Original Research Paper

Volume-7 | Issue-11 | November-2017 | ISSN - 2249-555X | IF : 4.894 | IC Value : 79.96

Ophthalmology

A CLINICAL STUDY OF OPTIC NERVE INVOLVEMENT IN HEAD INJURIES

P.R.Niveditha MS Ophthalmology, Assistant Professor, Kurnool Medical College, Kurnool.

D.Nischala Rama* MS Ophthalmology; Kurnool Medical College, Kurnool. *Corresponding Author

K.Revathy MS Ophthalmology, Professor of Ophthalmology, Kurnool Medical College, Kurnool.

ABSTRACT

INTRODUCTION: Optic nerve injuries either due to direct or indirect trauma can induce significant visual loss or even blindness. The treatment remains controversial despite several studies in the past few decades. The purpose of this study is to evaluate the effect of high dose Intravenous Corticosteroids in optic nerve injuries.

METHOD: A comparative study including total of 30 patients with head injuries were included who were conscious and had diminished vision after the head injury. A detailed clinical history and examination of the patient was done and investigated. Out of 30 patients, 9 of them were managed conservatively and 21 patients were given Intravenous Methyl Prednisolone in a dosage of 1 gm per day for 5 days which was followed by oral Prednisolone 1 mg per kg body wt for 3 days and tapered by 10 mg for every 3 days and the visual outcome at the end of 6 weeks was recorded.

RESULTS: In the present study, 67% of patients who received treatment and 44% who did not receive the treatment had significant visual improvement while 33% of patients who received treatment and 56 % who did not receive treatment showed no significant visual improvement.

CONCLUSION : The study showed that IVMP HAS NO STATISTICALLY SIGNIFICANT EFFECT ON VISUAL OUTCOME.

KEYWORDS : Traumatic optic neuropathy, IVMP, visual outcome

INTRODUCTION

Optic nerve injuries can be classified as two types, indirect traumatic optic neuropathy a commoner type of injury and direct traumatic optic neuropathy .Indirect traumatic optic neuropathy (ITON) is a condition in which a patient suffers head trauma and is found to have optic nerve damage due to loss of vascular supply due to shearing forces over pial plexus of optic nerve. In DTON, the optic nerve axons or vascular supply are directly damaged due to strain (as may be observed in an avulsion of the optic nerve), compression (as may be observed from edema or retro-orbital hemorrhage) or transection (as may be observed from a fracture in the optic canal). Patients suffering either ITON or DTON can experience profound vision loss after trauma. Prognosis is guarded in either situation. The treatment options available are masterly observation, administration of high dose Intravenous Corticosteroids, surgical decompression and a combination of both medical and surgical treatments.

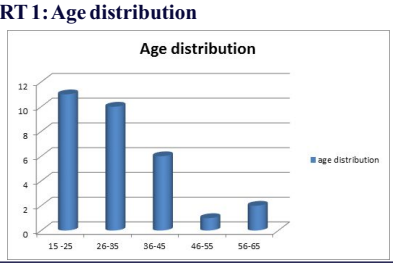
MATERIALS AND METHODS

A total of 30 patients aged 14 years and above admitted to the Department of Neurosurgery, Government General Hospital, Kurnool with history of diminished vision following head injuries are included. Patients with preexisting ocular diseases and altered sensorium were excluded. A detailed clinical history and examination of the patient was done which was followed by appropriate investigations (VEP,CT scan). Patients were counseled about the various modalities of management and their respective outcomes. Out of 30 patients, 21 patients were given Intravenous Methyl Prednisolone in a dosage of 1 gm per day for 5 days which was followed by oral Prednisolone 1 mg per kg body wt for 3 days and tapered by 10 mg for every 3 days and and 9 were managed conservatively with observation alone. The visual outcome at the end of 6 weeks was recorded.

OBSERVATIONS:

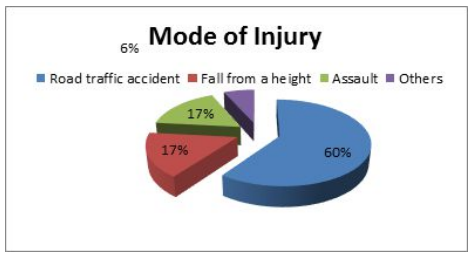
Out of 30 patients in this study 20%(n=6) were female and 80%(n=24) were male. patients 36.6%(n=11) are between 15 – 25yrs, 33.3% (n=10) are between 26-35 yrs, 20%(n=6) are between 36-45yrs , 3.3% (n=1) are between 46-55 yrs and 6.6%(n= 2) are between 56-65yrs.

BAR CHART 1: Age distribution



The commonest mode of injury was head on collision in Road traffic accidents in 60%(n=18),fall from a height and assault being 16.7% (n=5) each others being less common amounting to 6.6% of all cases.

PIE CHART 1:Mode of injury



Right eye was involved in 53.3% (n=16) and left eye was involved in 46.7% (n=14). The most common site of impact is at the frontal region 60% (n=18), followed by temporal region 23.3% (n=7) and 16.7% (n=5) had other sites like trauma over mid face in 6.6% (n=2) cases, over vertex in 6.6% (n=2) and in 3.3%(n= 1) the exact site of impact was not known to the patient.

TABLE 1.SITE OF IMPACT

Site of impact	Number	percentage
Frontal	18	60%
Temporal	7	23.3%
Others	5	16.7%
Total	30	100%

In 80% (n=24) patients, relative afferent pupillary defect was present and in 20% (n=6) cases, there was dialated fixed pupil. Fundus picture was normal in 63.3% (n= 19),temporal pallor of optic disc in 26.7% (n= 8) and a splinter hemorrhage was seen over optic disc in 10% (n=3)., 40% (n=12) had direct injury to optic nerve due to orbital fractures and 60% (n=18) had no evidence of direct injury to the optic nerve such as orbital fractures, VEP showed absent wave form in majority of cases 43.3%(n=13), followed by prolonged P100 latency in 40% of cases (n=12), while prolonged P100 latency with diminished amplitude was seen in 13.3%(n=4) of cases and the least common finding of diminished amplitude was seen in 3.33%(n=1).

TABLE 2. VEP FINDINGS

VEP findings	Number	percentage
Prolonged p100 latency	12	40%
P100 latency prolonged with diminished amplitude	4	13.3%

Diminished amplitude	1	3.33%
Absent wave form	13	43.3%
Total	30	100%

At presentation the Snellen visual acuity was >/=6/60 in majority of cases constituting to about 43.4%(n=13),counting fingers 3 meters to counting fingers 5 meters was seen in 20% (n=6), counting fingers 2 meters to perception of light present in 23.3% (n=7) ,and 13.3% (n=4) had no perception of light at presentation.

TABLE 3.VISUAL ACUITY AT PRESENTATION

VA	number	Percentage
PL-	4	13.3%
PL+ - CF 2m	7	23.3%
CF 3m – CF5 m	6	20%
>6/60	13	43.4%
Total	30	100%

PL-Perception of light, CF-counting fingers

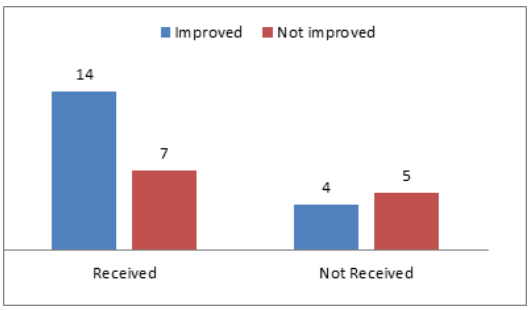
Out of 30 patients, 67% of patients who received treatment and 44% who did not received the treatment had significant visual improvement while 33% of patients who received treatment and 56 % who did not receive treatment showed no significant visual improvement.

Table 4: Visual outcome in two groups

Treatment with IVMP	Improved	Not improved	Total
Received	14 (67%)	7 (33%)	21
Not received	4 (44%)	5 (56%)	9
Total	18	12	30

IVMP: Intravenous Methyl Prednisolone

BARCHART 2 : VISUAL OUTCOME IN TWO GROUPS

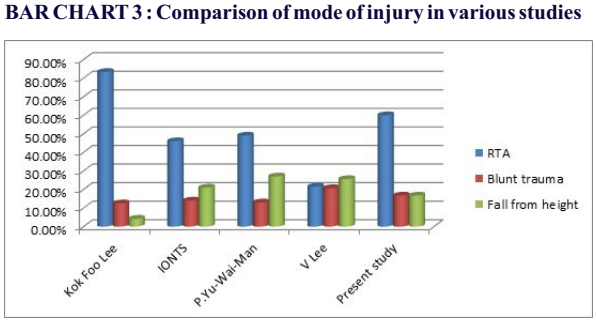


DISCUSSION:

Statistical analysis has been made with reference to several parameters and conclusions were drawn and compared with other series. Males are more commonly affected by head injuries with optic nerve involvement. This is in accordance with other studies where male preponderance was noted.[1,2,3] Our study showed that majority of patients were young and about 70% were below 35 yrs similar to study by P.Yu- Wai-Man with majority of cases in early 30s [2] A study by Pirouzmand F showed that out of 121 cases ,the median age was 31 years and 21% were younger than 18yrs [1] In a retrospective study by Kok Foo Lee[3] et al,the mean age was found to be 33yrs.

The most common mode of injury was road traffic accidents, which constituted to about 60% of all cases

BAR CHART 3 : Comparison of mode of injury in various studies



The retrospective study by Kok Foo Lee[3] et al showed that RTA was the most common mode of injury that lead to TON which constituted to about 83.3% while other causes like blunt trauma due to assault was 12.5%, Fall From Height was 4.2%.

The International Optic Nerve Trauma Study [4] which was a comparative non randomised interventional study also showed that the most common mode of injury associated with TON was RTA which constituted to about 46% followed by Fall from height 21% and blunt trauma 14%.

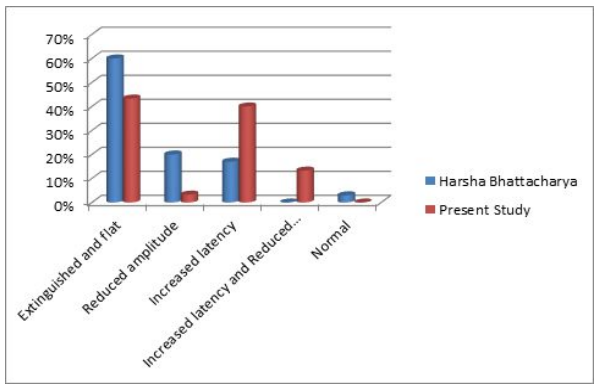
In a study by P.Yu-Wai –Man [2], the most common causes of TON were RTAs (49%),falls(27%) and assaults (13%).

A prospective study by V Lee [5] et al showed that RTA,blunt trauma and fall from height were the most important causes which were 21.5%,20.7%,25.6% respectively.

In the present study, the most common site of impact was the forehead on the same side constituting to about 60% followed by temporal region in 23.3% of cases and other regions like vertex and mid face constituted 16.7%.

A retrospective observational study by Harsha Bhattacharya et al [6] reported that the site of injury was typically located on ipsilateral superior temporal orbital rim over eyebrow at the extreme lateral end. Visually evoked potentials were done in all cases and the most common pattern was absence of wave form which was seen in 43.3% of cases followed by prolonged P100 latency in 40% of cases and 4% showed prolonged P100 latency along with diminished amplitude and the least common pattern was diminished amplitude alone constituting 3.3% no normal responses were recorded.

BAR CHART 4: Comparison of VEP findings



A Major review on traumatic optic neuropathy by Kenneth D Steinsapir [7] et al quoted that, the visual evoked potential (VEP) may be of use in the unresponsive patient suspected of having traumatic optic neuropathy.[8,9,10] In a retrospective observational study by Harsha Bhattacharya[6] et al, it was found that Flash VEP of the affected eye showed an extinguished and flat response in 21 (60%) cases (one had extinguished response even for 16 x 16, 32 x 32, 64 x 64), reduced amplitude in seven (20 %) cases, increased latency in six (17 %) cases and normal response was seen in one (3 %) case. In the present study, 67% of patients who received treatment and 44% who did not receive the treatment had significant visual improvement while 33% of patients who received treatment and 56 % who were observed without treatment showed no significant visual improvement. Chi square test was applied to the data and chi square value was 1.39. At significance level of $P<0.05$, chi square test showed that the p value is 0.25 which shows that the treatment with IVMP HAS NO STATISTICALLY SIGNIFICANT EFFECT ON VISUAL OUTCOME. The IONT[4] study concluded that no clear benefit was found for either corticosteroid therapy or optic canal decompression surgery . Steroids for traumatic optic neuropathy by Yu-Wai-Man P Griffiths PG [2] et al, and High dose corticosteroids for treatment of vision loss due to indirect injury to the optic nerve by Seiff SR[11]; concluded that the difference in visual outcome with IVMP was not statistically significant ($P = 0.38$).High-dose intravenous Methyl Prednisolone in recent traumatic optic neuropathy; a randomized double-masked placebo-controlled clinical trial by Morteza Entezari et al[12] study confirms earlier findings that there is no difference in visual acuity improvement between

intravenous high-dose corticosteroids and placebo in treatment of recent TNO.Visual outcome of traumatic optic neuropathy in patients treated with intravenous megadose of steroids A. Sadeghi-Tari et al [13] showed that IV megadose steroids had no clear benefit on the visual outcome of patients with TON Visual outcome following mega dose corticosteroid therapy in indirect traumatic optic neuropathy Dima Andalib et al [14] results demonstrate that the mega dose corticosteroid therapy has no significant effect on visual outcome of ITON.

CONCLUSION

Our study showed that corticosteroids do not seem to be effective and should be better avoided as the treatment with corticosteroids is not without potential complications. This study showed that Intravenous Methyl Prednisolone has clinically significant visual improvement but has no statistically significant effect on visual outcome in traumatic optic neuropathy.

REFERENCES

1. Pirouzmand F. Epidemiological trends of traumatic optic nerve injuries in the largest Canadian adult trauma center. J Craniofac Surg 2012;23(2):516–520.
2. P. Yu-Wai-Man, Traumatic optic neuropathy Clinical features and management issues , Taiwan Journal of Ophthalmology 5 (2015) 3e8.
3. Kok Foo Lee ,Nor Idahriani Muhd Nor,Azhany Yaakub et al : Traumatic optic neuropathy : A review of 24 patients.Int J ophthalmol, 2010, Vol 3 No.2 Jun 18.
4. Levin et al Treatment of Traumatic Optic Neuropathy, The International Optic Nerve Trauma Study; Ophthalmology 1999;106:1268–1277.
5. V Lee et al, Surveillance of TON in the UK, Eye (2010) 24, 240–250
6. Harsha Bhattacharjee, Kasturi Bhattacharjee, Lokesh Jain, Gitumoni Sarma, Angshuman Sen Sarma, Jnanankar Medhi, Dipankar Das, Sanjoy Kr Buragohain Indian J Ophthalmol. 2008 Nov-Dec; 56(6): 475–480.
7. Steinsapir KD, Goldberg RA. Traumatic optic neuropathy. 1994;38:487-518
8. Nau HE, Gerhard L, Foerster M, et al: Optic nerve trauma: clinical, electrophysiological and histological remarks. Acta Neurochir (Wien), 1987, 89:16-27.
9. Feinsod M, Auerbach E: Electrophysiological examinations of the visual system in the acute phase after head injury. Eur Neural, 1973, 9:56-64,
10. Feinsod MM, Rowe H, Auerbach E: Changes in the electroretinogram in patients with optic nerve lesions. Dot Ophthalmol, 1971, 29: 169-200.
11. Seiff SR; High dose corticosteroids for treatment of vision loss due to indirect injury to the optic nerve;Ophthalmic Surgery[1990, 21(6):389-395
12. Entezari, M., Rajavi, Z., Sedighi, N. et al. Graefes Arch Clin Exp Ophthalmol (2007) 245: 1267. doi:10.1007/s00417-006-0441-0
13. A.Sadeghi-Tari et al: Visual Outcome of Traumatic Optic Neuropathy in patients treated with Intravenous Megadose of Steroids; Acta Medica Iranica 2005. 43(2):110-114.
14. Andalib D, Niyousha MR, Heidari R, Mesbahi R. Visual outcome following mega dose corticosteroid therapy in indirect traumatic optic neuropathy. J Am Sci 2013;9(7s):142-144.