Combined treatment modality including topical 20% fluorescein dye in the management of phthiriasis palpebrarum – A case series

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Purpose: To study the clinical presentations and outcomes of phthiriasis palpebrarum (PP) managed with combined treatment modality comprising of 20% fluorescein dye, mechanical removal of the ectoparasites, and topical application of antibiotic eye ointment with paraffin base. Methods: This is a prospective interventional noncomparative hospital-based series of 13 patients of PP. All the patients underwent local application of 20% fluorescein dye over the eyelashes and eyebrows of both the eyes followed by the mechanical removal of all the ectoparasites and trimming of the eyelashes from the base followed by application of ophthalmic ointment. Results: Mean age of the patients was 28 ± 22 years (range 3–60 Years). Out of the total of 13 patients, 11 patients (85%) were having bilateral involvement. The mean duration of symptoms in 11 patients (rest 2 were accidental findings) was 4 ± 3 weeks (range 1–10 weeks). Three patients (23%) had a history of sexual contact with possible parasite-infested partners. Four patients (31%) had additional parasites in the pubic area or torso. All the patients were completely parasite free at the end of 1 month. There was no infestation of the treating medical personnel from the patient. The average follow-up was 8 ± 5 months (range 3–21 months). Conclusion: Itching and irritation of the eyes were the most common presentations of PP. Combined treatment modality comprising of 20% fluorescein dye, mechanical removal of ectoparasites, and topical application of antibiotic eye ointment with paraffin base is effective in the management of PP.

Key words: 20% fluorescein, allergic conjunctivitis, lice, phthiriasis palpebrarum, pthirus pubis

Phthiriasis palpebrarum (PP) is the infestation of eyelids caused by *Pthirus pubis*, a louse (ectoparasite) of the Phthiridae family and the *Pthirus* genus.[1] Close contact, sharing linens, and sexual contact with an already infested person are believed to be the predominant modes of transmission. There are instances where the source of infestation cannot be identified. PP is a disease with high morbidity, e.g., chronic irritation and itching, excoriation of the eyelids, secondary local and systemic bacterial infection, etc. However, PP is frequently misdiagnosed as allergic conjunctivitis, blepharitis, or dermatitis due to the deep burial of the ectoparasites and the presence of crusts on the eyelashes. Most of the publications on PP are case reports and large case series evaluating the role of treatment modalities are lacking. Though various treatment modalities have been described, there is no standard treatment of choice for PP. Mechanical removal is described to be the most common method of treatment.[2,3] There is the inherent risk of the treating medical person being infested with the parasite during treatment. There is a mention of the lethal effect of 20% fluorescein dye on the louse in a previous publication.[4] This current study was intended to find out the role of 20% fluorescein dye in the management of PP.

Methods

This is a prospective hospital-based case series of 13 patients of PP diagnosed clinically with the help of slit-lamp biomicroscopy in a tertiary eye center in South India. All the patients with PP presenting between January 2017 and December 2019 and undergoing the combined treatment modality as per the study protocol were included in the study. The patients who did not complete the scheduled follow-up were excluded from the study. The study was approved by the institutional review board. The protocol was as per the tenets of the Declaration of Helsinki. Before the evaluation, all the patients and attenders were thoroughly questioned regarding the duration of symptoms, any treatment taken elsewhere, and possible mode of infestation with special emphasis on personal contact or sexual contact with already infested personnel. Clinical images of all the patients were documented before removal of the lice and nits [Fig. 1a and b]. The 20% fluorescein dye was procured from the Department of Vitreo-retina (which is being used for the procedure of fundus fluorescein angiography) of the same hospital. After the installation of topical anhesia (proparacaine eye drops) on the conjunctival cul-de-sac, the patients were asked to gently close the eyelids. Then, the dye was applied over the eyelashes and eyebrows of both the eyes, with the help of sterile cotton-tipped applicators. Thirty minutes were allowed for the fluorescein dye to dry and to have its effect on the parasites. The patients were instructed to keep their eyelids closed during this period. Then, the eyelashes were trimmed from the base with the help of surgical scissors. Any remaining adult parasites or nits anchored...
to the skin of the lid margin or small stump of eyelashes were
mechanically removed with the help of blunt forceps. This
trimming and mechanical removal were done with the help of a
slit-lamp examination. However, for the patients of the pediatric
age group not cooperative enough to undergo the procedures
with the slit lamp, the procedures were done with the patient
lying in a supine position and slit-lamp examination was done
at the end of the procedures to confirm the absence of the lice
and nits. This was followed by thorough cleaning of the eyelids
and adnexal area with normal saline. This was an OPD-based
procedure. The same procedure was repeated after 10 days
for the patients who had predominantly nits during the initial
presentation. All the patients were prescribed local application
of ofloxacin 0.3% eye ointment containing white soft paraffin as
the base (Exocin, Allergan India private limited) thrice a day for
10 days after the initial treatment. All the patients were referred
to the dermatologist for further management of the possible
presence of body lice or head lice. All the patients were reviewed
at 10 days, 1 month, and 3 months. All the treating physicians,
nurses, and photographers were evaluated for the presence of
Phthirus pubis on the eyelashes or over the body parts on day
1, day 10, and day 30. Data were analyzed using a Microsoft
Excel spreadsheet and SPSS for Windows software (version 20.0,
International Business Machines Corp.). Mean (± standard
deviation) and frequency (percentage) were used to describe
continuous and categorical variables, respectively.

Results

Demographics

There were eight (61.5%) males and five (38.5%) females. The
mean age of all the patients was 28 ± 22 years (range
3–60 Years). Out of the total of 13 patients, 11 patients (85%)
were having bilateral involvement. The mean duration of
symptoms in 11 patients (the rest two cases, i.e., case numbers
3 and 12 were accidental findings) was 4 ± 3 weeks (range
1–10 weeks). The average follow-up was 8 ± 5 months (range
3–21 months).

Figure 1: (a) Patient number 8 showing multiple nits and adult lice on
both the lids of the left eye and (b) patient number 9 showing single
adult louse on the cilia of upper lid of the left eye

Figure 2: (a) A live adult louse as seen under the microscope and
(b) the same adult louse, dead, after the application of 20% fluorescein
dye, as seen under the microscope
Risk factors
Three patients (23%) had a history of sexual contact with possible parasite-infested partners. Out of five patients of the pediatric age group, a history of sexual abuse could be elicited in none. Four patients (31%) had additional parasites in the pubic area or torso.

Treatment effect
One out of the total 13 patients (8%) was having the presence of adult parasites at the time of first follow-up, which were successfully treated with a similar combined treatment. All the patients were completely parasite free at the end of 1 month. There were no recurrences in any of the patients during the follow-up. No case of cross-infection to the treating doctors, nurses, and photographers was found.

Complications
There was no incidence of any of the toxic effects of the fluorescein dye on the patients’ eyes like long-term discoloration of the periorbital skin or adnexa, keratitis, conjunctivitis, uveitis, or visual impairment. There was no incidence of infestation of the treating medical personnel from the patient.

The profile of all the patients is described in Table 1.

Discussion
In this current study, 13 patients of PP were successfully treated with 20% fluorescein dye, mechanical removal, and application of ophthalmic ointment. It was found that the dye caused immobilization of the parasites facilitating their removal. This is the largest series of PP treated with combined modalities of treatment and the second largest series of PP patients reported in the literature, the largest one including 35 patients described by Ashkenazi et al.[9]

There are three varieties of lice infesting humans: Pediculus capitis (head louse), Pediculus corporis (body louse), and Pthirus pubis (pubic louse or crab louse). Pthirus pubis lives in the pubic and inguinal regions of the patient and gets its entry into the eyelid area of another host by direct or indirect contact, resulting in PP. Pthirus pubis has a broad oval abdomen and stout claw-like legs resembling a crab’s; hence, its name “crab louse.” [Fig. 2a and b]

PP is described mostly in the pediatric population and is related to sexual abuse.[7] However, in the current study, there was no history of sexual abuse in any of the five pediatric patients. Adult patients with PP have been reported less frequently. However, in the current study, adults constituted 61% (8/13 cases) of the total number of patients. Sexual contact with an infested partner was found in three adult patients. This indicates modes of transmission other than sexual contact to be significant in both the pediatric and adult patients in the current study. Involving the authorities like child protective services and psychological counselors in the inquiry of the patients and the caregivers may help in detecting sexual abuse if any.[7]

The common ophthalmic symptoms of PP are itching and irritation, though it can be incidentally found in a routine ophthalmological examination, as in patients’ numbers 3 and 12 in the current study. The slit-lamp examination helps to identify the adult parasites and nits over the eyelashes and eyebrows.[8,9]

There are various modes of treatment for PP described in the literature including manual removal of adult parasites and nits using forceps, trimming of eyelashes, argon laser therapy, cryotherapy, 1% gamma-benzene hexachloride cream, 1% mercuric oxide ointment, physostigmine eye ointment, petrolatum ointment, pilocarpine 4% gel, malathion shampoo, and permethrin 5% ointment and 20% fluorescein dye.[10] The most popular ocular treatment remains the mechanical removal of the adult parasites and nits with the help of forceps.[2,3]

There is the description of immediate death of the adult louse upon application of 20% fluorescein by Mathew M, et al.[14] In that study, the authors have described the role of different concentrations of fluorescein dye causing immobilization and death of Pediculus capitis (head louse) in vitro. In the current series

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**Table 1: Phthiriasis palpebrarum clinical features.** M – Male, F – Female, RE – Right eye, LE – Left eye, BE – Both eyes

| Patient No | Age in years/ Sex | RE/ LE | Duration (weeks) | Symptoms | Source | Head louse/ Body louse | H/O family Members | Recurrence/Need for additional session of treatment | Follow-up (Months) |
|------------|-------------------|--------|------------------|----------|--------|------------------------|---------------------|-----------------------------------------------|-------------------|
| 1          | 3/M               | BE     | 2                | Itching, irritation | Unknown | No                      | Unknown             | No                                                           | 21                |
| 2          | 5/M               | LE     | 3                | Itching, irritation | Unknown | No                      | Unknown             | Application of 20% fluorescein at day 10                  | 12                |
| 3          | 31/M              | BE     | -                | Accidental finding | Sexual contact | Pubic area | Male sexual partner | No                                                           | 12                |
| 4          | 60/F              | BE     | 10               | Itching           | Unknown | No                      | Unknown             | No                                                           | 10                |
| 5          | 43/M              | BE     | 1                | Itching, irritation | Unknown | No                      | Unknown             | No                                                           | 9                 |
| 6          | 43/M              | BE     | 6                | Itching, irritation | Unknown | No                      | Unknown             | No                                                           | 8                 |
| 7          | 4/F               | BE     | 8                | Irritation        | Unknown | No                      | Unknown             | No                                                           | 6                 |
| 8          | 6/M               | BE     | 4                | Irritation        | Unknown | No                      | Unknown             | No                                                           | 6                 |
| 9          | 57/F              | BE     | 4                | Itching           | Unknown | No                      | Pubic area          | No                                                           | 5                 |
| 10         | 3/M               | BE     | 6                | Itching           | Unknown | No                      | Unknown             | No                                                           | 4                 |
| 11         | 49/F              | BE     | 3                | Irritation        | Unknown | No                      | Unknown             | No                                                           | 3                 |
| 12         | 30/M              | BE     | -                | Accidental finding | Sexual contact | Body louse, pubic area | Female sexual partner | No                                                           | 3                 |
| 13         | 32/F              | RE     | 2                | Itching           | Sexual contact | Pubic area          | Male sexual partner | No                                                           | 3                 |
of patients, the effect of 20% fluorescein was studied on *Pthirus pubis* (pubic louse or crab louse). Though the instantaneous immobilization of adult parasites over the eyelids and eyelashes was observed, they were found to be alive even after 30 min of application of the dye [Supplementary Video 1]. We studied the effect of the same concentration of the fluorescein dye on the lice after removing them from the eyelashes of the patient with the help of forceps. The application of the dye on the adult parasite placed under the microscope caused instantaneous death of the parasite [Supplementary Video 2, Fig. 2a and b]. Though we observed that 20% fluorescein caused the immediate death of the lice outside the human body, the parasiticidal effect of the dye was questionable when applied to the lice attached to the human body. The difference in the finding between Mathew M, et al. and this current study may be the result of the fact that *Pediculus capitis* (head louse) was studied in the former study whereas *Pthirus pubis* (pubic or crab louse) was studied in the current study. Mathew M, et al. have mentioned that they studied the effect of the dye on the head louse as “it is difficult to get crab lice.”

Repeat application of the dye and mechanical removal of the eyelashes was needed in patient number 2 in the current series. The nymphs originating from the left-out nits need additional treatment. The poor cooperation during treatment may have resulted in incomplete removal and the need for repeat treatment in patient number 2 (age 5 years).

Application of the 20% fluorescein dye causes immobilization of parasites, facilitates their mechanical removal, and reduces the risk of accidental infestation of treating physician. No case of infestation to treating doctors, nurses, and photographers was found in the current series.

Mechanical removal of all the nits and follow-up of the patients is crucial in the management of PP. This can be explained from the life cycle of *Pthirus pubis*, the stages of which include nits to nymph to adult. After 5–10 days, a nymph comes out of the nit and develops into an adult in 7–10 days. Without a host, it cannot survive for more than 1 day. None of the pediculicides are 100% ovicidal, and during the lifespan of about a month, the female adult lads about 30 nits. So, mechanical removal of all the nits is required, and follow-up for at least 1 month ensures eradication of all the lice.

The application of the ophthalmic ointment to the eyelid margins and eyebrows served a dual purpose: (1) the paraffin base acted as a suffocating agent to kill the remaining lice and newly hatched lice from the nits (if left out) and (2) the antibiotic component helped prevent secondary bacterial infection.[9]

There has been mention of some side effects of local application of fluorescein dye, e.g., skin discoloration, allergy, itching, pain, redness, etc. However, except for transient reversible skin discoloration, no other adverse event was noted in any of the patients in the current study.

All the patients in the current study were referred to a dermatologist for further evaluation, and counseling was done regarding personal hygiene and cleaning of linens and clothing.[1]

There are some limitations of this current study. First, this is a noncomparative study, and hence efficacy of a particular treatment modality above the other cannot be concluded. Second, a longer duration of follow-up is needed to study the recurrence rate. Third, the effect of 20% fluorescein dye on the crab louse attached to the eyelashes was not studied beyond 30 min. Further studies on extended contact time need to be done to study the lethal effect of 20% fluorescein dye on PP. Fourth, unlike the previous study by Mathew M, et al.,[1] the effect of different concentrations of fluorescein dye on the crab louse was not studied in this current series of patients.

**Conclusion**

To conclude, in PP, local application of 20% fluorescein dye causes immobilization of ectoparasites, facilitates their mechanical removal, and minimizes the risk of transmission to the treating medical caregiver. Combined treatment modality including 20% fluorescein dye, mechanical removal of the eyelashes, and the topical application of ophthalmic ointment is effective in the treatment of PP.

**Compliance with ethical standards**

All procedures performed in studies involving human participants were as per the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Before the evaluation, written consent was taken from all the patients and attenders in case of minor patients.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Badri T, Hafsi W. Phthiriasis Palpebrarum. Treasure Island (FL): StatPears Publishing; 2017.
2. Yoon KC, Park HY, Seo MS, Park YG. Mechanical treatment of phthiriasis palpebrarum. Korean J Ophthalmol 2003;17:71-3.
3. Khan T. Phthiriasis palpebrarum presenting as anterior blepharitis. Indian J Public Health 2018;62:239-41.
4. Mathew M, D’Souza P, Mehta DK. A new treatment of phthiriasis palpebrarum. Ann Ophthalmol 1982;14:439-41.
5. Ashkenazi I, Desatnik HR, Abraham FA. Yellow mercuric oxide: A treatment of choice for phthiriasis palpebrarum. Br J Ophthalmol 1991;75:356-8.
6. Anane S, Malek I, Kamoun R, Chtourou O. Phthiriasis palpebrarum: Diagnosis and treatment. J Fr Ophthalmol 2013;36:815-9.
7. Ryan MF. Phthiriasis palpebrarum infection: A concern for child abuse. J Emerg Med 2014;46:e159-62.
8. Karabela Y, Yardimci G, Yildirim I, Atalay E, Karabela SN. Treatment of phthiriasis palpebrarum and crab louse: Petrolatum jelly and 1% permethrin shampoo. Case Rep Med 2015;2015:287906.
9. Kiran B, Kareem SA, Illamani V, Chitralekha S. Case of phthiriasis palpebrarum with blepheroconjunctivitis. Indian J Med Microbiol 2012;30:354-6.