IOP Elevation After Cataract Surgery: Results For Residents and Senior Staff at Henry Ford Health System

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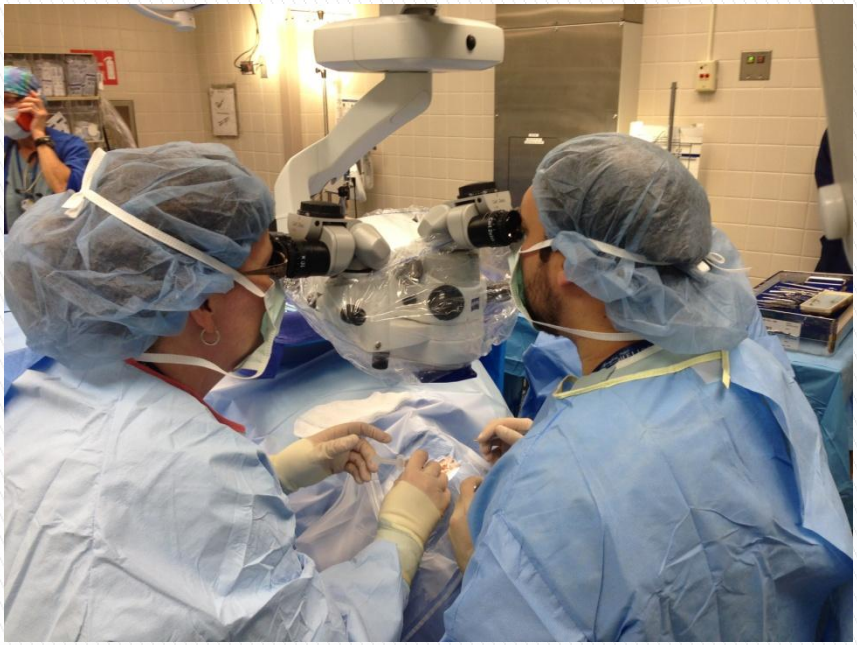
Purpose

- To determine the incidence of intraocular pressure (IOP) elevation on postoperative day 1 (POD#1) following cataract surgery by residents and senior staff for the sake of direct comparison, while examining the influence of associated variables.



Previous Study

- A previous study established a resident POD#1 IOP elevation rate(defined as >23mmHg) of 22% without direct comparison to senior staff .[1]

- In addition elevations of >40mmHg and >30mmHg overall and incremental increases of ≥ 20 mmHg and ≥10mmHg from pre-operative baseline were not examined.

Background

- The overall incidence of early post op IOP elevation is reported to be between 2.3 and 8.9% .[2]
- The elevation typically peaks between 3-7 hours post-operatively. [3]
- IOP elevation is related to AC inflammation, prostaglandin release, retained viscoelastic.[4]
- Transient elevations are often tolerated, but in glaucomatous eyes or eyes with extremely high or prolonged ocular hypertension, permanent damage may occur.[5]

Methods

- Retrospective review of 2472 consecutive 2.2-2.8mm temporal clear corneal cataract extractions by phacoemulsification performed by either residents or senior staff at HFHS.
- These cases were performed at either the main campus, or the surrounding satellite centers between July 1 and December 31, 2012.
- Fellow eyes were excluded because of redundant variables resulting in **1847** total eyes included in the study.
- IOP measurements of >40mmHg, >30mmHg and >23mmHg were examined along with incremental IOP elevations of ≥20mmHg and ≥10mmHg relative to preoperative baseline IOP.
- Associated variables examined included: Age, Gender, Diabetes, Hypertension, Glaucoma, Glaucoma Suspicion, Uveitis, and Vitreous Loss.
- Logistic regression analysis of the data was performed using a Wald Chi-Square test.

Data

- >40mmHg: Overall 1.0%, Residents 3.7%, Staff 0.7%. Significant results: Glaucoma 4.4($p=0.006$), trauma 10.3($p=0.003$), vitreous loss 12.42($p<0.001$), resident 5.76($p<0.001$).
- >30mmHg: Overall 4.7%, Residents 10.1%, Staff 4.0%. Significant results: Glaucoma 3.0($p<0.001$), trauma 5.7($p<0.001$), vitreous loss 7.4($p<0.001$), resident 2.7($p<0.001$).
- >23mmHg: Overall 14.6%, Residents 23.3%, Staff 13.6%. Significant results: male gender 1.4($p=.006$), Glaucoma Suspect 1.54($p<0.01$), Glaucoma 2.3($p<0.001$), trauma 3.0($p=0.01$), vitreous loss 3.6($p<0.001$), resident 1.9($p<0.001$).
- ≥ 20mmHg from baseline: Overall 1.7%, Residents 4.8%, Staff 1.4%. Significant results: Glaucoma 2.8($p=0.002$), trauma 8.8($p<0.001$), vitreous loss 9.1($p<0.001$), resident 3.6($p=0.002$).
- ≥ 10mmHg from baseline: Overall 10.9%, Residents 20.6%, Staff 9.8%. Significant results: male gender 1.6($p=0.002$) Glaucoma 2.0($p<0.001$), trauma 2.8($p=0.03$), vitreous loss 4.5($p<0.001$), resident 2.4($p<0.001$).

IOP POD#1: Resident vs Senior Staff

	Overall	Resident	Staff	Odds Ratio for residents(with significance)
≥ 10mmHg from baseline	10.9%	20.6%	9.8 %	2.4 ($p<0.001$)
≥ 20mmHg from baseline	1.7%	4.8%	1.4 %	3.6 ($p=0.002$)
>23mmHg overall	14.6%	23.3%	13.6 %	1.9 ($p<0.001$)
>30mmHg overall	4.7%	10.1%	4.0 %	2.7 ($p<0.001$)
>40mmHg overall	1.0%	3.7%	0.7%	5.76 ($p<0.001$)

IOP POD#1: Glaucoma vs Non-Glaucoma

	Glaucoma	Non-Glaucoma	Odds Ratio for Glaucoma(with significance)
≥ 10mmHg from baseline	18.0%	9.8%	2.0 ($p<0.001$)
≥ 20mmHg from baseline	3.4%	1.3%	2.8 ($p=0.002$)
>23mmHg overall	24.5%	12.2%	2.3 ($p<0.001$)
>30mmHg overall	10.3%	3.7%	3.0 ($p<0.001$)
>40mmHg overall	2.6%	0.6%	4.4 ($p=0.006$)

IOP POD#1: Other Variables

	Odds ratio (OR) for **trauma** (with significance)	OR for **vitreous loss** (with significance)	OR for **Male** gender (with significance)	OR for **Glaucoma suspicion** (with significance)
≥ 10mmHg from baseline	2.8 (p=0.03)	4.5 (p<0.001)	1.6 (p=0.002)	Not Significant
≥ 20mmHg from baseline	8.8 (p<0.001)	9.1 (p<0.001)	Not Significant	Not Significant
>23mmHg Overall	3.0 (p=0.01)	3.6 (p<0.001)	1.4 (p=0.006)	1.5 (p=0.01)
>30mmHg overall	5.7 (p<0.001)	7.4 (p<0.001)	Not Significant	Not Significant
>40mmHg Overall	10.3 (p=0.003)	12.42 (p<0.001)	Not Significant	Not Significant

Summary of Results

- The incidence of post operative IOP elevation >23mmHg in residents at HFHS (23.3%) was similar to the previously reported incidence (22%).[1]
- The simultaneous senior staff incidence was lower at 12.3%.
- Resident odds ratios for elevated POD#1 IOP were statistically significant for all measurements
- Other variables: Glaucoma, Gender, Trauma, Vitreous Loss, and Glaucoma Suspicion, were statistically significant contributors.

Conclusions

- Residents have 2-5 times the incidence of POD#1 IOP elevation which is statistically significant across the board.
- Glaucomatous eyes show 2-4 times the incidence of POD#1 IOP elevation which is statistically significant across the board.
- Other variables such as gender, trauma, vitreous loss, glaucoma suspicion are also significant contributors.
- Based on these findings, consideration for prophylactic IOP lowering is advised in high risk groups.

References

1. Kim JY et al. Increased intraocular pressure on the first postoperative day following resident-performed cataract surgery. Eye. 2011;25:929–936.

2. Desai P, Minassian DC, Reidy A. National cataract surgery survey 1997–8: a report of the results of the clinical outcomes. Br J Ophthalmol. 1999;83:1336–1340.

3. Ahmed II, Kranemann C, Chipman M, Malam F. Revisiting early postoperative follow-up after phacoemulsification. J Cataract Refract Surg. 2002;28:100–108.

4. O'Brien PD, Ho SL, Fitzpatrick P, Power W. Risk factors for a postoperative intraocular pressure spike after phacoemulsification. Can J Ophthalmol. 2007;42:51–55.

5. Rhee DJ, Deramo VA, Connolly BP, Blecher MH. Intraocular pressure trends after supranormal pressurization to aid closure of sutureless cataract wounds. J Cataract Refract Surg. 1999;25:546–549.