

HAEMOTOXIC SNAKE BITE- HOW CHALLENGING FOR AN OPHTHALMOLOGIST!Santanu Sinha Babu¹, Md. Nazarul Islam², Prasenjit Maiti³¹Third Year Postgraduate Trainee, Department of Ophthalmology, R. G. Kar Medical College and Hospital, Kolkata, West Bengal.²Associate Professor, Department of Ophthalmology, R. G. Kar Medical College and Hospital, Kolkata, West Bengal.³Professor, Department of Ophthalmology, R. G. Kar Medical College and Hospital, Kolkata, West Bengal.**ABSTRACT****BACKGROUND**

Snake bite is a common and dangerous public health problem. It evokes primordial fear in human beings. Still the public health importance of snake bite has widely been neglected. Though ophthalmological manifestations are uncommon, there are very few community-based surveys on ocular manifestations related to haemotoxic snake bite in West Bengal. We wanted to assess the prevalence and pattern of ocular morbidity due to haemotoxic snakebite among the patients in a tertiary care hospital and evaluate the causes of vision loss following haemotoxic snakebite in rural West Bengal.

METHODS

One hundred and ten patients (n=110) of haemotoxic snake bite cases admitted at R G Kar Medical College have been studied between February 2018 to January 2019. All the admitted patients were initially managed in the Medicine department and ocular examination was done after stabilization of the patients. This is a cross sectional observational study.

RESULTS

Males were the most common victims. Sub conjunctival haemorrhage (10%) followed by acute anterior uveitis (7%) was the most common anterior segment finding. Cotton wool spots and retinal haemorrhage were the most common posterior segment findings. Other findings were chemosis, episcleritis, scleritis, eyelid swelling, keratomalacia, endophthalmitis and angle closure glaucoma. Other findings were vitritis, vitreous haemorrhage, macular infarction, central retinal artery occlusion, exudative retinal detachment and optic disc swelling. One case of direct ocular injury was seen from ocular bite resulting in conjunctival and corneal laceration.

CONCLUSIONS

It is very essential to limit the vision loss and minimize the ocular side effects especially in rural hospital. It is very challenging and special training to ophthalmologist at primary level may be necessary for diagnosis and management of such type of cases.

KEYWORDS

Haemotoxic Snake Bite, Ocular Morbidity, Vision Loss

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BACKGROUND

Snake bite is a very common and dangerous public health problem, especially in rural areas of tropical and sub-tropical countries.¹ India is one of the high prevalence countries including rural areas of West Bengal. It evokes an innate and primordial fear in human beings, and it is an old, deeply entrenched form of prejudice, born of ignorance and perpetuated through superstition and myth. The public health importance of snake bite has widely been neglected. As a result, snake bite was included in the list of neglected tropical diseases declared by WHO in the year 2009.^{2,3}

Snake venoms is a complex mixture of proteins which is responsible for both haemotoxic and neurologic dysfunction.⁴ Though ophthalmological manifestations are uncommon, however, if involved vision losses are often associated with various vascular, neurological manifestations or from direct ocular inoculation.⁵ There are very few community-based surveys on ocular manifestations related to haemotoxic snake bite in West Bengal. It is estimated that under-reporting related to ocular manifestations is likely to occur in most states of India including West Bengal where snake bite is prevalent. So our purpose of the study is to assess the cause of ocular morbidity and to limit vision loss due to haemotoxic snakebite as much as possible.

We wanted to assess the prevalence and pattern of ocular morbidity due to haemotoxic snakebite among the patients in tertiary care hospital and evaluate the causes of vision loss following haemotoxic snakebite in rural West Bengal.

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METHODS

Our study was conducted on 110 patients (n=110) of diagnosed haemotoxic snakebite admitted at the department of Medicine, R. G. KAR Medical College, Kolkata, West Bengal. Study time was one year, from February 2018 to January 2019. All participants were informed about details of the study before signing the consent. The clinical datas about age, sex, symptoms, signs, complications were recorded through structured questionnaire. Ophthalmic examination was done in all admitted patients irrespective of their complaints because most of the patients were systemically unstable and unable to speak their complaints. Care has been taken to minimize the risk of missing and erroneous data. Data has been cleaned and entered on specially designed data analysis sheet. The following materials have been used- 1. A formulated case record form, 2. Consent form, 3. Torches / spotlights with batteries, 4. Snellen's distant vision chart, 5. Ishihara's pseudoisochromatic chart, 6. Slit lamp biomicroscopy, 7. Direct and indirect ophthalmoscope, 8. +90D biconvex lens, +20D biconvex lens, 9. Applanation tonometry, 10. Mydriatics- Tropicamide ophthalmic solution 1%, 11. Spirit, 12. Dry gauze, 13. Gloves, 14. Mask.

Study Design

Cross sectional observational study.

Inclusion Criteria

1. Patients admitted in the department of General Medicine with history of haemotoxic snakebite (Usually Russell's viper).
2. Any age of the patient from younger to older.

Exclusion Criteria

1. Dying and systemically unstable patients.
2. Associated systemic infections like HIV and TB.
3. Autoimmune disease or any other pre-existing ocular disease.

Study Technique

Patients were recruited daily from the Department of General Medicine indoor. The aims and procedures of the study were explained to all eligible patients in their own language and consents was taken. Then data were collected using interview, clinical examination. Only visual symptoms of patients have been assessed. The ocular examination has the following format-

1. Best Corrected Visual Acuity (BCVA) test
 - Snellen's distant vision chart.
 - Jaeger near vision chart.
2. Colour vision test
 - Ishihara's pseudoisochromatic chart.
3. Tonometry
 - Goldmann applanation tonometry.
4. Anterior Segment Examination
 - Slit lamp biomicroscopy
5. Dilated fundus examination with mydriatics
 - 90 D slit lamp
 - Direct ophthalmoscopy
 - Indirect ophthalmoscopy by 20D lens.

Statistical Analysis

Complied data were analysed by statistical software SPSS. The data were presented by mean ± Standard deviation for continuous variables and frequency with their relative percentages were given for categorical/qualitative variables.

RESULTS

A total of 110 patients diagnosed as haemotoxic snakebite were admitted in the department of Medicine, R G Kar Medical College over a one-year period. Sixty-four cases (58%) out of 110 victims had ophthalmological manifestations. Age of the patients were between 15 to 70 years (Table 1). All the admitted patients were initially managed in the Medicine department and ocular examination were done after stabilization of the patients.

Age in years	Frequency	Percent
15-20	12	10.9%
21-30	6	5.4%
31-40	34	30.9%
41-50	36	32.7%
51-60	16	14.5%
61-70	6	5.4%

Table 1. Age-Wise Distribution of Patients (n=110)

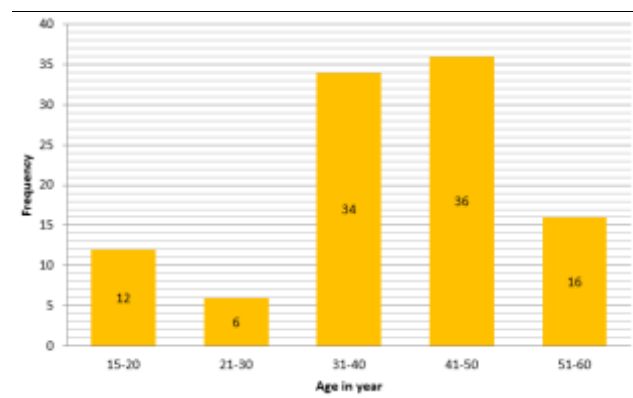


Figure 1. Gender Distribution of Study Population (n=110)

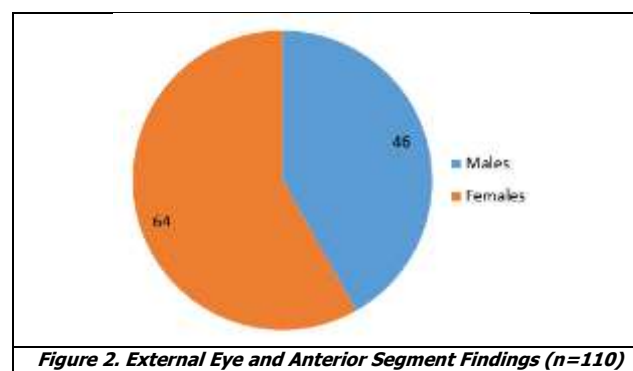


Figure 2. External Eye and Anterior Segment Findings (n=110)

External Eye and Anterior Segment Findings (n=110)

A total of 28 patients (25%) had anterior segment lesions among ocular manifestations. The most common anterior segment finding was sub conjunctival haemorrhage (12 patients, 10%) followed by anterior uveitis. Other lesions seen in the anterior segment were eyelid swelling, chemosis, episcleritis, scleritis, angle closure glaucoma. One case of direct ocular injury was found from ocular bite resulting in

conjunctival and corneal laceration as a result of direct intra ocular injection of venom.

Posterior Segment Manifestations

A total of 20 patients had chorio retinal lesions among ocular manifestations. The most common finding was retinal haemorrhage followed by cotton wool spots. Other lesions were cystoids macular oedema, vitritis, vitreous haemorrhage, macular infarction, exudative retinal detachment.

Neuro-Ophthalmological Findings (n=110)

Disc swelling was the most common finding among neuro ophthalmic lesions found in 12 patients. Two patient had hyperaemic discs. Optic disc findings are given in Table 4.

External and Anterior Segment Findings	No. of Patients	Frequency (Percent)
Sub conjunctival haemorrhage	12	10
Anterior uveitis	8	7
Eyelid swelling	16	14
Chemosis	6	5
Episcleritis	4	3
Scleritis	3	2
Keratomalacia	1	0.09
Conjunctival and corneal ulceration	1	0.09
Endophthalmitis	1	0.09
Angle closure glaucoma	4	3

Table 2. The Results of External Eye and Anterior Segment Examination

Posterior Segment Findings	Number of Patients (n=110)	Frequency (%)
CWS alone	8	7
CWS and retinal haemorrhages	6	5
1-4 retinal haemorrhages	12	10
>25 retinal haemorrhages	6	5
Vitritis	8	7
Vitreous haemorrhage	4	3
Exudative retinal detachment	2	1
Macular infarction	1	0.9
Central retinal artery occlusion	2	1
Cystoid macular oedema	8	7

Table 3. Posterior Segment Manifestations

Disc Finding	No. of Patients	Frequency (%)
Bilateral discs swelling / papilloedema	8	7.2
Hyperaemic discs	1	0.9
Unilateral disc swelling	4	3.6
Optic neuritis	2	1

Table 4. Disc Findings

Visual Acuity	No. of Patients
Better than or 6/12	28(25.4%)
Between 6/12 and 6/60	64(58.1%)
Worse than 6/60	18(16.3%)

Table 5. Visual Impairment in Eyes with Ocular Lesions (n=110)



DISCUSSION

Various studies already done previously, clearly states that snake bite needs to get more importance not only for systemic morbidity but also for visual prognosis or early visual outcome. From governmental data it has been clearly reported that number of snake bite death are much higher than malaria death in rural West Bengal. Without early and rapidly intervention, haemotoxic snake bite may cause rapid visual loss which may be permanent. Haemotoxic snake venom contains more than twenty different polypeptides, proteins, enzymes and various other toxic and lethal substances.⁶ It causes haemorrhage, fibrinolysin, prothrombin activation, platelet aggregation inhibition. Ultimately it causes loss of integrity of endothelial cells in retinal vasculature causing extravasation. Snake venom serine proteases (thrombin like enzymes) are known to cause degradation of fibrinogen into fibrinopeptides.⁷

From our study, we revealed that males were the most commonly victims because of their activities in outdoor procedures. Ocular manifestations were common in

haemotoxic snake bite. Loss of vision was usually affected when ocular changes particularly involved macula and it was usually gradual onset, painless. In case of exudative retinal detachment, vision loss was sudden onset and patient needed intervention as soon as possible. External and anterior segment findings revealed that sub conjunctival haemorrhage, bleeding underneath the conjunctiva were very common and sometimes it was the only sign without any loss of vision. Blood testing revealed decreased platelet count. A bright red patch was seen beneath the clear lining of the conjunctiva. It was usually self-limiting. It usually resolved after two to three weeks. Second most common finding was acute anterior uveitis.^{8,9} On examination, best corrected visual acuity was normal in most of the cases. There was history of pain and redness and anterior chamber showed grade 3-4 cells and flare and keratic precipitates, sometimes posterior synechiae. In maximum number of cases, other ocular examination was normal. Sub conjunctival haemorrhage and hyphema were occurred possibly due to the systemic haematotoxicity. Few patients presented with acute angle closure glaucoma with signs of hazy and oedematous cornea, shallow anterior chamber and mid dilated fixed pupil with no response to light. Intra ocular pressure raised up to 40 to 50 mm of Hg and patient needed urgent intervention. Ciliary body oedema and forward movement with papillary block were possibly responsible for angle closure glaucoma. Other ocular manifestations were chemosis, eye lid swelling, episcleritis, scleritis and keratomalacia in one case possibly due to collagenase causing stromal lysis. One case of conjunctival and corneal laceration occurred due to direct injury to the eye with bite marks. One case of endophthalmitis was seen possibly due to direct toxicity of venom or anti snake venom and patient gave history of swollen eyelid, red eye and vision reduced to perception of light.¹⁰

Posterior segment findings were mainly involvement of vitreous and retina. In case of retina, cotton wool spots and retinal haemorrhages were common. Two case showed feature of central retinal artery occlusion. Vitreous haemorrhages and vitritis were also other findings.^{11,12,13} One case of exudative retinal detachment was reported. It is possibly due to capillary damage resulting in choroidopathy and it causes massive fluid exudation into the sub retinal spaces resulting in exudative retinal detachment. The leak in RPE was treated with laser photocoagulation in exudative retinal detachment. Though neuro ophthalmological findings were rare, optic neuritis, disc swelling, disc hyperaemia were seen in some cases.

CONCLUSIONS

Haemotoxic snake bite is one of the most common public health problems in rural West Bengal. It can result in significant anterior and posterior segment involvement of eye. History of vision loss is more in case of macular involvement. From the study, a preliminary idea regarding

external ocular findings and fundus pictures were obtained and various typical and atypical findings have been seen. It is very essential to overcome the vision loss as much as possible and minimize the ocular side effects especially in rural hospital. It is really very challenging and Special training to ophthalmologist at primary level may be necessary for diagnosis of such type of cases.

Abbreviation

WHO: World Health Organization

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immune Deficiency Syndrome

BCVA: Best Corrected Visual Acuity

RPE: Retinal Pigmented Epithelium

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