



Intraoperative Cefuroxime in Penicillin Allergy During Cataract Surgery

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Abstract

Purpose: To establish the incidence of anaphylactic reaction to intraoperative cefuroxime in patients with a self-reported penicillin allergy during cataract surgery.

Setting: Clinical practice in North Devon District Hospital, Barnstaple, United Kingdom.

Design: Retrospective.

Methods: It included patients who underwent cataract surgery between March 2009 and March 2020. The details of their demography, procedure carried out, record of allergies, intra-op medication were extracted from the EMR. The main outcome measures were post op allergic reaction; urticarial or anaphylactic. The data was analyzed on Microsoft Excel.

Results: Overall 15764 eyes had cataract surgery between March 2009 and March 2020. 1764 [11%] of these were reported to be allergic to penicillin and 1652 [93.6%] still received intraoperative cefuroxime (intracameral +/- subconjunctival) despite their history of penicillin allergy. None of these 1652 patients developed any anaphylactic reaction.

Conclusion: Intra-operative cefuroxime during cataract surgery was well tolerated in patients with self-reported penicillin allergy in this large patient cohort. No post-operative anaphylaxis was observed.

Keywords: Cataract Surgery; Cefuroxime; Cephalosporins; Penicillin Allergy; Anaphylaxis

Introduction

Cataract surgery has been one of the most performed surgeries in many parts of the world [1] with postoperative endophthalmitis being one of its most dreaded complications. Various measures have been in place to reduce the risk of this including the use of intracameral cefuroxime. Montan., et al. detected that intracameral cefuroxime provided a 5-fold protective effect against endophthalmitis [2]. Colleaux and Hamilton also found

a significant protective effect with subconjunctival antibiotics vs without [0.01% vs. 0.17%] [3]. The ESCRS practice guideline of 2007 recommended the systematic use of intracameral cefuroxime [4].

Penicillin allergy is frequent in the general population. True type I penicillin allergy occurs in 7 - 23% of patients who give a history of penicillin allergy [5]. Cross reactivity to first generation cephalosporins is estimated at 0.5% [6]. This was once thought

to be as high as 10% [7,8] but that was due to a contamination of cefuroxime with penicillin during manufacture [9]. Cross reactivity to second generation cephalosporins like cefuroxime is unlikely due a different side chain [9-12]. In 2009 the Medical Defense Union (MDU) successfully defended a claim in relation to penicillin/cephalosporin cross reactivity concluding that usage of cephalosporins in the presence of a history of a rash in response to penicillin is acceptable and common practice [10].

Though there is good evidence that intracameral cefuroxime is safe in patients with reported penicillin allergy [13-15] there have been 2 case reports of anaphylactic reaction to intracameral cefuroxime in penicillin allergy [16,17], but no incidence rate has been reported. Hence it was of interest to audit the incidence of anaphylaxis in those patients where IC and s/c cefuroxime was administered in the presence of a patient-reported penicillin allergy.

Methods

This was a retrospective study carried out at North Devon District Hospital, Barnstaple. Ethical approval was not required as established best practice was retrospectively audited.

It included 15764 eyes who underwent intraocular surgery between the March 2009 - March 2020. The data were extracted

using the Medisoft audit function of our EMR. Information on demography, surgery, penicillin allergy, intraoperative antibiotic and the occurrence of anaphylactic reaction or any allergic reaction was gleaned from Medisoft. This was entered and analyzed on Microsoft excel.

Results

There were 15,764 eyes who had cataract surgery between March 2009 and March 2020 9,137 (58%) were females and 6,627 (42%) males. The ages of the patients ranged between 20 and 109 with a mean age of 80.6 years. All the patients received intra-operative antibiotics with 14,530 (92.2%) receiving intracameral cefuroxime alone and a further 1106 (7%) receiving subconjunctival cefuroxime either alone or in combination with intracameral cefuroxime. This complies with the ESCRS endophthalmitis study group guidelines.

Of the 15764 patients 1,764 (11.2%) had penicillin allergy entered in their records (Table 1).

In the 1,764 penicillin allergic patients, 1,652 (94%) still received cefuroxime - 87% IC cefuroxime and 7% SC cefuroxime +/- IC cefuroxime (Table 1). No anaphylactic reactions were reported in these 1,652 patients.

Antibiotic	Total n (%)	Pen allergy n (%)	No steroid + pen allergy n (%)	Reaction with no steroid n (%)	Reaction wit steroid n (%)
I.C Cefuroxime	14530 (92.2)	1533 (87)	1348 (96.7)	0	0
S.C cefuroxime	1106 (7)	119 (6.7)	9	0	0
I.C Cefotaxime	2	0	0	0	0
S.C Gentamicin	102 (0.6)	94 (5.3)	19 (1.3)	0	0
Top Ofloxacin	19	17	17 (1.2)	0	0
S.C/I.C Vancomycin	1	1	1	0	0
S.C Cefazolin	3	0	0	0	0
Top Chloramphenicol	1	0	0	0	0
	15764	1764	1394	0	0

Table 1: Antibiotic use during cataract surgery.

Table 2 shows us the different antibiotics that were used in our study. 93.7% of the penicillin allergic patients received cefuroxime, 5.3% received gentamicin and 1% received topical ofloxacin and some vancomycin.

Antibiotic	n (%)
Cefuroxime	1652 (93.7%)
Gentamicin	94 (5.3%)
Ofloxacin	17 (0.096%)
Vancomycin	1 (0.05%)
	1764 (100%)

Table 2: Penicillin allergy and choice of antibiotics.

Discussion

In our study we found that 11.2% (1764) of our patients had patient reported penicillin allergy recorded. This is higher than the incidence of 5 - 10% in previous papers [18-20]. It has also been reported in one study that the percentage of patients with a true hypersensitivity reaction is only about 5 - 10% of the self-reported cases with 0.01 - 0.04% of all patients having true anaphylaxis [18].

Of the penicillin allergic patients 94% still received cefuroxime. 84.3% of the 94% had also not received any intra-operative steroid. We thought this was relevant to point out as steroids giving the anti-inflammatory effects of steroids.

It is interesting to note that a patient reporting a penicillin allergy changed the surgeon’s standard choice of antibiotic in only 6% (Table 2). Subconjunctival gentamicin was the antibiotic that was most used when cefuroxime was avoided in these patients. Other antibiotics used were topical ofloxacin, subconjunctival and intracameral vancomycin. In a study done after the ESCRS endophthalmitis study 67% of doctors in the UK said they did not consider penicillin allergy a contraindication to intracameral cefuroxime [21]. In our study self-reported penicillin allergy was not considered a contraindication to intracameral cefuroxime in 87% of those allergic to penicillin and we have no recorded adverse event.

Cross reactivity is usually only seen with the 1st generation cephalosporins, with the 2nd generation cephalosporins the cross reactivity with penicillin is negligible [21]. This fits well with our results.

The abundance of lymphoid tissue in the subconjunctival space compared to the immune privileged anterior chamber means a higher risk of triggering a sensitivity reaction in a sensitized patient but no cross reactivity was seen in the 119 penicillin allergic patient who received cefuroxime (Table 1). The cross reactivity of penicillin and sub conjunctival cefuroxime has also been found to be low in previous studies [22,23] and in our study this was zero(0).

In the patients who had penicillin allergy recorded we looked at what type of reaction they had recorded (Table 3). We found that 30.5% said they had a rash, 2.6% reported they had anaphylactic/respiratory symptoms with penicillin. Extrapolating this to the whole data we find a self-reported anaphylaxis rate of about 0.3%, this is slightly higher than suggested in previous studies which was 0.2% in one study [24] and 0.01 - 0.04% in another [11].

Reaction type	IC/SC cefuroxime	Gentamicin	Other	Total
Rash	514	21	3	538 (30.5%)
More severe than a rash/ but no anaphylaxis	192	15	4	211 (12.0%)
Anaphylaxis/respiratory symptoms	28	16	2	46 (2.6%)
Not recorded	918	44	7	969 (54.9%)
				1,764 (100%)

Table 3: Penicillin allergic reaction type and choice of antibiotic.

Conclusion

This has been a large retrospective study covering over 10 years in NHS practice of 15,764 eyes and we have found no adverse event or anaphylactic reaction in patients with self-reported penicillin allergy.

What was Known

- Previous literature has alluded to a low cross reactivity between penicillin and cefuroxime.

- 67% of doctors in the UK did not consider penicillin allergy a contraindication for intracameral cefuroxime following the ESCRS endophthalmitis study.

What this Paper Adds

- We did not observe any adverse event including anaphylactic reactions with intraoperative cefuroxime in the 1,764 patients with self-reported penicillin allergy.
- In the subgroup of those with previous self-reported anaphylactic reaction to penicillin, 61% of them who received intraoperative cefuroxime reported no adverse events.

In conclusion the administration of intraoperative cefuroxime did not generate any signal for safety concern in this large cohort of 15764 patients. We therefore conclude that self-reported penicillin allergy is not an absolute contraindication to administration of cefuroxime during surgery.

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Conflict of Interest

We have no interests to declare.

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