Report of a Case of Human Nasal Myiasis Caused By Second Instar Larvae of Oestrus Ovis in CHU Oran: Review of Literature

Abstract
Myiasis is the invasion of human and animal organs and tissues by dipteran larvae. This is a case report of a human nasal myiasis caused by the second instar larvae of the sheep bot fly, Oestrus ovis. The cases of human myiasis at Oestrus ovis are accidental and rare, mainly affecting the eyes. In the literature, there are only sporadic reports of nasal myiasis.

We present a new case of nasal myiasis caused by the second instar larvae of Oestrus ovis in a 29-year-old male patient, originally from Oued Rhiou in the west of Algeria, who is a medical doctor suffering from signs of rhinosinusitis.

Keywords: Oestrus ovis; Human myiasis; Nasal myiasis

Introduction
Myiasis is defined as the invasion of human and animal organs and tissues by dipteran larvae [1-4] which optionally or necessarily feed on living or necrotic tissue for at least a period of time [5]. This is an essentially veterinary pathology. The human being is infected only accidentally [6-8]. Nasal myiasis is much more prevalent in tropical countries. The localizations in humans are varied: Cutaneous and subcutaneous, gastrointestinal, genitourinary or cavities of the face that can cause damage to the nasal cavities, ear canal or eyes [8]. Clinically, human myiasis may be benign and asymptomatic, or on the contrary may lead to violent disturbances or even death [9,10]. Among these types of myiasis, the nasal form is relatively rare [11,12]. We describe a nasal myiasis due to Oestrus ovis in a 29 year old patient from Oued Rhiou, a doctor by profession with a literature review.

Case Presentation
A 29-year-old male patient from Oued Rhiou who lives in Oran, Algeria. Without special medical history, showing signs of left Rhinosinusitis with nasal discharge abundant two weeks after a short stay in his native village (Oued Rhiou) 140 km east of Oran. Five days after the onset of this symptom and following a sneeze, two larvae are expelled from his nose, bringing him to consult the Department of Medical Parasitology and Mycology of CHU d’Oran. An endoscopy carried out at the ENT department showed a slight inflammation in the nasopharynx and did not visualize any other residual larvae, an antibiotic treatment is then instituted in order to avoid superinfection.

Ten days later, the patient brought us a larva expelled from his nose. Fixed to 70% alcohol, and then heated to 90°C with 5% glycerine in our service for identification [13]. The patient’s biological assessments were unusual, the frontal X-ray showed a small left maxillary sinus filling, supplemented by a CT scan of the sinuses, which objectified an aspect of thickening of the left maxillary sinus mucosa, evoking chronic sinusitis.

The larva was identified macroscopically and microscopically according to the Zumpt criteria [1]. This was the second stage L2 larva of Oestrus ovis, measuring 6 mm long. This larva is of semi-cylindrical shape (Figure 1). The anterior end or pseudocephalon has two visible buccal hooks (Figure 2). The last metamerus carries the posterior sub-circular stigmata with a central button, pierced with numerous pores [1-14] (Figure 3).

Discussion
The human being is not a usual host of the Oestrus ovis fly or sheep nasal bot fly, but rare cases of larval infestations of these diptera have been described. The eye is the most affected site,
literature, in total, eighteen are the publications that report in detail twenty-one cases of human nasal myiasis due to Oestrus ovis, presented in Table 1 among seventy publications of cases of human nasal myiasis due to different species of diptera larvae, Oestrus ovis included.

It is in Algeria, since 1904, that the brothers SERGENT have for the first time demonstrated the role of fly larvae Oestrus ovis in human pathology with agent responsible for ophthalmomyiasis [15-17] a country where the human myiasis had been known since the beginning of time by the inhabitants who called them thimni, which is that of the sheepbot fly in the Berber dialects [15,17]. In 1952, Edmond SERGENT published a survey on the geographical distribution of this human oculo-nasal myiasis due to Oestrisovis in the world and proposed the use of thimni names for myiasis [18]. The cases of human myiasis described in the literature in Algeria are shown in Table 2 the actual number of cases is certainly higher than the published cases, which makes it difficult to appreciate the actual incidence of myiasis in Algeria.

Oestrus ovis is a yellowish-gray, cosmopolitan, non-pungent dipteran, 10-12 mm long. The adult has a short life devoted solely to breeding during which he does not feed. Larvae are obligatory parasites of the nasal fossae and frontal sinuses of sheep and goats [6-8]. Oestrus ovis' female viviparous fly, often in flight, deposits its larvae at the nostrils of the mammal [18-39]. First instar larvae deposited in the autumn (September to October) move up the animal's nasal fossae to reach the frontal sinuses where they mature to reach the third larval stage in two to twelve months and will be released into the nasal mucus the following spring [4]. They fall or are eliminated during sneezing on the soil, where they are transformed into a pupa, from which an adult insect is immersed four to six weeks later and the cycle begins again [4,6,8,15,37,39,40,41]. The animals thus infected show a summer rhinitis followed by a winter sinusitis [4].

In sheep, the pathogenic action results from two phenomena, namely a minor mechanical effect and allergic hyper-sensitization phenomena [4,14,29,38,42,43]. In humans, the traumatic and mechanical pathogenic action is preponderant. Clinical signs are due to the presence of larvae with buccal hooks and numerous very strong spines which ensure both their fixation and their displacement [24,26,38]. The short duration of parasite infestation in humans would prevent allergic expression of larvae [4,24,26,29,38].

The infestation of man is rare, it generally interests the eye [4]. The contamination is made from larvae L1 stages which are deposited by the female fly in full flight at the level of the conjunctival sac [6,27,37]. The human feels a brutal shock on his eye followed by inflammation, some hour later. The evolution is favourable after the extraction of the larvae [4,37,40-47]. Exceptionally, L1 larvae may settle at the external nasal orifices causing an itching sensation, boots of sneezing accompanied by an abundant nasal discharge, seeing pains in relation to the sinuses [4,18]. Note also the possibility of deposition of the larvae on the lips responsible for oropharyngealmyiasis. In the cases reported, the duration of the pathology generally does not exceed fifteen days and the symptoms disappear gradually after the extraction of the larvae [4].
Treatment consists of larval excision, antibiotic treatment may be combined to avoid superinfection [4,24,37,41,46], some authors recommend the systemic use of ivermectin which is an anthelmintic treatment [48].

The development of rhinomyiasis is usually benign after treatment. However complications have been described, as in the case of a patient with a nasal myiasis complicated by apneumocephalus [10].

### Table 1 Cases of human nasal myiasis due to Oestrus ovis reported in the world, since 1958.

| Years | Countries | Number of Cases | Notes | References |
|-------|-----------|-----------------|-------|------------|
| 1958  | Algeria   | 1 case          |       | [19]       |
| 1977  | Turkey    | 1 case          |       | [20]       |
| 1978  | India     | 1 case          |       | [21]       |
| 1990  | Spain     | 2 cases         |       | [11]       |
| 1997  | United Kingdom | 1 case    |       | [22]       |
| 1997  | Egypt     | 2 cases         |       | [23]       |
| 1999  | New Zeland | 2 cases     | Associated with ophthalmocephalus | [24] |
| 2001  | France    | 1 case          |       | [4]        |
| 2007  | China     | 1 case          | Location at the maxillary sinus | [25] |
| 2007  | Canary Islands | 1 case |       | [26]       |
| 2008  | Turkey    | 1 case          |       | [27]       |
| 2010  | United Kingdom | 1 case   | Associated with ophthalmocephalus | [28] |
| 2011  | Morocco   | 1 case          |       | [29]       |
| 2011  | Sweden    | 1 case          |       | [30]       |
| 2011  | Israel    | 1 case          |       | [31]       |
| 2012  | Netherlands | 1 case    | Location at the maxillary sinus | [32] |
| 2015  | China     | 1 case          |       | [33]       |
| 2015  | Canary Islands | 1 case  | Associated with ophthalmocephalus | [34] |

### Table 2 Cases of human myiasis reported in Algeria, since 1929.

| Years       | Type of Myiasis       | Species          | Number of Cases | References |
|-------------|-----------------------|------------------|-----------------|------------|
| 1929-1952   | Ophthalmomyiasis       | Oestrus ovis     | 50 cases        | [18]       |
| 1958        | Oculo-nasal myiasis   | Oestrus ovis     | 1 case          | [19]       |
| 1991        | Head skin myiasis     | Lucilia          | 2 cases         | [35]       |
| 1999        | Urogenitalmyiasis     | Faniacanicularis | 1 case          | [36]       |
| 1997        | Auricularmyiasis      | Chrysomabbeziana | 1 case          | [17]       |

### Conclusion

Nasal myiasis is relatively rare in humans and can have consequences ranging from simple rhinitis and psychological stress to life-threatening complications of the patient [9]. It is necessary to know to evoke them in front the sudden appearance of the signs of rhinosinusitis with sensation of a foreign body moving in the nasal cavities, in order to be able to treat them early and to avoid the complications that can occur.
References

1. Zumpt F (1965) Myiiasis in man and animals of the old world: a textbook for physicians, veterinarians and zoologists. Butterworth Co Ed, London. p. 257.

2. Lapiere J, Pette M (1954) À propos d’un cas de myiase oculaire dû à Oestrus ovis observé dans la région parisienne. Bulletin de la Société de Pathologie Exotique 47: 561-563.

3. Steiner C, Deduit Y (1959) Myiase oculaire. Bulletin des Sociétés d’Ophtalmologie Françaises 12: 924-927.

4. Delhaes L, Bourel B, Pinatel F, Cailliez JC, Gosset D, et al. (2001) Myiasenasalehumaine à Oestrus ovis. Parasite 8: 289-296.

5. Service MW (1981) Medical entomology for students. Cambridge University Press, Cambridge.

6. Ducourneau D (1981) Les myiases oculaires. Med Trop 41: 511-514.

7. Rodhain F, Perez C (1985) Les diptères myiasigènes. In Précis d’entomologie médicale et vétérinaire. Maloine, Paris. pp: 249-265.

8. Anane S, Ben Hssine L (2010) La myiase conjonctivale humaine à Oestrusovisoides le sud tunisien. Bull Soc Pathol Exot 103: 299-304.

9. Wood TR, Slight JR (1970) Bilateral orbital myiasis: Report of a case. Arch Ophthalmol 84: 692.

10. Kuruvilla G, Albert RRA, Job A, Ranjith VT, Selvakumar P (2006) Pneumocephalus: A rare complication of nasal myiasis. Am J Otolaryngol 27: 133-135.

11. Quesada P, Navarrete ML, Maeso J (1990) Nasal myiasis due to Oestrusovislarvae. Eur Arch Otorhinolaryngol 247: 131-132.

12. Babamahmoudi F, Rafinejad J, Enayati A (2012) Nasal myiasis due to Lucilia sericata (Meigen, 1826) from Iran: A case report. IRAN J Ophtalmol 27: 133-135.

13. Garcia LS, Bruckner DA (1988) Diagnostic medical parasitology. Elsevier Science Publishing, New York. p. 431.

14. Gianneto S, Santoro V, Pampiglione S (1999) Scanning electron microscopy of Oestrus ovis larvae (Diptera: Oestridae): Skin armour and posterior spiracles. Parasite 6: 73-77.

15. Sergent ED, Sergent ET (1907) Myiase humaine d’Algérie causée par Oestrus ovis. Ann Inst Pasteur 21: 392-399.

16. Sergent ED, Sergent ET (1913) La «Tammé». Myiase humaine des montagnes sahariennes touarègues, identique à la «Thimni» des Kabyles, due à Oestrus ovis. Bull Soc Pathol Exot 6: 487-488.

17. Abed-Benamara M, Achir I, Rodhain F, Perez-Eid C (1997) Premier cas algérien d’otomysie humaine à Chrysomya bezziana. Bull Soc Pathol Exot 90: 172-175.

18. Favier G (1958) A case of oculo-nasal myiasis caused by Oestrus ovis and seen at Saoura (southern Oran). Arch Inst Pasteur Alger 36: 182-183.

19. Yeruham I, Malnick S, Bass D, Rosen S (1997) An apparently pharyngeal myiasis in a patient caused by Oestrus ovis (Oestridae: Diptera). Acta Trop 68: 361-363.

20. Lucientes J, Clavel A, Ferrer-Dufol M, Valles H, Peribanez MA, et al. (1997) Short report: One case of nasal human myiasis caused by third stage instar larvae of Oestrus ovis. Am J Trop Med Hyg 56: 608-609.

21. Fekry AA, el Serougi AO, Ayoub SA (1997) Oestrus ovis (sheep nasal fly) infesting the eyes and the nose of a camel keeper family. J Egypt Soc Parasitol 27: 493-496.

22. Macdonald PJ, Chan C, Dickson J, Jean-Louis F, Heath A (1999) Ophthalmodemyia and nasal myiasis in New Zealand: a case series. NZ Med J 112: 445-447.

23. Zheng XC, Liu XD, Lu ZM (2007) Myiasis of maxillary sinus and nasal cavity by the larvae of Oestrus ovis. Zhongguo Ji Sheng Chong XueYu Ji Sheng Chong Bing ZaZhi 25: 1.

24. Hemmersbach-Miller M, Sánchez-Andrade R, Domínguez-Coello A, Meiluid AH, Paz-Silva A, et al. (2007) Human Oestrus sp. Infection, Canary Islands. Emerg Infect Dis 13: 950-952.

25. Evigör H, Dost T, Dayanir V, Başak S, Eren H (2008) A case of naso-ophthalmyiasis. Kulak Burun Bogaz Ihtis Derg 18: 371-373.

26. Smillie I, Gubi PK, Cocks HC (2010) Nasal and ophthalmyiasis: case report. J Laryngol Otol 124: 934-935.

27. Tiigui H, Oudaina W, Khairane I, Boughaïdi A, Lamalmi F, et al. (2011) Rhino-myiasie humaine à Oestrus ovis: Une observation au Maroc. Med Trop (Mars) 71: 83-84.

28. Einer H, Ellegard E (2011) Nasal myiasis by Oestrus ovis second stage larva in an immunocompetent man: case report and literature review. J Laryngol Otol 125: 745-746.

29. Mumcuoglu KY, Eliashar R (2011) Nasal myiasis due to Oestrus ovis larvae in Israel. Isr Med Assoc J 13: 379-380.

30. Hummelen R, Zeegers T, den Hollander J, Tabink I, Ten Koppel P (2012) Eenongewoneoorzaak van sinusitis. Ned Tijdschr Geneeskd 156: A5373.

31. Su H, Liu L, Zhao Y (2015) One case of human nasal myiasis. Lin Chung Er Bi Yan Hou Tou Jing Wai Ke Za Zhi 29: 1138-1139.

32. SanteFernández, Lhernández-Porto M, Tinguaro V, Lecuona Fernández M (2015) Ophthalmodemyiasis and nasal myiasis baaya Oestrus ovis in a patient from the Canary Islands with uncommon epidemiological characteristics. Enferm Infecce Microbiol Clin 24: 213-375.

33. Boudghene SO, Merad BA (1991) Myiase de plaies du cuir chevelu chez deux enfants de Tlemcen (Algérie). Bull Soc Pathol Exot 84: 283-285.

34. Perez-Eid C, Mouffok N (1999) Myiase urinaire humaine a larves de Fanniacanicularis (Diptera, muscidae) en Algérie. Pesse Med 28: 580-581.

35. Zayani A, Chaabouni M, Gouiaa R, Hamida FBH, Fki J (1989) Myiase humaine à Oestrus ovis (Etude parasitologique). Bulletin des Sociétés de Pathologie Exotique 47: 262-265.

36. Agrawal RD, Akuwalia SS, Bhatia BB (1978) Occurrence of Oestrus ovis larvae in nasal cavity of a woman. J Indian Med Assoc 70: 263.

37. Yeruham I, Malnick S, Bass D, Rosen S (1997) An apparently pharyngeal myiasis in a patient caused by Oestrus ovis (Oestridae: Diptera). Acta Trop 68: 361-363.
43 Nglyen VK, Jacquet P, Duranton C, Bergeaud JP, Prevot F, et al. (1999) Reactions cellulaires des muqueuses nasales et sinusales des chèvres et des moutons à l’infestation naturelle par Oestrusovis Linné 1758 (Diptera: Oestridés). Parasite 2: 141-149.

44 Khan ZA, Al-Jama AA, Rahi AHS, Ahmed M, Madan I (1993) Myiasis: Report of two cases. Annals of Saudi Med 13: 464-466.

45 Dorchies P, Larrouy G, Deconinck P, Chantal J (1995) L’ophtalmomyiase externe humaine : Revue bibliographique a propos de cas en République de Djibouti. Bull Soc Pathol Exot 88: 86-89.

46 Cohen H, Rozenman Y, Ronen S (1981) Trois cas de myiases conjonctivales dues à Oestrusovis. J Fr Ophtalmol 4: 583-585.

47 Delord JJ (1976) Une parasitose de chez nous : l’euliasie de la conjonctive oculaire. Mediterranean Medic 106: 31-32.

48 Shinohara EH, Martini MZ, de Oliveira Neto HG, Takahashi A (2004) Oral myiasis treated with ivermectin: Case Report. Brazilian Dental J 15: 79-81.