Matthew D. Benson, Laura Donaldson, Jessica Ruzicki, Gareth Mercer, Aishwarya Sundaram

A comparison of two DMEK graft preparation techniques

Matthew D. Benson, PGY-4

Partial-thickness transplants are currently the mainstay for the surgical management of corneal endothelial disorders. Descemet membrane endothelial keratoplasty (DMEK) represents a technique where only the Descemet membrane and corneal endothelium are transplanted into a host. Although both graft preparation and tissue handling are more difficult in DMEK compared to transplants that incorporate corneal stroma,[1] DMEK transplants have been shown to lead to faster postoperative visual recovery, improved visual acuity outcomes, and fewer graft rejections.[2,3] In a recent review of corneal transplants in Toronto, Canada from 2014 to 2016, DMEK was the most common corneal transplant procedure performed.[4] Given the increased trend in DMEK procedures, a comparison of graft preparation techniques is prudent in order to enhance efficiency and patient outcomes.

Several graft preparation techniques have been described, including manual dissection, pneumatic dissection, and hydrodissection, with each technique having its own advantages and disadvantages.[5] In this issue of the *Canadian Journal of Ophthalmology*, Sella et al. compared the learning curves of two commonly used manual dissection techniques for preparing DMEK grafts.[6] The first approach described in the study, the *m*odified *s*ubmerged *c*ornea *u*sing *b*ackgrounds *a*way (mSCUBA) technique, used a 9.5mm trephine to create a plane where the graft was peeled anterior to Schwalbe's line for approximately 4 clock hours. A central 7.5mm graft was then created using a smaller trephine. This was compared to a second approach, the peripheral blunt dissection technique, where a cleavage plane was created posterior to Schwalbe's line and continued for 360 degrees. A central graft was then created with an 8mm trephine. Each technique utilized a different instrument to dissect Descemet membrane from the posterior stroma.[6]

By evaluating the performance of a single surgeon who lacked previous experience with either technique, the authors reported significantly reduced graft peeling time and fewer radial tears with the mSCUBA technique.[6] In addition, the authors described a lower subjective difficulty grading for the mSCUBA approach and concluded that the mSCUBA technique has a shorter learning curve than the peripheral blunt dissection technique. These findings have important implications for enhancing the efficiency of graft preparation in both the operating room and the eye bank and for facilitating surgical teaching.

The authors highlight several points to consider when interpreting their results. First, the sample size for each preparation technique was small (n=10) and the time required to complete the peripheral blunt dissections was variable. In fact, the timing for peripheral blunt dissection trended toward the timing for mSCUBA by the eighth graft; however, the final two blunt dissections were apparently particularly difficult, resulting in more time spent with each preparation.[6] Furthermore, although mSCUBA demonstrated a shorter learning curve, other clinically relevant outcomes such as endothelial cell count and graft survival need to be explored as these measures may trump any differences in graft preparation time.

In summary, Sella et al. demonstrated that the mSCUBA technique may save time in the operating room and facilitate more effective teaching of DMEK surgery. Optimizing the processing of grafts is crucial to ensure the best outcomes in corneal transplant patients.

Summary 1: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30790-7/fulltext

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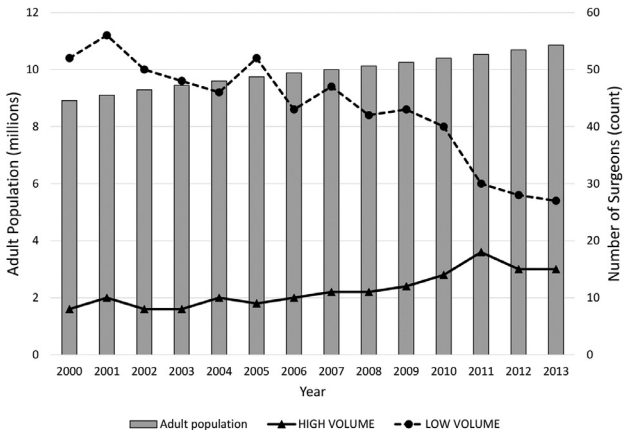

Adult strabismus surgery in Ontario: a changing landscape

Laura Donaldson, PGY-4

In recent years, there has been increasing evidence for the benefits of strabismus surgery in the adult population, not only in terms of visual function but also in a patient's confidence and self-image. In this issue of the *Canadian Journal of Ophthalmology*, Szigiato and colleagues present a picture of population trends in adult strabismus surgery in Ontario over a 14-year period from 2000 to 2013.[1]

The authors reported a 26% increase in the total number of adult (age ≥ 18) strabismus surgeries per 100,000 population. Data was obtained through Ontario Health Insurance Plan billing claims, a single payer system, where all procedures performed should be represented. In the first year of the study, 60 total surgeons performed strabismus operations. By 2013, this number had decreased by 30% to only 42 surgeons. High-volume surgeons (≥ 50 surgeries per year) on the other hand, increased from 8 to 15, and these individuals performed more than 90% of all procedures. The greatest increase was seen in two-muscle surgeries (43%) and the use of adjustable sutures also became more common (30% increase).

The same group[2] published a study of pediatric strabismus surgery case numbers per 100,000 pediatric population over the same time period and reported an increase of 38%. There was a similar increase in the number of high-volume surgeons over time (37.5%). Though a comparable statistic was not reported in the current study, the pediatric data suggested that fewer young ophthalmologists are choosing high-volume strabismus surgery, as there were no high-volume surgeons practicing early in their careers, which was defined as less than 10 years since medical school graduation.

Strabismus surgery is a component of all Canadian residency programs and the Royal College of Physicians and Surgeons requires sufficient exposure to achieve competency in performing strabismus surgery[3]. Though not specifically captured in this study, the shrinking numbers of low-volume surgeons suggests that fewer comprehensive ophthalmologists are choosing to incorporate adult strabismus surgery into their practices and that more patients are being seen by subspecialists. The authors noted that there was an increase in the number of pediatric ophthalmology and strabismus fellowship-trained surgeons working in Ontario over the study period. Adult strabismus surgery may also be performed more often by fellowship-trained neuro-ophthalmologists, and it would be interesting to know the breakdown of strabismus surgeons by training.

There are several potential challenges to the comprehensive ophthalmologist performing strabismus surgery. First, exposure during residency, particularly to more complex cases, vertical muscles, and adjustable sutures may be limited. As this study pointed out, the rarity of high-volume strabismus surgeons suggests that not all trainees would have the opportunity to be mentored by one of them. In addition, private and outpatient operating suites are becoming more commonplace and general anaesthesia is usually not available in this setting. There is also a lower financial incentive. Cataract surgery has similar remuneration to strabismus surgery but in general requires much shorter operative time.

Taken together, the results of this study and the corresponding pediatric data indicate that the increasing demand for strabismus surgery is being met by a small number of surgeons with increasing caseloads. In this system, wait times for surgery would presumably also be increasing, and the retirement, relocation, or lack of replacement of high-volume surgeons could lead to a labour shortage. With the imminent introduction of competency by design in Canadian ophthalmology residency programs, it will be interesting to see whether the emphasis on proficiency in strabismus surgery will change to encourage comprehensive ophthalmologists to continue to be actively involved or whether it will shift even more into the subspecialty domain.

Summary 2: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30677-X/fulltext

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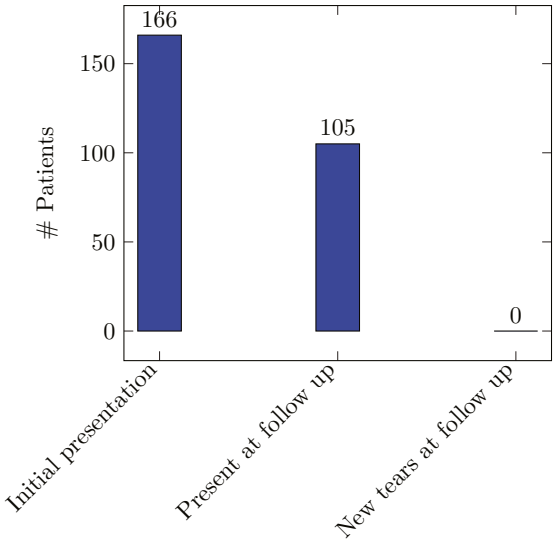

Posterior vitreous detachment and incidence of delayed retinal breaks

Jessica Ruzicki, PGY-4

In the emergency eye clinic setting, a posterior vitreous detachment (PVD) is one of the most common ocular diagnoses made by ophthalmologists. Although time consuming, a fully dilated examination, which includes indirect ophthalmoscopy with scleral depression and/or a 3-mirror assessment of the peripheral retina is necessary to rule out the risk of a potentially imminent retinal detachment.

In this issue of the *Canadian Journal of Ophthalmology*, Nassrallah et al. present results from their study, which examined patient charts from multiple McGill teaching hospital sites over a 2-year timespan.[1] In this study, an ophthalmology resident trainee or attending physician diagnosed 166 patients with an uncomplicated PVD, defined as schaeffer negative in the absence of any other vitreoretinal pathology. The majority of these patients presented with unilateral symptoms (92%) and flashes and floaters (58%).

One-hundred-and-five of the diagnosed uncomplicated PVD patients were re-assessed at an average follow-up time of 8 weeks. No patient was found to have developed a late stage retinal break. This study offers evidence that the incidence of delayed retinal breaks after an acute uncomplicated symptomatic PVD is low.

However, it is important to recognize that the results of this study will not apply to every individual with a diagnosis of PVD. As noted in a recent review article by Gishti et al., "the greatest risk factor for the development of retinal tears was the presence of 10 or more floaters, a cloud-like obscuration in the visual field, and a retinal or vitreous hemorrhage."[2] In addition, Gishti et al. observed that this risk remained for 4 to 8 weeks following the initial symptoms.

According to the AAO practice guidelines from 2014:

> [p]atients presenting with an acute PVD and no retinal breaks have a small chance (~2%) of developing retinal breaks in the weeks that follow. Selected patients, particularly those with any degree of vitreous pigment, vitreous or retinal hemorrhage, or visible vitreoretinal traction, should be asked to return for a second examination promptly with new symptoms or within six weeks following the onset of PVD symptoms.[3]

In my experience, the current standard of care at several Canadian institutions is to counsel all patients with uncomplicated PVDs to seek urgent medical attention if they develop new symptoms and ask that all of these patients return for a routine follow-up examination in 4 to 6 weeks, even if asymptomatic. This protocol is based on the possibility of missing a delayed retinal break, which could have the serious consequence of irreversible vision loss. According to the evidence presented by Nassrallah et al., it may be that this standard of care should be revisited, offering better use of resource allocation in uncomplicated cases.

Additional high-quality studies are needed to supplement the current evidence for follow-up protocols. Nassrallah et al. indicated that they plan to conduct a prospective study with a larger sample size of patients diagnosed with acute symptomatic PVDs with appropriate follow-up.

Summary 3: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30740-3/fulltext

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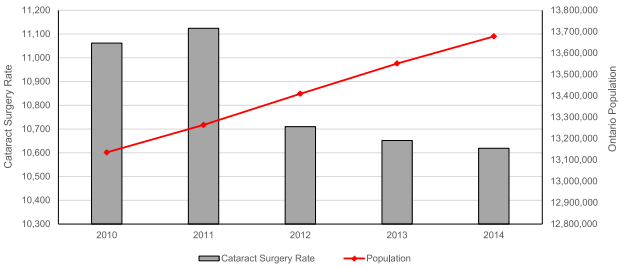

Distribution gaps in cataract surgery care and impact on seniors across Ontario

Gareth Mercer, PGY-2

Globally, and in North America, cataract is the leading cause of blindness (VA <20/400 in the better seeing eye), and the second leading cause of moderate-to-severe visual impairment (VA <20/60 but ≥20/400) among adults over the age of 50.[1] The World Bank considers cataract surgery to be an essential surgery because it is cost effective, there is substantial global need, and it is feasible to implement.[2] Canada, in endorsing the World Health Organization *Global Action Plan for Universal Eye Health 2014 to 2019*, has committed to reducing avoidable blindness and visual impairment, including from cataract, by 25% by 2019.

In this issue of the *Canadian Journal of Ophthalmology*, Jin and colleagues examined the performance of Ontario's health system in meeting the population's needs for cataract surgery between 2009 and 2014.[3] Using medical services billing data, they calculated the annual cataract surgery rate (CSR), or the number of surgeries per million people, by age group, sex, and municipality. During the study period, the Ontario government undertook a health funding reform, which included a cap on the number of cataract surgeries performed in the province.[4] Consistent with this cap, the authors found the volume of cataract surgeries remained relatively constant over the study period. This effect, combined with population growth and aging, resulted in a 4% decline in the CSR overall. The largest declines were seen for people 75 years and older (-16.2%), and those living in rural communities (-18.7%).

Two previous studies of cataract surgeries performed in Ontario during this period suggest the government's zero-growth mandate may have inequitably restricted the case volumes of newly graduated[4] and female[5] surgeons, compared to their later-career stage, male colleagues.

Acknowledging that health funding reforms stem from the legitimate need to rationally allocate limited health funding, one may ask: What options are available to governments to do this in a way that also ensures equitable, efficient delivery of quality services? Interestingly, Ontario's Health System Funding Reform actually adheres closely to the World Health Organization's recommendations for how this ought to be done.[6-8] Notably, the "Quality-Based Procedure" funding model that has been adopted, while considering more traditional supply-demand aspects of health service delivery, also includes an explicit emphasis on the quality of services delivered.

Why then, did the Ontario government implement so crude a cost-management strategy as an across-the-board cap on the volume of surgeries performed? The effects of this strategy appear to be at odds with the ideals of equity and quality espoused in the Health System Funding Reform and with Canada's commitments to the *Global Action Plan*.

Evidently, Jin and colleagues were puzzled by this same question. As they have demonstrated, our responsibility as researchers and clinicians is to ask such questions so as to both assist and hold governments to account in their attempts to reform the health care system.

Summary 4: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30621-5/fulltext

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N	Variable	Count (% Total) or Mean ± SD
697	Sex	
	Female (%)	355 (50.9%)
	Male (%)	342 (49.1%)
697	Age	51.6 ± 19.4
697	Decade of life	
	0–10	11
	11–20	27
	21–30	84
	31–40	88
	41–50	93
	51–60	152
	61–70	133
	71–80	62
	81–90	38
	91–100	9

Retrospective analysis of ophthalmology consults to a tertiary academic teaching centre: a resident perspective

Aishwarya Sundaram, PGY-3

Being on call and determining the level of urgency of a consult based on the story given by the referring physician can be one of the most stressful parts of call for a junior resident. Furthermore, the continued decline in the number of hours of formal ophthalmology education within medical education curricula suggests potential for increased discomfort of future referring physicians.[1] In this issue of the *Canadian Journal of Ophthalmology*, Oliver et al. (2018) present the findings from a retrospective chart review of 697 consults that were received on call by a single resident during a 13-month period.[2] The authors concluded that there was 65.8% agreement between emergency department and ophthalmology resident diagnoses. However, it is important to note that the agreement rate was calculated based on anatomic categories: anterior segment, posterior segment, orbit and ocular adnexa, neurological, uveitis, glaucoma, refraction error, normal eye exam, and unknown. Given the broad anatomic categories, it is difficult to extrapolate whether the agreement rates can be used for triaging purposes; for example, a corneal ulcer referral would be considered the same as a blepharitis diagnosis. The most common diagnoses from the referrals were for anterior segment (36.4%) followed by posterior segment (27.4%) pathology.[2] The most common diagnosis in the anterior segment was corneal abrasion and the most common in the posterior segment was posterior vitreous detatchment.[2]

Two additional studies evaluated ocular emergency referral agreement with ophthalmology services in Canada. A prospective study from University of British Columbia showed an agreement rate of 67.0%.[3] but the study also found inferior visual acuity and higher intraocular pressure measurement by referring services when compared with ophthalmology service.[3] A retrospective review from Hamilton showed an agreement rate of 79.4% when comparing referring diagnosis from emergency departments with final diagnoses.[4] Interestingly, this study also found that increasing age (OR 1.013, 95% CI: 1.001 to 1.026) and female gender (1.705, 95% CI: 1.052 to 2.764) were associated with higher odds of disagreement between referring physician and ophthalmologist.[4] The authors also found that while referring physicians' visual acuity measurements were inferior to the ones measured by on-call ophthalmology service, there was good correlation between the two measurements in terms of severity.[4] In addition, they reported a significantly higher intraocular pressure measurement by referring physicians.[4] Thus, these 2 Canadian studies suggest moderate agreement between referring emergency department physicians and ophthalmology services with generally inferior visual acuity and higher intraocular pressure measurements by referring physicians. Furthermore, comparing the agreement rates between the 2 studies from British Columbia (65.8%[2] and 67.0%[3]) with the one from Hamilton (79.4%[4]) highlights possible regional differences in referral agreements.

The 3 articles discussed above only compared agreement rates between referrals from the emergency department with ophthalmology services with the exclusion of other referring services. Another study from Hamilton compared the agreement rate between ophthalmologists and optometrists and showed an agreement rate of only 60.0%.[5] Although the agreement levels were only 60.0%, when reported by optometrists, the visual acuity and intraocular pressure measurements strongly correlated with ophthalmologist measurements.[5] The three most commonly referred ophthalmic diagnoses by optometrists were: retinal tear or detachment, vitreous hemorrhage, and posterior vitreous detachment/vitreous syneresis. This study highlights possible variation based on referral source.

Clinical Practice Point: There is moderate agreement between ophthalmologist and emergency department diagnoses with a general trend towards inferior visual acuity and higher intraocular pressures being measured by emergency department physicians. Furthermore, there is considerable variation based on region and referral source (emergency department vs. optometrist). These studies suggest a need for further education of referring services and highlight trends that may be useful when triaging patients on call.

Summary 5: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30370-3/fulltext

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