

Treatment Options and Referral Pattern among Patients with Retinal Diseases Attending an Eye Clinic in a Tertiary Institution, North Central Nigeria

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ABSTRACT

Objectives: The aim of the study was to determine the treatment modalities and pattern of referral of patients with retinal diseases in the eye clinic.

Methods: All consenting new patients attending the eye clinic were recruited for the study and interviewed by the author. The treatment offered to the participants diagnosed with retinal disease (medical, surgical, LASER, optical or a combination) was recorded. Information on the patient's referral for vitreoretinal consultation (this could be 'yes' or 'no') and reasons for the referral were also documented and analyzed.

Results: Treatment options for the 278 study participants were: medical for 100 (36%), optical for 94 (33.8%), surgical for 24 (8.6%), LASER photocoagulation for 6 (2.2%) and a combination of LASER photocoagulation and intravitreal avastin injection for 20 (7.2%) patients. Counselling and watchful expectancy accounted for the treatment of 34 (12.2%) patients. Seventy-four patients of the 278 included in the study had retinal diseases. Of these 74 with retinal diseases, 46 (62.2%) were referred to vitreoretinal units, out of which 39 (84.8%) patients were referred to the vitreoretinal unit in the Jos University Teaching Hospital (JUTH) and 7 (15.2%) were referred to vitreoretinal units elsewhere. The referrals were largely on account of the unavailability of requisite equipment in 3 (42.8%) patients, surgical expertise in 2 (28.6%) patients, and patient requests in 2 (28.6%) cases.

Conclusion: The need for the establishment of standard vitreoretinal services strategically in each geo-political zone of Nigeria to cater more efficiently to the needs of patients with retinal diseases and appropriate referral cannot be overemphasized.

Keywords: Referral-pattern, treatment options, vitreoretina.

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1. INTRODUCTION

The management of retinal disorders presents peculiar diagnostic and therapeutic challenges, more so in resource-deficient settings, due to the scarcity of much-needed material and human resources [1], [2]. Retinal disorders in developing countries have hitherto had a low priority in blindness prevention programmes [3], [4]. Reasons for this abound, some of which include the huge backlog of untreated cataracts, trachoma, refractive error, and the fact that retinal disease was initially thought to not be a common cause of blindness in the developing world. Also, the outcome of treating retinal diseases was not

as dramatic or satisfactory to the doctor or the patient as treating cataracts. The equipment required was also considered too costly and unreliable for use in a developing country environment. There is a profound lack of skilled personnel who have been trained in retinal subspecialty [5]. A survey carried out in 2012 reported that Sub-Saharan Africa had the lowest average number of ophthalmologists per million population (about 2.7 Ophthalmologists per million population) as opposed to the WHO recommended ratio of 4 ophthalmologists per million population in Sub-Saharan Africa by the year 2020 [5]. While Nigeria has 38 trained vitreoretinal specialists (including residents and

ophthalmologists with interest in vitreoretina), the North-central geo-political zone has only a few of these trained specialists with a fellowship in vitreoretinal [6]. As a result, Africa is not adequately prepared for the procedures and treatments of retinal diseases, but with the right training and equipment, these challenges can be successfully tackled [7].

Centres in Nigeria and other developing countries are becoming increasingly better equipped with facilities and personnel to treat posterior segment eye diseases (PSEDs), unlike what was obtainable in the past [8]. Various modalities exist for the treatment of retinal diseases, some of which include LASER photocoagulation, which could be Pan Retinal Photocoagulation (PRP), retinal grid LASER photocoagulation, Scatter LASER photocoagulation etc. Medical therapy, such as the use of acetazolamide, the injection of anti-vascular endothelial growth factors, and the injection of intravitreal steroids, such as triamcinolone acetonide, could also be employed. Other treatment modalities, such as surgical intervention like vitrectomy and macula translocation surgery, cryopexy and scleral buckling, photodynamic therapy, and a combination of techniques, are sometimes also used. Similarly, optical modalities such as low vision aids (rehabilitation) and retinal prostheses can be helpful in the management of patients with retinal diseases. Other simple methods of control, such as counselling and glycaemic (blood sugar) control, also play a major role.

LASER is an acronym for Light Amplification by Stimulated Emission of Radiation. Argon or diode LASERs are the types most commonly used, though others are available [9]. Treating the retina with LASER burns the rods, cones, and RPE and causes small blood vessels to fibrose and close. This destroys large areas of the retina, thereby reducing its oxygen need and causing shrinking and atrophy of new vessels [9]. In the case of macular oedema, grid LASER photocoagulation destroys the retina where there are leaking blood vessels, thus preventing damage to the macula and visual loss from maculopathy [9]. The use of LASER in the treatment of blinding eye diseases of both the anterior and posterior ocular segment has become increasingly popular in the last two decades, especially in developed countries like the United States of America (USA), United Kingdom (UK), Canada and Japan [10]. So much so that in the USA alone, 500,000 weekly LASER sessions and 24 million annual LASER sessions are carried out at the cost of \$4.6 billion [10].

LASER has now become a reality in Nigeria and is playing an important role in curbing the menace of blindness [11]. Retinal LASER photocoagulation is effective in the management of retinal breaks, vasoproliferative retinopathies such as proliferative diabetic retinopathy (PDR), ischemic central or branch retinal vein occlusion (RVO) and retinopathy of prematurity [12]. A retrospective hospital-based study in Jos, Plateau state, reported that diabetic retinopathy (PDR and CSMO) was the leading indication for LASER photocoagulation in that centre. Furthermore, partial or complete regression of neovascularisation was achieved in 72% of eyes with PDR and complete regression in 50% of eyes with RVO [13]. As further clinical research reveals the characteristics of LASER

treatments, its indications, safety margin and records of the outcomes for the use of existing and newer generations of LASER are made available, a broader spectrum of eye diseases will be treatable by ophthalmologists with greater precision, thereby minimizing the use of invasive methods [14].

1.1. Cryotherapy

Cryotherapy can be applied to the peripheral retina. This freezes the retina and choroid, causing a scar and ensuring the adhesion of retinal layers and shrinkage of new vessels. This is, however, less effective than LASER photocoagulation [9].

1.2. Anti-Vascular Endothelial Growth Factor (Anti-VEGF)

Vascular Endothelial Growth Factor (VEGF) has been recognized as a predominant factor that induces ischemic retinal neovascularization [15]. Intravitreal anti-VEGF agents (e.g., ranibizumab, commonly called Lucentis, bevacizumab commonly called Avastin, pegaptanib commonly known as Macugen and aflibercept, known as Eylea) can, therefore, be used as an adjunct to LASER with the aim of stopping retinal angiogenesis and reducing macular oedema [16]. Neovascular (“wet”) AMD, diabetic macular oedema and retinal vein occlusion (RVO) are amongst the most common causes of blindness [17]. It is worth noting that the advent of anti-VEGFs has revolutionized the treatment of these diseases [17], [18]. The use of anti-VEGFs encourages the resolution of persistent vitreous haemorrhage, avoiding more invasive surgical procedures like vitrectomy in some patients [19].

1.3. Intravitreal Steroids (Triamcinolone)

The efficacy and side effects of this novel form of therapy in the treatment of retinal diseases have been documented by various studies, which have all indicated significant improvement in macular function and or structure, at least in the short term [20]. Corticosteroids are useful in the treatment of retinal morbidity because they have been found to stabilize the blood-retina barrier, increase the expression of tight junction proteins and inhibit the expression of the VEGF gene [21]. Intravitreal triamcinolone can also be used as primary therapy for macular oedema or in the treatment of refractory macular oedema [19].

1.4. Systemic Acetazolamide

There is some clinical evidence that the administration of systemic acetazolamide improves the active transport from the sub-retinal space to the RPE, which may be helpful in the management of retinal diseases like cystoid macula oedema [22].

1.5. Vitrectomy

Vitrectomy is an intravitreal surgery, and it is indicated for the management of severe proliferative complications of retinal lesions like diabetic retinopathy, some of which include non-clearing vitreous haemorrhage, tractional retinal detachment, combined traction/rhegmatogenous retinal detachment, macular oedema with a thickened and

taut posterior hyaloid and tight pre-retinal macular haemorrhage. Early vitrectomy increased the percentage of eyes with a visual acuity of 10/20 to 44%, compared with 28% in a group that was conventionally managed [23].

This study aims to assess the various options for treatment and patterns of referral of retinal diseases among patients attending the eye clinic in the Jos University Teaching Hospital, from which recommendations can be made with the eventual target of upscaling services.

2. METHOD

2.1. Background of the Study Area

The Jos University Teaching Hospital, Jos (JUTH) is one of the 3 teaching hospitals in the North-Central geo-political zone of Nigeria. It has a capacity of 520 beds and serves as a referral centre for many neighbouring states, including Bauchi, Gombe, Nasarawa, Benue, Taraba, Adamawa and parts of Kaduna State. These states have in common the use of English and Hausa as languages for communication. Though there are other tertiary hospitals in the North-central region of the country, JUTH is the most popular and has the highest number of specialist doctors and specialists in training. The Jos University Teaching Hospital Jos offers specialist care in various subspecialties, with physicians running endocrine, hypertension and haematology clinics. There are also general Eye Clinics which run 4 days a week (Monday–Thursday), where eye care services, including diagnostic, optical, medical and surgical services, are offered. Of note is the vitreoretinal unit in the Department of Ophthalmology, which runs two clinics per week (a clinic for treatment with Light Amplification by Stimulated Emission of Radiation-LASER on Tuesdays and Wednesdays) and has a record of consistently having the largest population of new patients seen weekly in a single unit (10–15 new patients per clinic) due to retinal complications and referrals. The vitreoretinal unit, though equipped with a fundus camera, a diode LASER machine, an iridotomy argon/diode LASER lens, a Ritch trabeculoplasty argon/diode LASER lens, a pan-funduscope, a 78D lens, and an indirect ophthalmoscope, is as yet not fully equipped.

2.2. Study Procedure

Consecutive patients who met the inclusion criteria were recruited from the eye clinic, Department of Ophthalmology, JUTH Jos. Patients who did not have ocular media opacities preventing posterior segment examination after dilatation and those above 18 years of age were included in the study. The sample size was calculated using Fisher's formula, and an informed consent form written in clear and simple English was administered (a version translated into Hausa was made available for patients who didn't understand English). The study procedure was explained to all participants, and written consent was obtained. Patients who were not literate gave thumbprints as consent after the content of the consent form was properly explained to them. All consenting participants were then interviewed by the author using an interviewer-administered questionnaire in order to obtain key information on the

participants' bio-data and clinical history. The treatment offered to the participants diagnosed with retinal disease (i.e., medical, surgical, LASER, optical or a combination) after consultation was recorded. Information on the patient's referral for vitreoretinal consultation (this could be 'yes' or 'no') was obtained. The reasons for the referral were also documented (which could be a lack of surgical expertise, equipment, patient request, etc.).

2.3. Data Analysis

The findings obtained from the questionnaires were double-entered, cleaned and analyzed using the Statistical Package for Social Sciences, version 19 software (SPSS, Chicago, IL, USA). Frequency tables and charts were used for data summarization and presentations for qualitative variables.

2.4. Ethical Considerations

Ethical clearance was obtained from the Ethical committee of the institution, and the declaration of Helsinki and ethics was adhered to.

3. RESULTS

3.1. Distribution of Treatment Options

The majority of the study participants (N = 100%, 36%) were offered medical treatment (anti-glaucoma drugs, anti-allergy eye drops, intravitreal avastin etc.), 94 (33.8%) optical correction, 24 (8.6%) were offered surgery, 6 (2.2%) were offered LASER photocoagulation and 20 (7.2%) a combination of LASER photocoagulation and intravitreal avastin injection. Other modalities, such as counselling and watchful expectancy, accounted for the treatment of 34 (12.2%) patients (Table 1). A patient could be offered more than one treatment modality. Out of 39 patients that were referred to the vitreoretinal surgeon in JUTH, 26 (66.7%) had LASER photocoagulation, 20 (51.3%) had combined intravitreal avastin injection and LASER photocoagulation, 10 (25.6%) were offered optical modes of treatment and 18 (46.2%) were offered medical therapy.

3.2. Patient Referral

A total of 278 patients were included in the study. Though 74 patients in the study population (278) had retinal diseases, only 46 (62.2%) of them were referred to vitreoretinal units, out of which 39 (84.8%) patients were referred to the vitreoretinal unit in JUTH and 7 (15.2%) were referred to vitreoretinal units elsewhere. This referral was to vitreoretinal surgeons outside JUTH and

TABLE I: DISTRIBUTION OF TREATMENT OPTIONS

Treatment options	No	%
Medical treatment	100	36.0
Surgical treatment	24	8.6
Optical treatment	94	33.8
LASER photocoagulation	6	2.2
IVA and LASER	20	7.2
Others	34	12.2
Total	278	100.0

TABLE II: PATTERN AND REASONS FOR PATIENT REFERRAL

Referral	No	%
Type of referral		
Vitreoretinal unit in JUTH	39	84.8
Vitreoretinal unit elsewhere	7	15.2
Total	46	100
Reasons for referral elsewhere		
Unavailability of equipment	3	42.8
Surgical expertise	2	28.6
Patients' request	2	28.6
Total	7	100

was largely on account of unavailability of requisite equipment in 3 (42.8%) patients, surgical expertise in 2 (28.6%) patients and patient request in 2 (28.6%) cases (Table II). The remaining 28 (37.8%) patients out of the total 74 with retinal diseases who were not referred were treated conservatively in other units and counselled.

4. DISCUSSION

The treatment options found in the study were mostly medical, with some patients offered intravitreal injections, LASER photocoagulation, optical and watchful expectancy/counselling. This is similar to the findings of another hospital-based study by Ajayi *et al.* in Southwestern Nigeria but contrary to those of Uhumwangho *et al.* in the South-South geo-political zone, which was a retrospective study [24], [25]. The treatment options employed, as observed by the index study, are limited against a backdrop of high morbidity. Consequently, referral of cases to more equipped centres was necessary. Special diagnostic retinal studies such as fundus fluorescein angiography (FFA) and Indocyanine green angiography (ICG), though important in the conclusive diagnosis of retinal diseases, are unavailable in this centre. Other hospital-based studies, like those of Eze *et al.* in Enugu and Onakpoya *et al.* in Ife, had similar findings [1], [2]. The ability to exclusively distinguish early diabetic macular oedema from ischaemia, for example, in order to avoid application of LASER photocoagulation and inadvertent worsening of already existing retinal ischaemia, is therefore lacking. This could, therefore, adversely affect the outcome of treatment.

The findings in the index study reveal that most cases were not referred to other centres for vitreoretinal expertise. This, however, does not invalidate the fact that there is much left to be desired in the area of retinal disease management. A large number of facilities are needed for better evaluation, diagnosis and management of retinal diseases. Some of these facilities include vitrectomy and OCT machines. Similarly, several studies in third-world settings, particularly retrospective studies elsewhere in Southeastern and Southwestern Nigeria, also observed deficiency in facilities for specific diagnosis of vitreoretinal diseases and their appropriate management [1], [2], [26].

More recent studies have also decried the lack of skilled personnel and units while buttressing the need for more trained vitreoretinal surgeons and better-equipped units to combat the increasing menace of retinal diseases worldwide [24], [25], [27]. Conversely, though Abdulsalam *et al.*

reported in an overview that there were now up to 38 vitreoretinal specialists in Nigeria, the distinction between specialists in training, ophthalmologists with interest in vitreoretinal surgery and fully trained vitreoretinal surgeons with subspecialty-training-was not made [6].

The establishment of appropriate and timely referral protocols from other physicians, notably endocrinologists, is an important stage in the management of retinal diseases. Collaboration between these physicians and ophthalmologists should be encouraged to ensure routine and sustainable screening of diabetic patients [28].

Although delay in response to referred patients was not recorded in this study, the establishment of referral routes from primary and secondary centres located in the hinterlands of the North-Central geo-political zone is of great importance. This underscores the benefit of routine screening exercises in these locations and in the medical and general outpatient departments of JUTH, as observed by Ewuga *et al.* [28].

5. CONCLUSION

It is important to establish standard vitreoretinal services strategically in each geo-political zone of Nigeria to cater more efficiently to the needs of patients with retinal diseases. Worthy of note is the fact that vitreoretinal services and equipment, though considered expensive, can be made more cost-effective when high-volume treatments are carried out such that the financial burden of the procedures is shared by several patients at a time.

CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest.

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