

Changing Trends in Cataract Surgery in Singapore

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ABSTRACT

Aim of Study: To determine the incidence of cataract surgery in Singapore, both island-wide as well as at the Singapore National Eye Centre (SNEC). We also evaluated the changing techniques of cataract surgery performed locally.

Methods: We analysed all cataract operations performed in Singapore over a 10-year period from 1985 to 1996 using data obtained from Medisave claims. We also analysed data of all cataract operations in SNEC between 1992 and 1996 retrospectively, with emphasis on patient demographics and the changing surgical techniques.

Results: Data from Medisave claims revealed a significant increase in cataract operations from 5,679 in 1986 to 12,177 in 1995. There was a similar increase in SNEC with a rise from 3,714 in 1992 to 7,516 in 1996. This increase was disproportionately greater than the increase in the number of local surgeons over the same period. The incidence of cataract surgery rose from 2.25/1,000 in 1986 to 4.02/1,000 in 1995. Patients older than 60 years accounted for 75% of cases, with a rise in patients older than 80 years from 2.73% in 1992 to 11.43% in 1996. SNEC data showed that the incidence of phacoemulsification rose from 1% in 1992 to 25% in 1996.

Conclusion: There is a rising incidence of cataract surgery in Singapore, particularly in the elderly population. There is also a significant change in the pattern of cataract surgery with a sharp rise in the incidence of phacoemulsification over the last 5 years. These findings have an impact on future planning considerations regarding ophthalmic manpower and resources in Singapore.

Keywords: cataract, ageing population, extracapsular cataract extraction (ECCE), phacoemulsification, changing trends

INTRODUCTION

Cataract surgery is the most commonly performed ophthalmic operation in Singapore. The majority of cataracts occur in the elderly population. With an ageing local population, the incidence of cataract is expected to rise, and with it, the demand for ophthalmic care and services. Furthermore, cataract surgery is being redefined with the introduction of ultrasound technology.

Cataract impairs vision and reduces the quality of life. This is particularly poignant in the elderly as they are likely to be already experiencing difficulties in their daily living. In Singapore, the elderly population, defined as those over the age of 60 years, is expected to rise from 9.2% in 1990 to 12% in 2000 and 27% by the year 2030⁽¹⁾. These predictions, however, do not take into account improved health care and reduced mortality, leading to longevity. The local life expectancy at birth rose from 71.4 years in 1980 to 74.2 years in 1989⁽²⁾.

Technological advancements and improvements in microsurgical techniques have brought about changing trends in cataract surgery. In the early 1980s, removal of the entire, intact crystalline lens, or intracapsular cataract extraction (ICCE), was the procedure of choice, but with the introduction of the intra ocular lens implant (IOL), extracapsular cataract extraction (ECCE) quickly became the technique of choice. In this technique, the posterior capsule of the crystalline lens is left in place in order to support secure placement of the IOL. In 1982, only 32 implants were performed in the government hospitals⁽³⁾, now virtually all patients have IOL implants. In 1996, only one planned ICCE procedure was performed in the Singapore National Eye Centre, as opposed to 5,572 ECCE procedures. In addition, small incision cataract surgery is now gaining popularity, in the form of phacoemulsification, a procedure in which the lens nucleus is emulsified in-situ with the use of an intraocular high frequency ultrasound probe, through a small 3.5 mm incision, with implantation of a foldable acrylic or silicon implant. In 1994, Leaming⁽⁴⁾ showed that there was an increasing preference for phacoemulsification over the past decade in America, rising from 12% in 1985 to 86% in 1994. This phenomenal rise in the prevalence of phacoemulsification is also occurring in Asia and in Singapore as well.

The aim of this study was to evaluate the increasing rate of cataract surgery in Singapore between 1986 and 1996, in relation to our ageing population, and thereby attempt to predict the future increase in the incidence of cataract surgery and its demand. We also aimed to evaluate the changing trends in cataract surgery locally.

MATERIALS AND METHODS

We obtained data from the Singapore National Eye Centre, which monitors and audits all cataract surgery

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performed within the centre, and the Research and Evaluation Department of the Ministry of Health, which keeps records of all surgeries performed in Singapore with Medisave claims.

I. SNEC data

All cataract operations performed at SNEC from 1992 to 1996 were analysed based on sex, race and age. A comparison was also made between ECCE and phacoemulsification.

II. MOH data

We analysed all cataract operations performed in Singapore over a 10-year period from 1986 to 1995. This data was sourced based on Medisave claims through operation codes of all cataract-related operations. Using population statistics obtained from the Department of Statistics, we were able to calculate the incidence of cataract surgery for each year.

RESULTS

I. SNEC data

A total of 3,714 cataract operations were performed in 1992 (Fig 1), with an escalation of 202% to 7,516 operations in 1996. Of all the operations performed, less than 5% were performed on non-residents. There was a female preponderance, with an average of 53%; however, this may be age-related. The racial distribution was reflective of the local population.

A review of the age distribution (Table I) of the patients who underwent surgery showed that greater than 75% of the patients were older than 60 years for

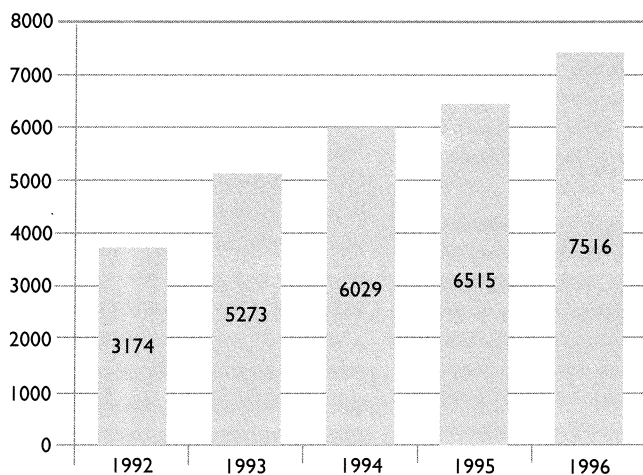


Fig 1 – Total number of patients who underwent cataract surgery at SNEC from 1992 to 1996.

Table I – Age distribution of patients who underwent cataract surgery at SNEC between 1992 and 1996

Age/years	1992 (%)	1993 (%)	1994 (%)	1995 (%)	1996 (%)
0 – 19	0.30	0.35	0.28	0.28	0.18
20 – 39	2.40	2.17	2.12	1.87	1.96
40 – 59	21.67	22.47	20.09	21.27	20.27
69 – 79	66.90	65.58	67.63	66.54	66.16
> 80	8.73	9.43	9.88	10.04	11.43

each year. The proportion of patients in the 40 to 59-year age group remained relatively static, at an average of 21.15%. Patients between the ages of 60 and 79 years consistently made up the bulk of the patient load at an average of 66.56%. There was a gradual increase in the proportion of patients greater than 80 years old, from 8.73% in 1992 to 11.43% in 1996.

The frequency of use of phacoemulsification technique was compared with the standard method of ECCE (Fig 2). In 1996, 1,944 cataract operations were performed using phacoemulsification as compared to 26 cases in 1992. In addition, the ratio of phacoemulsification versus ECCE rose from 0.70% in 1992 to 25.86% in 1996.

II. Ministry of Health – Medisave data

In 1986, 5,679 cataract operations were performed in Singapore. This number rose to 12,177 in 1995, a 114% increase (Fig 3). The incidence of cataract surgery rose from 2.25/1,000 in 1986 to 4.08/1,000 in 1995, a 181% increase (Table II).

DISCUSSION

Our study shows that there is a 214% increase in the number of cataract operations performed in Singapore between 1986 and 1995. This trend will continue well into the twenty-first century. The implication of such a finding has an impact on both the practice of ophthalmology and the health costs of the country.

There was a steady increase in the number of cataract operations performed per year, as can be seen in Fig 3. The incidence of cataract operations also is on an upward trend (Table II). However, we are unable to account for the trough seen in the years 1989 and 1990. The increasing numbers can be attributed to several factors. Local population statistics have shown that Singapore is an ageing population. Thus, it can be expected that there will be a greater demand for surgery. Senile cataract was shown by Tan⁽⁵⁾ to account for 97.1% of the cases performed at SGH in the first three months of 1990. Our study shows consistently that patients older than 60 years accounted for more than 75% of the patient load. Furthermore, our study also shows that there is a gradual increase in the proportion of patients who are greater than 80 years old. This is in keeping with the increasing elderly population as well as greater longevity of our people.

There was a marked increase in the number of operations performed from 5,679 in 1990 to 7,864 in 1991. This can be attributed to the opening of SNEC in the second half of 1991. Over the past 5 years, ophthalmologists have coped with the rising demand for cataract surgery with the availability of day surgery services. In the 1980s, less than 15% of these operations were performed as day surgical cases. This figure rose dramatically to 95% in 1992. Our study has shown that the surgeons at SNEC accounted for greater than 50% of all cataract operations performed. The commencement of day surgical services has made cataract surgery so easily available that there is no significant waiting time locally,

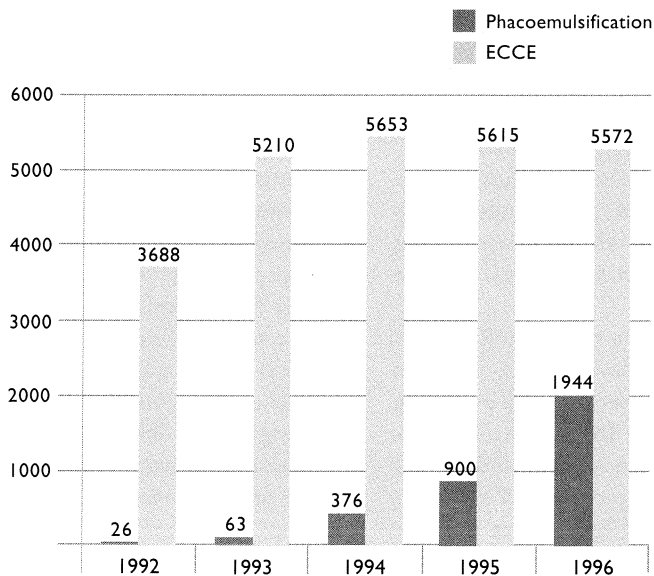


Fig 2 – Comparison of ECCE versus phacoemulsification at SNEC.

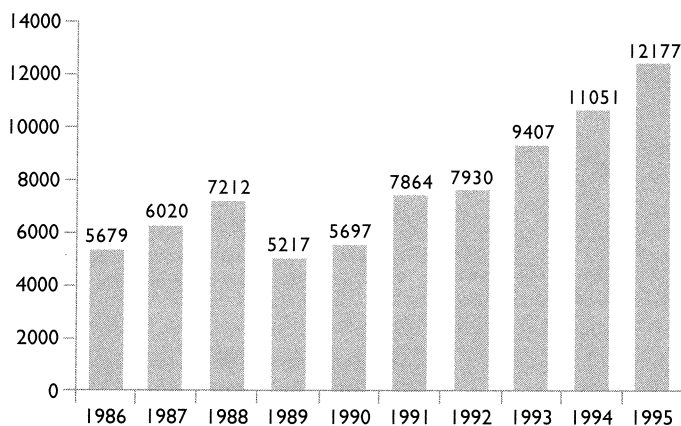


Fig 3 – Number of cataract operations performed in Singapore between 1986 and 1995 based on Medisave claims data.

Table II – Incidence of cataract surgery in Singapore between 1986 and 1995 based on Medisave claims data

Year	Incidence/1000
1986	2.25
1987	2.36
1988	2.78
1989	1.97
1990	2.11
1991	2.85
1992	2.81
1993	3.27
1994	3.77
1995	4.08

compared to the United Kingdom, where the patients may have to wait as long as 4 years⁽⁶⁾ to have their operations. In 1989, the local ophthalmologist to patient ratio was 1:50,000⁽⁷⁾, ie. 53 surgeons. In 1994, there were 80 ophthalmic surgeons but the number of cataract operations more than doubled to 11,051 cases. With the expansion of health services, health costs will rise for the individual as well as for the institution and the nation. Although patients locally may regard themselves fortunate with the government's heavy subsidy on their health costs and the availability of their Medisave, rising inflation rates will still have a major impact on the individual.

Greater than 75% of the patients who underwent cataract surgery were older than 60 years. This is consistent with senile cataract being the main type. Those in the 40 to 59-year and 60 to 79-year age groups remained in a fairly constant fraction of 21.15% and 66.56% respectively. However, we noted a 30.93% increase in the proportion of patients older than 80 years between 1992 and 1996. This can be attributed to the increasing proportion of the very elderly in the population, particularly among the females, as they accounted for an average of 53%.

Significant changes in surgical techniques in cataract surgery have also occurred in Singapore over the past decade. IOL implantation was performed in 96% of all cataract operations in Singapore in the 1990s. Most were performed using the ECCE technique. Most recently, phacoemulsification has been introduced into Singapore, and although surge phacoemulsification performed locally is still relatively low (25.9% in 1996 in SNEC), it has been shown in the West that phacoemulsification has the potential to usurp ECCE as the surgery of choice. ECCE with IOL is a timetested procedure that is safe and relatively easy to perform. A study at the National University Hospital (NUH) in 1991⁽⁸⁾ showed that even resident trainee doctors could perform the procedure safely and effectively with 98.5% of the patients achieving visual results of 6/12 or better, and a complication rate of only 2%. It is cost effective and does not incur high costs on the hospital or the patient. However, significant corneal astigmatism in the first 1 – 2 months after surgery limits early visual rehabilitation in ECCE, and post-operative spectacle correction is often prescribed as late as 2 months after surgery due to refractive instability.

Phacoemulsification, on the other hand, is favoured for its small incision, minimal post-operative astigmatism and earlier visual recovery. A significant advantage of phacoemulsification and small incision surgery is that patients see extremely well within 24 hours of surgery, due to minimal corneal astigmatism, and post-operative refractive error stabilises much earlier as compared to ECCE. There is also evidence to suggest that significantly less intraocular inflammation occurs with phacoemulsification.

There are however, high costs to pay for these advantages. Phacoemulsification is more expensive because of the need for a phacoemulsification unit, dependence on consumable tubings and cartridges, and the more costly small rigid or foldable IOLs required. However, with the continual introduction of new products into the market, phacoemulsification costs can be expected to fall with increasing competitiveness in the cataract surgery and implant market.

It is important to note that phacoemulsification is a relatively difficult procedure to master, with a significant learning curve experienced by all beginning phacoemulsification surgeons. In addition, different intraoperative complications may occur, and may be more difficult to handle as compared to ECCE surgery. This is clearly demonstrated by the fact that the management of the dreaded complication of a nucleus dropping into the vitreous cavity is usually beyond that of a general cataract surgeon, and usually necessitates temporary closure prior to referral to a vitreoretinal specialist for retrieval.

The potential for significant complications with phacoemulsification has necessitated the implementation of a system of controlled entry for ophthalmic surgeons in SNEC and NUH since 1993, consisting of hands-on workshops conducted by world renowned phacoemulsification experts, strict monitoring of quality assurance, videotaping and archival of complication videos for teaching purposes, and initial restriction of phacoemulsification to more senior and experienced ECCE surgeons. Although these measures have been felt to significantly reduce complications during the learning curve, the incidence of complications was still higher as compared to ECCE surgery.

In summary, it should be remembered that there is a distinct paucity of good clinical trials to demonstrate any definite and long-term superiority of phacoemulsification over ECCE at this point of time, and as such, the issue of phacoemulsification versus ECCE as a better form of cataract surgery is as yet, unresolved. Individual surgeon preference and market forces thus prevail at this time.

CONCLUSION

There is a rising demand for cataract surgery in Singapore. It has been shown that the incidence of

cataract surgery is expected to escalate into the twenty-first century. Coupled with Singapore's ageing population, this will add to the burden of ophthalmic services to maintain the standard of optimal ophthalmic care. There are also changing trends in the methods of management of cataract, with phacoemulsification emerging as a significant usurper of extracapsular cataract extraction. All these avenues converge on to a common point of rising health costs, not only for the patient, but also for the institution and the nation. Provision must be made for the expansion of ophthalmic services and education of the public must continue to ensure that with the emerging visual demands of our rapidly ageing population, optimal, high quality cataract surgery remains affordable to Singapore.

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