TRADITIONAL AND INTEGRATIVE MEDICINE

Trad Integr Med, Volume 6, Issue 1, Winter 2021

Historical Article

Prevention of Rabies by Application of *Lytta vesicatoria* in Persian Medicine Texts in Islamic Civilization

Mostafa Moallemi[1], Mohammad Yousofpour[2,3,4], Assie Jokar[2,3,4]*

[1]*Department of History of Medical Sciences, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran*
[2]*Department of Traditional Persian Medicine, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran*
[3]*Traditional and Complementary Medicine Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran*
[4]*World Federation of Acupanctuer-Moxibustion Societies (WFAS), Beijing, China*

Received: 8 Dec 2020 **Revised:** 27 Jan 2021 **Accepted:**5 Mar 2021

Abstract

Rabies is one of the most lethal diseases in human history. From the past, various drugs have been used to prevent the contraction of the disease when being bitten by a rabid animal. An insect called *Ḏarārīḥ* (*Lytta vesicatoria*), although poisonous, has in some cases been medically used. Greeks and Romans have used venomousness of this insect to treat skin diseases, but it has not been used to prevent rabies. This is a summative qualitative content analysis that focused on Persian Medicine (PM) texts from 2th to 13th AH centuries. Literature was searched during centuries 4th to 13th AH, by using this key words: ذراریح (*Ḏarārīḥ*), قنثاریدس (*Cantharis/cantharides*), and ئشفث *Lytta vesicatoria* and after extracting the data and analyzing them, the results were presented. In TPM texts, this insect was used to prevent rabies. This study has shown that the use of *ḏarārīḥ* (*Lytta vesicatoria*) in the prevention of rabies has been one of the innovations of the practitioners of Islamic civilization. The innovation proves that scholars in the period of Islamic civilization were not merely consumers or custodians of Roman, Greek, Indian, and Iranian knowledge, but added to it while preserving that knowledge.

Keywords: *Lytta vesicatoria*; Rabies; Islamic civilization; Persian medicine

Introduction

Rabies, which is referred to in the texts of the Islamic period as *kalab* or *dā'a al-kalab* (داء الکَلَب), *su'ār* (سُعار) or *'anza* (عنزَة), has been one of the oldest and deadliest diseases in human history [1]. The disease occurs in animals such as dogs, wolves, foxes, bears, horses, mules, and sometimes elephants and cows, and the end result for the animal is nothing but death. Being bitten by an infected animal could transmit the disease to

Citation: Moallemi M, Yousofpour M, Jokar A. **Prevention of Rabies by Application of *Lytta vesicatoria* in Persian Medicine Texts in Islamic Civilization.** Trad Integr Med 2021; 6(1): 70-77.

*Corresponding Author: Assie Jokar
Department of Traditional Persian Medicine, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran
Email: a.jokar@mazums.ac.ir
Tel: 09116399024

humans. According to written sources in Iranian medicine, the symptoms of this disease are similar to the effects of insanity and melancholia, and the most important symptom of this disease in the advanced stages is hydrophobia.

The Greeks, followed by the Romans, called the disease lyssa and rabies because of the insanity that afflicted the patient [2,3]. In the Arab world and the Semitic tribes, the name of this disease (*Kalab*) is derived from the specific symptom of this disease. *Kalab* (in Arabic) means thirst and a patient with rabies suffers from severe thirst but unfortunately, due to the progressive dysphagia, and the excessive tendency to dryness and the appearance of hydrophobia he/she cannot drink water [4].

Today, nearly sixty thousand people die each year from rabies [5]. Due to its incidence, geographical distribution, high mortality, human and animal costs, this disease is one of the most important viral zoonosis that imposes high economic costs annually to different countries of the world, especially in Asia and Africa [6].

In Iran, this disease is endemic and in addition it is the most important zoonotic disease in the country [7]. According to a survey, almost all the provinces of the country are more or less polluted. The highest incidence of the disease is observed in the vicinity of Caspian Sea, northeastern and southwestern regions of the country [8].

To prevent and sometimes treat rabies, various drugs have long been common among tribes and nations. In Greek and Roman medical texts, Alyssum and river crabs, as well as grilled rabid dog liver, have been introduced as one of the most popular drugs for the prevention and treatment of rabies [9-11]. In the period of Islamic civilization, among the drugs announced in the prevention and treatment of rabies, name of an insect can be seen. An insect which its powdered body has been described as a drug with a surprising effect on rabies [12]. This insect and the medicine that was prepared from its body are also mentioned in the medical and pharmaceutical texts of Greece and Rome. The insect, in question, is called *Ḏarārīḥ* (ذراریح) (*Lytta vesicatoria*) which the Greeks called cantharis [13]. And in Persian language, it has been known by various names in different regions [14]. Numerous medicinal uses for the insect have been defined in Greek and Roman medicine, including for the treatment of skin diseases, the removal of whiteness on the nails, in the treatment of scabies, as well as the cancerous swellings [13]. The medical application of this insect also had a relatively delicate process as follows: a number of these insects were placed in an earthenware container and the opening of the container covered with a clean cloth made of linen, and then the container was turned upside down and its mouth was placed on another container containing boiling vinegar. The steam of vinegar will suffocate the insect. The insects were then pulled into a string of linen and rubbed and consumed when needed [10,15]. Today, the effective drug extracted from this insect is called Cantharid, and it is mainly used in Invitro and Invivo trials for the treatment of skin diseases and cancer [16-18].

A study of medical and non-medical texts in the period of Islamic civilization on rabies gives re-

searchers a very important and valuable point, and that is the new use of *Lytta vesicatoria* in the prevention and treatment of rabies. This application has not been recognized in any of the modern and contemporary medical texts and no attention has been paid to it. Perhaps due to the existence of preventive treatments with vaccines, the approach to it seems futile. However, the historical aspects of this discussion and even the possibility of conducting laboratory studies to prove the effectiveness of this drug in the prevention of rabies will be a good justification for a research in this field. *Dr. Mirza ʿAbd ul-Hussein Khan*, known as the "*Fīlsūf al Dawlah*" physician of the *Nāṣir al-Dīn Shah* period, in his book "The acquaintance with the toxins" refers to the application of *Lytta vesicatoria* in treating rabies by an Austrian physician [19].

Methods

This article is a summative qualitative content analysis that processed in seven classic steps:(20,21)

1. The research questions to be answered: "What is rabies disease in the Persian medicine texts, we don't find any disease that called as "Rabies"; To find the name of "Rabies" disease in the context of Persian medicine, we tried to collect all data's about rabies in the context of up to date modern texts; This information includes etiology, symptoms, signs, risk factor and treatment of rabies. And then we tried to find one disease have most overlap with rabies. As a result, rabies in Persian Medicine texts is known as "*kalab or dā'a al-kalab*"[1].
2. Selecting the sample to be analyzed: In this study, all of available medical texts of the Is-

Table 1: Historical books:

Author	Title of the Book	Date Written	Subject	reference
Farāhīdī Ḥ/ فراهیدی	*Kitāb ul ʿAyn/* کتاب العین	8th century/ سده دوم هجری	An Arabic Lexicon	[4]
Balāḏurī A/ بلاذری	*ʾAnsāb al ʾAšrāf/* انساب الاشراف	9th century/ سده سوم هجری	Biographies of the noblemen	[22]
Al-Ǧāḥiẓ A/ جاحظ	*Al-Ḥayawān/* الحیوان	9th century/ سده سوم هجری	Miscellaneous but generally about animals	[23]
Razī M/ Rhazes/ Rasis/ محمد بن زکریا رازی	*Al Ḥāvī fi al Ṭibb*	10th century/ سده چهارم هجری	Medicine	[9]
ʾAhwāzī A. Haly Abbas/ علی بن عباس اهوازی	*complete book of the medical art (Kāmil al-Ṣinā ʿa al-Ṭibbīya or Royal Medicine)*	10th century/ سده چهارم هجری	Medicine	[15]
Bīrūnī M./ ابوریحان بیرونی	*Al Ṣaydana*	11th century/ سده پنجم هجری	Pharmacology	[11]
Avicenna Ibn Sīnā H/ ابن سینا	*Canon on Medicine (Al Qānūn fi al Ṭibb)*	''th century/ سده پنجم هجری	Medicine	[10]
Ǧurǧānī SI./ سید اسماعیل جرجانی	*Ḏaḫīra ḫārazmšāhī & Al ʿAġrāḍ al-Ṭibbīya wa al mabāhiṭ al ʿAlāīya*	12th century/ سده ششم هجری	Medicine	[24]

Ğawālīqī M/ جوالیقی	*Šarḥ ʾAdab il Kātib/* شرح ادب الکاتب	12th century/ سده ششم هجری	A Literary book	[25]
Ibn Bayṭār/ ابن بیطار	*Tafsīr-u Kitāb discoridus*	13th century/ سده هفتم هجری	Medicinal Herbs	[13]
Ḥakīm Muʾmin M./ حکیم مومن	*Tuḥfat al Muʾminīn*	17th century/ سده یازدهم هجری	Traditional Medicine and Pharmacology	[14]

In the second step, the databases were searched by using key words of "rabies's etiology, prevention and treatment" in PubMed, PMC, Google Scholar and Scopus.

lamic civilization texts in this field were selected. These texts included manuscripts (the book itself or its electronic file) in different centuries from 11 to 20 A.D. we studied and searched historical books are in table 1.

Results

Ḏarārīḥ and Its Application in Medicine of Islamic Civilization:

Ḏarārīḥ (*Lytta vesicatoria*) in Arabic language is the name of a poisonous insect which was applied to make poison. Although this word has the plural form, but refers to a singular meaning. Its singular form has been said in different forms as follow: *Ḏurrāḥ*, *Ḏuraḥraḥa*, Ḏarrūḥ and *Ḏarīḥa*. The book of *Al-ʾAin* compiled by *Khalīl ibn Aḥmad Farāhīdī* (d. 170 AH) is the oldest Arabic source in which the word Ḏarārīḥ (*Lytta vesicatoria*) is mentioned. This insect has been introduced in the entry of "*Ḏarḥ*" as follows: "The insect is slightly larger than a fly, with colorful red, black, and yellow lines and spots on its body. It has two wings which flies with them. The toxicity of this insect must be reduced by mixing with other things [4].

Farāhīdī wrote about the disease rabies and mentioned ways to treat it. He wrote:" it is said that to cure this disease a few number of *Lytta vesicatoria* should be dried in the shade, then crushed and sifted. This powder of *Lytta vesicatoria* must be mixed with lentils with a ratio of one to seven respectively. The mixture again should be mixed with pure wine and kept in a jar. This mixture must be prescribed for patients bitten by rabid animals. After taking the medicine, the patient should not sleep but should stand under the sunlight to sweat. This must be repeated several times in order to be healed by God's will" [25].

ʿĪsa ibn Ḥakam of Damascus (living in 225 AH), known as *Masīḥ* (Christ), has introduced the drug *Lytta vesicatoria* in his treatise *Al-Kāfīiya* to prevent the contraction of rabies. "Some *Lytta vesicatoria* must be removed of their head, wings and legs. Then the rest should be soaked in buttermilk and dried in the shade, then crushed and sifted with silk cloth. Mix one part of *Lytta vesicatoria* with two parts of peeled lentils and knead with oil and divide it into pills that weigh two *dāniq* (a weight unit) each. When taking it, take a pill with lukewarm water and stand in front of the sun of which one hour has passed from its rise. Wear thin clothes and run fast to get tired and sweat. When exhausted then warm animal fats or plant oil must be eaten. If he needs to urinate then must sit in warm water. The sign of healing is bloody urine! "[28].

Abul Ḥasan ʿAlī ibn Raban Ṭabarī (alive in 235 AH) was the third writer in the Islamic world after *Khalīl ibn ʾAḥmad* and *Ibn Ḥakam* of Damascus to speak about the application of *Lytta vesicatoria* in the prevention of rabies. He wrote in more detail about the method of preventing rabies, almost the same way that *Ibn Ḥakam* wrote in *Al-Kāfīiya* treatise. *Ṭabarī* didn't identify his source but said: "My father used to say something strange about preventing rabies that had never been heard of before"[12]. These three reports are among the oldest references in Islamic civilization to the application of *Lytta vesicatoria* in the prevention of rabies. *Rhazes* (d. 313 AH) and *Avicenna* (d. 428 AH) have also repeated the contents of the three foretold authors in the use of *Lytta vesicatoria* in the prevention of hydrophobia. Razī has described *Lytta vesicatoria* as having a wonderful and good effect in preventing rabies, and *Ibn Sīnā* has called it beneficial [9,10]. *Bīrūnī* (d. 440 AH) has introduced *Lytta vesicatoria* in *Ṣaydana* as follows: "it is a bee size animal, with yellow and red spots on his body. When a person grabs him, it constantly urinates. Like a bee, it has two wings to fly through. This insect is a poisonous killer. In order to mitigate the toxicity, the powdered insect will be mixed with lentils. The mixture will be applied to cure the patient bitten by a rabid dog. The mixture won't do any harm and will heal the wound" [11].

In the following centuries, physicians and writers of the Islamic period considered *Lytta vesicatoria* to be beneficial in preventing rabies or hydrophobia. In pre-Islamic Arabic literature, there is a story about a man named ʿ*Aswad ibn* ʿ *Auws* who learned the cure for rabies from *Naǧāšī* (probably the ruler of Ethiopia). This method of treatment remained in his family, and one of those who survived the rabies with this treatment wrote a poem about it as follows:

If it weren't for *Ibn Muḥill's* medicine and his knowledge, I would still be barking as the people's dogs bark! And the servant of God urinated puppies whose shoulders and sides were black and white!

In this treatment, the patient will find bloody urine after receiving the drug, which is a sign of recovery and safety from rabies [23]. However, the quality of this treatment and the drug applied were hidden and kept secret in the *Aswad* family [22], And according to historical reports, it was not taught to others [29].

One of the important points about the application of *Lytta vesicatoria* in prevention of rabies is its side effects which has been noticed by the physicians.

It was generally believed, and the experiences had shown, that the adverse effects of the drug on the urinary bladder and kidneys were significant and that measures should be taken to further reduce its side effects. Therefore, they recommended eating vegetable or animal oils along with the water in which the peeled lentils were cooked [9].

Lytta vesicatoria was known in Greek and Roman medicine and pharmacology, and its healing effects along with dangerous side effects were not hidden from them. However, the use of this drug according to the book of "On Medical Material" (*De materia medica*) and Galen's books and Pliny's Natural History shows that

it has not been used in Greece and Rome in the prevention or treatment of rabies [30]. The Greeks and Romans also detoxified the insect's venom by boiling it with boiling vinegar. In the period of Islamic civilization, the use of this insect in the prevention of rabies is evident. The method of mitigating the venom of this insect in Arab and Islamic lands has been different from the Roman method.

In the pre-Islamic period in the Arabian Peninsula, according to the remaining poems, we can believe in the existence of a drug in the prevention of rabies; but it is not clear what the drug was. However, there is a similarity between the symptoms a patient cured by *Lytta vesicatoria* in its final stage of treatment and the patient's condition mentioned by the pre-Islamic poems (having bloody urine), but one cannot be sure that the medicine used was inevitably the *Lytta vesicatoria*. If the treatment mentioned in the case of *Ibn al-Muḥill* was by *Lytta vesicatoria*, it can be said that the origin of this medicine was outside the Arabian Peninsula and probably in Africa. Because the name of the drug and the method used in the treatment are not known, it cannot be judged. The writings of *Farāhīdī*, ʿĪsa ibn Ḥakam of Damascus, and *ʿAlī ibn Raban al-Ṭabarī* about the application of *Lytta vesicatoria* show that none of these writers were the original source. *Farāhīdī*, who has previously written about *Lytta vesicatoria* and its benefit in preventing rabies, has relied on previous (possibly oral) sources because he has used the term "it is said (يقال)".

ʿĪsa ibn al-Ḥakam also gave meticulous details on how to use *Lytta vesicatoria*, but did not specify his source for this method of prevention. *ʿAlī ibn Raban Ṭabarī* narrated the medicine extracted from *Lytta vesicatoria* from his father, and if we trust this statement, we must accept that this method of treatment was widespread and that *ʾĪsa ibn al-Ḥakam* was not the only one to know this point.

Well-known and skilled physicians of the Islamic period have generally mentioned *Lytta vesicatoria* as a beneficial, amazing and irreplaceable medicine in the prevention of rabies and hydrophobia. The importance of this medication was so high that a physician of the Islamic period has written about the usefulness of this drug in preventing rabies: "it has a wonderful, clear, and unbelievable benefit which could not be compared with anything else".

Some consider *Sayyid ʾĪsmāʿīl Ǧurǧānī* to be the first physician to identify *Lytta vesicatoria* as an insect with medicinal properties [29]. Although he referred to *Lytta vesicatoria* as a superb potion [24,31], but it should be noted that centuries before him, this insect and its medicinal properties were known. A contemporary writer in the West has criticized *Ibn Sīnā* for proposing the use of *Lytta vesicatoria* to prevent hydrophobia, while this poison is very dangerous and its side effects are similar to those of rabies itself [32]. This criticism does not seem to be acceptable, as the risk of death from being bitten by a rabid animal justifies the use of this drug. In addition, the venom of this insect was mitigated by mixing it with other substances, and the method of its use was such that it showed that the doctor was fully aware of the danger of the drug; but he had to prescribe such

a poison to save the patient's life. However, because the toxin of *Lytta vesicatoria* is dangerous to the bladder, so measures have been taken to protect the bladder. A qualified physician in the Islamic era usually noticed this crucial matter. Another contemporary writer wrote about the knowledge of the Islamic period: "Most of the statements of the physicians of the Islamic period in this regard are a repetition of the Greek material to which little information has been added"[33]. Although the author mentions a few of them; But she was unaware that, firstly, science is gradually evolving and accumulating, and secondly, the repetition and retelling of previous materials in the Islamic period led to the preservation of knowledge and its continuity. Thirdly, what could be more important than the prevention of rabies, which the Greeks and Romans did not mention! Therefore, reducing the scientific efforts of physicians of the Islamic period with such expressions will not be a scientific statement.

Discussion

The use of *Lytta vesicatoria* in the prevention of rabies and the method of mitigating the venom of this insect in this treatment, shows the forward movement in the Islamic period. Before the Islamic period, medicine has no mention of this method of treatment in preventing rabies and hydrophobia. Therefore, it should be considered that in the period of Islamic civilization, along with preserving and continuing the medical tradition of the ancients, new methods were used to control this very lethal disease. Physicians have not limited themselves to preserving past methods, but have entered new fields of medicine and pharmacology to find better ways to prevent rabies or other diseases.

Since rabies kills sixty thousand people a year, and one of the reasons for the disease is the lack of access to prevention and its high cost to poor countries, it is recommended due to the abundance of this insect in different areas of the world, a clinical trial on a laboratory scale should be conducted about the effectiveness of *Lytta vesicatoria* in preventing rabies. If this test is effective, a cheaper and easier way to prevent rabies can be found.

Conflict of interest

The authors declare that they are no conflicts of interest.

Compliance with Ethical Standards

This article does not contain any studies with human participants performed by any of the authors.

Acknowledgments

We are thankful to all other investigators, staffs, and participants of this study.

References

[1] Moallemi M, Yousofpour M. Naming, Definition, and Etiology of Rabies in the Medical Texts of the Islamic Civilization. Journal of Mazandaran University of Medical Sciences. 2019;29:167-174.
[2] Baer GM. The History of Rabies," in Rabies. Elsevier Inc. Oxford 2007.
[3] Azdī A. Kitāb ul māʾ. Masqat: Ministry of national culture 1996.
[4] Farāhīdī Ḥ. Kitāb ul ʿAyn. Dār al Hiğra. Qom 1988.
[5] World health organization (2017). 10 facts on rabies: https://www.who.int/features/factfiles/rabies/en.
[6] Esmaeilzadeh F et al. Effectiveness of post-exposure ra-

bies prophylaxis. Tehran University Medical Journal. 2014;72:630-637.
[7] Fayaz A et al. Epidemiological survey of rabies in Mazandaran Province during 1996-2006. 2010.
[8] Pourmarzi D, Razi M. Incidence rate of rabies vaccination delay after dog bite in Guilan province. J Holist Nurs Midwifery 2015;25:17-26.
[9] Razī M. al Ḥāvī fi al Ṭibb. Al-ʾaʿlamī Library Publication, Beirut 2001.
[10] IbnSīnā H. Al Qānūn fi al Ṭibb (Canon on Medicine). Al-ʾaʿlamī Library Publication, Beirut 2005.
[11] Bīrūnī M. al Ṣaydana. Markaz Našr Dānišghāhī, Tehran 1992.
[12] Ṭabarī A. Firdaws al ḥikmah. Dār al kutub al ʿilmīyya, Beirut 2002.
[13] Ibn-ebayṭār A. Tafsīr-u Kitāb discoridus. Dār ul Gharb Al islāmī, Beirut 1990.
[14] Ḥakīm Muʾmin M.Tuḥfat al Muʾminīn. 1st ed. Ǧalāl al-Dīn. Qom 2011.
[15] Ahwazī A. Kāmil al-Ṣināʿa al-Ṭibbīya (Royal Medicine). 1st ed. Ǧalāl al-Dīn. Qom 2008.
[16] López-López D, Agrasar-Cruz C, Bautista-Casasnovas A, Álvarez-Castro CJ. Application of cantharidin, podophyllotoxin, and salicylic acid in recalcitrant plantar warts. A preliminary study. Gac Med Mex 2015;151:14-19.
[17] Khattab FM, Nasr MM. A comparative study of topical cantharidin and intralesional PPD to treat molluscum contagiosum. J Dermatol Treat 2019:1-5.
[18] Fatima I, Kanwal S, Mahmood T. Natural Products Mediated Targeting of Virally Infected Cancer. Dose-Response. 2019;17.
[19] Fīlsūfaldawlah A. Mʿarifat ul sumūm. Iran university of Medical Sciences. Tehran 2005.
[20] Hsieh H-F, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res 2005;15:1277-1288.
[21] Yousefi SS, Jokar A, Sadeghpour O. Endogenous Gases or Wind as Important Etiologyof Diseases in Persian Medicine. Journal of Mazandaran University of Medical Sciences. 2020;30:127-142.
[22] Balāḏurī A. Ansāb al ʾAšrāf. Dār al Fikr, Beirut 1996.
[23] Al-Ǧāḥiẓ A. Al-Hayawan. Dār algil. Beirut 1996.
[24] Ǧurǧānī SI. Al ʿAġrāḍ al-Ṭibbīya wa al mabāhiṯ al ʿAlāīya. Iranian culture foundation. Tehran 1966.
[25] Ǧawālīqī M. Šarḥ ʾAdab il Kātib. Maktabat al Qudsī, Cairo 1931.
[26] Alok S, Raveendran J, Shaheen M. Conflict management strategies used by Indian software companies: A summative content analysis. IUP Journal of Soft Skills. 2014;8:47.
[27] Patton MQ. Qualitative evaluation checklist. Evaluation checklists project. 2003;21:1-13.
[28] MasīḥalDamišqī M. Al Risāla al Damišqīyah.
[29] Khodadust K. A Review of Medical Ideas of Seyed Esmail Jorjani, the Great Iranian and Islamic Scholar. Med Hist 2013;5:99-117.
[30] Pliny the Elder. The Natural History. John Bostock, Henry Thomas Riley (translators and editors); Gregory R. Crane (Chief editor). Taylor and Francis. Tufts University Perseus Digital Library. 2009.
[31] Ǧurǧānī SI. Ḏaḫīra ḫārazmšāhīi. 1st ed. Qom 2012.
[32] Wasik B, Murphy M. Rabid: A Cultural History of the World's Most Diabolical Virus: Penguin Press 2013.
[33] Kāẓimī M (2014). "Ḏurārīḥ" Encyclopedia of Islamic world. Tehran center for Great Islamic encyclopedia. Tehran.