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Original Research Article

Descriptive Study on Tarantula (Hairy Spider) Setae Induced Ophthalmic Lesions

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Conflict of interest: Nil

Abstract

Aim: The Aim of this study is to report the ocular clinical manifestations, course, outcome following the entry of Tarantula [Hairy spider] setae into the eye, and to create awareness among general practitioners for timely referral.

Materials and Methods: This descriptive study included twenty-two patients from July 2021 to December 2022 for 18 months at a tertiary Eye care centre, Ariyalur Medical College, Ariyalur, Tamil Nadu with Tarantula [Hairy Spider] induced ophthalmic lesions. Patients were retrospectively reviewed for clinical features, site of lodgement of tarantula setae, demographic factors, management methods, follow-up and outcomes. The common clinical manifestations include catarrhal conjunctivitis, keratoconjunctivitis, conjunctival nodules, keratitis, iridocyclitis, iris nodules, vitritis, papillitis, or chorioretinopathy. This can occur due to direct mechanical injury with or without penetration of setae or a local toxic reaction. Ocular inflammatory reactions due to urticarial toxins released from setae of insects is graded according to CADERA classification.

Results: If any visible hairs identified inside eye were removed from all patients with suture tying forceps. Majority of patients were fit with type 1 [conjunctival chemosis and inflammation] and also with type 2 [keratoconjuctival involvement with corneal abrasions].

Conclusion: Ophthalmic lesions due to Tarantula setae is relatively common in rural and forest areas. It has good visual outcome with timely referral and appropriate management.

Keywords: Tarantula, Setae, Ophthalmitis, Toxins.

Introduction

Tarantula hair induced ophthalmitis is an inflammatory response due to motion and urticarial toxin of hair. It is mostly a harmless condition and responds to conservative management. Rarely intraocular penetration of setae causes serious complications, which requires surgical management. Cadera W patchman et al.[1] in his study reported wide variety of cases with ophthalmic inflammations due any insect hair/ caterpillar hair. He also provided a clinical

classification regarding insect setae induced ophthalmitis. This clinical classification is considered as a hallmark of insect setae induced ophthalmitis, worldwide. So, this following classification is used to categorise patients in our study.

Clinical classification of ocular inflammatory lesions due to any Insect setae by Cadera[1] as follows:

- TYPE1- Conjunctival chemosis and inflammation due to acute anaphylactoid reaction.
- TYPE2- Chronic keratoconjunctivitis and linear corneal abrasions caused by lodging of hair.
- TYPE3- Granulomatous nodules in the conjunctiva.
- TYPE4- Iritis due to penetration of setae into anterior segment.
- TYPE5- vitreoretinal involvement due to penetration of setae into posterior segment.

It has variable presentation depend on site of lodgement of setae. The clinical presentation includes conjunctivitis, keratitis, keratoconjunctivitis, punctate epithelial erosions, iritis, Types of congestion includes both conjunctival and circumcorneal congestion. If setae present in superficial parts of eye which manifests as conjunctival congestion. Circumcorneal congestion is manifested if patients had anterior uveitis. Type-1 involvement is an immediate reaction due to anaphylaxis, induced by lodging of setae in conjunctiva, which manifests as conjunctival chemosis and inflammation. This can last for two weeks also. Type-2 involvement due to mechanical rubbing of hairs on conjunctiva and cornea, which produces keratoconjunctivitis. Type 1 and 2 involvements are common. Type- 3 involvement manifests with granulomatous nodules present in conjunctiva. Type-4 involvement is presented only with corneal penetration of hair inside anterior chamber which manifests as iritis with iris nodule and rarely associated with hypopyon. Type 5 with vitreoretinal involvement due to penetration of setae into posterior segment. Type 4 and Type 5 involvements are rare only. Both Type 4 and Type 5 involvements have examined with complete posterior chamber evaluation with fundus examination with indirect ophthalmoscopy.

Majority of studies were done regarding association of ophthalmitis induced by caterpillar hair or other unspecified insect hair. But our study exclusively reveals tarantula [hairy spider], which predominantly present in our rural and forest areas. Basis of our study is to identify the risk factors, clinical spectrum, and to create awareness among public and general practitioners for early referral of patients.

Material and Methods

A retrospective analysis of twenty-two patients of Tarantula hair induced ophthalmic lesions diagnosed from July 2021 to December 2022 for the period of 18 months was done.

Inclusion Criteria: All patients with definite history of tarantula hair contact exposure with eyes, irrespective of age included.

Exclusion Criteria: Patients not compliant to treatment and follow-up

Study Procedure

Descriptive study with retrospective review of computer-based hospital data base between July 2021 to December 2022. Complete ophthalmic Evaluation including Best corrected visual acuity, Intraocular pressure with non-contact tonometry and with slit lamp examination. Children were examined through magnified loupe with speculum. 6 out of 22 patients were pediatric patient. In adults it was commonly seen in agricultural workers whom residing at village and forest area. According to the site of

Lodgment of Tarantula hair, 9 cases had setae lodged in upper tarsal conjunctiva, 5 cases in lower tarsal conjunctiva, 4 cases in bulbar conjunctiva, 3 cases in cornea and 1 case in anterior chamber.

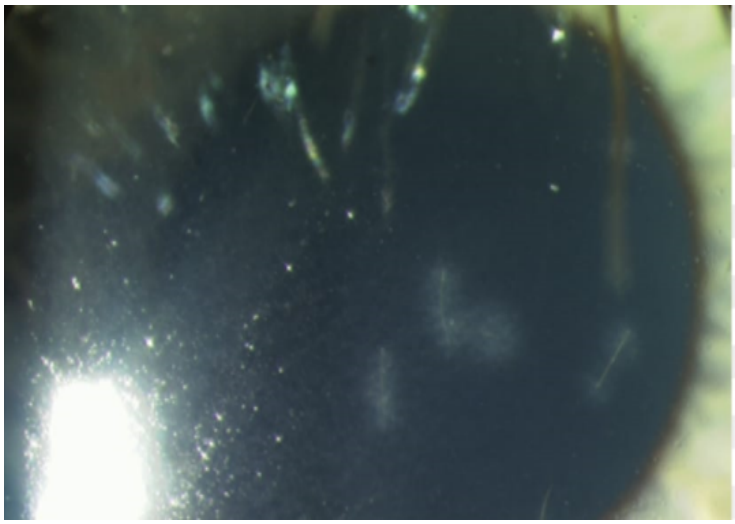


Figure 1. Clinical picture of tarantula hair inside *eye*

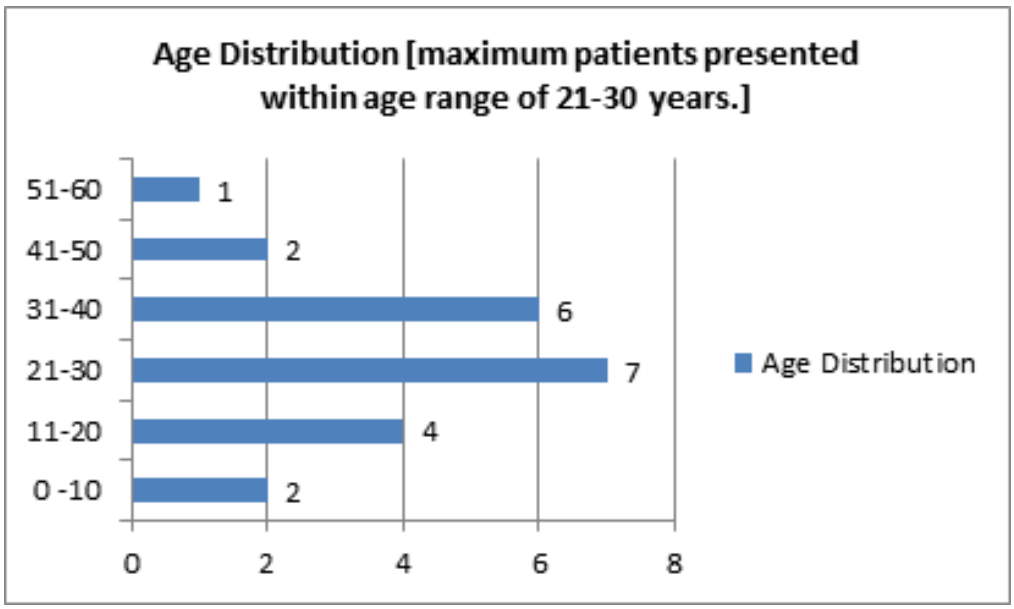
Management

First priority in management was removal of visible superficial hair. Medical treatment includes topical lubricants, NSAID, antibiotic eye drops. If patients had anterior uveitis, steroids and cycloplegics eye drops were added. Systemic steroids were given when posterior segment was involved.

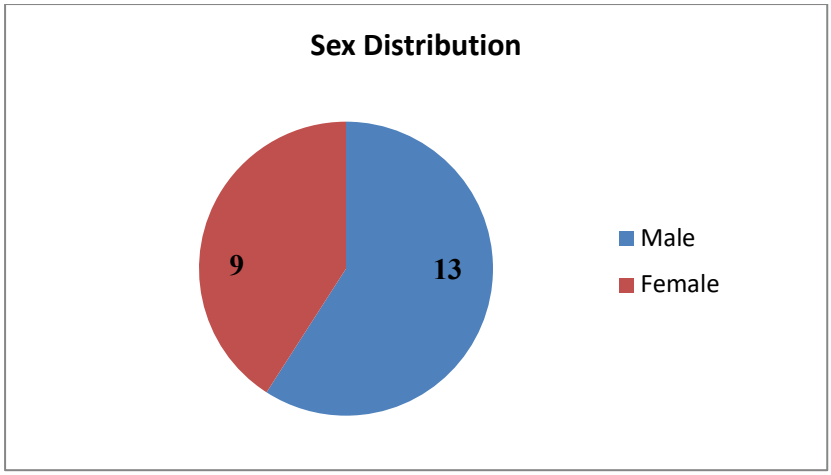
Statistical Analysis

Descriptive statistics analysis was carried out including frequency and percentage. The results of the study were tabulated.

Results



Graph 1: Age Distribution



Graph 2: Sex Distribution

Table 1: Demographic Factors [male preponderance is more than female]

Demographic characteristics	No. of patients
Occupation- Child/ student	6
Farmer	10
Worker	5
Professional	1
Socioeconomic status- High	3
Lower	19

Table 2: Anatomical location of the lodgement of the hair

Location of hair	Absolute number of cases	Percentage
UTC	9	40.9
LTC	5	22.7
Bulbar conjunctiva	4	18.1
cornea	3	13.6
Anterior chamber	1	4.5

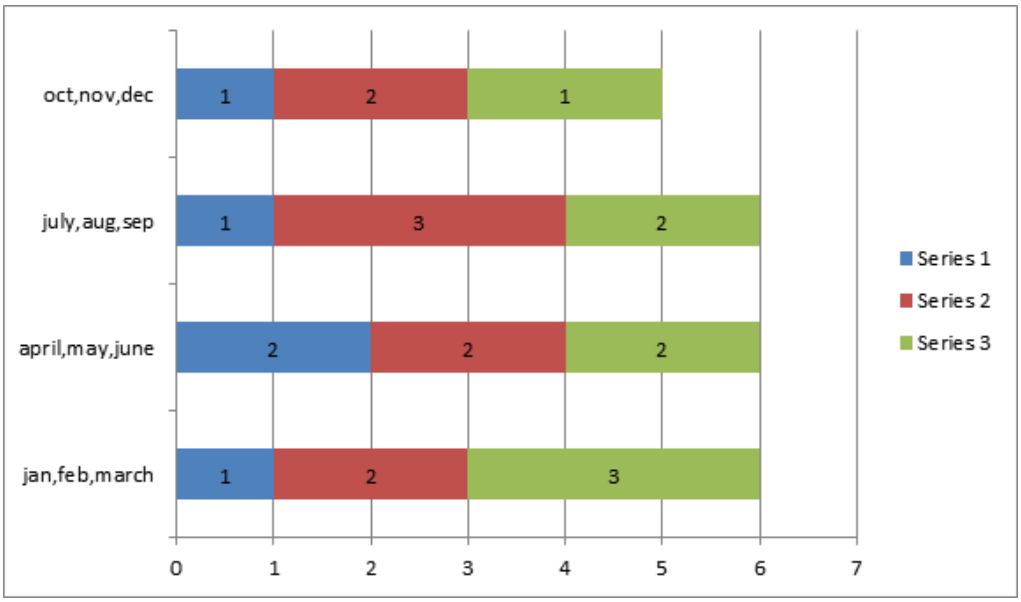
Among the total twenty-two patients with a history of ocular exposure with Tarantula hair, 15 patients had Type 1 involvement and seven patients with Type 2 involvement.

Most of them have type 1 and 2 involvement only. Among 22 patients 13 patients were male and 9 were female. Males are predominantly involved in this study may be due nature of work. Maximum 7 patients involved in the age range of 21-30 years may be due to excess outdoor activities. Children and old age persons are less commonly involved, may be due to reduced outdoor activities. Most of the 10 patients were agricultural field workers by occupation and from low socio economical status.

The time interval between injury and presentation ranged from 6 hrs. to one week. 16 patients presented within 24 - 48 hours of ocular exposure. 19 patients attended hospital for treatment in the acute stage, i.e., within 2 weeks of injury and 3 patients in chronic stage. Most of patients presented with Redness [76%], foreign body sensation [60%], pain [45%], lacrimation [26 %], photophobia [5%]. Clinical spectrum includes congestion [72%], papillary reaction [56%], corneal abrasions [34%], superficial punctuate keratopathy [9%], iritis [17%]. One patient presented with conjunctival nodule. Resolution of symptoms occurred within three days to two weeks.

Visible hairs were meticulously

identified and removed from most of the patients. Saline irrigation was done for 9 patients with excess quantum of hair. Maximum follow up period included in this study was one month only. During last visit of followup, mild conjunctival congestion was present in 4 patients. Corneal scarring was seen in 3 patients. Deep stromal involvement of hairs presents in one patient. Punctate epithelial erosions were seen in 5 patients. Anterior chamber reaction in form of cells and flare was seen in 7 patients. Two to three sittings of hair removal were needed for 6 patients Topical antibiotic eye drops, ointment, steroids, and cycloplegics were given. One month of compulsorily follow-up was done for each patient. Deep penetration of hair inside anterior chamber was also present in our study. Posterior chamber involvement was not present in our study. Cases are more or less evenly distributed throughout the year. Even though case frequency is less in winter season [October, November, December] in our study.



Graph 3: Bar Chart – Month Wise Case Distribution [case frequency is less in winter season [Oct., Nov., Dec.]

Discussion

Mangat SS et al. [2] reported and published a six cases of tarantula spider hair induced keratitis [2]. But in our study, we have reported twenty-two cases for the period of 18 months.

Bernarido CR et al. [3] reported and published a 29-year-old single male case with corneal involvement CADERA [1] W Patchman et al. classified ocular inflammatory lesions due to any insect hair and caterpillar hair.

Spectrum of clinical features was coined as ophthalmia nodosa by Pagenstecher in 1883. First case of ophthalmia nodosum was reported at the year of 1968 in India. A study by Sethi PK Dwivedi reports that majority of cases present between July to September. In western studies, cases were more in December and January because of windy harvest season. But in our study, case distribution was even throughout the year and mild decline of cases in winter season was present.

Duke Elder et al. [4] described that there is quiescent interval of 3-5 days., followed by recurrence of symptoms. Moreover, we found less than 24 hour of interval period found in almost all of cases. Most of western studies denoted barbed hair in

their studies, whereas in our study we identified smooth, non-barbed hair through microscope in majority of cases. Duke elder reported wide variety of cases including conjunctivitis, keratitis, keratoconjunctivis, iritis, anterior uveitis, vitritis, retinochoroiditis. He identified hazy ocular media in some cases due to vitreal inflammation. He graded vitritis according to severity of vitreal inflammations. Fundus examination done for all suspected vitritis cases and treated with intravitreal steroids in his study.

Tarantulas consist of a big group of spiders with setae of the family Theraphosidae. Most of the species have setae known as urticating hairs that contain toxins, which commonly produce irritation to the skin, and cause ophthalmic inflammations. Ophthalmia nodosa was initially described in 1904 as granulomatous nodules which predominantly found in conjunctiva and iris in response to urticating capillary hairs. But at present the same term is used to denote any ophthalmic reaction to vegetation or insect hairs. There are four types of insect hairs, which is distinguished by their barbs pattern. Type III hairs are approximately 0.1–1.3 mm long. They have shafts with a sharp-pointed heads. Type 3 hairs have enormous barbs. They strike like pinpointed arrows, and they are able to penetrate deeply into tissues. Tarantula hairs resemble caterpillars' hairs in their anatomical pattern. Setae of tarantula exposed into eyes while doing agricultural field works at rural, forest areas. Tarantula hair exposure into eyes may be due to direct contact. Sometimes, indirect contact also occurs due to windy exposure. They usually migrate aimlessly and cause multiple foci of inflammation in all segments of the eye. Tarantula hairs have been shown for superficial and deep penetration into the dermal layer of human skin and through corneal layers. This mechanical process is further induced by eye rubbing. They are clinically manifested as urticaria of skin, chronic kerato-conjunctivitis, acute iritis, and chronic iris granuloma. Vitritis, cystoid macular oedema, papillitis and punctate chorioretinitis. Secondary glaucoma due to acute and chronic longstanding inflammation inside anterior chamber which can transiently raise in intra ocular pressure due to trabecultis. Those patients with glaucoma are usually treated with antiglaucoma medications like timolol and brimonide. Prostoglandins are avoided in those patients, as it may aggravate iritis. Rarely association of cataract was also present in literature. Due to forceful striking force of insect, may subsequently produce migration of lens epithelial cells and cause cataract in some cases. [5]

The chorioretinal lesion is believed to represent the reaction due to intraocular migration of hairs into posterior chamber. For all cystoid macular edema cases, OCT images must be taken. All macular edema cases are responsive to intravitreal steroids. Commonly used intravitreal injection to reduce macular edema is triamcinolone. But triamcinolone injected patients must be followed periodically to monitor side effects of increased intraocular pressure. Some patients were reported with cataract also after injection of intravitreal steroids. Rarely patients with endophthalmitis must be treated with intravitreal antibiotics and steroids. All patients with any type of involvement according to cadera[1] to be followed up with visual acuity during each visit. Anterior segment examination only is done for all Type 1 patients. But If any Type 1 patient complaints of reduction in visual acuity during subsequent visits, posterior segment examination with indirect ophthalmoscopy is mandatory. Both anterior segment and posterior segment evaluation is done for both Type 4 and Type 5 patients. Chronic anterior uveitis may also identify during subsequent visits among Type 1 and Type 2 patients. Patients with anterior uveitis, to be

evaluated for intraocular pressure, and visual acuity during each visit. In case of anterior chamber reaction, cells and flare to be evaluated. Anterior chamber grading of cells and flare to be done with SUN classification. Each visit is to be evaluated for grading of anterior chamber cells and flare. Aggravation or reduction of anterior chamber cells and flare is to be monitored and recorded during each visit. Treatment options are to be tailored and monitored according to that anterior chamber reaction. If anterior chamber reaction is more, steroids and cycloplegic eye drops are used along with antibiotic drops to prevent secondary infection. Oral antihistamine tablets and non-steroidal inflammatory drugs are also used to reduce sensation of stinginess, and lid edema along with steroid eye drops in our study. If posterior segment involvement exixts, oral steroids like prednisolone also given to those patients who are included in this study. In our study, we found a patient with deep intracorneal penetration of hair inside anterior chamber, who manifested with mild anterior chamber reaction and corneal edema. We planned to treat that patient conservatively according to Joshi D[5] school of thought and advised frequent follow up of that patient. Fraser et al. also advised ND-YAG or Argon laser as a treatment modality of ophthalmia nodosa induced by insect hair as it neutralizes the toxic effect of intraocular setae, but with limited evidence to support this laser treatment. It is to consider that hypersensitivity reaction to tarantula hairs is a predominant involvement rather than an infective element.

Tarantula setae induced ophthalmitis is an inflammatory response of the eye. It is mostly a harmless condition which very well responds to medical management. Tarantulas consists of a large group of hairy spiders belongs to Theraphosidae family. Many species have urticating hairs known as setae, which produce skin irritation and eye damage. Tarantula setae induced ophthalmitis mostly seen in patients with low socio economical class status and agricultural field workers residing at rural and forest areas. It may be a vision threatening condition, if left untreated. Thorough ophthalmic examination and meticulous removal of all visible hairs reduce the risk of intraocular penetration. However, it is very cumbersome to remove all hairs due to their friability and deep lying location especially in first sitting itself. Those patients with retained intracorneal setae must be followed up frequently as sight depriving complications may develop later.[6]

Direct urticarial toxicity and locomotion of setae cause ophthalmic inflammation and damage to eye. Risk of intraocular penetration is determined by striking force of setae. However, the quantity of hair presents on the ocular surface and direct contact with insect do not determine the risk of penetration as seen in our study. Vitritis and endophthalmitis also very rare. In case of vitritis and endophthalmitis intravitreal identification of single hair, or setae with mild, moderate, or severe vitritis with hazy media. So, for all patients with Type 4 and Type 5 involvement, fundus examination is mandatory with indirect ophthalmoscopy. Because those patients on treatment with reasonably good visual acuity may subsequently present with sudden decline in visual acuity like with light perception. So, all Type 4 patients treated with steroid eye drops and cycloplegic eye drops and frequent follow-up is needed. All Type 5 involved patients with mild, moderate grade of vitritis, intravitreal steroids may be used as a first line of management. Moreover, core vitrectomy through pars plana route may be needed for vitritis with severe grade and non-responsive patients with intravitreal infections. [7,8]

Conclusion

Majority of Tarantula setae induced ophthalmitis exists in type 1 and type 2

category. Timely referral of patients to ophthalmologists by general practitioners, is also needed. Early diagnosis and appropriate management, advice, counselling and follow-up of patients by ophthalmologists determines the satisfactory outcome of all patients. Awareness to be created among the rural population.

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