ORIGINAL ARTICLE

SCORING OF PAIN PERCEPTION DURING PHACOEMULSIFICATION UNDER TOPICAL ANAESTHESIA

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Background: Topical anaesthesia is safe and inexpensive type of anaesthesia used during phacoemulsification as compared to local anaesthesia. The trend of conducting surgeries under topical anaesthesia is increasing globally. The objective of this study was to determine the perception of severity of pain during phacoemulsification using topical anaesthesia. **Methods:** This descriptive cross-sectional study was conducted at Jinnah International Hospital Abbottabad for a period of one year and included 196 patients of posterior subcapsular cataracts. Data was collected on a pretested structured questionnaire and analysed by SPSS version 20. Chi square test was used to find association between variables and *p*-value of equal or less than 0.05 was considered significant. **Results:** The mean age of the patients was 60.43±14.63 years. Out of 196 patients, 110 (56.1%) were males and 86 (43.9%) were females. During surgery pain score was 0 (no pain) in 149 (76%), 1 (mild) in 14 (7.1%), 2 (moderate) in 15 (7.7%) and 3 (severe) in 18 (9.2%) patients. Pain score was found to be significantly associated with gender (p=0.003) and age group (p=0.008). **Conclusion:** Phacoemulsification can be safely performed under topical anaesthesia in patients with posterior subcapsular cataracts with minimum intraoperative pain perception by the patients.

Keywords: Phacoemulsification; Scoring; Anaesthesia; Posterior subcapsular cataracts

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INTRODUCTION

Phacoemulsification is the most modern surgical procedure which is performed in an eye with cataract which is defined as opacification in the lens or its capsule.[1] This procedure makes use of ultrasonic waves to emulsify the cataract which is then aspirated and is replaced by an intraocular artificial lens.[2] However this procedure becomes much easier for the surgeon and more comfortable for the patient if the cataract is not of hard variety as hard cataracts are difficult to emulsify.[3,4]

The procedure is usually done under different types of anaesthesia but traditionally under local anaesthesia (peribulbar) in which lidocaine and/or longer acting bupivacaine anaesthetic is injected into the area around the eye ball to establish akinesia.[5] This is not only a painful procedure but also it can result in certain complications like chemosis, ecchymosis, retrobulbar haemorrhage, globe penetration, perforation, ptosis, retinal vascular occlusion and optic nerve damage.[6] Sometimes cardiac patients are unable to tolerate the pain so the ophthalmologists are now doing phacoemulsification under a new technique of topical anaesthesia.[7]

Topical anaesthesia is safe and inexpensive and in United States about 61% cataract surgeries are now done under topical anaesthesia.[7] No data in the South Asian region including Pakistan is available regarding use of topical and local anaesthesia for cataract surgeries. However, the trend of using topical anaesthesia has rapidly increased worldwide.[8] It was used for the first time by Koller in 1884 and he used cocaine.[9] Topical anaesthesia is becoming more popular especially with the increase in number of day care surgeries. The control of procedure-related-pain is an integral factor for hospitals trying to attain high patient satisfaction scores.[10] Topical anaesthesia works by surface absorption of the topical agent and topical anaesthetics which are used for ophthalmological purposes are either esters including Oxybuprocaine 0.4%, Tetracaine 0.5%, or 1%, proparacaine and amides including lidocaine4% and bupivacaine 0.5%.[11]

Cataracts are of different types including nuclear, sclerotic and posterior subcapsular. In our study we tried to determine the severity of pain during phacoemulsification in patients with only posterior subcapsular cataracts. The posterior subcapsular cataract develops just beneath the lens capsule. It is characterized by initial clouding of posterior lens surface or more exactly the posterior cortical layers of the lens that can easily be viewed with retro illumination. The symptoms are glare and decrease vision during day time or in bright light

when the pupil is small and of course the near vision is more affected.[12]

There are many studies which discuss the use of topical anaesthesia for cataract extraction and patients' visual experiences and also discuss other factors like use of intracameral anaesthetics, preoperative analgesic medication and also the factors which can be the reason for pain.[13,14]

Topical anaesthetics are instilled into the eyes in the form of drops and gel and thus needle prick injury to the eye can be avoided and thus eliminates the risk of above-mentioned complications and also decreases the time and cost of surgery but it has a potential to produce pain. Although it has less complications but it should be used with care in uncooperative patients as it does not produce akinesia.[15,16] In some patients it can cause oculo-cardiac reflex as well.[17] In many studies there was history of mild intraoperative or postoperative pain but a few reported severe pains as well.[18,19]

Therefore, the aim of this study was to determine the perception of severity of pain during phacoemulsification using topical anaesthesia as per simple verbal scoring scale Therefore the rationale of our study was to help the ophthalmologists in determining the best practice for choosing appropriate anaesthesia for phacoemulsification among patients with posterior subcapsular cataracts.

MATERIAL AND METHODS

This one-year cross sectional study was conducted at Jinnah International Hospital Abbottabad from February 2018 to February 2019. The study included 196 patients among which 110 patients were male and 86 were females. The sample size was calculated using WHO software for sample size estimation with 95% confidence interval and 0.05 precision.[7] The patients were informed about the objective of the study and a written consent was taken. Clearance for study conduction was also taken from the Ethical Review committee. Data was collected on a structured *pro forma*.

Patients were included in the study after history including systemic inquiry for hypertension and diabetes and also evaluated for refractive status. Slit lamp bio microscopy was done for anterior segment and after tonometry posterior segment indirect ophthalmoscopy was also done. Patients with only posterior subcapsular cataracts and normal fundi were included in the study. Patients with diabetes, deafness, movement disorders, unable to cooperate, difficult to dilate, mature and hyper mature cataracts, complicated cataracts and patients with any intraoperative or postoperative complication were excluded from the study.

All patients who underwent phacoemulsification under topical anesthesia (propacaine) were shifted to the ward and were inquired about the pain perception during surgery according to predefined 4 category verbal scoring scale.

0 No pain
1 Mild pain…..No further intervention needed
2 Moderate pain…..Relieved with topical anaesthetic
3 Severe pain…..Relieved by Intracameral anaesthetic

Data was entered and analysed using SPSS software version 20. Mean and standard deviation was calculated for the continuous variables like age while frequencies and percentages were calculated for the categorical variables like gender, age groups and perception of pain during surgery. Chi square test was employed to determine the association between the variables. *p*-value of ≤0.05 was considered significant.

RESULTS

The mean age of the patients was 60.43±14.63years ranging between 14–78 years. Out of 196 patients, 110 (56.1%) were males and 86 (43.9%) were females. The perception of pain during surgery according to the verbal pain score can be seen in table-1. Most of the patients experienced no pain during phacoemulsification under topical anaesthesia.

Gender association with pain perception during surgery can be seen in the clustered bar chart (Figure-1). Male patients were found to perceive less pain significantly as compared to the females. (*p*=0.003) Association was also found to be significant between pain scoring and age groups with most of the elderly age group experiencing no pain during the operation as seen in table-2.

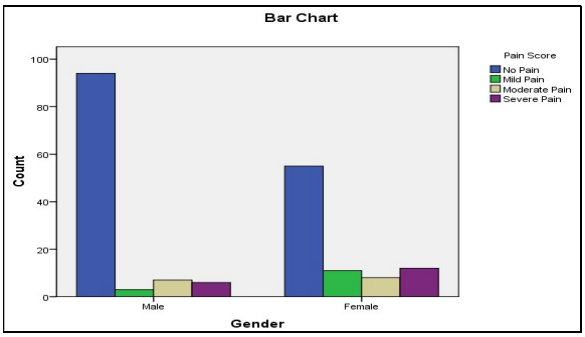

Figure-1: Gender in association with pain perception

Table-1: Pain perception according to scoring

Pain score	Frequency	Percent
0 (no pain)	149	76.0
1 (mild pain)	14	7.1
2 (moderate pain)	15	7.7
3 (severe pain)	18	9.2
Total	196	100.0

Table-2: Association between pain score and age groups

Age groups	No Pain	Mild Pain	Moderate Pain	Severe Pain	Total
<21 years	5	3	2	0	10
	50.0%	30.0%	20.0%	.0%	100.0%
21–40 years	5	2	0	0	7
	71.4%	28.6%	.0%	.0%	100.0%
41–60 years	50	4	3	10	67
	74.6%	6.0%	4.5%	14.9%	100.0%
>60 years	89	5	10	8	112
	79.5%	4.5%	8.9%	7.1%	100.0%
Total	149	14	15	18	196
	76.0%	7.1%	7.7%	9.2%	100.0%
Chi square: 22.29			***p*-value: 0.008***		

DISCUSSION

Modernization in the field of cataract surgery has led to many developments. These developments not only cover advance procedures but also discuss different methods to make surgery painless for the patients. The most modern technique which is being used for cataract removal is phacoemulsification.[1] In this procedure ultrasound is used to emulsify the cataract which is then aspirated and is replaced by an intraocular lens.[2] Phacoemulsification is easy to do in soft type of cataracts as hard cataracts are difficult to emulsify.[4]

Moreover, the procedure of phacoemulsification can't be done without anaesthesia and commonly the peribulbar anaesthesia is used in which local anaesthetics are injected between the eye ball and the walls of the orbit and of course this is not only a painful procedure but also it can result in certain complications and sometimes cardiac patients are unable to tolerate the pain so the ophthalmologists are now doing phacoemulsification under a new technique of topical anaesthesia.[5,6]

The aim of our study was to find out the perception of pain during phacoemulsification under topical anaesthesia in patients with posterior subcapsular cataracts. It is clear from our study results that most of the patients (76% eyes scored zero) felt no pain during the surgery under topical anaesthesia and shows that patients can be safely be operated under topical anaesthesia while 7.1% experienced mild pain (scored 1), 7.7% experienced moderate pain (scored 2), and 9.2% experienced severe pain (scored 3).

Many studies are compatible with our study like Mohammad Alam *et al* reported that about 78.33% eyes scored zero, 5% had a score of 1, another 5% had a score of 3, and 3.33% had a score of 2.[20] Similarly according to Ahmed S pain score of zero was achieved by 76%[21], Javed EA reported that 88.89% of the patients had a score of zero[22] and Syed Z reported zero score in 66% patients which shows that patients can be safely be operated under topical anaesthesia[23].

Monestam *et al* also tried topical anaesthesia in 890 patients in Sweden and in his study 72% of patients were operated successfully without the need for any additional anaesthetics.[24] Hence the results of most of the studies are consistent with our results but there are few variations which may be due to differences in sample sizes, differences in the number of surgeons being involved in one study, differences in the type of anaesthetics being used and of course differences in the type of cataracts selected.

We found a significant association between pain perception during phacoemulsification under topical anaesthesia and age and gender. This is supported by Tan *et al* study who also found that male patients experienced less pain during surgery[18] while in the study of Gombos *et al* old patients also experienced less pain during cataract surgery as compared to the younger patients[25]. However, no association was found between pain perception during cataract surgery and age or gender in study of Apil *et al*.[13]

The study has few limitations. The study covered only posterior subcapsular cataract so more studies covering other types of cataract are also needed. Also, the study should be done at a broader level including more institutions and better study designs.

CONCLUSION

It is concluded from this study that the procedure of phacoemulsification can be safely performed under topical anaesthesia in patients with posterior subcapsular cataracts with minimum intraoperative pain perception by the patient as topical anaesthesia use is pain free in most of the patients.

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AUTHORS' CONTRIBUTION

AK: Conceptualization of study design, data collection. BA: Literature search, data entry, write up. ZN: Data entry, Data analysis, Proof reading. AS: Literature search, Referencing. ZS: Literature search, Referencing. RL: Literature search, write up

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