

The impact of using a new hybrid phacoemulsification tip compared to a traditional metal tip for cataract surgery: Posterior capsule rupture rates and hospital resource utilization

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INTRODUCTION:

- Cataract, a progressive opacity of the ocular lens, is the single largest cause of reversible blindness worldwide and its treatment, which involves the implantation of an intraocular lens—is the most frequently performed surgical procedure in the Western World.¹
- The most common, significant intraoperative complications of cataract surgery include capsule-related problems and dislocation of lens nucleus fragments or entrance of lens fragments into the vitreous, outcomes which are recommended to be recorded as part of the ICHOM standard set.¹
- Numerous studies have demonstrated poor patient-reported outcomes in cases involving capsule-related surgical complications and PCR is associated with increased patient^{2,3} and economic burden⁴ (see fig. 1 and 2).
- This study has a focus on Posterior Capsule Rupture (PCR), the development of which, usually involves lens touch with surgical instruments during the procedure.⁵
- The objective of this analysis was to assess the impact of using a new hybrid phacoemulsification tip designed to prevent PCR, compared to a traditional metal tip.

METHODS

- A decision analytic model was built in MS Excel (model schematic shown in figure 3).
- A targeted literature review was performed in order to inform the model parameters.
- The rate of PCR and additional PCR-related vitrectomies & follow-up visits, were set as the variables of efficiency.
- The analysis was performed in the context of a hypothetical hospital setting, where 2,000 cataract procedures are performed annually.

RESULTS

- Consistent with a 2018 National Ophthalmology Database audit in the UK (n=183,812), the estimated rate of PCR assumed was 1.4% with a metal tip.⁶
- While in a recently published study on cadaver eyes, it was reported that the hybrid tip is less likely to cause PCR than the metal tip, this was a function of the hybrid tip requiring on average 4 times less torsional power before causing PCR.⁷
- Extrapolating from the above research^{6,7}, an estimated PCR rate of 0.48% was calculated for the hybrid tip.
- It was assumed and as reported in the literature that each case of PCR was associated with 3.4 additional follow-up visits.⁴
- Our base case scenario and as a result of generating estimates from the assumptions above, shows that use of a hybrid tip could potentially avoid an average of 19 cases of PCR and 63 additional follow-up visits, annually.

Fig.1. Patient burden associated with PCR

Potential patient benefit of reducing PCR rates

- No PCR/vitrectomy helps patient have a fast post operative recovery⁴
- Reduce travel time and transportation costs⁴
- No productivity loss for patient under employment⁴
- Decrease office visits and duration of each visit⁴
- No impact of vision related quality of life⁴

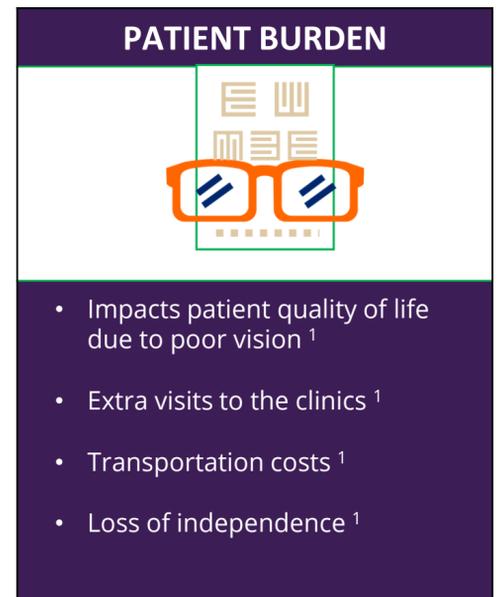


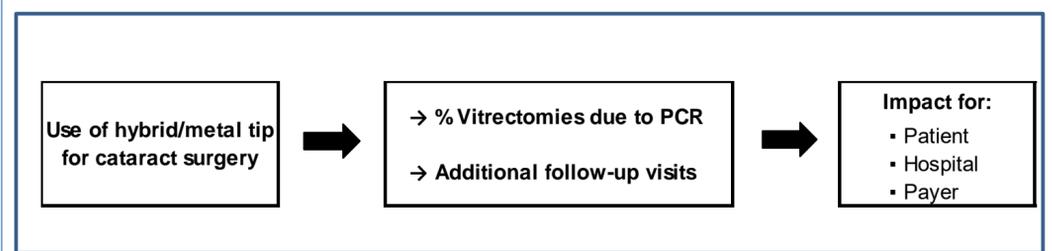
Fig.2. Economic burden associated with PCR⁴



Potential economic benefit of reducing PCR rates

- Reduce the treatment costs for Vitrectomy⁴
- Save health care system expenditure⁴
- Lower the costs of postoperative office-based appointments⁴

Fig.3. Model schematic



Key Learnings

- There is considerable variability in the rate of PCR during cataract surgery.
- Compared to surgeries performed with a metal tip, the use of a hybrid phacoemulsification tip could reduce the number of patients experiencing PCR during cataract surgery.
- In a hypothetical hospital setting, performing 2,000 cataract procedures per year, using a hybrid tip could infer an important benefit on patients and payers.
- This is illustrated by the estimates from our model which demonstrates that 19 cases of PCR and 63 extra follow-up visits could be avoided.
- A benefit could also be accrued to the hospital with respect to potential opportunity costs in terms of these additional procedures and follow-up visits.

Reference

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