Clinical Practice Point

Intraoperative Antimicrobial Prophylaxis in Elective Cataract Surgery Patients with Penicillin Allergy

Introduction

The true prevalence of IgE-mediated allergy in those self-identifying as penicillin allergic sits at less than 1% and cross-reactivity between penicillins and cephalosporins has been reported in up to 10% of these patients for first and second-generation cephalosporins, such as cefuroxime.

There is a lack of evidence for significant cross-reactivity of intracameral cefuroxime in penicillin allergic patients. This has led to significant variation in intraoperative antimicrobial prophylaxis for cataract surgery in this setting. An online survey of UK surgeons in 2019 looking specifically at their use of intracameral cefuroxime (ICC) found more than 80% of respondents gave ICC in penicillin-allergy patients without a history of anaphylaxis and almost a third did so even if there was a history of anaphylaxis. There has not always been as much confidence in ICC use. There appears to be greater consensus from authorities in Europe. For example, the French Agency for Safety of Health Products validated ICC as early as 2011 for prophylaxis in intraocular surgery. Furthermore, patients in Sweden are only denied ICC if they report a distinct allergy to cephalosporins, but notably, not penicillin.

In this Concise Practice Point, we critically appraise published evidence to produce evidence-based recommendations on this varied area of practice.

Methods

A literature search was conducted using PUBMED. The search was performed on all fields using the search terms, “penicillin”, “allergy”, “cataract surgery” and “cefuroxime” in August 2021. References of cited publications were examined to identify further relevant articles. Summarised results, references and further evidence considered can be found in the appendices.
# Recommendations

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<td>1</td>
<td>Take a thorough allergy history to determine whether or not the patient has a history of possible anaphylaxis</td>
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<td>2</td>
<td>If there is a confirmed or suspicion of possible anaphylaxis to penicillin, intracameral moxifloxacin should be considered as an alternative</td>
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<td>3</td>
<td>If there is no confirmed or suspicion of possible anaphylaxis to penicillin, based on the evidence we have considered, we recommend proceeding with intracameral cefuroxime (ICC)</td>
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<td>4</td>
<td>It is important to note that informed consent necessitates making patients aware of any and all material risks, as highlighted by the case of Montgomery vs Lanarkshire Health Board. As such, a discussion must be had with the penicillin allergy patient in which their options and associated risks are discussed and clearly documented</td>
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<td>5</td>
<td>Any adverse drug reactions must be reported to the Medicines and Healthcare products Regulatory Agency (MHRA) via the Yellow Card scheme, in addition to an in-house incident report as per local policy</td>
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A decision algorithm summarising these recommendations is presented below
Decision Algorithm: approach to antimicrobial prophylaxis for elective cataract surgery patient reporting penicillin allergy

**Take an allergy history**

**Does the history fit with possible anaphylaxis to penicillin?**

**Example symptoms to elicit from history:**
- Breathing difficulty / wheeze
- Loss of consciousness / light-headedness
- Hospitalisation / told to carry adrenaline auto-injector (EpiPen)

**Yes**

Consider alternative e.g. intracameral moxifloxacin 0.5mg/0.1ml

Keep patient in department for 30-minute period of observation post-op

Counsel the patient that while the evidence base is slightly limited compared with cefuroxime, this must be balanced against risk of anaphylaxis. Reassure them that there is still well-documented efficacy and safety from clinical studies.

**No**

Proceed with intracameral cefuroxime 1mg/0.1ml

Counsel the patient that while there is a theoretical risk of cross-reactivity and anaphylaxis, there is a well-documented good safety profile from clinical studies.
Discussion

The most suitable intracameral antimicrobial alternative to ICC is moxifloxacin (ICM), for which large retrospective studies from the Aravind Eye Care System and elsewhere provide strong support. This option has many appealing features for the patient with penicillin allergy; it is molecularly distinct, can be injected undiluted from a commercial preparation, it is not toxic to the eye and it has proven efficacy in preventing endophthalmitis.
### Appendix 1: Key Papers

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<tr>
<th>Author</th>
<th>Methodology</th>
<th>Key Message</th>
<th>Strengths</th>
<th>Limitations</th>
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<tr>
<td>LaHood et al&lt;sup&gt;9&lt;/sup&gt;</td>
<td>Literature search in which a range of antimicrobial agents via varying routes for antimicrobial prophylaxis in penicillin-allergy patients are explored.</td>
<td>They place the key fork in the decision process at whether or not a patient is suspected of being anaphylactic to penicillin. If so, they suggest use of intracameral moxifloxacin (ICM) and if not, to stick with ICC.</td>
<td>The suggestions made were all backed up with evidence and a neutral stance is maintained.</td>
<td>None identified</td>
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<td>Promelle et al&lt;sup&gt;10&lt;/sup&gt;</td>
<td>Assessment of tolerability of ICC in penicillin-allergy.</td>
<td>ICC is safe in this cohort since no cases of anaphylaxis were encountered out of 40 eyes of 40 patients.</td>
<td>Prospective study and a reasonable number were recruited and analysed.</td>
<td>Diagnostic purity bias since patients underwent pre-operative subcutaneous cefuroxime testing and those with a positive result were denied ICC.</td>
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<td>Svetozarskiy et al&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Systematic review in which they collate reported adverse reactions to ICC.</td>
<td>Listed adverse reactions include: toxic anterior segment syndrome (TASS), serous retinal detachment (RD) with macular oedema, retinal haemorrhagic infarction and anaphylaxis. A proportion of the serous RD cases and all the retinal haemorrhagic infarction cases relate to instances of above-treatment dose injection.</td>
<td>None identified</td>
<td>Irvine Gass syndrome remains an important differential diagnosis of post-op macular oedema.</td>
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<td>Mitra et al&lt;sup&gt;12&lt;/sup&gt;</td>
<td>Retrospective case notes review of penicillin-allergy patients receiving subconjunctival cefuroxime for prophylaxis.</td>
<td>Out of the 36 cases given cefuroxime, none had any issues.</td>
<td>An enquiry as to the exact nature of penicillin allergy was performed and included facial swelling, tongue involvement and loss of consciousness.</td>
<td>The subconjunctival route is not the mainstream choice of delivery.</td>
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<td>Myneni et al&lt;sup&gt;13&lt;/sup&gt;</td>
<td>Incidence of post-op endophthalmitis (POE) was examined over an 8-year period.</td>
<td>Out of 50 cases of ICC given to those with penicillin allergy, no adverse reactions occurred.</td>
<td>Prospective study</td>
<td>Diagnostic purity bias since none of these patients reported a history of anaphylaxis to penicillin.</td>
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<td>Mesnard et al&lt;sup&gt;14&lt;/sup&gt;</td>
<td>Case series</td>
<td>5 patients developed POE despite receiving ICC, one in the setting of posterior capsular rupture. This serves as an important reminder of the fact that while it comes close, ICC is still not quite the silver bullet that we need for safe and universal prophylaxis.</td>
<td>None identified</td>
<td>None identified</td>
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Appendix 2: References


8. The Medicines and Healthcare products Regulatory Agency. yellowcard.mhra.gov.uk/the-yellow-card-scheme/


Appendix 3: Further Reading


5. “Managing an outbreak of postoperative endophthalmitis”, Ophthalmic Services Guidance July 2016, The Royal College of Ophthalmologists

6. “Cataracts in adults: management”, NICE guideline 2017 ([nice.org.uk/guidance/ng77](https://www.nice.org.uk/guidance/ng77))


9. Qureshi, [ascrs.confex.com/ascrs/18am/meetingapp.cgi/Paper/41799](https://www.ascrs.com/ascrs/18am/meetingapp.cgi/Paper/41799)


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