Minimal gauge vitrectomy for optic disc pit maculopathy: Our results

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The purpose of the study was to describe the surgical technique and clinical outcomes of pars plana vitrectomy without laser or gas tamponade in cases with optic disc pit maculopathy at our centre. Six eyes of six consecutive patients presenting with unilateral optic disc pit maculopathy were enrolled. Preoperative optical coherence tomography (OCT) was performed to determine the presence and extent of schisis and macular detachment. All eyes underwent 23-gauge pars plana vitrectomy with induction of posterior vitreous detachment (PVD) and internal limiting membrane (ILM) peeling and eyes were closed under fluid. Patients were followed up for at least 12 months post-surgery. Median age of patients was 22.5 years. Five of six eyes had neurosensory detachment (NSD) at the presentation; whereas, inner layer schisis was present in all patients. None of the patients had any evidence of vitreomacular or vitreopapillary adhesion or PVD either clinically or on OCT. Inner and outer retinal schisis resolved in all eyes after follow-up of at least 6 months. Resolution of subretinal fluid in eyes with NSD was seen in 4 of 5 eyes. There was a significant visual acuity improvement from mean preoperative visual acuity of 0.79 logarithm of the minimum angle of resolution (logMAR) units to 0.36 logMAR units at 12 months (P = 0.001). Thus, vitrectomy with ILM peeling and PVD induction alone could achieve good functional outcomes in cases with optic disc pit maculopathy.

Key words: Internal limiting membrane peeling, maculopathy, optic disc pit, schisis

Optic nerve pits are a rare entity and are generally asymptomatic unless complicated by macular involvement in the form of macular schisis, neurosensory detachment (NSD), or pigmentary changes owing to chronicity which is seen in 25–75% of patients.[1,2]

Management of optic pit related maculopathy is controversial and includes observation, laser of pit margin, scleral buckling, and pars plana vitrectomy.[8,13,47] The use of laser therapy to produce scarring of the margins is often unsuccessful, and repeated treatments are needed.[1,3,4] Various reports suggest that vitrectomy combined with laser photocoagulation and gas tamponade may be more effective than laser, particularly in eyes with severe visual loss.

However, Hirakata et al. had hypothesized that gas tamponade may not be necessary considering slow resolution of macular changes after surgery and have reported good anatomical and functional outcomes in their recent series without use of gas tamponade.[8]

We report our experience in this series of six cases with optic nerve head pit maculopathy (ONH-M) who underwent pars plana vitrectomy with posterior vitreous detachment (PVD) induction without gas tamponade or laser treatment.

Methods

Consecutive patients with unilateral optic disc pit with maculoschisis with/without NSD and diminished visual acuity (<6/18) were included. All patients underwent baseline ophthalmological examination and spectral domain optical coherence tomography (OCT) to confirm the optic disc pit and macular abnormalities in all patients.

All underwent 23-gauge pars plana vitrectomy with triamcinolone acetonide-assisted PVD induction and internal limiting membrane (ILM) peeling. Separation of posterior hyaloid over the schitic area was done cautiously to prevent deroofing of the schisis cavity. Surgery was concluded with fluid filled vitreous cavity, and no tamponading agent was used. No laser was performed at the pit margin in any of the cases.

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Patients were followed up for at least 12 months and at each visit underwent full dilated fundus examination, slit lamp biomicroscopy, and OCT evaluation.

Results

Patient population
A total of six eyes of six patients (2 females, 4 males) were included [Table 1]. Mean age of the patients was 22.5 years (range: 13–40 years). All patients were phakic and median follow-up was 14 months (range, 12–16 months).

Clinical characteristics
On clinical examination, optic disc pit with maculoschisis and NSD was seen in all patients except patient 2, who presented with multi-layered schisis without NSD [Fig. 1a]. There was an associated outer retinal defect which was seen communicating with both inner and outer retinal schisis [Fig. 1a]. An inner lamellar hole was also present in patient 1. Patient 3 had a large intraretinal cyst involving inner retinal layers along with NSD and inner retinal layer schisis [Fig. 1b]. For patient 4, laser photocoagulation along the temporal edge of the optic disc had been performed earlier. None of the patients had PVD or any evidence of vitreomacular or vitreopapillary adhesion either clinically or on OCT.

Anatomical results
Postoperatively, OCT revealed persistent macular detachment for 6–8 months after surgery in four of five patients with preoperative NSD, though there was a reduction in inner layer schisis and decrease in the height of detachment with time. Complete resolution was seen in four cases by 12 months. Patient 3, however, had early resolution of NSD after 6 months of follow-up and patient 4 did not have resolution of NSD even after 16 months of follow-up [Table 2]. No further intervention was performed for the same. One patient presenting with multilayered macular schisis had complete resolution at 10 months. In patient 1, closure of the associated inner retinal hole was seen at 1-week follow-up.

Functional outcomes
The mean corrected distance visual acuity (CDVA) improved from 0.79 logarithm of the minimum angle of resolution (logMAR) units to 0.36 logMAR units ($P = 0.001$) at 12 months. Improvement in CDVA has been seen in all patients at 12 months follow-up except for patient 5 in whom it was unchanged [Table 2]. Patient 4 also had a persistent NSD at 12 months follow-up, despite which CDVA improved from 1 logMAR unit to 0.6 logMAR units [Tables 1 and 2].

Table 1: Age, preoperative visual acuity, and clinical characteristics of optic disc maculopathy of all patients

| Patient number | Age (years)/gender | Eye involved | Preoperative CDVA* (logMAR) | Schisis | NSD** | Others |
|----------------|-------------------|--------------|---------------------------|---------|-------|--------|
| 1              | 25/female         | Left         | 1.18                      | +       | +     | Macular hole |
| 2              | 40/male           | Left         | 0.78                      | +       | –     | −      |
| 3              | 14/male           | Right        | 0.60                      | +       | +     | −      |
| 4              | 23/male           | Right        | 1                         | +       | +     | +      |
| 5              | 20/male           | Left         | 0.60                      | +       | +     | −      |
| 6              | 13/female         | Left         | 0.60                      | +       | +     | −      |

*CDVA: Corrected distance visual acuity, **NSD: Neurosensory detachment, logMAR: Logarithm of the minimum angle of resolution

Figure 1: (a) Serial optical coherence tomography scans of patient 2 shows resolution of inner and outer retinal schisis and closure of outer retinal defect slowly over a year; (b) serial optical coherence tomographics of patient 3 demonstrating resolution of schisis at 3 months and complete resolution of subretinal fluid at 6 months of follow-up.

Table 2: Postoperative parameters such as visual acuity, postoperative changes in maculopathy, and follow-up duration of all patients

| Patient number | Postoperative CDVA* (logMAR) | Duration of follow-up (months) | Resolution of maculoschisis | Resolution of NSD** | Others |
|----------------|------------------------------|-------------------------------|----------------------------|---------------------|--------|
| 1              | 0.30                         | 12                            | +                          | +                   | Macular hole closed |
| 2              | 0.60                         | 18                            | +                          | NA                  | −      |
| 3              | 0.30                         | 12                            | +                          | +                   | −      |
| 4              | 0.60                         | 18                            | +                          | −                   | −      |
| 5              | 0.18                         | 12                            | +                          | +                   | −      |
| 6              | 0.18                         | 14                            | +                          | +                   | −      |

*CDVA: Corrected distance visual acuity, **NSD: Neurosensory detachment, NA: Not applicable, logMAR: Logarithm of the minimum angle of resolution
Discussion

The rationale for treating optic disc pit maculopathy has been limited by a lack of understanding of origin and mechanism of accumulation of the serous fluid. In recent years, the release of traction (either vitreous or ILM-induced) has been considered a very important factor in the management of patients with pit related maculopathy.

Several investigators have tried to remove or counter this traction by performing either pars plana vitrectomy or scleral buckling. Hirakata et al., on the other hand, have demonstrated good results of pars plana vitrectomy with PVD induction with or without ILM peeling and with or without endotamponade.

In our series of six patients with ONH-M, we also observed similar improvement in anatomical structure and significant vision improvement where no endotamponade was used. We found that functional improvement in the form of resolution or decrease in symptoms was quite earlier despite the continued, albeit decreased, presence of schisis-like separation, and foveal detachment as reported by other authors.

Hirakata et al. hypothesized that use of endotamponade becomes unnecessary since the course of resolution of architectural changes is slow and occurs over long duration in these cases. Thus, no endotamponade was used, and all patients were left with fluid filled vitreous cavity. The same was demonstrated in our series as resolution of ONH-M took at least 6 months in all cases.

We performed ILM peel in all our cases to ensure thorough removal of any tangential tractional component. Although role of ILM-related tangential traction in macular hole is known but for pit related maculopathy, its effect is not well-established. We, however, consider that for complete removal of traction over optic pit, removal of both posterior hyaloid and ILM is required to eliminate all tangential and anteroposterior vector forces. Moreover, ILM peeling might also promote glial repair by inducing local expression of growth factors and, thus, closure of communication between pit and retina. Furthermore, removal of ILM would prevent any epiretinal membrane formation in future in these cases. Gandorfer and Kampik have also highlighted the importance of removing all vitreoretinal adhesions including the ILM.

Thus, in our small series, we could achieve good anatomic and functional outcomes in optic disc related maculopathy by performing pars plana vitrectomy with PVD induction and ILM peeling, without use of any endotamponade or laser.

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Conflicts of interest
There are no conflicts of interest.

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