ORIGINAL ARTICLE

Natural visual improvement in patients with branch retinal vein occlusion

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Background:
Branch retinal vein occlusion is the second most common retinal vascular disease after diabetic retinopathy. The prognosis for visual acuity is quite variable.
Objective: The rationale behind doing this study is the sudden loss of vision which is quite disabling and distressing to the patient. This study will give us local and first hand data about natural improvement in visual acuity.
Study Design: Cross-sectional study
Duration and setting: 1 year, Ayub Teaching Hospital Abbottabad.
Methods: A Cross-sectional study was carried out from 18 April 2015 to 06 April 2016 on 96 eyes to determine the frequency of visual improvement in patients with Branch retinal vein occlusion after 12 weeks. Visual improvement was defined as Improvement in visual acuity of at least two lines on Snellens Chart without any treatment after 12 weeks.
Results: At the end of study period out of 96 eyes, 59(61.5%) eyes showed visual improvements while 37(38.5%) eyes failed to show visual improvement after 12 weeks.
Conclusion: The frequency of visual improvement Ophthalmology, Ayub Teaching Hospital Abbottabad was 59(61.5%).

Keywords: Visual improvement, visual acuity, branch retinal vein occlusion (BRVO)

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Introduction:

A branch retinal vein occlusion (BRVO) is defined as a blockage of one of the small blood vessels that drains blood from the retina.[1]

The branch retinal vein occlusion case was first reported by Leber in 1877.[2] It is the second most common retinal vascular disease after diabetic retinopathy.[3] In the population over 40 years of age it is a frequent retinal vascular disease with an incidence of 2.14/1,000/year. The 15-year cumulative incidence of branch retinal vein occlusion was 1.8%. The prevalence is highest in Asians and Hispanics and lowest in Whites. Fifteen year cumulative incidence was 1.8% in Beaver Dam eye study in US.[4]

Common predisposing factors are hypertension, hyperlipidaemias, diabetes mellitus, advance age, raised intraocular pressure and smoking leading to arteriolosclerosis and thrombosis.[5,6] Apart from these, blood clotting disorders, infectious, and inflammatory eye diseases also play their role.[7]

It usually occurs after 50 years of age, affecting both genders equally. Patient presents with unilateral painless sudden visual loss.[3,4] Initial reduction in visual acuity is due to a haemorrhage which takes about 6 weeks to get clear leading to some improvement in visual acuity.[8]

The prognosis for visual acuity is variable and further treatment depends on clarity of retinal

Table 1:Mean age

	N	Minimum	Maximum	Mean	Std. Deviation
Age in years	96	34	88	57.52	12.20

Table 2:Group Statistics of mean age in years with gender

	N	Mean	Std. Deviation	Std. Error Mean
Male	51	60.67	12.28	1.71
Female	45	53.96	11.21	1.67

Table 3: Frequency distribution of Visual Improvement with baseline visual acuity

Baseline Visual Acuity	Visual Improvement		Total (%)
	Yes	No	
Less than 6/60	30(31.2%)	19(19.8%)	49(51.0%)
6/60	8(8.3%)	8(8.3%)	16(16.7%)
6/36	8(8.3%)	7(7.3%)	15(15.6%)
6/24	3(3.1%)	1(1.0%)	4(4.2%)
6/18	6(6.2%)	2(2.1%)	8(8.3%)
6/12	4(4.2%)	0(0%)	4(4.2%)
Total	59(61.5%)	37(38.5%)	96(100%)

Table 4: Overall Visual Improvement after 12 weeks

Visual improvement		Percentage
Yes	59	61.5%
No	37	38.5%
Total	96	100%

haemorrhages and improvement in visual acuity. If vision is improving with good macular perfusion then no treatment is required. If visual acuity is 6/12 or worse after 12 weeks and there is macular oedema but good macular perfusion, laser photocoagulation should be done. If there is macular non-perfusion and vision is not improving, laser will not improve further vision.[8,9]

Literature survey reveals that there is no existing data regarding this disease in Pakistani population with respect to visual improvement. However an analysis of several series indicates that 50% patients will have visual improvement of at least two lines or 6/12 on Snellens chart without treatment.[2] The rationale behind doing this study is the sudden loss of vision which is quite disabling and distressing to the patient. This study will give us local and first hand data about natural improvement in visual acuity and if found to be significantly good then recommendations will be given regarding emphasis on natural visual improvements rather than going for invasive procedures.

Materials and Methods:

This Cross-sectional study was conducted in the Department of Ophthalmology, Ayub Teaching Hospital Abbottabad from 18 April 2015 to 06 April 2016 after approval from hospital's Ethical committee. The sample size of 96 eyes was calculated using WHO software for sample size determination in health studies with the Confidence interval of 95%, Absolute precision of 10% and Presumed frequency of patients with visual improvement without treatment was 53%.[2] The sample size thus calculated was 96 eyes using Non-probability consecutive sampling. Included in the study were patients with branch retinal vein occlusion of any age and gender presenting within 6 weeks of onset of sudden visual loss of < 6/12. The purpose and benefits of the study were explained to the patient and a written informed consent was obtained. All patients were worked up with detailed history and clinical examination followed by detailed ophthalmological examination. In all patients baseline visual acuity was recorded and the confounding variables which were excluded from the study were Diabetic retinopathy, Hypertensive retinopathy, Glaucomatous optic atrophy, Cataracts, Retinal detachment and Macular branch retinal vein occlusion. These variables affecting visual acuity were detected by history and slit lamp biomicroscopy and dilated fundus examination using 90 D lens. The data was collected on a proforma. Then the patients were advised to go home and come for follow up after 12 weeks to determine visual improvement in terms of improvement in at least 2 lines on Snellens chart.

All the data was stored and analyzed into SPSS version 16.00. Mean±Standard deviation were calculated for numerical variables like age and duration of reduction in visual acuity. Frequencies and percentages were calculated for categorical variables like gender and visual improvement. Visual improvement was stratified among age, gender, duration of visual loss, and baseline visual acuity.

Results:

A total of 96 eyes of Branch Retinal Vein Occlusion patients were recorded during the study pe-

riod. Themean age was a 57.52±12.20 year, with males having mean age of 60.67±12.28 years and females having mean age of 53.96±11.21 years. (Table 1). There were 51(53.1%) males and 45(46.9%) females. About 49(51%) of eyes had baseline visual acuity of less than 6/60 and only 04(4.2%) presented with visual acuity of 6/12. Taking gender into consideration, of the 49(51%) eyes with visual acuity less than 6/60, 26(27.1%) were females. After 12 weeks most of the eyes showed improvement in their visual acuities, with 10(10.4%) having 6/36 on Snellens chart, 14(14.6%) having 6/24, 19(19.8%) having 6/18, 17(17.7%) having 6/12, and 13(13.5%) having 6/9. Among males, final visual acuity among most of the eyes was 6/18 and among the females final visual acuity was 6/24. Frequency of visual improvements with gendershowed that about 59(61.5%) eyes showed two lines of visual improvement on Snellens chart in which 34(35.4%)were males and 25(26.0%) were females, while 37(38.5%) failed to show improvement. Frequency of visual improvements with age groups showed thateyes within age groups 51 years and above showed 21(21.9%) visual improvement while those below 40 years showed 10(10.4%) visual improvement. Frequency of visual improvements with baseline visual acuities (Table 2) shows that 49(51.0%) eyes with baseline visual acuity of less than 6/60 showed 30(31.2%) visual improvement while 04(4.2%) eyes with visual acuity of 6/12 showed 4(4.2%) visual improvement. Table 3 shows frequency distribution of overall visual improvement after 12 weeks showsthat out of 96 eyes, 59(61.5%) eyes showed visual improvements while 37(38.5%) eyes failed to show visual improvement after 12 weeks

Discussion:
Visual improvement in the natural history of BRVO is well documented. In our study out of 96 eyes affected by branch retinal vein occlusion, there were 51 males and 45 females. Retrospective analysis was performed in 32 consecutive eyes by Abegg.[10] In his study 15 patients were females and 17 were males. In our study

the mean age was 57.52±12.20 years. Mathias Abegg found median age of patients to be 65 years, rangizng from 48 to 87 years10, while others found no significance of age2. These patients presented differently as far as duration is concerned. Majority of the patients i.e about 31% presented late during the 4-5th week, then 24% presented during 1st week and rest of the patients presented somewhere between 2nd- 4th week of visual loss. Taking gender into account, females presented earlier than males.

It is evident from the study that the patients presented with base line visual acuity ranging from less than 6/60 to 6/12, with 51% of patients having vision less than 6/60. When we consider gender with respect to base line visual acuity, it is the group of females having significant visual loss as compared to males. This base line decrease in visual acuity was due to retinal haemmorrhages, macular edema, and macular ischaemia. In Rogers study VA was moderately poor at baseline (<20/40) and sudden visual loss was due to macular edema and vitreous haemorrhages secondary to neovascularization.[9] Mathias Abegg used log MAR chart in his study and at the time of diagnosis best corrected visual acuity was 0.46±0.3 log MAR.[10] This study shows that after 12 weeks, most of the eyes showed remarkable improvement in visual acuity as evident from final VA of 6/24-6/9 and in this aspect male patients showed significant improvement as compared to females. Thus patients having good visual acuity at presentation showed good improvements. Gutman et al. found that in the natural course of BRVO, only 14% of eyes with chronic macular oedema retained a VA of 20/40 or better, while 86% had a final VA of 20/50 or worse. He concluded that chronic macular edema has a poor prognosis in terms of final VA. Finkelstein showed that 91% of 23 eyes with macular ischemia recovered vision within one year with a VA of 20/40 or better.[2]

VA is a very sensitive indicator of the oxygen level of perfusion of the macula. For this reason, VA at presentation may be an important prognostic factor. Rehak analyzed six studies including Gutman et al. and findout relation between initial

and final VA. Five studies were used in an analysis of the data of eyes with unsatisfactory final VA (20/200 or worse) in relation to initial VA. There were 2 groups; the first consisted of eyes with an initial VA of 20/50 or better and the second group of eyes with an initial VA of 20/200 or worse. In the second group were found a considerably higher percentage of eyes with a final VA of 20/200 or worse, regardless whether the eyes had undergone laser treatment or not. Since there were differently divided subgroups for final VA, this study does not match with our study.[2] In general, BRVO has a good prognosis with 50–60% of eyes reported to have a final VA of 20/40 or 6/12 or two lines in improvement on Snellen's chart even without any treatment.[2] The natural history of BRVO depends upon the site and degree of occlusion, cystoid macular oedema, macular non-perfusion, retinal neovascularization, vitreous hemorrhage, and the efficiency of the developing collateral circulation. Retinal neovascularization and persistent macular edema develop in 25% and 60% of eyes, respectively.[11] Gutman et al. found that in the natural course of BRVO, only 14% of eyes with chronic macular edema retained a VA of 20/40 or better, while 86% had a final VA of 20/50 or worse. He concluded that chronic macular edema has a poor prognosis in terms of final VA. Schilling et al. observed a worse visual prognosis in cases of ischemic macular edema compared to perfused macular edema. However, findings by Finkelstein showed that 91% of 23 eyes with macular ischemia recovered vision within one year with a VA of 20/40 or better. The conflicting reports and small number of studied eyes make it difficult to reach definitive conclusions on visual prognosis in patients with BRVO.[9] In this study as far as visual improvement is concerned in terms of lines of Snellens notation, out of 96 eyes 59 eyes showed an improvement of two lines on Snellens notation with maximum eyes having visual acuity of 6/18. Thus males with better base line visual acuities, though presented late, but showed better improvement in visual acuities after 12 weeks without any treatment. Fluorescein fundus angiography of these patients showed that the improvement occurred due to absorption of hemorrhages and development of collaterals.

Conclusion:

The frequency of visual improvement in patients with Branch retinal vein occlusion after 12 weeks in the Department of Ophthalmology, Ayub Teaching Hospital Abbottabad was 59(61.5%).

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