

nz national eye centre

Cataract surgery in New Zealand /Aotearoa approaching 2020: demand, supply, politics, economics & shared care

Professor Charles NJ McGhee MB.ChB, BSc(Hons), PhD, DSc, FRCS, FRCOphth, FRANZCO Maurice Paykel Professor & Chair of Ophthalmology Director, New Zealand National Eye Centre, SMO, Auckland District Health Board, Consultant, Eye Institute, Auckland





Introduction: cataract



The most common cause of visual impairment The most common surgical procedure in the developed world Extremely efficient, effective and safe health-dollar investment!

Why can we never meet the annual demand?

New Zealand	> 30,000
Australia	> 160,000
United Kingdom	> 390,000
United States	> 3,600,000
Globally	> 20 million



Political solutions or misdirection





Cataracts and hip replacement surgery the currency of election healthcare policies

© CNJ McGhee 2017

Considering Cataract Outcomes in NZ The Auckland Cataract Studies 2000-2017







OUTLINE OF LECTURE

Cataract surgery is most common surgical procedure in New Zealand Typically presents to optometrists and general practitioners



International Cataract Costs We are more, not less, expensive!

Report: U.S. health care costs significantly higher than other countries

Americans spend more on drugs, surgery, and hospital stays



Potential barriers to successful cataract surgery & visual rehabilitation in NZ

- 1. Identifying visually significant cataract
- 2. Referral and first specialist visit
- 3. Assessing suitability, eligibility, listing
- 4. Pre-operative assessment
- 5. Provision of excellent surgical services
- 6. Post-operative care
- 7. Dealing with complications
- 8. Potential barriers to discharge*
- 9. Long term Optical correction
- 10. Funding the process: Government, Health Insurers, Self









GHT

CATARACTS

Aetiology of cataract



- Congenital
- Inherited
- Age-related (the majority)
- Metabolic e.g. diabetes
- Toxic e.g. corticosteroids
- Traumatic e.g. irradiation
- Secondary e.g. uveitis



Diagnosing cataract



- Reduced visual acuity
 - Snellen, glare, contrast sensitivity, driving
- Entirely clinical diagnosis
 - Distance & near vision
 - Ophthalmoscope
 - Slit lamp microscope
 - Significant lens opacity
- Exclude other ocular pathologies*







Effect of differing cataracts

Nuclear Cataract

- Common, VA may be preservedmay induce myopia
- Cortical Cataract
 - Often associated with nuclear
 - May cause distortion/glare
- Subcapsular Cataract
 - May have good vision in test conditions
 - Variable vision particularly in low light
 - Consider history and test glare vision









Burden of cataracts: visual impairment

Global cataract surgical rates (2004)

"cataract is responsible for **51% of world blindness**, *which represents about* **20 million people** (2010)"

World Health Organisation



World Health Organization The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

http://www.who.int/blindness/data_maps/cataract_surgery_rate/en/



The Auckland Cataract Study 1:

2000-2001: Waiting – the harbor bridge study N=193



The Waiting Game: The natural history of a cataract waiting list in New Zealand AF Riley, C Grupcheva, TY Malik, JP Craig, CN McGhee. Clin Expt Ophthalmol **2001**



The majority of those with significant cataract have General Health issues

Hypertension25%Cerebral vascular disease12%Diabetes Melitus11%Ischaemic Heart disease10%Rx42%Aspirin42%Warfarin6%



Pre-proliferative diabetic retinopathy

The Auckland Cataract Study: Demographic, Corneal Topographic and Ocular Biometric Parameters. AF Riley, CN Grupcheva, TY Malik, JP Craig, CN McGhee. Clinical & Experimental Ophthalmology 2001



Ocular co-morbidities in cataract patients

Open-angle glaucoma10%Diabetic retinopathy6%

Vein occlusion 2%

Advanced AMD

1%**



Advanced Optic disc cupping in glaucoma

The Auckland Cataract Study: Demographic, Corneal Topographic and Ocular Biometric Parameters. AF Riley, CN Grupcheva, TY Malik, JP Craig, CN McGhee. Clinical & Experimental Ophthalmology 2001

Cataract Surgery

Ancient Techniques

- Couching

Current cataract techniques

Intra-capsular – Now mainly in developing world Extra-capsular –

Some use in developed world

Phacoemulsification –

most popular technique

Femto-laser assisted

Use increasing developed world







Contemporary Cataract Surgery



1990's small incision phacoemulsification and the evolution of foldable/injectable Intraocular lenses revolutionized cataract surgery in developed world





Extracapsular surgery: ECCE vs Phaco





Phacoemulsification in practice









Outcome:

Mean BSCVA 6/7.5 (88% \geq 6/12) Mean SphEq -0.46+/-0.89D

Complications:

4.9% capsular tears
3.7% cystoid macular oedema
0.2% endophthalmitis
1.5% of eyes red'n BSCVA due to surgery



The Auckland Cataract Study: co-morbidity, surgical techniques and clinical outcomes in a Public Hospital Service. Andrew Riley, Tahira Malik, Christina Grupcheva, Michael Fisk, Jennifer Craig, Charles McGhee. BJO 2002

OF AUCKLAND FACULTY OF MEDICAL AND HEALTH SCIENCES

The timing of referral varies significantly with available local DHB funding, however, many would consider referring when vision ≤6/12

Current cataract referral waiting times:

- 1. From referral to FSA (4 months)
- 2. From FSA to surgery (4 months)

Cataract referrals at ADHB via three main routes:

- General Practice
- Optometrist*
- Ophthalmologist



Efficiency: Radical streamlining of existing systems?



- 1. Immediate listing from the community
- 2. Combined Optometry/General Practitioner electronic referrals Enables collection of demographic data and risk analysis
- 3. Same day FSA clinic review and surgery
- 4. Electronic surgical records

Enables ongoing audit and creates discharge

5. Bilateral same day cataract surgery

6. Immediate discharge to optometric shared care



Improving the operative rate for cataract surgery

Kevin Holmes, BMBS, Jonathan Park, FRCOphth, BSc, Derek Tole, FRCOphth J Cataract Refract Surg 2013; 39:712–715

One stop cataract clinic N=4657 (Bristol, 2008-2010)

Two referral routes – traditional GP route and Refined Direct Optometrist (RDO) pathway

Operative rates higher for RDO (92%) than GP (82%) routes

" By combining referral information from optometrists and GPs, a highquality and efficient cataract surgery patient pathway can be established.

This has major economic advantages, and this scheme could be adopted at a national level."

Cambridgeshire cataract shared care model: community optometrist-delivered postoperative discharge scheme



George Voyatzis,¹ Harry W Roberts,¹ Jonathan Keenan,¹ Madhavan S Rajan^{1,2}

Uncomplicated surgery and no significant ocular comorbidity - *same day discharge to community optometrists*.

Over 2 years, 1492 of 2461 (61%) Cambridgeshire patients discharged to community on day of cataract surgery.

Complete feedback in 97%, uneventful in 94% and 3% of patients re-referred. CMO 0.6%, uveitis 1.0% and raised IOP 0.1%.

No patients had sight-threatening complications in this study



Preoperative RISK stratification maximizing outcomes, safety and audit



- Scores for patient risk factors documented in the clinical notes
- A validated system devised by Muhtaseb et al. (2004, UK)

1 point	3 points
Age >88 years	Brunescent/white/dense/total cataract/ no fundus view
Ametropia (>6D of myopia or hyperopia)	Pseudoexfoliation
Corneal scar	
Posterior capsule plaque	
Posterior polar cataract	
Previous vitrectomy	
Shallow AC <2.5mm	
Small pupil <3mm	
Miscellaneous (poor position, etc)	

Auckland Cataract Study IIa and IIb Risk of intraoperative complications

- Observed higher complication rates with high risk scores
- Significant increase for scores >3







Dr Bia Kim MD

Intraoperative complications in cataract surgery (N=1000) Following introduction of risk analysis in ADHB

	2015	2016	P-value for difference
Intraoperative complications	8.4% (N=500)	5.0% (N=500)	0.042
PC tear ± vitreous loss	2.6%	1.8%	0.258
Anterior capsular tear	1.2%	0.4%	0.224
Zonular dialysis	1.6%	0.6%	0.224
Iris prolapse	2.6%	1.4%	0.258
Iris trauma	1.0%	1.4%	0.773
Dropped nucleus fragment	0.2%	0.4%	1.000

The Auckland Cataract Study II: Reducing Complications by Preoperative Risk Stratification and Case Allocation in a Teaching Hospital. Kim BZ, Patel DV, McKelvie J, Sherwin T, McGhee CNJ. Am J Ophthalmol. **2017** Sep;181:20-25.



Auckland Cataract Study 2:

Postoperative complications

	2015	2016	P-value for difference
Postoperative complications	8.1% (N=479)	6.1% (N=472)	0.258
Cystoid macular oedema	3.5%	3.8%	0.865





Auckland Cataract Study 2: Postoperative complications: Cystoid macular oedema

• Rare

- Endophthalmitis
 - Pain, redness, decreased vision in first week
- Intra-ocular haemorrhage
- Severe uveitis

More common

- Cystoid macular oedema
 - Typically in first month suspect if vision has been good and deteriorates moderately in quiet eye
- Mild uveitis beyond 4 week





RADICAL ROUTES TO IMPROVED CATARACT SURGERY PROVISION: Excellence, Efficiency, Economy top ten

- 1. Fully electronic pathway
- 2. Optometry/GP referral / listing
- 3. Risk stratification analysis and audit
- 4. Consider one-stop surgical approach
- 5. Bilateral same day surgery where appropriate
- 6. In teaching units create (hi-volume) service vs training lists
- Day-one discharge to community optometry in >50% cases
 Standardised data set pre and post-op
- 9. Unified national program and agreed threshold
- 10. Continuous audit cycle Local, DHB and National level





Shared care in cataract surgery

- Identifying
- Appropriately referring
- Pre-operative assessment
- Post operative management*
- Unexpected complications*



RANZCO CO-MANAGEMENT POLICY STATEMENT

RANZCO is opposed to any payment, which could in any way be perceived or is an inducement to refer, by an ophthalmologist to any party who refers a patient to them.

Where co-management is in the best interest of a patient, the fundamental principle is that a patient should always be aware of and responsible for all fees associated with the delivery of the services that they receive from the attending practitioner, including pre and post-operative care where required.

Where co-management is in the best interest of a patient, the following must apply:

- All responsibility and management decisions remain with the ophthalmologist;
- A co-managing practitioner and an ophthalmologist must communicate with each other at every encounter between the patient and the co-managing practitioner, and wherever possible communication should be done in writing or followed-up with a written summary;

Approved by: Board Approval date: 1 March 2013 Next review: 1 March 2016

The fine-print of co-management

- An ophthalmologist is satisfied that the co-managing practitioner has competence appropriate to the tasks involved. In general, post-operative care should if at all possible, be provided by the ophthalmologist performing the procedure. No payments should be made, directly or indirectly, to any practitioner providing post-operative care.
- The co-managing practitioner MAY separately bill the patient for the services they render. It is not acceptable to offer to any referring practitioner payment or reward for any services or investigations that have been performed by the referring practitioner. Payments for these services are the responsibility of the patient.





Common complications



- Striate keratopathy
- Elevated IOP
- Aqueous leak
- Ant. Uveitis
- Loose sutures*
- Rare complications
 - Retinal detachment
 - Choroidal haemorrhage
 - Filtering bleb



Endophthalmitis – always a risk?



- 94,653 cataract procedures in 19 years
- Endophthalmitis in 188 patients
- Serious visual impairment in 70.6%



Incidence of cataract surgery increased x3

However, endophthalmitis rate constant at 2 per 1000

Semmens JB, Li J, Morlet N, Ng J. Trends in cataract surgery and post-operative endophthalmitis in Western Australia (1980-1998): The endophthalmitis Population Study of Western Australia. Clinical & Experiment **Ophthalmol June 2003**

Post-operative management



- Day 1 review
- Symptoms
- Unaided VA
- Pinhole VA*
- Assess:
 - Cornea
 - Pupil
 - Media
 - IOL position
 - IOP





- Usually 2-4 weeks post-operative topical medication
- Typically an antibiotic and a steroid
 - E.G. g. Chloramphenicol QDS / g. ciprofloxacin TDS*
 - E.G. g. Predforte QDS / g. Maxidex QDS
 - Or Maxitrol (dexamethasone + neomycin + polymyxin B)
 - Or occasionally NSAIDS e.g. ketorolac/diclofenac



Post-op vision & visual acuity

Day one and day seven:

- Usually 6/6 to 6/18
- If less than 6/12 unaided refract
- More than 1.5D residual error consult





1/12 post-op vision & best corrected visual acuity

- Generally BSCVA \geq 6/7.5
- BSCVA <6/12, exclude pathology:</p>
 - Cystoid macular oedema
 - Posterior capsule opacity
 - Macular degeneration
 - Diabetic maculopathy



Post-operatively they all obtained at least counting cats unaided vision



Post-operative refractive error

- Contact ophthalmologist if (*):
- ≥1.50D from intended refraction
- ≥1.50D of induced astigmatism





Wound appearance and aqueous leak

Day 1 wound should well apposed, if anterior chamber shallow or IOP <10mmHg exclude wound leak:

- Check for phaco burn or wound retraction
- Perform fluorescein test
 - Spontaneous leak
 - Leak to gentle compression
- Check pupil is round
- Exclude iris prolapse
- If AC compromised refer



Post-operative intraocular pressure



- DAY 1
- Generally less than 24mmHg
- Less than 10mmHg consider leak
- Greater than 30mmHg or painful
 - Consider acetazolamide
 - Consider referral



Corneal appearance day 1



Appearance related to cataract density, difficulty of case, nucleus density, FECD and phaco energy used:

- 1. Entirely clear
- 2. Occasional effete endothelial cells
- 3. Focal striae & oedema at incisions
- 4. Extensive striae & oedema

Generally resolves - <0.5% develop PBK



Postoperative pupil



- Should be round, up to mid-dilated,
- If distorted exclude:
 - Iris prolapse
 - Vitreous to wound
 - Vitreous in anterior chamber
 - IOL displacement



Anterior chamber inflammation



Day 1
 Flare +

Cells + to ++

If heavy flare or cells +++ consider endophthalmitis

Day 28
 Usually no activity
 5% may have persisting low-grade inflammation







Postoperative visual outcomes (N=1000)

Visual acuity	2015 (N=476)	2016 (N=472)	P-value for difference
Unaided	6/12	6/12	0.262
Best-corrected	6/9	6/9	0.648

Postoperative IOL position



- IOL should be well centred
 Relative to capsular bag / rhexis
 Relative to pupil
- If > 1.0mm IOL displacement
 - Consider haptic position
 - Assess for vitreous in AC
 - Discuss with ophthalmologist



Fundal examination



If BSCVA less than expected

Assess macula

Exclude retinal detachment

Exclude vitreous/retinal haemorrhage



Post-operative day 28



- Day 28 review
- Symptoms
- Unaided VA
- Refraction
- Assess:
 - Cornea
 - Pupil
 - Media
 - IOL position
 - IOP
 - Dilated fundus



Delayed complications



 Posterior capsular thickening 2-5%

Rx YAG laser

- Capsular phimosis
- Retinal detachment 1%



Posterior Capsular Opacification





Posterior capsule opacification



YAG Laser capsulotomy











Co-management Summary

Assessment	Normal	Action
Unaided vision	6/18 - 6/5	Refract if <6/12
Corrected vision	6/6 - 6/12	Exclude causes of reduced BSCVA if <6/12
Refractive error	+/-1.00D of intended	If greater than 1.50D deviation from intended endpoint contact ophthalmologist
Exclude wound leak	None	If spontaneous & AC compromised - refer
Wound appearance	Closed	exclude phaco burn, retraction, or leak
Goldman IOP	<24mmHg	If painful or >30mmHg Rx diamox or refer
Corneal striae or oedema	None/Minimal	Observe, should settle in few days
Anterior chamber activity	Flare+, cells + to ++	If marked activity consider endophthalmitis or secondary uveitis - refer
Pupil	Round, up to mid-dilated	If distorted: exclude iris prolapse, vitreous in AC or to wound, or IOL displacement - refer
IOL position	Well-centred in the bag	If greater than 1.0mm decentred - refer
Fundal examination	Clear view	Exclude haemorrhage, detachment







What to tell your patients?

- Public surgery at $\leq 6/12$ vision (Private insurers typically $\leq 6/9$)
- Will need to complete "Impact on life" questionnaire
- Cataract surgery is safe and typically takes < 30 minutes
- Small risk of intra/post-operative compilations < 5%
- More than 95% of patients will have significant improvement

Translational Vision Research



Department of Ophthalmology

the state of the s

Contractory and Contractory



The set our set and the title of the trainer of the set of the set of the

7hank you