

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