SHORT REPORT

Comparison of effect of machine muteness to reduce noise anxiety vs regular settings on patient compliance during pan-retinal photocoagulation

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Abstract

This Quasi Experimental study was conducted at Major Eye Clinic, Gujranwala, from January to December 2022, to study the effect of muting the sound of Argon Laser machine on patient compliance and the pain felt during pan-retinal photocoagulation (PRP). Eighty patients were included in the study with proliferative diabetic retinopathy (PDR), retinal breaks, lattice and myopic fundus degenerations for which PRP was performed. A total of 80 patients were enrolled, who were divided in two groups with 40 patients in each group. Group A patients received muted machine settings, while group B underwent regular PRP. The mean age was 54.6±3.4 years. Sixty-eight (85%) cases were of PDR, 4 (5%) of retinal breaks, 3 (3.75%) of lattice degenerations associated with breaks, and 5 (6.25%) of laser barrage. In group A, 28 (70%) patients had grade 1 and grade 2 pain score, while in group B, 26 (65%) had grade 3 and grade 4 pain score. It was concluded that by eliminating machine sound, noise anxiety can be greatly reduced ensuring better patient cooperation.

Keywords: Pan-retinal Photocoagulation, Argon Laser, Pain.

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Introduction

Diabetes mellitus is one of the leading concerns of healthcare providers in working age group. A literature review, done in 2018, showed that in Pakistan the prevalence of diabetic retinopathy was 28.78% and that of vision threatening diabetic retinopathy was 28.2%.[1] With this increasing disease burden, early diagnosis and treatment of the disease is inevitable.

Ensuring a strict glycaemic control with available ocular treatments like intravitreal corticosteroids, intravitreal ANTI VEGF injections, retinal photocoagulation, and retinal surgery can help stabilise the disease process.[2]

With the recent advancements, intravitreal ANTI VEGF injections are the new treatment modality for diabetic retinopathy but pan-retinal photocoagulation is still the major part of treatment as it is cost-effective and non-invasive.

Non-compliance to the treatment of pan-retinal photocoagulation is high due to several factors, such as lack of education, poor counselling, unavailability of the service to masses due to increased patient overload, and pain during the procedure, etc. Several methods have been tested to decrease the pain sensation in these patients, like different kinds of ocular anaesthesia and oral pain killers or even acupuncture. Efficacy of different oral analgesics has also been compared.[3]

While reviewing the literature, it was noted that noise anxiety in different hospital settings adversely affected the patients. The purpose of this study is to document the pain which patients felt with this procedure while the auditory stimulus coming from the machine was masked. It was hypothesised that this noise increases the anxiety level of the patient causing poor compliance in completing the treatment, while decreasing it may benefit the situation and improve patient cooperation.

Patients and Methods

This was a quasi-experimental study conducted at Major Eye Clinic, Gujranwala, from January 2022 to December 2022. The study was approved by the Institutional Review Board/Ethical Review Committee (IRB# 298/GMC). Informed written consent was taken from all the participants. Eighty patients were enrolled during one year of the study period. The sample size was estimated using 95% confidence interval and 80% power of test using WHO sample size calculator.[4] Patients who were scheduled to have PRP done due to proliferative diabetic retinopathy, central retinal vein occlusion, retinal breaks, and lattice and myopic fundus degeneration diagnosed on the basis of detailed dilated fundus examination, had clear medias, either phasic or pseudophakia, were included in study. Any patient with any media opacity, advanced diabetic disease like neovascular glaucoma, vitreous haemorrhage or with any vertebro-cervical issue

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was excluded. Patients with a history of hearing loss were also excluded. None of the patients had undergone PRP previously.

Patients were divided in two groups with 40 patients in each group allocated by random sampling method. All the patients were briefed about the procedure and dilated with 1% Tropicamide (1% Mydriacyl, Alcon Laboratories) instilled every 15 minutes for an hour. 0.5% Proparacraine Hydrochloride (Alcaine, Alcon Novartis) eye drops were instilled in the eye twice with a five-minute interval in-between before the procedure to anaesthetise the cornea. In group A, pan-retinal photocoagulation was done with the mute settings of the machine. While in group B, routine pan-retinal photocoagulation was performed. The whole procedure was performed according to DRS recommendations.[5] Argon laser was performed using Carl Zeiss Visuals 532s green laser machine with the laser settings of wavelength 521nm, laser spot size 500 µm, and repetitive mode with an exposure time of 0.1 second. PRP 165 wide field lens was used. Methylcellulose gel was used as a coupling agent. Moderate intensity white burn was produced as the end result of the procedure. One burn-width apart pattern was followed. All the laser sessions were performed by the same surgeon in the retina clinic. A minimum of 1,500 shots of laser were applied during one session. During laser application, a specific pattern was followed. Inferior half of the retina was lasered first. Minimum laser settings were chosen when applying laser in the horizontal meridians. Fifteen minutes after the application of laser, pain score was documented from each patient by using a standard verbal rating scale.[6] This verbal scale included a range from 0 (no pain at all), 1 (slight discomfort), 2 (mild pain), 3 (moderate pain), 4 (severe pain), to 5 (extremely painful). All patients (group A and B) underwent the same set of standard protocol. All data was saved on Microsoft Excel Sheets for analysis later. Statistical analysis was done using statistical programme for social sciences (SPSS) version 25. Mean pain score was evaluated and then compared for both the groups. Specific tests of statistical significance were applied wherever necessary.

Results

A total of 80 patients were included in this study and were divided equally into two groups. Group A consisted of 40 patients on whom PRP was performed with Mute Settings and Group B comprised 40 patients on whom regular PRP was performed. Out of the 80 patients, 30 (37.5%) were males and 50 (62.5%) were females. In Group A, out of 40 patients, 14 (35.0%) were males and 26 (65.0%) were females. In Group B, 16 (40.0%) were males and 24 (60.0%) were females. Patients were also divided according to different age groups —9 (11.3%) were younger than 40 years, 3 (16.3%) between 40 and 50 years, 43 (53.7%) between 51 and 60 years, and 15 (18.7%) above 60 years age. Mean age was 54.6±3.4) years. PRP was performed on a number of conditions, such as proliferative diabetic retinopathy, retinal breaks, lattice degenerations associated with retinal breaks and laser barrages. The list is given in Figure 1. Pain was scored according to an already defined verbal scoring system which categorised pain into six categories from grade 0 to 5. Pain scoring in both groups is shown in Table 1.

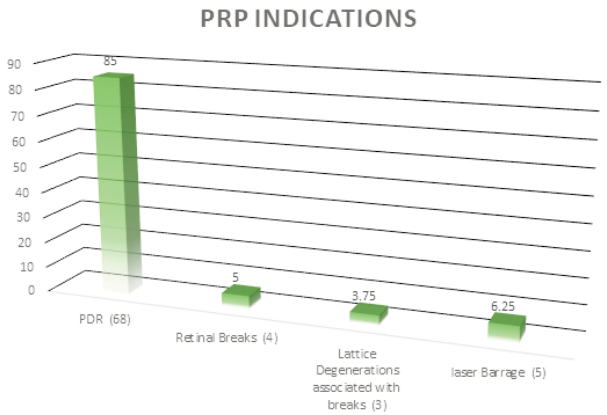

Figure: Laser Procedures.

Table-1: Pain Score Grading.

Pain Score	Group A		Group B	
	Number	Percentage	Number	Percentage
Grade 0	7	17.5%	1	2.5%
Grade 1	16	40%	4	10%
Grade 2	12	30%	8	20%
Grade 3	2	5.0%	17	42.5%
Grade 4	3	7.5%	9	22.5%
Grade 5	0	0%	1	2.5%
Total	40	100%	40	100%

Discussion

Pan-retinal photocoagulation is a painful procedure. It is performed quite frequently for different retinal diseases. As different diseases may need multiple sessions, pain felt during the procedure contributes to increased discomfort levels and poor patient compliance for further treatment. A study showed that patients planned for pan-retinal photocoagulation are more likely to be lost to follow-up because the pain felt during the procedure was approximately 60 times more than intravitreal ANTI VEGF injection. Different surgeons use different methods to reduce the pain. All types of anaesthesia like topical, subconjunctival, subtenon, and peri-bulbar,

intramuscular, and general anaesthesia have been used. Peri-bulbar anaesthesia was noted to be most effective. However, all types of anaesthesia are interventional methods.

Some researchers have also studied the effects of oral pain killers, while effects of different pain killers have also been compared.[7] Oral pain killers are associated with systemic side effects like gastric upset and these medicines may not be suitable for every patient.

Literature review showed studies on noise anxiety and how it affects the hospital environment and contributes to worsen the patient's mental health.[8]

In 2021, a study done in Turkey showed that the increased noise levels in intensive care units adversely affected the patients' sleep and anxiety.[9]

A similar study was performed in haemodialysis units. The noise levels of dialysis machine exceed the recommended level and it also affected the patients' mental well-being.[10]

Acoustic settings in neonatal ICU were also checked and compared between daytime and night shifts. Measures to decrease the noise were advised in order to decrease the potential adverse effects on patients.[11]

The current study was based on similar principle. The noise coming from PRP machine may trigger the patient's anxiety levels and it may induce the feeling of fear and aversion from further treatment. Muting the sound settings allowed the patients to remain calm throughout the procedure. It also increased patient cooperation during PRP and compliance for further sessions if needed.

Cognitive behaviour therapy has a major role in improving noise anxiety and also in counselling the patients about the procedure to improve their cooperation.[12]

The limitations of this study is small sample size and single centre trial.

Conclusion

Noise anxiety is a real issue and a confounding factor in noncompliance of pan-retinal photocoagulation. It can easily be overcome, hence, improving the patient's cooperation and quality of treatment being offered.

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Conflict of Interest: None.

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Ethical Approval: The study was approved by the Ethical Review Committee / Institutional Review Board. (IRB # 298/GMC).

References

1. Mumtaz SN, Fahim MF, Arslan M, Shaikh SA, Kazi U, Memon MS. Prevalence of diabetic retinopathy in Pakistan; A systematic review. Pak J Med Sci. 2018; 34:493-500. doi: 10.12669/pjms.342.13819.
2. Leley SP, Ciulla TA, Bhatwadekar AD. Diabetic Retinopathy in the Aging Population: A Perspective of Pathogenesis and Treatment. Clin Interv Aging. 2021; 16:1367-78. doi: 10.2147/CIA.S297494.
3. Haider MA, Sattar U, Ahmed I. Efficacy of Oral Alprazolam and Mefanamic Acid in Relieving Pain During Pan Retinal Photocoagulation. Pak J Ophthalmol. 2021; 37:38-42. Doi: 10.36351/pjo.v37i1.1084
4. Lwanga SK, Lemeshow S. Sample size determination in health studies: a practical manual. Geneva, Switzerland: World Health Organization; 1991 . [Online] 1991 [Cited 2022 July 20]. Available from: URL: https://apps.who.int/iris/handle/10665/40062
5. The Diabetic Retinopathy Study Research Group. Photocoagulation treatment of proliferative diabetic retinopathy. Clinical application of Diabetic Retinopathy Study (DRS) findings, DRS Report Number 8. The Diabetic Retinopathy Study Research Group. Ophthalmology. 1981; 88:583-600. DOI: 10.1016/S0161-6420(81)34978-1
6. Karcioglu O, Topacoglu H, Dikme O, Dikme O. A systematic review of the pain scales in adults: Which to use? Am J Emerg Med. 2018; 36:707-14. doi: 10.1016/j.ajem.2018.01.008.
7. Hazem HA, Sayed JA. Efficacy of gabapentin versus pregabalin in pain control during and after pan-retinal laser photocoagulation. J Egypt Ophthalmol. Soc. 2014; 107:28-32. DOI: 10.4103/2090-0686.134940
8. Oleksy AJ, Schlesinger JJ. What's all that noise-Improving the hospital soundscape. J Clin Monit Comput 2019; 33:557-62. doi: 10.1007/s10877-018-0215-3.
9. Aydın Sayılan A, Kulakaç N, Sayılan S. The effects of noise levels on pain, anxiety, and sleep in patients. Nurs Crit Care. 2021; 26:79-85. doi: 10.1111/nicc.12525.
10. Ok E, Sayilan AA, Sayilan S, Sousa CN, Ozen N. Noise levels in the dialysis unit and its relationship with sleep quality and anxiety in patients receiving HD: A pilot study. Ther Apher Dial. 2022; 26:425-33. doi: 10.1111/1744-9987.13794.
11. Darcy AE, Hancock LE, Ware EJ. A descriptive study of noise in the neonatal intensive care unit: ambient levels and perceptions of contributing factors. Adv Neonatal Care 2008; 8:s16-26. doi: 10.1097/01.ANC.0000337268.85717.7c.
12. Reddy YCJ, Sudhir PM, Manjula M, Arumugham SS, Narayanaswamy JC. Clinical Practice Guidelines for Cognitive-Behavioral Therapies in Anxiety Disorders and Obsessive-Compulsive and Related Disorders. Indian J Psychiatry 2020; 62:s230-50. doi: 10.4103/psychiatry.IndianJPsychiatry_773_19.

Author's Contributions
AA: Data collection, writing, data interpretation.
IQM: Writing, data analysis, review.
ZH: Design, writing, data interpretation.