Trends in Cataract Surgery Technique and Anaesthesia Preferences in Singapore: A 2016 Survey

Dear Editor,

Cataract surgery is one of the most commonly performed operations in Singapore.[1] Anaesthesia techniques for cataract surgery have evolved over the past decades,[2] with variations in preferences and practices worldwide.[3-10] Current options include general anaesthesia, topical anaesthesia, as well as various regional anaesthesia techniques (peribulbar, retrobulbar and sub-Tenon's anaesthesia). We have repeated a similar survey from 2004[11] to describe any changes in cataract surgery technique and anaesthesia preferences.

Materials and Methods

In October 2016, an electronic survey by Google Doc was distributed to Singapore ophthalmologists via the College of Ophthalmologists, Academy of Medicine, Singapore using its electronic membership mailing list. Ethics approval was obtained from the Domain Specific Review Board. The questions included in the survey and the results are summarised in Table 1. A reminder email was sent in December 2016. There were no financial incentives for completing the survey and no identifiable data were collected. The results were tabulated and analysed in Microsoft Excel.

Results

There were 143 eligible members (Fellows) in the College of Ophthalmologists, Academy of Medicine, Singapore. A total of 84 responses were received (response rate = 59%). Of these, 62 (74%) and 22 (26%) were members from public institutions and private practice, respectively. Just under half of all respondents (48%) had completed ophthalmology training 10 or more years ago, and 47% performed more than 20 cataract operations on average per month over the last year.

Most respondents (n = 83, 99%) preferred phacoemulsification for routine cataract extraction, with only 1 surgeon (1%) preferring femtosecond laser-assisted cataract surgery (FLACS). Topical anaesthesia with or without intracameral anaesthesia was the technique of choice (n = 54, 64%), followed by peribulbar anaesthesia (n = 23, 28%), combined retrobulbar and facial block (n = 3, 3.6%), sub-Tenon's anaesthesia (n = 2, 2.4%), modified lateral peribulbar block (n = 1, 1.2%) and retrobulbar block (n = 1, 1.2%).

For mature cataracts, both phacoemulsification (n = 39, 46%) and extra-capsular cataract extraction (ECCE) (n = 39, 46%) were equally preferred, with the remaining 6 respondents (8%) opting for FLACS. ECCE was the operation of choice for surgeons who had completed their

Table 1. Survey Questions

What Type of Institution Are You Currently Practising in (Majority of the Time)? (n = 84) (%)		
Public	62 (74%)	
Private	22 (26%)	
How Long Ago Did You Complete Your Ophthalmology Training?		
0 – 4 years	27 (32%)	
5 – 9 years	17 (20%)	
10 – 14 years	12 (14%)	
15 – 19 years	12 (14%)	
20 – 24 years	8 (10%)	
25 – 29 years	3 (4%)	
30 – 34 years	3 (4%)	
35 – 39 years	2 (2%)	
How Many Cataract Surgeries Did You Perform Per Month (Average for the Last 1 Year)?		
0 – 4	10 (12%)	
5 – 9	9 (11%)	
10 – 14	16 (19%)	
15 – 19	9 (11%)	
20 – 24	21 (25%)	
25 – 29	1 (1%)	
30 – 34	8 (9%)	
>35	10 (12%)	
What is Your Preferred Surgical Technique for:	**Routine Cataract Surgery**	**Mature Cataract Surgery**
Phacoemulsification	83 (99%)	39 (46%)
ECCE	0	39 (46%)
FLACS	1 (1%)	6 (8%)

ECCE: Extracapsular cataract extraction; FLACS: Femtosecond laser-assisted cataract surgery; MLPA: Modified lateral peribulbar anaesthesia; PA: Peribulbar anaesthesia; RA: Retrobulbar anaesthesia; SA: Sub-tenon's anaesthesia; TA: Topical anaesthesia

*Percentages do not add up to 100% as respondents were allowed to give more than one reason.

†Mild sedation is defined as the level of sedation in which the patient is able to respond purposefully to verbal commands and be easily roused.

Table 1. Survey Questions (Cont'd)

Which is Your Preferred Anaesthesia Technique for:					
	Routine Cataract Surgery		**Mature Cataract Surgery**		
	Phacoemulsification	**FLACS**	**Phacoemulsification**	**ECCE**	**FLACS**
RA	1 (1%)	0	3 (8%)	0	0
RA + facial block	3 (4%)	0	1 (3%)	5 (13%)	0
PA	23 (28%)	0	24 (61%)	31 (79%)	0
SA	2 (2%)	0	4 (10%)	2 (5%)	0
TA alone	37 (45%)	1 (100%)	6 (15%)	1 (3%)	5 (83%)
TA + intracameral anaesthesia	16 (19%)	0	1 (3%)	0	0
MLPA	1 (1%)	0	0	0	1 (17%)
Why Do You Prefer a Particular Anaesthesia Technique for:*					
	Routine Cataract Surgery		**Mature Cataract Surgery**		
Patient comfort	54 (64%)		59 (70%)		
Patient's choice	3 (4%)		3 (4%)		
Surgeon comfort	25 (30%)		62 (74%)		
Surgeon's choice	48 (57%)		58 (69%)		
Speed/efficiency	37 (44%)		7 (8%)		
Safer technique	19 (23%)		10 (12%)		
Who Administers the Anaesthesia for Your Cataract Surgery?					
Nurse			4 (5%)		
Anaesthetist			2 (2%)		
Trainee surgeon			3 (4%)		
Myself			75 (89%)		
Do You Routinely Give Mild Sedation for Your Cataract Operations?†					
Yes			59 (70%)		
No			25 (30%)		
What Kind of Anaesthesia Support Do You Have When You Operate?					
Monitoring by surgeon			1 (1%)		
Monitored anaesthesia care (MAC) by anaesthetist			80 (95%)		
Mixture of the above			3 (4%)		

ECCE: Extracapsular cataract extraction; FLACS: Femtosecond laser-assisted cataract surgery; MLPA: Modified lateral peribulbar anaesthesia; PA: Peribulbar anaesthesia; RA: Retrobulbar anaesthesia; SA: Sub-tenon's anaesthesia; TA: Topical anaesthesia

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ophthalmology training more than 15 years ago (n = 19/28, 67%). Surgeons who completed their ophthalmology training less than 15 years ago preferred phacoemulsification (n = 33/56, 59%) over ECCE (n = 20/56, 36%). The uptake of newer technology FLACS appeared independent of graduation year. The 6 surgeons who used FLACS in mature cataracts completed their training ranging from 5 to 24 years.

Peribulbar anaesthesia was preferred in mature cataracts for both phacoemulsification (n = 21, 62%) and ECCE (n = 31, 79%) while topical anaesthesia was the preferred option for surgeons performing FLACS (n = 5, 83%). The anaesthesia choice for mature cataract operations was distributed in a similar proportion in the different surgeon graduation year groups.

The reasons behind surgeons' preference for anaesthesia techniques are shown in Table 1. For routine cataract extraction, patient comfort (n = 54, 64%) was the most prominent factor, followed by surgeon choice (n = 48, 57%) and efficiency of turnaround (n = 37, 44%). On the other hand, surgeon comfort (n = 62, 74%) was prioritised in mature cataract extraction, followed by patient comfort (n = 59, 70%) and surgeon choice (n = 58, 69%).

All respondents except 1 (n = 83, 99%) operated under monitored anaesthesia care (MAC) provided by anaesthetists. Seventy percent (n = 59) of the respondents complemented MAC with mild sedation—defined as the level of sedation in which the patient is able to respond purposefully to verbal commands and be easily roused. Thirty-four respondents provided the type of sedation used during cataract surgery, of which, most preferred the use of propofol (n = 19, 56%) followed by midazolam (n = 12, 35%) and fentanyl (n = 8, 24%). Eleven respondents used these drugs in different combinations.

Discussion

This survey provides a summary of the current cataract practice in Singapore and shows some variations in preferences between surgeons, both in surgical and anaesthesia techniques. This survey is also the first amongst the others performed internationally[3-10] to stratify results into 2 groups based on the maturity of cataract.

All respondents in Singapore now use phacoemulsification (with or without femtosecond laser) for routine cataract surgery compared to 92% in 2004[11] (when 8% preferred ECCE). In 2004, 28% of surgeons performed phacoemulsification for all types of cataract (compared to 54% in 2016). This shift may reflect the comfort levels of surgeons with phacoemulsification due to training and improved technology. ECCE is still commonly used in mature cataracts (46%), however, surgeons who completed ophthalmology training for 15 or more years were much more likely to use ECCE technique than those who completed ophthalmology training less than 15 years earlier (67% vs 36%, respectively). One surgeon chose FLACS as the preferred routine technique. A recent Cochrane review comparing FLACS and standard phacoemulsification found a lack of evidence to suggest superiority of 1 technique over the other.[12] As technology evolves, there may be a shift in the standard of care in the future.

We compared our findings with longitudinal data available from studies in some countries, notably United States of America (USA), Canada, New Zealand, United Kingdom (UK), Korea and Japan (Table 2). Anaesthesia preferences for routine cataract surgery vary significantly across the world. While sub-Tenon's anaesthesia was the most popular technique in Japan (42%),[9] New Zealand (78.3%)[6] and UK (46.9%),[7] it is infrequently used in Singapore (2%). Topical anaesthesia—with or without intracameral anaesthesia—was the technique of choice in Singapore (64%), which is similar to findings in the USA (51%),[3] Korea (69%)[8] and Canada (95.5%).[5] The main difference was that Canadian surgeons were twice more likely to supplement topical

Table 2. International Comparison of Anaesthesia Preferences in Cataract Surgery (%)

Anaesthesia Technique	Singapore (Current Study) (n = 84)	Singapore* (2004; 2007)** (n = 88)	USA† (2003; 2004)** (n = 985)	Canada‡ (2016; 2017)** (n = 114)	New Zealand§ (2007; 2008)** (n = 83)	UK‖ (2001– 2006; 2006)** (n = 55, 567)	Korea¶ (2012; 2015)** (n = 62)	Japan# (1999; 2001)** (n = 457)
TA alone	45.2	36	17	29.1	8.4	22.3	69	26
TA + IC	19	6	44	66.4	15.7	4.7	69	4
PA	27.4	43	17	0.9	12	19.5	4	4
RA alone	1.2	6	11	0.9	1.2	0.5	10	10
RA + FB	3.6	7	9	0	2.4	0	10	11
SA	2.4	1	2	0.9	78.3	46.9	17	42
Others‡‡	1.2	1	0	0	1.2	6.1	0	0

FB: Facial block; IC: Intracameral anaesthesia; PA: Peribulbar anaesthesia; RA: Retrobulbar anaesthesia; SA: Sub-tenon's anaesthesia; TA: Topical anaesthesia; UK: United Kingdom; USA: United States of America

*Zhao LQ, Zhu H, Zhao PQ, Wu QR, Hu YQ. Topical anesthesia versus regional anesthesia for cataract surgery: a meta-analysis of randomized controlled trials. Ophthalmology 2012;119:659-67.

†Leaming DV. Practice styles and preferences of ASCRS members – 2003 survey. J Cataract Refract Surg 2004;30:892-900.

‡Ong-Tone L. Practice patterns of Canadian ophthalmological society members in cataract surgery-2016 survey. Can J Ophthalmol 2017;52:2.

§Pick ZS, Leaming DV, Elder MJ. The fourth New Zealand cataract and refractive surgery survey: 2007. Clin Exp Ophthalmol 2008;36:604-19.

‖Oshika T, Amano S, Araie M, Majima Y, Leaming DV. Current trends in cataract and refractive surgery in Japan: 1999 survey. Jpn J Ophthalmol 2001;45:383-7.

¶Eichel R, Goldberg I. Anaesthesia techniques for cataract surgery: a survey of delegates to the Congress of the International Council of Ophthalmology, 2002. Clin Exp Ophthalmol 2005 Oct;33:469-72.

#Wagle AA, Wagle AM, Bacsal K, Tan CS, Chee SP, Au Eong KG. Practice preferences of ophthalmic anaesthesia for cataract surgery in Singapore. Singapore Med J 2007;48:287-90.

**The first year quoted refers to the year in which the study was conducted, while the second year refers to the year in which the study was published.

††Combined results as the study did not provide separate results for each individual anaesthesia technique.

‡‡Other techniques, e.g. modified lateral peribulbar block, subconjunctival anaesthesia, general anaesthesia.

anaesthesia with intracameral lignocaine compared to their Singapore counterparts. A common trend was the move away from sharp needle techniques, such as retrobulbar and peribulbar blocks, observed in Singapore (32% in 2016, from 58% in 2004), New Zealand (13.1% in 2007, from 65.7% in 1997) and UK (19.5% in 2006, from 34% in 2003). This may be explained by the higher risk of injection-related complications,[13] leading to increasing popularity of topical anaesthesia.

The respondents in our survey were asked to indicate their rationale anaesthesia preference. The reasons were broadly grouped into the following: patient comfort, patient's choice, surgeon comfort, surgeon's choice, speed or efficiency and safety of the technique. Patient comfort and surgeon's choice was more commonly indicated to be a consideration for mature cataracts (74%) compared to routine cases (64%). This reflects on the complexity of mature cataracts and need for greater control of eye movement and pain.

A quick turnaround time of surgery was prioritised by nearly half of the respondents (44%) in routine cataract surgery, compared to just 8% in mature cataract extraction, indicating a demand for high-volume surgery for routine cases, but surgeons are willing to sacrifice turnaround time in complex cases, especially since most surgeons prefer to administer the regional anaesthesia themselves (89%).

All but 1 of the respondents (99%) operated under MAC with an anaesthetist. This is comparable with international practice in countries such as UK (74%), New Zealand (82%) and Australia (97%).[10] The majority of respondents (70%) supplemented anaesthesia with mild sedation, a practice that is notably more prevalent in Singapore, with only USA (86%) reporting a higher figure.[10] Propofol is the most preferred drug, likely due to its rapid recovery and antiemetic properties.[14] This survey is limited by the relatively small sample size, compared to larger national databases set up in countries such as UK.[7] While the survey may be considered a valid representation of practice patterns in Singapore, it was unable to take into account the practice preferences of the surgeons who did not respond (n = 59/143, 41%), as well as that of ophthalmology trainees who have yet to qualify as Fellows of the College of Ophthalmologists, Academy of Medicine, Singapore.

Conclusion

Phacoemulsification under topical anaesthesia with sedation and MAC is the technique of choice for routine cataract surgery in Singapore. For mature cataracts, either phacoemulsification or ECCE is equally preferred, under peribulbar anaesthesia with sedation and MAC. Overall, there has been a shift towards phacoemulsification and FLACS (away from ECCE), and towards topical anaesthesia (away from regional anaesthesia) since the last survey in 2004.

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