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Hemorrhagic Retinopathy Following Spondylosis Surgery and Seizure

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Abstract

Purpose—To report bilateral hemorrhagic retinopathy in an adult female following lumbar spinal surgery and seizure.

Case Report—A 38 year old female presented with bilateral blurry vision and spots in the visual field. The patient had lumbar spondylosis surgery which was complicated by a dural tear with persistent cerebrospinal fluid leak. Visual symptoms started immediately following witnessed seizure-like activity. At presentation, visual acuity was 20/100 and 20/25 in the right and left eye, respectively. Dilated fundus examination demonstrated bilateral hemorrhagic retinopathy with subhyaloid, intraretinal and subretinal involvement. At 4 month follow up, visual acuity improved to 20/60 and 20/20 in the right and left eye, respectively. Dilated fundus examination and fundus photography showed resolution of retinal hemorrhages in both eyes.

Conclusions—The first case of bilateral hemorrhagic retinopathy following lumbar spondylosis surgery and witnessed seizure in an adult was reported. Ophthalmic examination may be warranted following episodes of seizure in adults.

Keywords

hemorrhagic retinopathy; intraretinal hemorrhage; subretinal hemorrhage; spinal surgery; seizure

Although postoperative visual loss is uncommon, it can be a devastating complication of spinal surgery.¹ Ischemic optic neuropathy, occlusive vasculopathies and cortical blindness are recognized as causes of visual loss following spinal surgery,¹ though the exact etiology of these ophthalmic complications remains unclear.² Bilateral posterior segment hemorrhage has been reported to be associated with systemic diseases, blood dyscrasias, and head and chest trauma.^{3–10} We present the first case of bilateral hemorrhagic retinopathy in an adult patient after spinal surgery and a witnessed seizure.

CASE REPORT

A 38 year old female underwent ophthalmic evaluation at the University of Illinois for bilateral blurry vision of two days duration with a complaint of “maroon spots” in her visual

field. The patient's past medical history was notable for recent surgical repair of lumbar spondylosis complicated by a dural tear with persistent cerebrospinal fluid (CSF) leak that was repaired intraoperatively. She experienced persistent positional headaches requiring readmission five days after surgery and was treated for recurrent CSF leak with a blood patch and Fioricet. Computerized tomography (CT) of the brain was unremarkable. One week after surgery, she was readmitted with similar symptoms and while being taken for magnetic resonance imaging (MRI) of the lumbar spine, she experienced a seizure-like activity requiring a rapid response team. Cardiopulmonary resuscitation was not performed. The lumbar MRI demonstrated a large pseudomeningocele at the L5-S1 level.

Following witnessed seizure-like activity in hospital, she complained of blurry vision and visual field changes, described as red and orange spots throughout her visual field. At her initial ophthalmic evaluation, visual acuity (VA) was 20/100 and 20/25 in the right and left eyes, respectively, with no improvement with pinhole. The patient's pupils were round and reactive without an afferent pupillary defect. Extraocular motility was full and visual fields by confrontation demonstrated no defect. Intraocular pressure was 10 mmHg and 12 mmHg in the right and left eye, respectively. Anterior segment examination was unremarkable. Dilated fundus examination demonstrated bilateral hemorrhagic retinopathy. The patient was followed after discharge from hospital for her neurologic complaints.

At 11 day after discharge, the patient was reevaluated at the Retina Clinic. VA remained the same as first visit. Dilated fundus examination was consistent with color fundus photos that demonstrated stable bilateral hemorrhagic retinopathy with subhyaloid, intraretinal and subretinal hemorrhage in both eyes (Figure 1). Fluorescein angiography was notable for patchy hypofluorescence in areas of hemorrhage with no late leakage (Figure 1). Spectral domain optical coherence tomography (SD-OCT) demonstrated subhyaloid hemorrhage, intraretinal hemorrhage, but intact inner retinal layers, foveal contour, inner segment ellipsoid and retinal pigment epithelial layers (Figure 1). The patient was instructed to avoid heavy lifting or straining and return to clinic in one month for follow up or sooner if urgent symptoms including further vision loss and eye pain occurred.

At one month follow up, the patient had significant improvement in her symptoms. VA was remained the same as first visit and dilated fundus examination demonstrated significant regression of hemorrhagic retinopathy. Only a small subretinal hemorrhage remained along the border of the macula in the right eye and in the mid periphery superiorly in the left eye. At 4 month follow up, the visual acuity was 20/60 and 20/20 in the right and left eyes, respectively, and the patient stated no spots in her visual field. Fundus photography and SD-OCT imaging (Figure 2) demonstrated significant regression of hemorrhages in both eyes.

DISCUSSION

The differential diagnosis of bilateral hemorrhagic retinopathy is broad and includes vascular retinopathies (diabetes mellitus, hypertension, sickle cell disease, Lupus), retinopathies associated with malignancies (leukemia, radiation retinopathy), trauma, and indirect traumatic retinopathies (Valsalva retinopathy, Terson's syndrome, whiplash retinopathy, Purtscher's retinopathy and shaken baby syndrome).³⁻¹⁰ In addition, bilateral

subretinal hemorrhage has been reported in cases with indirect traumatic retinopathy such as Terson's retinopathy, Purtscher's retinopathy, and Valsalva retinopathy.⁶⁻¹⁰ Although ischemic optic neuropathy and occlusive vasculopathies have been reported as the leading causes of vision loss after spinal surgery,¹ the present case showed ophthalmic manifestations compatible with an indirect traumatic retinopathy.

The exact etiology of hemorrhagic retinopathy in this case is unclear. The patient was a young and healthy female with no other medical history to account for her ophthalmic findings. There have been previous reports of retinal hemorrhages with no identifiable cause,¹¹⁻¹⁴ but they do not completely resemble this case. In contrast to the patient in this study, previously reported patients had unilateral smaller retinal hemorrhages,¹¹⁻¹⁴ that varied in size from a punctuate spot¹³ to one-half disk diameter.¹² In the patient in present study, the temporal relationship between seizure and the onset of visual symptoms may be suggestive of Valsalva retinopathy. However, Valsalva retinopathy mostly presents with a predominance of unilateral solitary, well-circumscribed preretinal hemorrhage^{6,7} which was not observed in this patient. There was a predominance of bilateral multiple, deep hemorrhages suggesting their origin in the deeper layers of the retinal vasculature in this patient, which is rare in Valsalva retinopathy. Furthermore retinal hemorrhages resulting directly from a seizure are extremely rare.¹⁵ Therefore, the finding of bilateral hemorrhagic retinopathy does not suggest Valsalva retinopathy and is not likely related to seizure only. The findings of fundus photography in the patient in the current study were similar to what has been described in Terson's syndrome.⁹ Terson's syndrome is strongly associated with intracranial hemorrhage. Increased intracranial pressure is believed to cause acute obstruction of the retinal venous circulation leading to the rupture of superficial retinal vessels.⁹ However, an unremarkable CT scan of the head essentially ruled out this possibility.¹⁶ Purtscher's retinopathy exhibits as bilateral patches of retinal whitening and hemorrhage around the optic disc due to massive head trauma or non-traumatic diseases such as acute pancreatitis, fat embolization, amniotic fluid embolization and vasculitis diseases.^{8,10} However, none of these conditions were present in this case.

The exact underlying mechanism of bilateral hemorrhagic retinopathy in the patient in the current study is not clear, however it is likely that both seizure and persistent CSF leak following spinal surgery may have caused it. It has been reported that a rapid rise in the intraocular venous pressure may cause spontaneous rupture of perifoveal capillaries and subretinal bleeding.^{7,17} Since the patient in the current study experienced severe headaches probably due to persistent CSF leak following spinal surgery,¹⁸ this may have resulted in intracranial hypotension and therefore intracranial venous hypotension due to less CSF and more blood storage in a space of fixed volume.¹⁹ In this setting of venous congestion, increase in intraocular pressure due to seizure may be more likely to cause a deep retinal hemorrhage similar to what has been described in indirect retinopathies particularly Terson's syndrome.

In conclusion, we presented the first adult case of bilateral hemorrhagic retinopathy following witnessed seizure after lumbar spondylosis surgery. Although the incidence and prevalence of hemorrhagic retinopathy in adults is not known, ophthalmic examination may be warranted following episodes of seizure.

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Figure 1.

Fundus imaging (A), fluorescein angiography (B) and spectral domain optical coherence tomography (SD-OCT) (C) at presentation. Arrow heads denote subhyaloid hemorrhage in the right eye. Fundus imaging shows multiple intraretinal hemorrhages in both eyes (A). Fluorescein angiography demonstrates hypofluorescence in areas of hemorrhages (B). SD-OCT presents sub-foveal hyper-reflective lesions in both eyes (C).

Figure 2. Fundus imaging (A) and spectral domain optical coherence tomography (SD-OCT) (C) at follow up. Normal fundus images (A) and normal SD-OCT (B) with resolution of hemorrhages and sub-foveal lesions.