Incidence of Acute Symptomatic Posterior Vitreous Detachment, its Complications and Impact on Emergency Eye Care Set Up

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ABSTRACT

Purpose: To determine the incidence of complications of acute symptomatic posterior vitreous detachment (PVD) and its impact on ophthalmic emergency setup. Design: A retrospective study of 172 patients presented in one year’s time, with acute symptomatic posterior vitreous detachment. Methods: A retrospective record of 172 patients (n=172) was reviewed who were seen in one years’ time period at local hospital’s eye departments as emergency referrals. Referrals were made by primary care physicians and optometrists. Only patients with acute symptomatic PVD were taken into account. Their symptomatology, visual acuity, fundus examination findings, follow up appointments and outcomes were checked. Results: Mean age at presentation was 62.76 years. Acute Symptomatic Posterior vitreous detachment was detected without complications in 126 (73.25%). Retinal breaks were found on initial presentation in 33 patients (19.18%). Out of these, 18 had rhegmatogenous retinal detachment on initial presentation (10.46%), while one patient who also had vitreous haemorrhage developed it later. PVD was seen with vitreous haemorrhage in 4 patients (2.32%). Seven patients presented with PVD and associated retinal haemorrhages (4.06%). Demographically 96 patients were females (55.81%) as compared to 76 males (44.18%). The highest incidence was between 51 to 75 years of age (84.29%). Posterior vitreous detachments accounted for 7.50% of total eye emergencies in one year. Conclusions: Patients with flashes and floaters should be seen urgently. Priority should be given to patients with cells in vitreous (shafer’s sign) as well as retinal or vitreous haemorrhages. These patients should be seen by experienced ophthalmologist to rule out any break with 360-degree indirect ophthalmoscopic examinations. Junior doctors should have extensive training with indirect ophthalmoscopy with scleral indentation and should not miss shafer’s sign in all patients with acute symptomatic PVD.

Keywords: Posterior Vitreous Detachment (PVD), Rhegmatogenous Retinal Detachment (RRD)
INTRODUCTION

Posterior vitreous detachment is the age-related separation of posterior vitreous cortex from internal limiting membrane of the retinal surface [1]. The commonest symptoms of PVD are flashes and floaters but it can be virtually asymptomatic.

Vitreous makes 80% of the ocular volume. It is jelly-like at young age and consists of 99% of water and 1% hyaluronic acid and collagen. Hyaluronic acid in interspersed in collagen fibers. Collagen fibers attach vitreous to retina. The attachments are stronger at the margins of optic disc, fovea and at the ora serrata. With increasing age vitreous syneresis occurs with decreased concentration of hyaluronic acid resulting in shrinkage of vitreous gel. This results in pulling of vitreous from the retina specially where the adhesions are stronger. Any pull on the retina is seen as a flash of light. A stronger pull may cause tear in the retina. Fluid in vitreous cavity may gain access to the subretinal space and cause detachment of the retina. In some patients it may cause retinal or vitreous haemorrhages from torn blood vessels. If vitreous remains attached to macula it may cause vitreomacular traction with resulting distortions noted by patients and subsequent partial or full thickness macular holes in some patients [2]. Floater may be seen in many forms. Wei ring which is classically seen in patients with PVD is the torn glial tissue around the edges of optic disc. It may be ring shaped or lunar shaped. It is not seen in all patients [3,4]. Classical ring may be seen in less than one-third of patients with PVD [4].

Posterior vitreous detachment may occur early in myopes [5]. Patients with PVD who don’t have retinal breaks on initial presentation may be seen with breaks (new or missed breaks) many weeks later. This occurs in 2 to 5% of cases [6,7,8]. Prevalence of posterior vitreous detachment is high in myopia.

The high risk factors for the development of breaks are retinal/vitreous haemorrhage and cells in anterior vitreous (shafer’s sign) [9, 10]. There is a strong correlation between the presence of pigment cells in the vitreous and retinal breaks. Brod et al [11] found pigments in vitreous in 15 out of 16 eyes with PVD. Some have suggested that patients with flashes and vitreous haemorrhages have PVD unless proved otherwise. Patients with symptoms of acute PVD should be seen urgently with thorough fundus examination specially if they are older than 45 [12]. Posterior vitreous detachment very likely occurs subsequently in the fellow eye after 6 to 24 months [13]. The purpose of the study was to determine the prevalence of complications of PVD and to ascertain its implications on day to day clinical practice in emergency settings.

2. METHODS

A retrospective study of 172 patient’s (n=172) seen at Ophthalmology department of a hospital in Lancashire UK, as ophthalmology department emergencies during a period of one year (1st March 2015 to 28Feb 2016) was carried out. Their record was obtained from casualty register and computer notes.

Patients were referred mainly from primary care colleagues and optometrists with acute symptoms of posterior vitreous detachment (PVD), mainly flashes and floaters. Patient’s visual acuity was checked. History of symptoms was recorded; dilated fundus examination was carried out. Most patients without complications received 4 to 6 weeks appointment for follow ups. Patient with high risk were observed more quickly. Patient’s follow up record was also checked as long as they were under observation. Those patients with retinal breaks who needed laser retinopexy were treated on the same day of examination. Patients with vitreous haemorrhage had ophthalmic ultrasounds done and were seen more quickly. Patients without complications were warned about signs and symptoms of retinal detachments and haemorrhages as well as increase in flashes and floater. Patients were told to report immediately in such circumstances. Patients with asymptomatic PVD were not included in this study. Only age related PVD was taken into account.

Demographic data was collected and Tables of various age groups were devised.

Patient’s confidentiality was maintained. Ethical committee was consulted but no approval was considered necessary for such type of study. Study was registered with Research & Development (R&D) Department, Northern Care Alliance NHS Group.

3. RESULTS

Retrospective record of 172 patients (n=172) was reviewed. All patients were examined during one year period (March 2015 to February 2016) at Rochdale Infirmary eye department’s casualty settings.

Out of 172 patients, acute symptomatic PVD was detected without complications in 126 (73.25%) on initial presentation. Retinal break was found in 32 patients (one developed it later). Out of these, 18 patients (10.46%) had rhegmatogenous retinal detachment (RRD) on initial presentation and hence referred to Manchester Royal Eye Hospital for...
vitreoretinal surgical management. Posterior vitreous detachment was seen with vitreous haemorrhage in 4 patients (2.32%) without any break. Out 172 patients one presented with vitreomacular traction.

**Table 1: Acute symptomatic PVD and its complications**

<table>
<thead>
<tr>
<th></th>
<th>Total PVD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PVD without complication</td>
<td>126</td>
<td>(73.25%)</td>
</tr>
<tr>
<td>PVD with Retinal Tears only</td>
<td>14</td>
<td>(8.139)</td>
</tr>
<tr>
<td>PVD with Retinal tear with RD</td>
<td>18</td>
<td>(10.46%)</td>
</tr>
<tr>
<td>PVD with Vitreous haemorrhage</td>
<td>4</td>
<td>(2.32%)</td>
</tr>
<tr>
<td>PVD with Retinal haemorrhage</td>
<td>7</td>
<td>(4.06%)</td>
</tr>
<tr>
<td>PVD with Ret hg/VH (no breaks/RD)</td>
<td>2</td>
<td>(1.16%)</td>
</tr>
<tr>
<td>Other (Vitreomacular traction)</td>
<td>1</td>
<td>(0.58%)</td>
</tr>
</tbody>
</table>

Total Retinal breaks, 33 (19.18%). Demographically, as expected, women were affected more than men.

**Table 2: Demographic representation**

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>172</td>
<td>96 (55.81%)</td>
<td>76 (44.186%)</td>
</tr>
</tbody>
</table>

Age of the patient was the main factor in development of posterior vitreous detachment. This is expected due to anatomical changes in vitreous humour with advancing age. Main group of patients affected was between 51 to 75 (84.29%).

**Table 3. Age factor in years**

<table>
<thead>
<tr>
<th>Total</th>
<th>40 &amp; below</th>
<th>41-50</th>
<th>51-60</th>
<th>61-75</th>
<th>Over 75</th>
</tr>
</thead>
<tbody>
<tr>
<td>172</td>
<td>2 (1.11%)</td>
<td>9 (5.23%)</td>
<td>40 (23.25%)</td>
<td>105 (61.04%)</td>
<td>16 (9.30%)</td>
</tr>
</tbody>
</table>

**Effect on emergency work load**

Acute symptomatic posterior vitreous detachment has significant effect on daily emergency eye set up. During one year period, total ophthalmic emergencies received in ophthalmology department were 2293. Out of these, the chunk of acute symptomatic PVD alone was 172 (7.50%). This vision threatening situation was mainly dealt with by middle grades and junior doctors on initial presentation. This aspect needs to be looked into.

**Table 4: Total share of Acute Symptomatic PVD in emergency set up**

<table>
<thead>
<tr>
<th>Period</th>
<th>Total emergencies</th>
<th>PVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st March 2015 to 29 February 2016</td>
<td>2293</td>
<td>172 (7.50%)</td>
</tr>
</tbody>
</table>

**Figure 1: Graphic representation of Acute Symptomatic PV cases in one year.**

4. **DISCUSSION**

Posterior vitreous detachment is a common ophthalmic emergency. Common mode of presentation in symptomatic PVD is floaters and flashes. Advancing age, myopia [5] and pseudophakia are common predisposing factors. High risk factors for development of retinal breaks are vitreous haemorrhage, retinal haemorrhage and cell in the vitreous (Shafer’s sign) [9, 10]. In cases where retinal breaks are not found, next follow up should be soon if these findings co-exist [17, 18]. In our cohort of 33 patients (19.18%) had retinal breaks on presentation. This is slightly higher than some recent studies where it is reported to be between 8% and 15%. Hollands et al [13] found it in 14% of patients. Bond-Taylor et al [14] found it in 14.5% patients in their cohort of 365 patients. Dayan et al [6] found it in 26.7% of their patient in their study which was even higher than ours. In our study, out of 33 patients with retinal breaks, 18 patients (10.46%) had developed rhegmatogenous retinal detachment (RRD) at initial presentation. These patients were immediately referred onwards to tertiary care hospital for surgical management by vitreoretinal surgeon.
One, out of 172 patients in our series (0.58%), developed Vitreomacular Traction (VMT). Such complication can lead to macular hole formation and subsequently epiretinal membrane (ERM) which can effect vision significantly.

Like many other studies females were affected more than males. In our study 96 patients were females (55.81%) as compared to 76 males (44.18%). Linder [15] reported female/male ratio to be 73 and 27% respectively.

In majority of patients PVD was linked to increasing age. The highest incidence was seen between 51 to 75 years of age (84.29%). Average age of presentation in our study was 62.76. This is consistent with Yi Wei Goh et al [16] and Robert E et al [17] who reported the figure to be 62.

Posterior vitreous detachment is one of the commonest ophthalmic emergencies requiring urgent, thorough and expert attention. All our patients, on initial presentations were seen by experienced middle grades or junior doctor colleagues. This issue must be looked into.

5. CONCLUSION

Acute symptomatic PVD is significant part of acute emergency workload, having vision threatening consequences. Every patient with flashes and floaters should be seen urgently. Most of the complications are seen on initial presentations which require urgent attention. It is mainly managed by junior doctors initially. These junior colleagues must be well trained and competent in indirect ophthalmoscopy with scleral indentation as well as slit lamp biomicroscopy. These colleagues should be well aware of importance of pigmented cells in anterior vitreous (Shafer’s sign) as well as retinal and vitreous haemorrhages. Emphasis should be placed on these findings [19]. Dynamic examination of anterior vitreous should be carried out on slit lamp examination, first looking straight with high magnification and narrow beam. If cells in anterior vitreous are not visualised then examination in upwards and downwards saccades should be carried out to set into motion the vitreous and cells in periphery and inferiorly. Such patients should be seen very soon by more experienced ophthalmologist. As mentioned by Hikichi [20] asymptomatic PVD might be present in fellow eye in 20% of cases. Dayan MR and his colleagues [6] provided similar data. The other eye must be thoroughly examined in all cases of acute PVD.

REFERENCES
