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Cataract Surgery in IRAN 2000-2005

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Abstract

***Purpose*:** To determine the distribution of cataract surgery in Iran between 2000 and 2005

***Methods*:** In a retrospective study based on files, cataract surgery centers were selected. Between 2000 and 2005, one week of each season was selected randomly and all cataract surgery files of the center were studied. The surgeries were analyzed based on type, types of the lenses, intraoperative complications, hospitalization time, length of waiting time before surgery, sex and age.

***Results*:** Mean age of 13,409 cataract cases (50.2% males, 49.8% females) was 64.9±14.7. Mean age of males (64.37) was significantly less than females (65.5) (P<0.001). Age-related (89.26%) and congenital (0.99%) cataract were the most and the least common surgery cases, respectively. Extracapsular method had the highest prevalence (50.76%). However, within 2000-2005 its prevalence decreased from 56% to 20.5%. Instead, the Phaco method, with a prevalence of 47.01% increased from 12.5% to 77.5% during the same period of time. During that time window of 6 years, the prevalence of outpatient surgeries was 31.42%.

***Conclusion*:** This study reports the overall status of cataract surgery in Iran between 2000 and 2005. In comparison to some developed countries, although the transition to Phaco method was done with a delay, its prevalence in 2005 was 77.5% and is expected to replace quickly other surgical techniques in the country.

***Keywords*:** Cataract Surgery, Iran, Phacoemulsification

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Introduction

Several worldwide studies suggest that the prevalence of blindness is approximately 11%.[1-3] Review of these studies shows that cataract is the main cause of blindness, as some studies have reported about 79% of bilateral blindness is due to cataract.[4]

A report from India indicated that cataract do not only affect the elderly, but is also one of the main causes of blindness in children at school age.[5] Vision 2020 Project as a global project to prevent blindness and vision disorders could partly reduce the incidence of blindness in some countries. However, some studies have reported an increase in cataract blindness.[5-7] One of the vision 2020 targets is to increase cataract surgical rate (CSR) worldwide to prevent a high proportion of cataract blindness.[8,9] Studies in different regions of the world, specially Asia have reported a cataract surgical coverage from 30% to 80%.[10-13] Although an increase in cataract surgical coverage can be an index of the success of Vision 2020 Project, there is no doubt that, along with the quantity, the quality of cataract surgery is a priority. Tabin studied the cataract surgical coverage and the individual's postoperative vision together.[7] Information on cataract surgery in each region or country reveals both the health care status and the challenges. Therefore, considering the prevalence of cataract surgery, various surgical techniques and the results and advances in this field in every country, can improve the quality of medical eye services and promote health care in that country. The current report studied the distribution of cataract surgery in Iran between 2000 and 2005.

Methods

Iran Cataract Surgery Survey (ICSS) study was a retrospective study based on files. The samples were patients who underwent cataract surgery between 2000 and 2005 in one of the ophthalmology centers.

Details of the methodology of this study along with the number of cataract surgeries in Iran have already been published in another report.[14]

Sampling

After selection of cataract surgical centers in Iran, all the necessary information was obtained. Based on the information, the centers were divided into a major and a minor group. The classification was done based on the total number of performed eye surgeries in 2004.

Major centers (19 centers) were those with over 1000 surgeries in the year and minor ones (9 centers) were those with less than that. After excluding the first two weeks of the solar Jalali calendar (Iranian calendar), that are holidays and active surgeries are not performed, one week in each season was randomly selected (one week in each season during 2000 and 2005 included 24 weeks for each unit). Files of all cataract surgeries performed in the center were reviewed and necessary information was extracted by a trained doctor.

Data analysis

In this report the cataract surgeries in Iran between 2000 and 2005 were analyzed based on age, sex, surgery type, hospitalization time, length of waiting time before surgery, types of the lenses, and cataract type. The analysis was reported based on the values and percentage of each variable along with their 95% confidence interval (CI) in all surgeries during the 6 years. The design effect was calculated using 95% CI and standard errors. Separate and multiple logistic regression models were used to measure the statistical relationships. Data analysis was done using SPSS software and STATA.

Results

Of the studied cataract surgeries between 2000 and 2005 in 28 centers in Iran, a total number of 13,409 surgeries randomly were selected using cluster sampling. Mean age of cataract cases (50.2% males, 49.8% females) was 64.9±14.7 years. Mean age of males (64.37) was significantly less than females (65.5) ($P<0.001$). Table 1 shows the demographic specifications of the surgeries between 2000 and 2005. As shown in table 1, the maximum number of cataract surgeries in Iran was between the age of 71 to 80 years.

The percentage of surgeries was 10.9% in 2000 and increased to 21.32% in 2005. The trend of cataract surgery was significantly different during different years ($P<0.001$).

Figure 1 shows the time trend of cataract surgery during the studied years.

The results of cataract surgeries in Iran based on major and minor centers are presented in table 2. The rate of cataract surgeries performed in the major and minor centers were 86.01% and 13.99%, respectively.

Number of references did not show a statistical difference between sexes (P=0.653). However, as table 2 presents, in major centers the number of cataract surgeries significantly decreases with age (P=0.032).

Figure 2 presents the percentage of cataract surgeries based on the surgery types in major and minor centers. As the figure shows, the percentage of extracapsular surgeries in minor centers was more than major ones (P<0.001). Also, Phaco method was performed significantly more often in the major centers (P=0.002).

Cataract type

Table 3 shows the percentage of cataract surgery types between 2000 and 2005. Age-related (89.26%) and congenital (0.99%) cataracts were the most and the least common surgery cases, respectively. Analysis of the data showed that traumatic cataract was significantly more frequent in the male population (P<0.001).

Surgery methods

During the study period, extracapsular surgery was the most common surgery operation in Iran (50.76%) (Table 4).

However, as figure 3 shows the time trend of different methods of surgery, extracapsular method decreased from 86% in 2000 to 20.5% in 2005 and instead Phaco method increased from 12.5% to 77.5% that shows almost 65% growth within 6 years.

Table 1. The distribution rates of cataract surgery by age and sex between 2000 and 2005 in Iran

	Male		Female		Total	
Age	**n**	**%**	**n**	**%**	**n**	**%**
10>	86	0.65	55	0.41	141	1.07
11- 40	398	2.99	286	2.15	684	5.16
41- 50	551	4.15	463	3.48	1014	7.63
51- 60	975	7.34	1015	7.64	1990	14.97
61- 70	1986	14.94	2156	16.22	4142	31.17
71- 80	2183	16.42	2174	16.36	4357	32.76
80<	497	3.74	467	3.51	964	7.24
Total	6676	50.2	6616	49.8	13292	100

Table 2. The distribution of cataract surgeries in Iran by centers

	Center	
	Major	**Minor**
10>	93.71 (87.27-100.14)	6.29 (-0.14-12.73)
11-40	90.41 (88.49-92.32)	9.59 (7.68-11.51)
41-50	91.34 (90.04-92.64)	8.66 (7.36-9.96)
51-60	85.46 (82.72-88.21)	14.54 (11.79-17.28)
61-70	84.81 (80.98-88.63)	15.19 (11.37-19.02)
71-80	86.28 (83.13-89.42)	13.72 (10.58-16.87)
80<	80.19 (76.36-84.01)	19.81 (15.99-23.64)
Male	86.13 (83.46-88.8)	85.89 (83.44-88.34)
Female	13.87 (11.2-16.54)	14.11 (11.66-16.56)
Total	86.01 (83.58-88.44)	13.99(11.56-16.42)

Table 3. Cataract surgeries in Iran by type of cataract in gender groups

	Male	Female	Total	Female/male
Type of cataract	%(95%CI)	%(95%CI)	%(95%CI)	OR(95%CI)
Senile	88.24 (87.93-88.55)	90.4 (88.55-92.26)	89.26 (88.49-90.02)	1.26 (0.99-1.59)**
Developmental	1.75 (1.54-1.96)	1.49 (1.05-1.93)	1.62 (1.46-1.77)	0.85 (0.57-1.26)
Traumatic	2.78 (2.26-3.3)	0.67 (0.38-0.95)	1.74 (1.37-2.12)	0.24 (0.15-0.37) *
Congenital	1.12 (0.5-1.74)	0.84 (0.44-1.23)	0.99 (0.6-1.38)	0.75 (0.37-1.51)
Other	3.05 (2.17-3.92)	3.73 (2.59-4.86)	3.39 (2.43-4.35)	1.23 (1.11-1.36) *

*: P<0.05
**: P=0.054

Table 4. Cataract surgery by type of operation

	Male	Female	Total
ICCE	0.46 (0.23-0.7)	0.23 (0.16-0.3)	0.35 (0.25-0.46)
ECCE	50.4 (39.84-60.96)	51.11 (39.59-62.63)	50.76 (39.71-61.8)
Phacoemulsification	46.63 (35.75-57.52)	47.4 (35.84-58.96)	47.01 (35.85-58.16)
Lensectomy	2.5 (1.88-3.13)	1.26 (0.77-1.74)	1.89 (1.49-2.29)

ICCE: Intracapsular cataract extraction
ECCE: Extracapsular cataract extraction

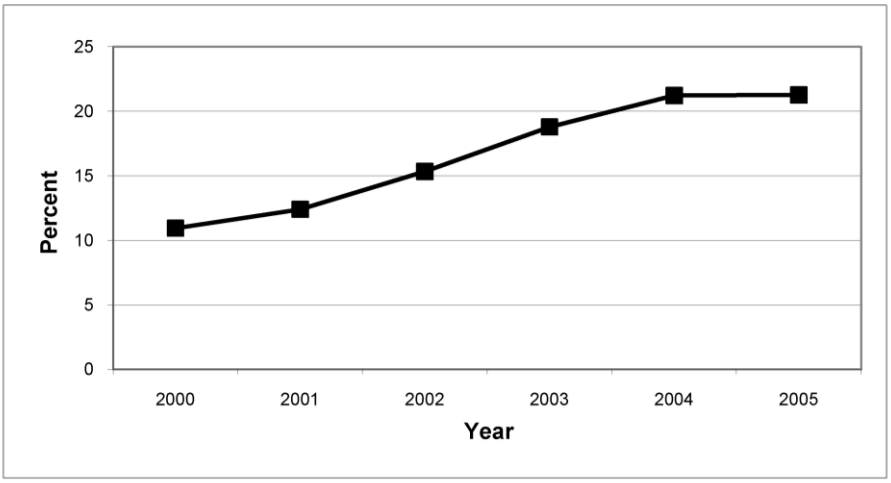

Figure 1. Cataract surgery between 2000-2005

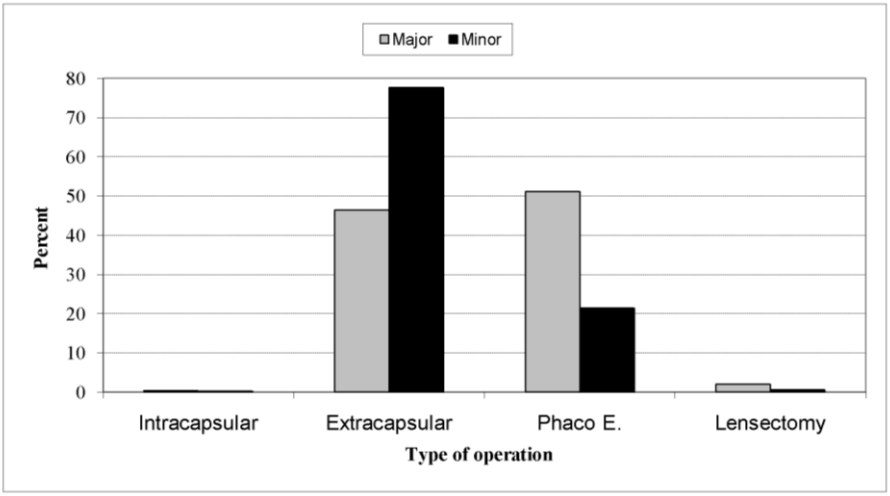

Figure 2. The ratio of surgeries performed in major and minor centers during 2000-2005

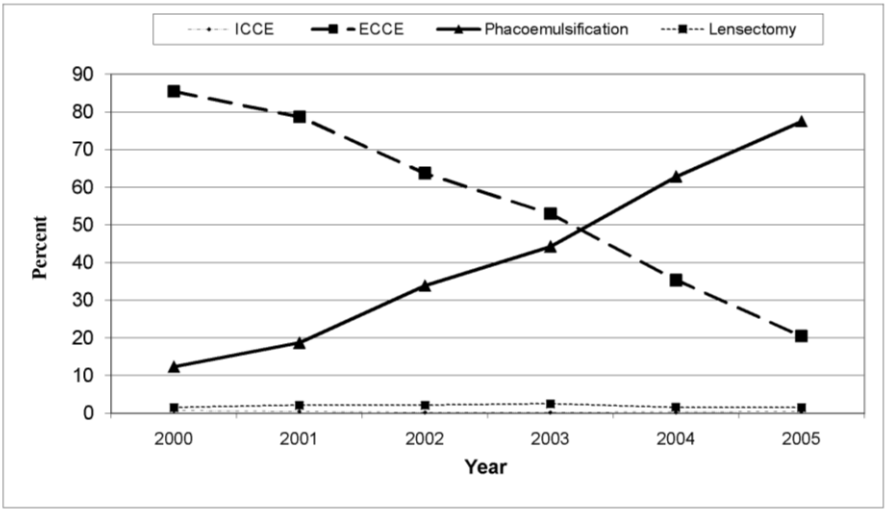

Figure 3. Time trend of different methods of cataract surgery between 2000-2005

The most common lenses used during this period were PC lenses with prevalence of 96%. PMMA lenses had a prevalence of 54.74% (64.62-44.86 95% CI) and foldable lenses were used in 41.60% of cases (31.55-41.65 95% CI). The least lenses used were AC-IOL lenses with a prevalence of 1.6% and no lens was used in 2% of surgeries. Foldable lenses usage grew from 10.9% in 2000 to 67.33 in 2005. While within the same 6 years the usage of PMMA lenses decrease by 55%.

Discussion

Because cataract is mostly age-related, it has the highest incidence among elderly. In addition to the surgery role in improvement of the person's vision it also plays an important role in improvement of the quality of life.[15] Therefore, the importance of proper number and distribution of cataract surgery, its quality and benefiting new technology all in line with Vision 2020 Project can have an effective role in improvement of the quality of life of the elderly people.

In a report by Naghavi it was shown that Iranian population is getting older and the average age of the population has increased within last 30 years, what is more, life expectancy as one of the measures of population health had a significant increase.[16]

The more people get older the higher number of cataract cases we expect in Iran. To control the problem health care systems should consider the issue. Because surgery is the only treatment for cataract, investment in quantitative and qualitative cataract surgery can solve a major part of the elderly vision problems. Considering the importance of cataract, we conducted a study as ICSS to determine the approximate annual CSR and we published its results as previously noted. The study was the first form included general information concerning the cataract surgery status in Iran. The purpose of this report, which is part of the ICSS, is to provide information on distribution of cataract surgery according to age and sex, type of surgery, type of cataract, and types of lenses that were used. The study showed an increase between 2000 and 2005. However, the study only shows the ratio of the surgeries over this 6-year period and did not show the prevalence of cataract surgery in each year. According to our 6-year population growth it was shown that cataract surgery had a bigger growth. Hence it can be judged that it has had an uptrend growth during this period. The reason for this growing rate of cataract surgery is the growing number of elderly population of the country and the growing number of demands for surgery. In addition, development of new methods of cataract treatment has created simpler conditions of cataract surgery. The review of cataract surgery trends in other countries has confirmed this point.[17,18] In a study by Lee on the number of surgeries in Singapore in 1986 the results showed a more than two-fold increase from 5,679 in 1986 to 12,177 in 1995.[19] Other reports from Japan, Denmark and Thailand have already showed a growth in number of cataract surgeries.[17,20,21]

We studied the distribution of cataract surgery base on age and sex. However it does not seem that the relationship between age and cataract surgery provide valuable information as the relationship has already been proven. Yet it would be useful for future planning to know what kind of people refer more for the cataract surgery. Our report showed that the highest percentage of those who refer for cataract surgery was between 71 and 80 years. Nirmalan,[1] Monestam,[22] Lundstrom,[23] and Erie[24] also reported that the highest prevalence of cataract surgery was in ages above 70. The most important reason is that in ages over 70 the darkening of lens reaches its maximum, hence vision disorders increase and vision reduces considerably. The difference in percentage of cataract surgery was almost the same between sexes in our study. The important point was higher average age of women in time of cataract surgery. A report on cataract surgery in Ireland between 1986 and 2003 also showed that women's mean age at the time of cataract surgery was higher. Nirmalan's study also corroborated these findings.[1,25] Higher occupational and environmental exposure of men can lead to earlier risk of cataract development.[26] At the same time since men have more social and occupational activities, they need a better vision.

Although extracapsular method was the most common surgical method between 2000 and 2005, as was shown, the usage of the method decreased each year and instead the Phacoemulsification method replaced it in the same conditions with about a 65% growth during these 6 years. In a study that was conducted in Ireland[25] between 1986 and 2003, 78.4% of surgeries were done using Phaco method the same study reported that between 1986 and 1991, 87% of surgeries used extracapsular method and only 12% of surgeries were done with Phaco method. The study also showed that since 1992, Phaco was the method of choice in 93% of cases and the percentage increased to 99.3% between 1998 and 2003. Phaco showed a growing trend in Iran and Ireland, but there are two important points to be mentioned. First, during the 6-year period, only 47% of surgeries in Iran were done using Phaco method while the percentage for Ireland was 78.4% which shows a significant difference. Second, our study was done 14 years after the study in Ireland but yet the Phaco method was used less frequently. A justification is that in comparison to some developing countries, Phaco technology is used with a delay in Iran. Only 12.5% of surgeries in Iran in 2000 used Phaco method while in Ireland after 1999 the percentage was 99%. The subject is related to economic and social conditions of our country in those years. It should also be noted that in comparison with the time of the study in Ireland, our country was not in current

situation of economic and social conditions and the possibility of having the necessary trainings and modern technology. In another report from America; it was shown that between 1980 and 2004, 64% of surgeries were performed using Phaco method.[24] Erie's study that was done in America,[24] reported that 91% of surgeries used extracapsular method in 1980 and no surgery was done using Phaco method in that year. Erie emphasized that the Phaco method was available for cataract surgery in America in 1986 and reported that in 2004; more than 99% of cataract surgeries in America were performed using Phaco method.[24] A comparison between our study and other studies showed a low prevalence of Phaco method usage in past years but what can be concluded from the data of this study is the growing trend of Phaco method in recent year which can possibly reach 100% as eligible candidate in the coming years.[24,25]

Our study on the lens type showed that during the 6-year period the foldable lenses had the most growing numbers. With the development of new surgical techniques and the emergence of foldable lenses, in most cases, small incision surgeries and Phacoemulsification are the preferred method for age-related cataract surgeries. However, since the intracapsular cataract extraction (ICCE) and extracapsular cataract extraction (ECCE) procedures with large incision have indications in specific cases or are still common in areas where modern surgical facilities are not available, non-foldable lenses were also studied in this report. The advantages of foldable lens usage in Phaco method in cataract surgeries are smaller incision, a small self-sealing incision for the lens replacement, decrease in the risk of suprachoroidal hemorrhage, less conjunctiva manipulation, reduced interference with other surgeries like glaucoma surgery. The mentioned advantages are the reasons of increasing usage of foldable lenses.

Approximately, 87% of cataract surgeries in Iran were done in the major centers between 2000 and 2005. Most of these centers were academic centers for training of professional ophthalmologists.

The ratio of elderly who were operated on in the minor centers was significantly higher. The most important reason seems to be that age-related cataract is the most important cause of cataract in older people and it is associated with fewer complications in comparison to congenital and neonatal cataract. Hence it is easier for the minor centers which are not training centers to perform these surgeries without considerable side effects.

Conclusion

The study reported the overall status of cataract surgery in Iran between 2000 and 2005. In comparison to some developed countries, although the transition to Phaco method was done with a delay, its prevalence in 2005 was 77.5%. In our country, it is expected to replace quickly other surgery techniques like extracapsular method when it is indicated.

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