

Title: Endophthalmitis Rates and Risk Factors Following Intraocular Surgeries: can we turn big-data benchmarks into patient benefit?

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Abstract/Summary

Endophthalmitis, although a frequently blinding complication of intraocular surgery when it does occur, is increasingly rare in the modern era of ophthalmic surgery. Other than for cataract surgery, which has sufficiently large volume to permit estimates of rates for even the rarer complications, endophthalmitis rates in other intraocular surgical procedures are difficult for surgeons or institutions to evaluate in their own practice, and to know if they are performing to an adequate standard in attempts to protect patients. Similarly, it is difficult to provide accurate estimates of risk during the process of informed consent. By publishing the endophthalmitis rates from the US Medicare population 2016-2019, the authors have given us the opportunity to take the infection rates from less frequently performed intraocular operations from their very large dataset and either utilise these for audit and informed consent, or to adapt them based on their relative frequencies compared to cataract postoperative infection rates. This data, therefore, may open the door to greater opportunities for eye surgery providers to reflect on their performance in infection prevention following intraocular surgery.

Endophthalmitis Rates and Risk Factors Following Intraocular Surgeries: can we turn big-data benchmarks into patient benefit?

This edition brings you a study exploring postoperative endophthalmitis rates from the United States' Medicare Population from 2016 to 2019 by Chen et al. They present postoperative infection rates for a range of intraocular procedures which are potentially very valuable for the process of informed consent, as well as functioning as benchmarks to permit individual departments to audit their own endophthalmitis rates. However, the utility of their estimates for these purposes is dependent on how generalisable the data are felt to be in other settings.

Prior to 2006, national surveillance systems, systematic reviews and meta-analyses consistently reported rates of post-cataract surgery endophthalmitis of around 1 in 700 (0.13% - 0.15%).^{1,2} The landmark 2006 randomised control trial (RCT) demonstrating the effectiveness of prophylactic intracameral antibiotics,³ has subsequently been corroborated by observational real-world data from health systems using intracameral antibiotics as standard, such that one case is now expected per several thousand phacoemulsifications.^{4,5}

The overall rate of endophthalmitis reported by Chen et al from the USA is slightly higher than being reported elsewhere in the world,^{4,5} and this may be due over-estimation by use of billing codes, or due to slower adoption of intracameral antibiotics in the US (<https://www.eyeworld.org/2021/2021-ascrs-survey-antibiotic-prophylaxis/>). The American Society of Cataract and Refractive Surgery (ASCRS) practice patterns survey suggests that only 2/3 of surgeons used IC antibiotics routinely in 2021, although a similar proportion is reported in a survey of Asian surgeons,⁶ and US utilisation of intracameral antibiotic prophylaxis is rising compared to 2007 and 2014 ASRCs surveys. Practice pattern surveys do not exist for every intraocular procedure, so we are left to infer uptake from that reported by cataract surgeons.

Even for those whose infection control strategies resonate with the providers of care to the Medicare population described, the value of this study, in terms of the absolute values of the estimates, hinges on the extent to which we can accept the billing codes as a surrogate for clinical cases of endophthalmitis. Some may be comfortable with this assumption, others less so. Although the legitimacy of this assumption matters, the extent to which billing codes introduce systematic bias in over- or under-estimating endophthalmitis rates is unknowable without some means to triangulate the data, possibly with a deep-dive into the data in a sample of patients.

Nonetheless, this big-data study is important for everyone who would wish to offer evidence-based risk estimates to their patients for the range of intraocular procedures described in this paper. The largest ophthalmic care providers may be able to offer estimates of post-cataract infection rates with reasonable confidence intervals, but will still struggle to produce estimates of the endophthalmitis risk following other intraocular procedures, and are therefore unable to audit effectively or to inform the process of *informed consent*. By providing relative rates of infection for different procedures, Chen et al allow everyone with an interest in generating procedure-specific endophthalmitis risk-estimates to create these in their own setting by comparing with their post-cataract endophthalmitis rates, applying the infection rate ratios observed from this very large data set.

In using the data in this way, a new set of assumptions must be made regarding the stability of risk ratios between different intraocular procedures between settings, but this publication still presents a unique opportunity for everyone who is able to create an estimate of their post-phacoemulsification infection rate for their own settings, to then estimate rates for the range of less

frequently performed operations based on the relative risks from these Medicare billing data. The value of this will be particularly felt by those from countries or health systems with less expansive or readily-available datasets, but for whom the cataract surgical activity level is sufficiently high that estimates of post-cataract endophthalmitis rates are possible.

Informed consent, therefore, becomes more informed, and evaluation and cyclical audit of endophthalmitis by institutions is also facilitated. Endophthalmitis audit risks being neglected to due its low incidence, and the opportunity to improve infection control measures which departmental conversations could produce, is thereby missed. The study by Chen et al may serve as an opportunity for many to reflect on where improvements can be made, and patients protected from this devastating complication of intraocular surgery.

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