European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 7, Issue 4, 2020

Superior orbital fissure syndrome – A review of literature

Correspondance to:
Dr. Vijay ebenezer1,
professor and head of the department of oral and maxillofacial surgery, Sree balaji dental college and hospital, pallikaranai, chennai-100.
Author Details:
Dr. Vijay ebenezer[1], Dr. Balakrishnan Ramalingam[2]
professor and head of the department of oral and maxillofacial surgery, Sree balaji dental college and hospital, pallikaranai, chennai-100.
professor in the department of oral and maxillofacial surgery, Sree balaji dental college and hospital, pallikaranai, chennai-100.

ABSTRACT:
Superior orbital fissure syndrome is a complex of cranial nerve impairment that affects the CN III, IV, V and VI all of which enters the orbit through the superior orbital fissure. Superior Orbital fissure syndrome occurs as a result of compression of all or some of these nerves passing through the fissure. Three major factors contributing to the syndrome includes traumatic injury, neoplasm and inflammation. This article takes into account the various data previously reported in literature and aims at providing a detailed knowledge about the anatomy of the superior orbital fissure to provide a better understanding about the syndrome.

KEYWORDS: Superior orbital fissure, trauma, cranial nerve.

1. INTRODUCTION:

Superior orbital fissure syndrome is a very rare complication occurring as a result of craniomaxillofacial trauma which was first described by Hirschfeld in 1958[1]. Later in 1896 , Andre Rochon Duvigneaud a french ophthalmologist considered the syndrome as a pathological entity and presented a report on the syndrome in four syphilis patient[2]. Other etiological factors that results in SOFS due to either compression of SOF contents or un natural narrowing of the SOF includes vascular disorders[3] like spontaneous aneurysms of the Internal carotid artery; neoplasm in cavernous sinus or the orbital apex like meningioma, pituitary gland tumours; inflammation in the orbital apex and cavernous sinus thrombosis can also attribute to the development of SOFS[4].

2. ANATOMY OF THE SUPERIOR ORBITAL FISSURE:

The boundaries of the superior orbital fissure are as follows
Laterally – Greater wing of sphenoid bone
Medially - Lesser wing of sphenoid and
Superiorly-Frontal bone

The superior orbital fissure lies at the orbital apex and at the border between the orbital roof and the lateral orbital wall. It serves as a pathway between the orbit and the middle cranial fossa. The shape of the fissure looks like an elongated pear with its broader part at the nasal side medially to the apex laterally with the long axis extending upward at a 45 degree angle. The size of the fissure in an adult is around 22mm in length, 2 to 3mm width at the apex and about 7 – 8 mm at the base[5]. The tendon of the lateral rectus muscle divides the tissue into two parts: the superior and inferior part. The superior part contains the trochlear nerve (IV), frontal and lacrimal branches of the ophthalmic division of the trigeminal nerve and the superior branch of the ophthalmic vein whereas the inferior part contains the superior and inferior branches of the oculomotor nerve(III), abducens nerve (VI), naso ciliary nerve(V) and the inferior branch of the ophthalmic vein. All

these structures are confined within the tendinous ring making them more susceptible to shearing injury during craniomaxillofacial trauma.

3. CLINICAL SIGNS:

Superior orbital fissure syndrome presents with the following signs

- Paraesthesia – loss of sensation over the forehead, cornea, upper eyelid and bridge of the nose resulting from the compression of the ophthalmic division of the trigeminal nerve involving the supratrochlear and supra orbital branches. There might also be lacrimal hyposecretion and possibly retro orbital pain along the path of the nerve [6].

- External ophthalmoplegia – it is the slowly progressive paralysis of extra ocular muscles that develops secondary to the transmission blockade of the oculomotor, trochlear and abducent nerves. Patients also will typically present with ptosis as a result of loss of tension and loss of function of the levator palpebrae superioris muscle and loss of tone in sympathetically innervated mullers muscle.

- Proptosis – prolapse of the globe anteriorly out of the orbit as a result of loss of extraocular muscle tone or retrobulbar hematoma or ophthalmic vein compression [7,8].

- Ptosis- Drooping of the upper eyelid because of loss of tension and loss of function of the muscle levator palpebrae superior and loss of tone of mullers muscle.

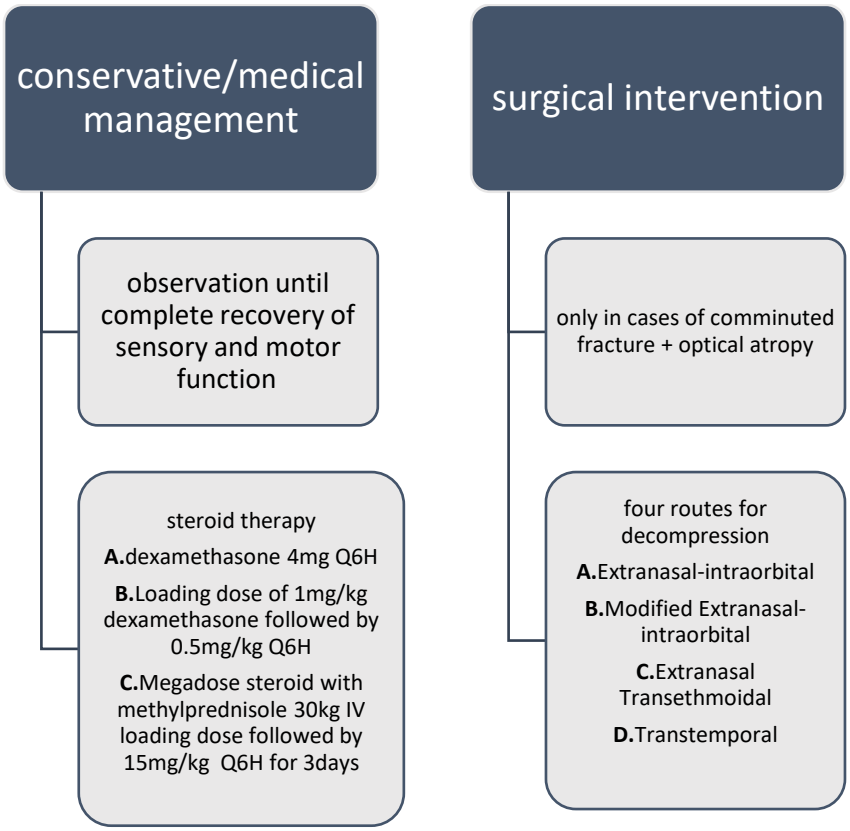
All of these clinical signs present in various degree depending upon the severity of injury and stage of healing. CN III,V and the nasociliary nerve passing through a tendinous ring are more susceptible to compression injuries than the other contents of the superior orbital fissure. Complete / partial involvement of these three nerves is indicated by the term "partial superior orbital fissure syndrome''. In SOFS the optic nerve and the vision is usually unaffected; if the optic nerve gets involved and if there is a subsequent compromise of vision the condition is termed as "orbital apex syndrome" coined by kjaer[9].

4. RADIGRAPHIC CONSIDERATIONS:

Diagnosis is usually based on the clinical symptoms and radiographic examination. However a plain film cannot be obtained in case of severely traumatized patients. In such patients Caldwell projection[10] is used which is a 20 – 25 degree tilt of the head that facilitates optimal projection of the superior orbital fissure.

CT scan serves as an excellent tool for the diagnosis of SOFS. CT slices of 2mm thickness are usually recommended for visualization of any compression around the fissure. The development of new spiral CT serves as a promising tool for improving the accuracy of a radiographic diagnosis by providing clear details of the SOF in axial and coronal projection without the need for neck extension.

TREATMENT:



5. REFERENCES:

[1] Banks P. The superior orbital fissure syndrome. Oral Surg Oral Med Oral Pathol 1967;24:455–458
[2] Rochon-Duvignaud A. Quelques cas de paralysis de tous les nerfs orbitaires (ophthalmoplegia totale avec amaurose et anesthesia dans le domaine de l'ophthalmique), d'originesyphilitique. Arch Ophthalmol (0aris) 1896;16:746–60.
[3] Pogrel MA. The superior orbital fissure syndrome: Report of a case. J Oral Surg. 1980;38:215–7.
[4] Llorente Pendas S, Albertos Castro JM. Traumatic superior orbital fissure syndrome: Report of a case. J Oral Maxilofac Surg. 1995;53:934–6.
[5] Lakke JP. Superior orbital fissure syndrome. Report of a case caused by local pachymeningitis. Arch Neurol 1962;7:289–300
[6] Berlit P, Tomow K: Zur Differentialdiagnose des Fissura-orbit- alis-superior-Syndroms. Schweiz Med Wochenschr 118: 1104, 1988
[7] Bowerman JE: The superior orbital fissure syndrome complicat- ine fractures of the facial skeleton. Br J Oral Surg 7: 1, 1969 7
[8] Kjaer I. A case of orbital apex syndrome in collateral pansinusitis. Acta Ophthalmol (Copenh) 1945;23:257
[9] Bun RJ, Vissink A, Bos RR. Traumatic superior orbital fissure syndrome: report of two cases. J Oral Maxillofac Surg 1996;54:758–761