Original Research Article

A study on Preoperative xylocaine sensitivity test in patients undergoing ocular surgeries

Abstract

Purpose:

Xylocaine sensitivity testing is being practised preoperatively in all patients undergoing ocular surgery under LA in order to prevent hypersensitivity reactions. With the current volume in the ocular surgeries and the expected increase in the future, it becomes critical to optimize the safety of the Preoperative xylocaine sensitivity testing.

Methods:

The study comprised of 400 patients (204 females & 196 males) aged 18 and above. The injection site was examined for all patients for wheal/erythema and itching, no reaction was seen after 10 min, 30 min and 24 hours.

Results:

After pre-operative XST the patients are examined for wheal, flare, itching or any other reaction locally. Intraoperatively, Patients are assessed for systemic and local reactions to Peribulbar and retrobulbar block. XST was performed for all 400 patients included in the group and reaction was recorded on the basis of local reaction at injection site. However, none of the patients actually showed any reaction to XST.

Conclusions: It has been recommended since decades that sensitivity testing before cataract surgery under LA should be undertaken as a routine precautionary measure. With changing paradigms in the type of anaesthesia (topical becoming prevalent in advanced nations as well as urban centres in developing world) there is a need to review the established protocols. Hence this study highlights the

possibility of avoiding such tests in all patients before routine cataract surgery under LA.

With due precautions and resuscitation measures available in standby, it is theorized that routine testing for LA sensitivity may be skipped.

Introduction

The usage of local anaesthesia in modern ophthalmology dates back to 18th century, when Cocaine was introduced by Koller in 1884. Various techniques like usage of sleep sponges, cold and pressure and even hypnosis were in practice until usage of cocaine as local anaesthetic started. Evolution of local or instillation anaesthesia progressed with later discovery of phenocaine, butacaine, tetracaine and procaine. Lidocaine is a synthetic amide type local anaesthetic which was synthesized in 1943 that has been one of most commonly used ever since. [1]

Cataract surgeries and other ocular surgeries are practiced widely and substantial resources are committed to an increasing ocular surgery rate in developing countries. Even though cataract surgery can be performed under topical anaesthesia, most surgeons prefer regional block with either peribulbar or retrobulbar anaesthesia. Peribulbar anaesthesia is comparatively safer than retrobulbar block as there is lesser chance of globe perforation and diffusion of anaesthetic agents into the central nervous system.

With the current volume in the ocular surgeries and the expected increase in the future, it becomes critical to optimize the safety of the procedure.

It is likely that routine preoperative medical testing, physical examination and routine testing will detect medical conditions, but it is questionable whether these conditions should preclude individuals from ocular surgery or change their perioperative management. [2]

Xylocaine (lidocaine HCl) Injection is an anaesthetic agent of amino amide type used for ocular and local or regional anaesthesia. The allergic reactions to the lignocaine are very rare, it has been estimated that true allergic reactions to local anaesthetics account for less than 1% of all adverse reactions to local anaesthetics [2, 3] .Only a few cases of type I immediate hypersensitivity reaction [4] and type IV delayed hypersensitivity [5, 6] to lignocaine have been reported till

date. Hyaluronidase is an enzyme used in peribulbar block as an adjuvant to 2% Lidocaine to increase the spread of anaesthetic agents. [7] Hyaluronidase as well is reported to cause allergic reactions rarely. Xylocaine sensitivity testing is being practised preoperatively in all patients undergoing ocular surgery under local anaesthesia in order to prevent hypersensitivity reactions. All the patients included in the study were given intradermal injection of 0.5 ml of 2% xylocaine preoperatively, and are monitored for local skin reaction after 5 mins according to the hospital protocol of XST. The intra operative and post operative reactions are correlated with the XST reaction in order to understand its effects on the procedure.

On thorough review of literature, no clear evidence was available showing that XST is mandatory preoperatively. Hence the current study is taken up to understand the significance of doing XST routinely in all preoperative patients.

Materials and Methods

400 patients who underwent ocular surgeries under local anaesthesia were included in this retrospective study over a period of 2 years from May 2019 to May 2021.MGM Medical college, Institutional ethics committee(IEC), Navi Mumbai approval was obtained and permission from medical records department was obtained before collecting the sample. No funding was required for this study.

All patients were aged 18. Patients who were previously documented allergic reaction to Xylocaine and Patients whose data was lacking in the MRD were excluded from the study. Reaction to lignocaine preoperative and intra operative was studied in all the patients. Preoperatively Inj. XST 0.5 ml intradermal

injection was given to all patients according to the hospital protocol and the site of injection was marked with a 1 cm circle. The injection site was examined for erythema/wheal and itching after 10 min, 30 min and 24 hours which were graded. (Table 1)

Table 1: Reaction to preoperative XST

Patient no.	Previous history of allergic reaction to local anaesthetic	Reaction at 10 min	Reaction at 30 min	Reaction after 24 hrs	Other findings:

Intraoperatively reaction to local anaesthesia was observed and graded as follows following peribulbar/retrobulbar block given with 8-10 ml injection of 6:4 combinations of lignocaine and bupivacaine with hyaluronidase.(Table 2)

Table2: Immediate reaction after peribulbar block:

Patient no.	Breathlessness	Itching	Wheeze	BP	Oxygen saturation	Type of allergic reaction
Patient no.	Oedema of eyelids	Pain in ocular movements	Diplopia	Prop tosis	Restriction of ocular movements	Type of reaction

The pre-operative and intraoperative reactions were compared in all the patients included in the study.

RESULTS:

In this study, 400 patients who were about to undergo ocular surgery were studied retrospectively for any specific adverse reaction to preoperative xylocaine sensitivity testing. The mean age of the study group was- 61.5 years. The total percentage of female patients was- 204. The total percentage of male patients was- 196. The total number of patients with history of bronchial asthma was- 24. The total number of patients with history of delayed hypersensitivity reaction to drugs other than LAs was 36. This is significant to rule out any correlation between asthma, hypersensitivity reaction to other drugs, and XST reaction.

The injection site was examined for all patients for wheal/erythema and itching, no reaction was seen after 10 min, 30 min and 24 hours.

Out of the 400 patients, none had any intraoperative reaction to local anaesthesia.

After pre-operative XST the patients are examined for wheal, flare, itching or any other reaction locally and the results are recorded as shown in the following table.

Intraoperatively, Patients are assessed for systemic and local reactions to Peribulbar and retrobulbar block and results are observed to be as follows (table 7)

Table no 3: Showing the local reaction at the end of 10, 20 and 30 minutes

Total number of patients.	Previous history of allergic reaction to local anaesthetic	Reaction at 10 min	Reaction at 30 min	Reaction after 24 hrs	Other findings:
400	0	0	0	0	0

Table no.4: Showing Immediate systemic reaction after peribulbar or retrobulbar block.

Total number of Patient	Patients who showed immediate Breathlessness	Patients who showed generalized Itching	Patients who had Wheeze	Patients with immediate BP fluctuations	Oxygen saturation drop	Type of allergic reaction
400	0	0	0	0	0	0
Total number of Patients	Oedema of eyelids	Pain in ocular movements	Diplopia	Proptosis	Restriction of ocular movements	Type of reaction
400	0	0	0	0	0	0

Table no.5: Showing reaction in patients with bronchial asthma.

Total number of patients with history of bronchial asthma	Number of bronchial asthma patients with reaction to XST	Number of bronchial asthma patients with intraoperative reaction to peribulbar block
24	0	0

Table no.6: Showing reaction in patients with known reaction to other drugs.

Total number of patients with history of DHR to other drugs	Number of patients showing XST reaction	Number of patients showing intraoperative reaction to peribulbar block
36	0	0

We initiated the study to monitor the reaction to pre-operative XST, to monitor intra-operative reactions to local anaesthesia and to assess any possible correlation between the two.

However, we found no such reactions or correlation after monitoring 400 patients over a period of 2 years.

DISCUSSION:

Eliciting LA allergy has become a routine practice before almost all surgeries, even though local anaesthetic allergy is rarely observed. However, few reported cases in literature had an extreme anaphylactic reaction after LA.

David W. Canfield et al proposed guidelines to local anaesthetic allergy testing in their paper. They included patient evaluation, patient preparation and management, preparation of test solutions, injection procedure, and evaluation of results including post procedure monitoring. [10] They recommended testing with appropriate specialists and with standby practitioners available for resuscitation if needed.

In our study XST was performed for all 400 patients included in the group and reaction was recorded on the basis of local reaction at injection site, with similar protocols in place.

It has been stated that amide group of local anaesthetics including lignocaine, bupivacaine, mepivacaine are less allergic than the ester group drugs. [11]

Andreas et al reported a case of lidocaine sensitivity with cross reactivity to the other amide group local anaesthetics where patient had recurrent contact dermatitis episodes immediately following local anaesthetic instillation. [12]

A similar case reported by Takahama et al also had fixed drug eruption with cross reactivity among the amide group of local anaesthetics. [13]

Similar drug eruptions are reported by other authors also in individual case reports [14, 15, and 16]. But inconsistent results with skin testing were also reported. [17]

In a study conducted by Dorota Jenerowicz et al on comparison of skin testing with positive history to drug allergy, only 1 of the 5 patients had positive intradermal test. [18]

An association has been noticed with delayed hypersensitivity and topical application of the drug usually presenting as contact dermatitis.

Even though IGE mediated hypersensitivity reaction to amide group is believed to be very uncommon, cases are reported where patients had adverse reactions to LA, suggesting type I hypersensitivity, where signs and symptoms tend to occur within minutes of drug injection and include urticaria, episodes of angioneurotic oedema, wheezing, sneezing, pruritus or even anaphylactic shock. [19, 20]

In a large group study done by Mackley CL et al on 183 patients, with contact dermatitis, only 4 patients had positive reaction to lignocaine. [21]

Less than 1% of reported allergic reactions to local anaesthetic drugs are actually said to be immune system mediated.[22]It has been theorized, many times the reactions are assumed to be allergy when they might truly be pharmacological, toxic or pseudo allergy.

In a recent study by Yilmaz et al, 228 patients who were referred for allergy testing with most common reason being, hypersensitivity to drugs other than LAs, second most common reason was hypersensitivity to unknown LA and the third reason for referral was asthma. They observed that out of 10 positive patients, 9 had history of DHR to drugs other than LAs, 6 had multiple DHRs, 5 had history of hypersensitivity to unknown LAs, and none had history of asthma. [23]

They stated that it is important to test for hypersensitivity in patients with previous allergy to LAs and other drugs and testing for allergy to LAs in asthma patients is unnecessary.

Sudhakar et al. reported 2 patients to have developed type I hypersensitivity reaction and 1 patient with type IV hypersensitivity to hyaluronidase in a study

conducted on 2904 patients who underwent cataract surgery under peribulbar block. [24]

They proposed a sensitivity test with hyaluronidase and lignocaine to prevent such adverse effects.

Supporting this case of severe inflammatory orbital syndrome was also reported secondary to hyaluronidase. [25]

In our study in a group of 400 patients, 24 were asthmatic, none of them showing a reaction to XST or LA. Neither did patients with DHR to other drugs showed any reaction.

However, no clear literature could be found in English correlating the XST and intraoperative reaction to peribulbar or retrobulbar block.

CONCLUSIONS:

It has been recommended since decades that sensitivity testing before cataract surgery under LA should be undertaken as a routine precautionary measure. With changing paradigms in the type of anaesthesia (topical becoming prevalent in advanced nations as well as urban centres in developing world) there is a need to review the established protocols.

This is even more relevant in resource limited setting of developing nations where the bulk of preventable blindness continues to be neglected cataract in the old age.

Our study highlights the possibility of avoiding such tests in all patients before routine cataract surgery under LA.

With due precautions and resuscitation measures available in standby, it is theorized that routine testing for LA sensitivity may be skipped.

However, larger number of studies looking at higher risk patients would be needed to confirm the same.

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