Post Traumatic Orbital Decompression: Our Experience

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Abstract

This study is an analysis of five cases of orbital trauma causing proptosis, paralysis of extraocular muscles with or without associated visual failure. All the cases were treated by a ENT and Neurosurgical team. Either a frontal craniotomy or a lateral orbitotomy was performed. Plain X-rays of the skull and Computerised Tomography (C.T. Scanning) were the main investigations. Results were encouraging both functionally and cosmetically. Early diagnosis and an aggressive approach to orbital decompression can achieve good results.

Keywords: *Head Injury, Proptosis, Head injury complications, Post traumatic blindness.*

Introduction

The exact incidence of orbital trauma remains unknown. Most of the cases are associated with concomitant head trauma. The incidence being less than 1%. The commonest cause is a frontal impact or a lateral blow to the orbital rim. Ecchymosis, swollen eyelids commonly follows head trauma, more so with orbital injury, thus an inability to perform a complete neuro-ophthalmological examination, especially in a patient who is obtunded following head injury are the two common reasons why these cases are usually diagnosed late. A complete neuro-ophthalmological, neurological examination and a thorough palpation of the orbital rims in all patient with ecchymosis and proptosis is mandatory. Plain X-rays of the skull, orbits and optic foramina along with C.T scanning in both coronal and axial sections gives adequate information as to the cause of proptosis and helps in selecting the operative technique if required.

Material and Method

Five cases of orbital trauma are discussed. SUMMARY : 1) Proptosis: 5/5 2) Paresis of extra ocular muscles: 5/5 3) Visual failure: 2/5 Plain X-rays of the skull, orbits and optic foramina were performed in all cases. Plain C.T Scans of the brain with axial cuts of the orbits and optic canals were performed in all five cases. Three cases were operated by a lateral orbitotomy (Kronlien's approach)[1]sub . The lateral wall of the orbit was excised followed by opening of the periorbita. The lateral orbital rim was preserved and re-approximated. Two patients underwent a frontal craniotomy and decompression of the orbital roof followed by opening of the periorbita to provide orbital decompression (Housepian's approach)[2] sub. Oneamong these two also underwent a de-roofing of the optic canal.

Result

The result were encouraging with hundred percent recovery.

DISCUSSION

Nature has protected both the eyes by providing the bony sockets (the orbits). Following trauma there is edema of the retro-ocular tissues which results in congestion of the veins which in turn increases the edema still further. The orbital walls with the eye ball and septum in the front result in a closed cavity. Edema and venous congestion push the eyeball forwards, this results in a stretch on the extraocular muscles and the nerves (hence the proptosis and ophthalmoplegia). This further compresses the draining veins. Once the limit of stretch is reached an abnormal intra-orbital pressure builds up which gradually occludes the retinal veins and later the

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retinal artery resulting in visual failure. The sequence of events is accelerated if there is a depressed fractures of the orbital wall and rim which has entered into the retro-ocular space. The accepted indications of emergency orbital surgery following orbital trauma are as follows: 1. Progressive visual failure : (Immediate loss of vision is considered to be due to vascular insufficiency and is not supposed to benefit by surgical decompression)[3] 2. Progressive proptosis : Either due to an expanding intra-orbital retro-ocular haematqma or due to progressive swelling of the retro-ocular tissues. 3. Radiologically demonstrated bony spicule pressing on the optic nerve in the canal. All the above indications give priority to visual failure. However, visual failure is not the only problem in orbital trauma. Acute proptosis also causes stretching of the nerves supplying the extra-ocular muscles and results in their paresis or palsy. Therefore relief of the raised intra-orbital pressure should also be treated on a priority basis. A paralysed eye with intact vision can be troublesome if not useless. In three of our cases a depressed fracture of the lateral orbital rim and wall was the cause of the proptosis and restriction of the extra-ocular movements. One amongst these three also had decreased visual acuity . Repositioning of the rim and provision of orbital decompression by (a) Excising that part of the greater wing of the sphenoid which forms the lateral wall of the orbit and (b) dividing the periorbita, resulted in an immediate improvement. The operation is not very major nor technically very demanding. The cosmetic results were also good. Two patients had a depressed fragment of the superior orbital rim and the roof of the orbit entering into the retro-ocular space, pushing the eyeball forwards and downwards and resulting in an inability to move the eyeball upwards. One patient also had visual failure. His vision had decreased to just perception of light. Both the patients were operated by the superior route (Housepian's approach). Following the operation, both the patients had immediate relief of the proptosis and upward gaze weakness. The vision returned dramatically following the operation in the patient who underwent optic nerve decompression for visual failure in addition to the orbital decompression. The superior orbital rim was preserved and re-approximated in both cases. We feel that this route should be chosen when a. orbital decompression is to be combined with a decompression of the optic canal, because no other approach gives such an excellent exposure and access to the optic canal. b. When there is a depressed fracture of the superior orbital rim along with the bones of the roof of the orbit. In such cases there may be associated injury of the frontal sinus. This results in a compound fracture even if the overlying skin is intact. Such fractures may be associated with a tear in the dura of the anterior cranial fossa. These cases are best dealt by the superior route. c. When there is an intra-orbital retro-ocular haematoma, as this approach gives a complete view and ability to control any unexpected bleeding vessel within the orbit. Before embarking on emergency orbital surgery a thorough ophthalmologic assessment is mandatory to exclude intra ocular causes of visual failure. In unconscious patients the pupillary reaction to light (both direct and consensual) gives a rough idea of the integrity of the second and third nerves. The dolls eye movement helps in assessing the extent of the extra-ocular movements (this manoeuvre should be done only after confirming that there is no associated cervical spine injury). C.T scanning of the orbit and cranium is mandatory before embarking on emergency orbital surgery. As thus the scan reveal the orbital anatomy in detail but also gives the opportunity to rule out any associated intracranial haematoma which may alter the surgical plan. We did not encounter cases with fractures of the floor or medial wall of the orbit. However, we feel that as these bones are relatively thin (apart from the rim) injuries will usually result in blow-out type of fractures resulting in enophthalmos rather than proptosis[4]. Visual failure as a result of raised intra-ocular pressure would be less likely due to the increased intra-orbital space. Visual failure if present would be either due to direct injury to the eyeball, or, vascular injury to the optic nerve. Restriction of extra-ocular movement due to the entrapment of the inferior oblique, inferior rectus and medial rectus muscles is possible. Such cases can be dealt with on an elective basis, the treatment of which has been discussed in great detail by Mustarde J.C.[5]

Conclusion

The incidence of orbital trauma requiring emergency surgery is negligible. We encountered only five cases in 2,000 consecutive cases of head trauma in a metropolitan hospital over a 2 year period. All the patients were males, reemphasising the increased incidence of head trauma in this sex. The indications for emergency orbital surgery following trauma should be: 1. Progressive visual failure. 2. Progressive proptosis a) due to edema of retroocular tissues. b) due to an expanding intra-orbital hernatoma 3. Radiologically demonstrated bony spicule pressing on the optic nerve. 4. Restriction of extra-ocular movements due to depressed bone fragment. All

the above problems may exist either singly or in various combinations. The main incriminating factor being, raised intra-orbital pressure. Plain X-rays of the orbits, optic canals and C.T scanning of the orbits and cranium are mandatory before embarking on emergency orbital surgery. Proper selection and early operation seem to be the keys to success.

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