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Steroid Responsive Idiopathic Superior Orbital Fissure Syndrome: A Case Series

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Superior orbital fissure syndrome (SOFS) is a rare condition characterized by ophthalmoplegia, proptosis, ptosis, and dilation and fixation of the pupil. We present a case series with clinical and radiological findings of patients with idiopathic SOFS. All five patients had a subacute onset of lateralized painful ophthalmoplegia. All patients were female, and 3 patients were aged >50 years. Diabetes was the common (n=3) comorbidity and 4 patients sought medical help in the second/third week after symptom onset. The most common presenting symptom was drooped eyelid followed by mild-to-moderate headache. The ophthalmic division of the trigeminal nerve was involved in 3 patients. The most common radiologic abnormality was visible soft tissue in superior orbital fissure extending anteriorly, which showed faint enhancement. Patients were managed with corticosteroids, with complete recovery seen within 8 weeks. One patient had disease relapse after 6 months with the same side affected but with a larger granulomatous lesion, who responded well with a second course of corticosteroids. In conclusion, most cases of SOFS are idiopathic or inflammatory and respond well to corticosteroids. The treatable causes need to be ruled out before considering neoplastic etiology. The early recognition of symptoms and prompt treatment may result in better outcomes.

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Keywords: Steroid; idiopathic; inflammatory; superior orbital fissure syndrome; ophthalmoplegia.

1. INTRODUCTION

The superior orbital fissure syndrome (SOFS) is a rare complication, first described in traumatic patients by Hershfield [1] in 1858, and later Rochon-Duvigneaud [2] described SOFS in syphilitic patients. The SOFS term was defined by Lakke in 1962 in pachymengitis [3]. In SOFS, there is impaired functioning of cranial nerves, which enter the orbit through the superior orbital fissure (SOF) [4–6]. The SOFS was characterized by Mortada with the presence of local pain, proptosis, paralysis of the 3rd, 4th, 6th and 1st division of the 5th nerve, with neuralgic pains, and anaesthesia of the upper lid, side of the nose, forehead, temple, conjunctiva, and cornea [7].

It is important to differentiate SOFS from the orbital apex syndrome, which includes the optic nerve in addition, leading to changes in visual acuity [8] There have been several etiologic factors listed for SOFS with the most common being infections, inflammation, vascular, trauma, neoplastic and idiopathic etiologies [9] Traumatic SOFS has been the most commonly reported SOFS [3,4,9] but the evidence on idiopathic SOFS remain scarce. This paper presents 5 cases of idiopathic SOFS managed with corticosteroid therapy and review of literature of this rare condition.

2. CASE REPORTS

We describe clinical and radiological profiles, and outcome of five cases of SOFS who presented with painful ophthalmoplegia. Table 1 enlists the characteristics of these five cases of SOFS.

2.1 Case 1

A 55-year-old woman presented with complaints of holocranial headache associated with pain in the right eye and photophobia from the past 1 month. She had double vision since 20 days with drooping of the right eyelid, which partially obstructed her vision. She had a history of diabetes and hypertension. Examination revealed that she had partial ptosis of the right eye with diplopia on right horizontal gaze and restricted extraocular movements of the right eye resulting in right complete external ophthalmoplegia. She also had hypoesthesia of the right ophthalmic division of the trigeminal nerve. Her magnetic resonance imaging (MRI) of brain showed heterogenous signal intensity noted at the superior orbital fissure extending to the right side of the anterior cavernous sinus with post contrast enhancement, which were suggestive of granulomatous pathology. Her cerebrospinal fluid (CSF) analysis was normal.

She was diagnosed with SOFS with involvement of the right III, IV, V and VI cranial nerves. She was treated with intravenous methylprednisolone for 5 days. Her right orbital pain gradually reduced. On the third day, improvements were seen in extraocular movements. She was discharged with oral corticosteroid treatment with gradual tapering of dose. She was asymptomatic with complete recovery at the follow-up visit.

2.2 Case 2

A 35-year-old woman presented with complaints of headache from the past 6 days with drooping of the left eyelid and painful eye movements. Her examination revealed complete ptosis of the left eye with diplopia and restricted extraocular movements, with pupil involvement in the left eye. Her MRI of the brain (Fig. 1a, 1b) showed abnormal soft tissue involving the left cavernous sinus encasing the cavernosal segment of the internal carotid artery (ICA) causing narrowing of the ICA. Post contrast enhancement of the soft tissue was seen extending up to the left orbital apex, which were suggestive of granulomatous pathology. Her CSF analysis was normal.

She was diagnosed with SOFS with involvement of the left III and IV cranial nerves. She was treated with intravenous methylprednisolone for 5 days. Pain subsided and extraocular movements began to gradually improve. She was discharged with oral corticosteroids. She was asymptomatic with complete recovery at the subsequent follow-up visit.

2.3 Case 3

A 70-year-old newly detected diabetic woman presented with complaints of right sided headache, difficulty in chewing with pain over the jaw region, drooping of right eyelid, blurring and double vision of right eye from the past 15 days. She had complete ptosis of the right eye with dilated right pupil and restricted extraocular movements of the right eye resulting in complete right external ophthalmoplegia (Fig. 2). She also had hypoesthesia of all divisions of the right

trigeminal nerve with absent right corneal reflex. Her MRI of the brain showed chronic bilateral small vessel ischemic changes. Her CSF analysis was normal.

She was diagnosed with SOFS with involvement of the right III, IV, V and VI nerves. She was treated with intravenous methylprednisolone for 5 days. Her right orbital pain gradually reduced and extraocular movements began to improve. She was discharged with oral corticosteroids. She was asymptomatic with complete recovery at the follow-up visit.

2.4 Case 4

A 42-year-old diabetic (15 days) woman presented with a history of tingling sensation over the right half of the face from the past 20 days and double vision since 15 days. She had right lateral rectus palsy with diplopia on right lateral gaze (Fig. 3). She also had hypoesthesia of all divisions of the right trigeminal nerve. Her MRI of the brain (Fig. 1c, 1d) revealed homogenous signal intensity with post contrast enhancement noted along the right orbital apex and superior orbital fissure. Her CSF analysis was normal.

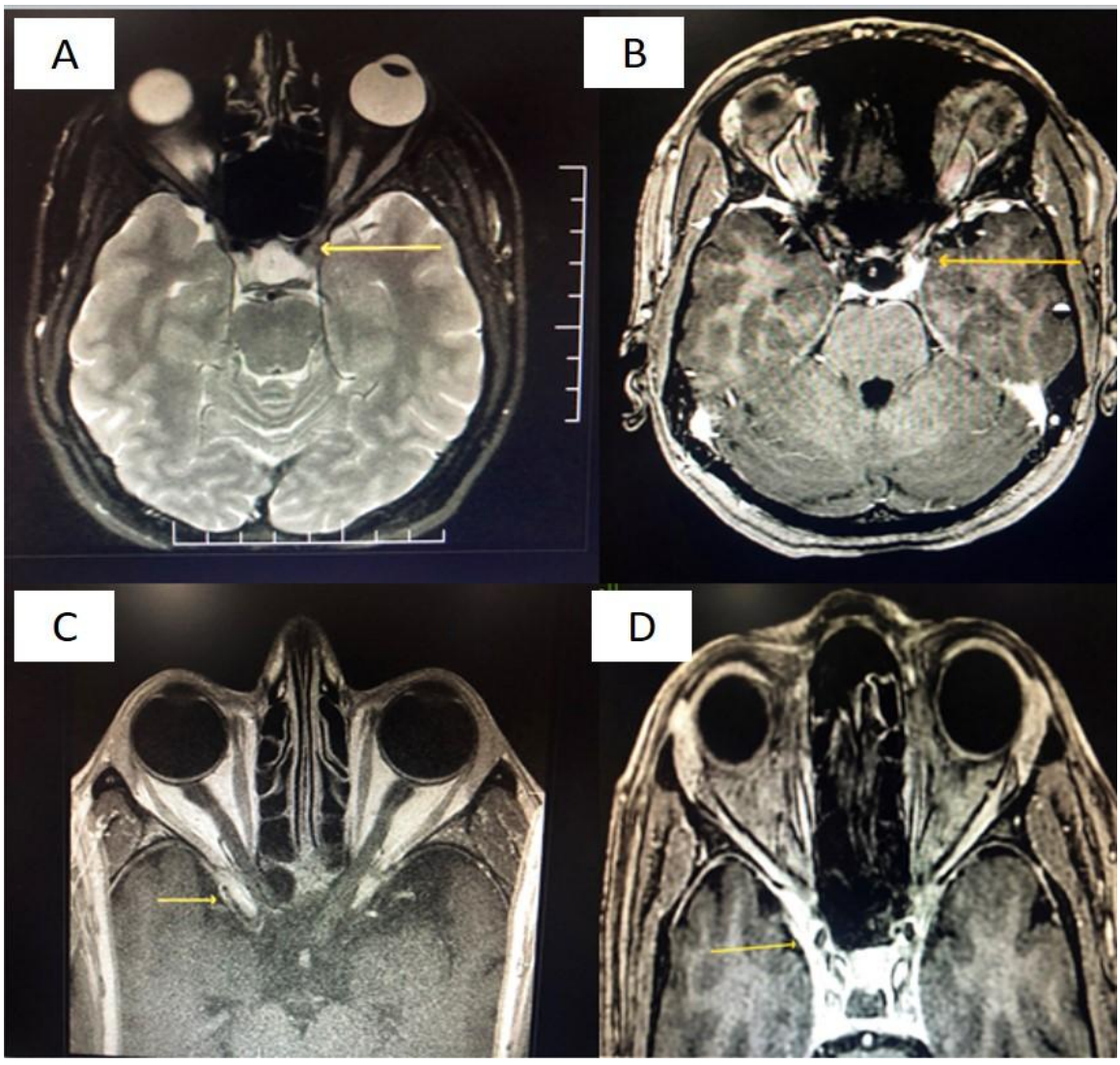

Fig. 1. MRI showing abnormalities in SOFS. A) Abnormal soft tissue seen involving left cavernous sinus encasing the cavernosal segment of ICA causing narrowing of the ICA. B) Post contrast enhancement of the soft tissue seen extending up to the left orbital apex. C) Homogenous signal intensity along the right orbital apex and superior orbital fissure. D) Post contrast enhancement noted

ICA, internal carotid artery

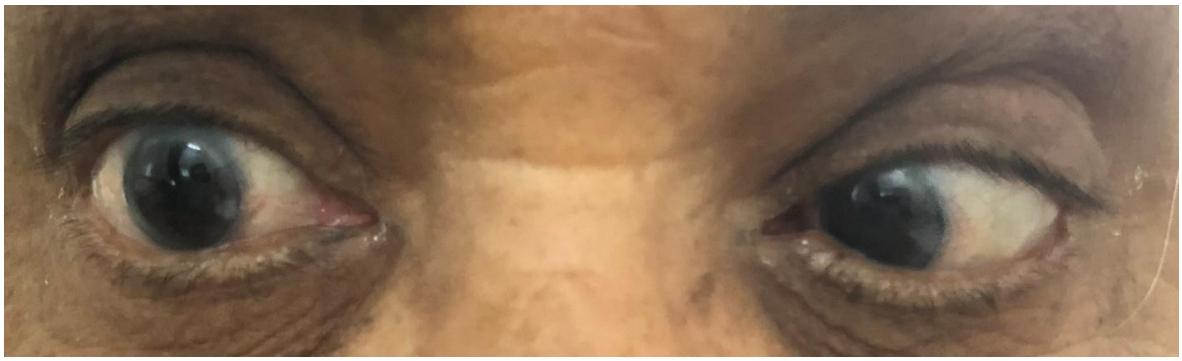

Fig. 2. Case 3, right SOFS in a female aged 70 years; The right eye is dilated with complete ptosis

She was diagnosed with SOFS syndrome with involvement of the right IV, V and VI cranial nerves. She was treated with intravenous methylprednisolone for 5 days. Her extraocular movements began to improve over the next 3 days but the tingling sensation persisted. She was discharged with oral corticosteroids. She was asymptomatic with complete recovery at the follow-up visit.

2.5 Case 5

A 75-year-old woman presented with a history of pain in the right eye from the past 15 days. She also had double vision since 8 days with drooping of the right eyelid which obstructed her vision. She had complete ptosis of the right eye with dilated right pupil and restricted extraocular movements of the right eye (Fig. 3). Her MRI of the brain and CSF analysis were normal.

She was diagnosed with SOFS with the involvement of the right III and IV cranial nerves. She was treated with intravenous dexamethasone for 5 days. Right orbital pain gradually reduced and her extraocular movements began to improve. She was discharged with oral corticosteroids. She was asymptomatic with complete recovery at the follow-up visit.

Autoimmune markers could be obtained from two patients, which tested negative. In the remaining patients, testing was not carried out due to financial constraints. The chest X-rays did not show any hilar nodes in any of our patients. Overall, a diagnosis of SOFS was made in all these 5 patients based on the clinical signs, symptoms and radiological findings, and alternate causes were ruled out by relevant investigations. All patients were treated with intravenous corticosteroids at a dose of 30 mg/kg for five days followed by oral corticosteroids. Diabetic patients' blood sugar levels were controlled with insulin preparations under endocrinologists' guidance. Pain started reducing from the third day after initiating corticosteroids. All patients were symptom free at the end of eight weeks of steroid administration, following which steroid doses were tapered over the next four weeks. One patient had relapse after 6 months from the last steroid dose who was managed with a second course of corticosteroids and responded well to treatment. The remaining 4 patients maintained disease remission.

3. DISCUSSION

The SOFS is a rare syndrome in clinical practice, which is usually investigated by ophthalmologists at the first instance. The clinical features of SOFS include loss of sensation over the forehead, edema of the periorbital region, proptosis, dilatation of the pupil, ptosis, ophthalmoplegia, loss of corneal reflexes, presence of the consensual reflex, loss of accommodation reflex, and lachrymal hypersecretion [1,3,4,6]. The SOFS patients may eventually develop orbital apex syndrome (OAS) and cavernous sinus syndrome (CSS) [10]. Luigi-Lenzi and Fieschi reviewed 130 cases of painful ophthalmoplegia with or without optic nerve involvement along with 2 case observations and reported that only the optic signs, i.e. the presence or absence, may assist in differentiating SOFS (without optic nerve involvement) or OAS, which requires orbital exploration [11]. Rai et al., determined the shape of SOF as a pear. From the broad base which is medially to apex laterally, there is a spreading out of the long axis in the upward direction at an angle of 45° (Fig. 4) [12].

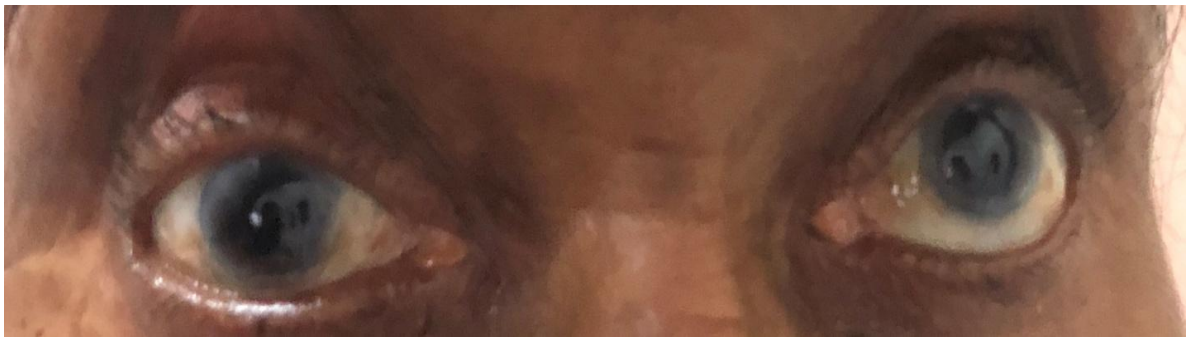

Fig. 3. Case 5, right SOFS in a female aged 75 years showing complete ptosis of the right eye with dilated right pupil

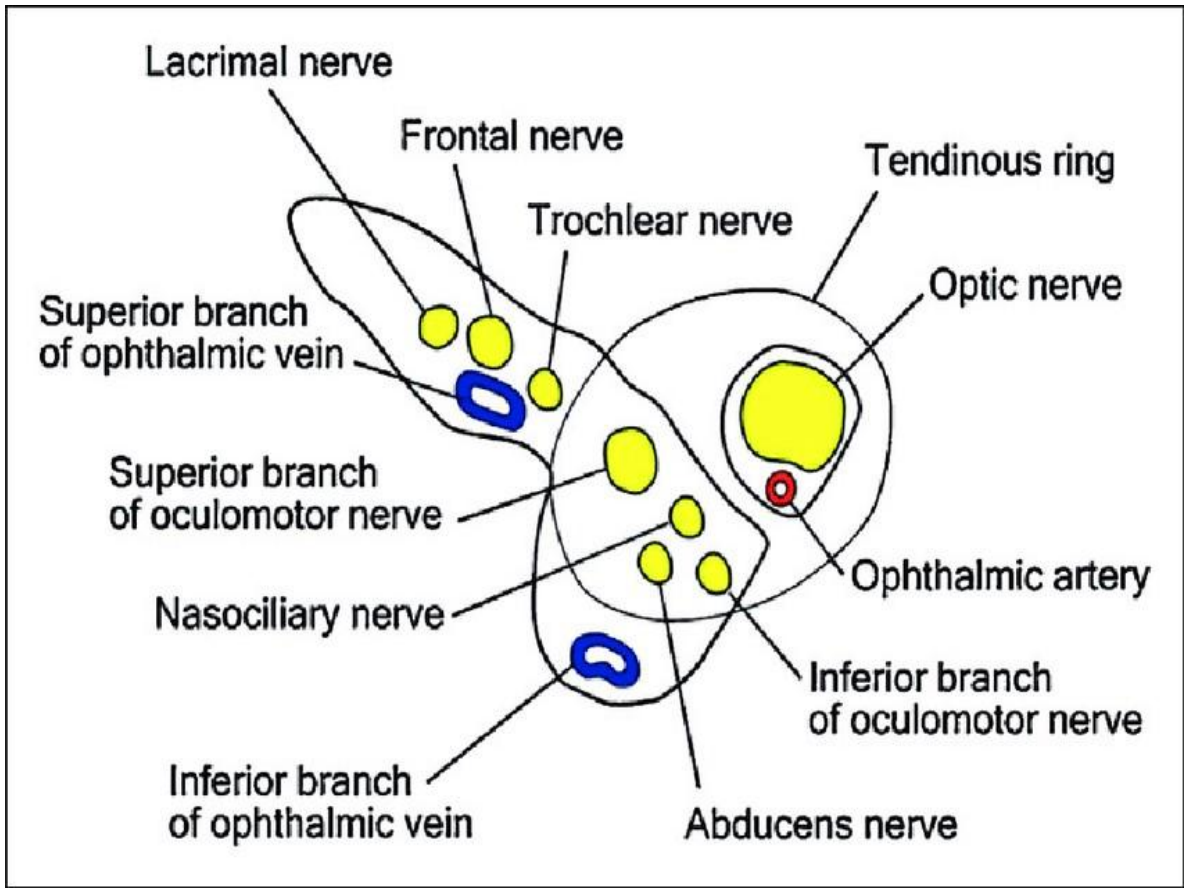

Fig. 4. Superior orbital fissure and its contents
Adopted from Rai S, Rattan V. Natl J Maxillofac Surg 2012;3:222-5

Although pathology remains similar in SOFS, published literature is scarce for idiopathic SOFS. Majority of the evidence exists on traumatic SOFS [9,10,12–14], with only a few case reports describing idiopathic SOFS [3–5,7,15]. It is also important to differentiate SOFS from more common Tolosa and Hunt syndromes, which refer to the idiopathic granulomatous inflammation of the cavernous sinus [15].

We observed female preponderance for SOFS, for reasons unknown. Presentation was usually in the later part of the fifth decade and later, except two patients who had symptoms at 35 and 42 years of age. Diabetes is a common risk factor for SOFS, which was observed in three of our patients. However, the blood sugar levels did not correlate with symptom severity.

Table 1. Characteristics of five cases of SOFS

Case	Age/ Sex	Symptoms and Signs	Duration	Cranial nerves involved				MRI Findings	CSF Analysis	Treatment received	Follow up
				III	IV	V	VI				
Case 1	55/F	Headache, pain and diplopia with partial ptosis of right eye, photophobia	20 days	Yes	Yes	Yes - first division	Yes	Heterogenous signal intensity at superior orbital fissure extending to right side of anterior cavernous sinus with post contrast enhancement.	Normal	30mg/kg intravenous methylprednisolone for 5 days followed by oral steroids.	Complete recovery
Case 2	35/F	Headache, pain and diplopia of left eye with ptosis and dilated pupil	6 days	Yes	Yes	No	No	Abnormal soft tissue seen involving left cavernous sinus encasing the cavernosal segment of ICA causing narrowing of the ICA. Post contrast enhancement of the soft tissue seen extending up to the left orbital apex	Normal	30mg/kg intravenous methylrednisolone for 5 days followed by oral steroids.	Complete recovery
Case 3	70/F	Headache, pain and diplopia of right eye with ptosis and dilated pupil	15 days	Yes	Yes	Yes – first, second and third divisions	Yes	Chronic bilateral small vessel ischemic changes	Normal	30mg/kg intravenous methylprednisolone for 5 days followed by oral steroids.	Complete recovery
Case 4	42/F	Tingling of right half of face, diplopia on right gaze	20 days	No	Yes	Yes – first, second and third divisions	Yes	Homogenous signal intensity with post contrast enhancement noted along the right orbital apex and superior orbital fissure	Normal	0.4mg/kg intravenous dexamethasone in three divided doses for 5 days followed by oral steroids.	Complete recovery
Case 5	75/F	Pain and diplopia of	15 days	Yes	Yes	No	No	Normal	Normal	30mg/kg intravenous steroids	Complete recovery

Case	Age/	Symptoms	Duration	Cranial nerves involved	MRI Findings	CSF	Treatment	Follow up
		right eye with ptosis and dilated pupil					for 5 days followed by oral steroids.	

ICA, internal carotid artery

We further observed the subacute onset of the symptoms, which may suggest that granulomatous pathology probably takes few weeks to compress the surrounding structures. Four of our patients presented in the second/third week after the onset of symptoms. The most common presentation was drooped eyelid followed by headache. To note, the headache was mild-to-moderate intensity unlike severe headache seen in Tolosa Hunt syndrome [16]. This could be due to a lesser involvement of the ophthalmic nerve. We also did not observe diplopia as a major symptom, which may suggest that levators were rapidly involved than other extraocular muscles which caused a rapid onset of ptosis (masking diplopia). Oculomotor nerve was the cause of symptoms in our patients. We observed pupil involvement in four of our cases. There was no predilection of any oculomotor nerve innervated muscles. Trochlear nerve was involved in all patients and 4 of the 5 patients had abducens nerve involvement. The ophthalmic division of the trigeminal nerve was involved in three of our cases. There was reduced perception for touch and pain on the affected side.

Contrast MRI was done in all our patients, of which 3 patients had abnormal MRI, suggesting the importance of imaging in SOFS. We usually ask for thin orbital axial/sagittal sequences. The most common abnormality was visible soft tissue in superior orbital fissure extending anteriorly which showed faint enhancement. It was presumed to be a granulomatous lesion since the lesion was very small.

The management of SOFS is not definite, and most of the researchers suggest exploration to rule out neoplasm, infection, physical impingement or retrobulbar hemorrhage [6,16]. In cases of retrobulbar hematoma which is not expected to resolve, a surgical intervention is considered. The use of systemic corticosteroids is the most common modality in SOFS management [6,8,11,16]. Acartürk and colleagues reported complete recovery in long-term follow-up in 11 SOFS patients with high-dose corticosteroids without any complications [17]. We treated all our patients with intravenous pulse corticosteroids (30 mg/kg/day) for a period of five days. The blood sugar levels were controlled with insulin according to an endocrinologists' opinion. The first symptom to respond was pain in all our cases, which began to subside with third dose of systemic steroids. After five days of systemic steroids, the treatment was changed to oral steroids (1 mg/kg) for at least eight weeks (or until all extraocular muscles recover), followed by a gradual tapering over the next four weeks. For diabetic SOFS, repeat pulse glucocorticoids were administered for two more months. Our case series reports that it took at least eight weeks for near complete recovery. There were no residual deficits in any of our cases. Case 1 relapsed after 6 months of initial presentation with the same site being affected, and her repeat MRI showed a larger granulomatous lesion on the affected side.

4. CONCLUSION

Idiopathic SOFS is a rare entity occurring due to the granulomatous inflammation of SOF. The diagnosis is made based on the clinical signs and symptoms, which is further confirmed by radiologic findings. It is more common in elderly females. Diabetes may be a predisposing factor for SOFS. The most common presentation is headache, drooped eyelids and diplopia. Clinical examination of individual cranial nerves clinches the localization. MRI should be done in all patients of suspected SOFS. Intravenous pulse corticosteroids with oral steroids as follow-up for at least 8 weeks provide optimal results in these patients.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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