Erciyes Med J 2021; 43(5): 513–8 • DOI: 10.14744/etd.2021.14603
HISTORY OF MEDICINE – ORIGINAL ARTICLE – OPEN ACCESS

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Cancer in Ottoman Surgical Books - Part I: Classical Period (1450-1730)

Ahmet Acıduman[1], Uygur Er[2], Deniz Belen[3]

ABSTRACT

Objective: Cancer is a disease known since prehistoric times; and both Western and Eastern medical literature have many works contain its causes and treatment during the ancient and medieval times. The aim of this study is to introduce cancer and its treatment in Ottoman *jarrāh-nāmes* in the classical period (1450–1730) and to make a contribution to literature of Turkish history of medicine by determining the place of this information.

Materials and Methods: Surgeon Mas'ūd's *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa*, Sharaf al-dīn Ṣabunjıoghlı's *Jarrāhiyyat al-Khāniyya*, *Jarrāh-nāme* of unknown author and Surgeon İbrāhīm's *'Alā'im-i Jarrāḥīn* were examined. However, after the comparison, *'Alā'im-i Jarrāḥīn* and *Jarrāhiyyat al-Khāniyya* were excluded from this study. A brief information was given firstly about the work and its author, and then the sections regarding cancer were presented in the Results section. The information on cancer in these works evaluated in the light of the relevant literature and period in the Discussion section.

Results: Surgeon Mas'ūd's *Khulāṣa* contains chapters about cancers on the head, trunk, breast and heel and their treatments. *Jarrāh-nāme* of unknown author comprises a section in which the treatment of cancer is generally mentioned without specifying the place of occurrence.

Conclusion: Although it is seen that Ottoman *Jarrāh-nāmes* in the classical period dealt with the cancer within the scope of medical practices in the Islamic civilization in the medieval times and almost all of the works examined in this study were translations.

Keywords: Cancer, Ottoman surgical books, Saraṭān, Surgeon Mas'ūd, *Khulāṣa*, *Jarrāh-nāme* of unknown author, history of Turkish medicine

Cite this article as: Acıduman A, Er U, Belen D. Cancer in Ottoman Surgical Books - Part I: Classical Period (1450-1730). Erciyes Med J 2021; 43(5): 513-8.

This article is based on an oral presentation at the Conference series in Cancer Institute, Hacettepe University, Ankara, Turkey, on 12th May 2016

[1]Department of History of Medicine and Ethics, Ankara University Faculty of Medicine, Ankara, Turkey
[2]Department of Neurosurgery, Acıbadem Ankara Hospital, Ankara, Turkey
[3]Department of Neurosurgery, University of Health Science Ankara City Hospital, Ankara, Turkey

Submitted 11.02.2021

Accepted 08.04.2021

Available Online 04.08.2021

Correspondence Ahmet Acıduman, Ankara University Faculty of Medicine, Department of History of Medicine and Ethics, Ankara, Turkey
Phone: +90 542 716 87 08
e-mail: ahmetaciduman@yahoo.com

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INTRODUCTION

Cancer, a disease known since prehistoric times, has been informed about its causes and treatment by the authors of many works in both Western and Eastern medical literature during the ancient and medieval times (1–4). The Arabic word *saratān* (سَرَطَان) has the same meaning as the Latin word *cancer* and represents similarly the crab (5, 6). An Arabic-English Lexicon contains the following explanation about the definition of *saraṭān*:

> "[The disease called cancer;] a black-biliary tumour, which begins like an almond, and smaller, and when it becomes large, there appear upon it veins, red and green, resembling the legs of the سَرَطَان: (...) (7, p.1348)"

Hippocrates (460–370 BC) defined malignant ulcer as *carcinoma apartus*, and non-ulcerated and deeply located tumor as *carcinoma occusus*. Regarding breast cancer, Hippocrates wrote: "A woman in Abdera had a carcinoma of the breast and bloody fluid ran from the nipple. When the discharge stopped, she died (4)." Regarding the treatment of cancer, Hippocrates made the following statement in his *Aphorisms* (VI, 38): "Occult cancers should not be molested; in attempting to discuss them, they quickly become fatal: when unmolested, they remain in a scirrhous state for a length of time (8, p.133)." *On the Diseases of Women* in the *Hippocratic Corpus* contains a statement about breast cancer (4).

Celsus (25 BC–50 AD) wrote that carcinoma often occurs in the upper parts of the body, face, nose, ears, lips, and women's breasts, and may also develop in an ulceration and occur in the spleen. Cancer is a constant, irregular swelling, sometimes accompanied by numbness. It has enlarged, curved veins around it. It is pale or purple in color. In some cases, it is invisible; some are painful to touch; in some, there is no sensation. Celsus made the classification of breast cancer. The first stage is what the Greeks called *cacoethes*. This is followed by carcinoma without ulceration. The next step comes to the ulceration, then the warty one. Of these, only *cacoethes* can be excised, others become irritated with treatment (9). Celsus writes:

> "Some have used caustic medicaments, some the cautery, some excision with a scalpel; but no medicament has ever given relief; the parts cauterized are excited immediately to an increase until they cause death (9, p.131)."

Galen (129–200 AD) interpreted Hippocrates's view that cancer is a systemic disease that occurs due to the increase in black bile, and coined the term "crab" to describe cancer. He claimed that breast tumor is a clot of black bile. He assumed that the woman's monthly menstrual discharge dispelled the excess black bile and suggested that this was the reason for the increased incidence of breast cancer among postmenopausal women. When it was an easily removable breast tumor, Galen recommended excision. On the other hand, special diets to remove excess black bile, purgation, venesection, and cupping are among the recommended treatments. Galen disliked ligatures used to bind blood vessels, as it was believed to cause the spread of cancer. He opposed the cauterization of the roots of the tumor, indicating that when cauterization is close to important organs the danger associated with it is not less (4). These are Galen's words about the surgery for cancer:

> "At any rate, if you will sometimes undertake to cure the cancer through surgery, you will start by evacuating the melancholic humor by purging. When you have accurately cut off the whole affected part so as to leave no root behind, allow the blood to flow out and do not quickly control it, but also compress the surrounding veins, squeezing out of these the blood that is thick. Then proceed to treat it similarly to other wounds (10, p.475)."

Paul of Aegina (625–690 AD) defined cancer as rough, unpleasant, blackish, painful, and sometimes non-ulcerated, worsening if operated, sometimes ulcerated, originating from black bile, spreading with erosion, and irregular swelling in many parts of the body, especially in the female uterus and breasts. He wrote that it has veins stretching all over it, like the crab's legs, from which it gets its name. He recommended surgical treatment, especially in the breast. He wrote that some people cauterize all the excess material while others first remove the whole breast and then cauterize it. However, he reported that Galen only found excision appropriate with Galen's words (11).

Jarrāḥ-nāmes are medical books written in Islamic civilization during medieval times that explain surgical diseases and medications used in their treatment, as well as surgical interventions in some cases. The 19th section of ʻAlī b. al-ʻAbbās al-Majūsī (Haly Abbas)'s (930?–994 AD) *Kitāb Kāmil al-Ṣinā ʿat al-Ṭibbiyya (Complete Book of the Medical Art)* or *Kitāb al-Malik (Royal Book)* is about surgical diseases and interventions (12, 13). On the other hand, the 30th chapter of *al-Taṣrīf li-man ʻAjaza ʿan al-Talīf (The Arrangement of Medical Knowledge for One Who is not Able to Compile a Book for Himself)*, the famous work of outstanding Andalusian surgeon Abū al-Qāsim Khalaf b. ʻAbbās al-Zahrāwī (Albucasis) (936–1013 AD), was devoted to surgery (12, 14). In this chapter, besides cauterizing in the treatment of diseases; surgical methods such as perforation, incision, and venesection are mentioned; and the treatments of fractures and dislocations are explained (15). A large part of *Kitāb al-Qānūn fī al-Ṭibb (Canon of Medicine)*, the famous work of Ibn Sīnā (Avicenna) (980–1037 AD) is concerned with surgery (12).

Ottoman *jarrāh-nāmes* in the classical period of Ottoman medicine were influenced by abovementioned famous names of the "Golden Age of Islamic Medicine". *Jarrāhiyyat al-Khāniyya* written by Sharaf al-dīn Ṣabunjıoghlı (Şerefeddin Sabuncuoğlu) in 1465 (16) is the Turkish translation of the 30th chapter of al-Zahrāwī's *al-Taṣrīf* (17). Surgeon Masʻūd's *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa* in the 15th century (18) and the *Jarrāh-nāme* of unknown author, written at the end of the 15th century (19), and Surgeon İbrāhīm's *ʻAlā ʾim-i Jarrāḥīn* (20) may be evaluated within the same tradition.

The aim of this study is to introduce the disease and its treatment methods, which are discussed under the title of *saratān* in Ottoman *jarrāh-nāmes* in classical period (1450–1730), and to make a contribution to literature of Turkish history of medicine by determining the place of this information.

MATERIALS and METHODS

The *jarrāh-nāmes* of the classical period of Ottoman medicine, i.e., Surgeon Masʻūd's *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa* (18), Sharaf al-dīn Ṣabunjıoghlı's *Jarrāhiyyat al-Khāniyya* (16), *Jarrāh-nāme* of unknown author (19) and Surgeon İbrāhīm's *ʻAlā ʾim-i Jarrāḥīn* (20) were planned to use in this study. However, after the comparison, since the only title "cancer on the head" in *ʻAlā ʾim-i Jarrāḥīn* is also included in the work of Surgeon Masʻūd and chapters on *saraṭān* in the work of Sharaf al-dīn Ṣabunjıoghlı were also discussed and examined in another study (21), they were excluded from this study. In the Results section of the article, brief information was given firstly about the mentioned work and its author, and then the sections related to the *saraṭān* in the work were presented. In the Discussion section, the information contained in these works has been evaluated in the light of the relevant literature and period.

RESULTS

Surgeon Masʻūd's *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa*

Surgeon Masʻūd stated in the introduction that this book was prepared by the physicians and surgeons under the leadership of Abū Ṭāhir b. Muḥammad Ghaznī (d. 838/9 AD) during the Khalifah Ma'mūn period (813–833 AD) and that its name was *Khulāṣa* (Summary) and he wrote that he decided to translate this book into Turkish because he knew Persian and Greek/Persian and Pahlavi (18, 22) (Fig. 1).

In this work, Surgeon Masʻūd writes about cancers on the head, trunk, breast and heel and their treatments.

> ***If the illness called cancer is on the head, the cause of this malady is a thick humor. Its symptom:*** *A small wound occurs and becomes exulcerated. Most [cancers] are seen on the [surface of the] body.* ***Treatment [and] management:*** *If it occurs on the head, let them shave the hair and cut [the skin] carefully in the shape of a cross so the skin is parted. Then, take out the mass, like walnut with its shell. [Then] fill the rest of the area with salt. Let it stay for three days. Then bring [the skin edges] together with an ointment. If cancer occurs on an extremity, it may be larger. Treatment: Tie up [the mass]*

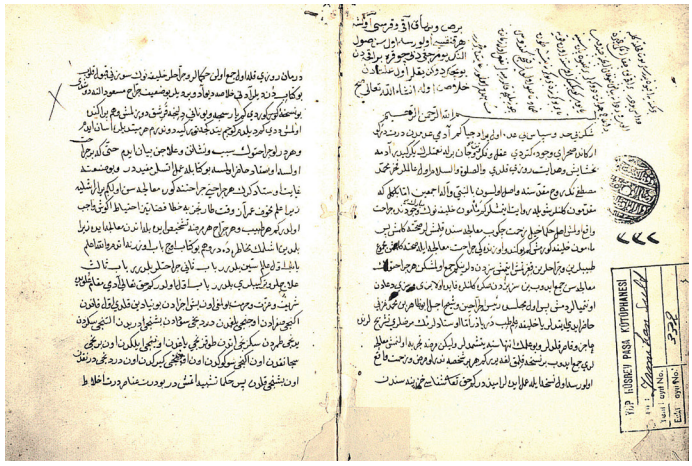

Figure 1. The first pages of Surgeon Mas'ūd's *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa* (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, Süleymaniye Yazma Eser Kütüphanesi, İsmihan Sultan Koleksiyonu, no. 332 [Süleymaniye Manuscript Library, İsmihan Sultan Collection, nr. 332], ff.0v, 1r) (Courtesy of Türkiye Yazma Eserler Kurumu Başkanlığı, İstanbul, Turkey)

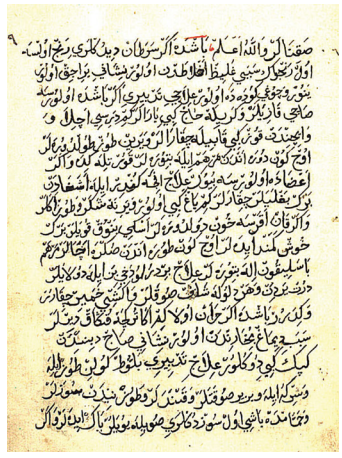

Figure 2. The page where Surgeon Mas'ūd's writes about the cancer on the head in *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa* (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, Süleymaniye Yazma Eser Kütüphanesi, İsmihan Sultan Koleksiyonu, no. 332 [Süleymaniye Manuscript Library, İsmihan Sultan Collection, nr. 332], f.9r) (Courtesy of Türkiye Yazma Eserler Kurumu Başkanlığı, İstanbul, Turkey)



Figure 3. Pages where Surgeon Mas'ūd's writes about breast cancer in *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa* (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, Süleymaniye Yazma Eser Kütüphanesi, İsmihan Sultan Koleksiyonu, no. 332 [Süleymaniye Manuscript Library, İsmihan Sultan Collection, nr. 332], ff.31v, 32r) (Courtesy of Türkiye Yazma Eserler Kurumu Başkanlığı, İstanbul, Turkey)

at its base tightly using fine hemp, (cut four corners)[1] *and remove it, [when] it becomes like fatty. Sprinkle sugar and salt in its place. If it bleeds, let them fill in styptics and put worn out cotton, and bandage it tightly and well enough. Let it stay for three days, and then open it. Let the [wound edges] come together with bāsalīqūn ointment. Another treatment: Pierce the mass on four sides with a bodkin and insert a suppository of the sour dough into each hole. It discharges and removes it* (18, f.9r) (Fig. 2).

If the breast decomposes and encompasses hard swelling, they call it cancer.

Its cause: *This is a malady that falls off through the throat and [the skin of the breast] gets pierced [over time].* ***Its symptom:*** *A phagedenic ulcer occurs, it stinks, and yellow fluid flows like water [out of the wound].* ***Its treatment [and] management:*** *Food: Feed [him/her] with chicken meat and treacle made from the juice of pomegranate, and rice and vermicelli, and pomegranate wine instead of water. Do not give opposite food. First; sprinkle small orpiment disks upon the wound and apply a cerecloth with rose oil around it. For a few days, smear the spinal marrow with sugar until its root has been eradicated. After that, let them prepare the ḥawāriyyūn ointment, add salt with lard and not touch water, apply it twice a day with worn cotton. But, reclean the wound; if decomposed matter remains after initial cleaning, apply the verdigris ointment using sponge, when it is cleaned with the ointment, they should sprinkle the powdered wound drug* (18, ff.31v-32r) (Fig. 3).

If cancer occurs on the heel, its cause: It originates from thick phlegm.

Its symptom: *If the swelling becomes hard, it twinges. It gets pierced [over time], and holes appear over it, and it starts seeping.* ***Its treatment [and] management:*** *First, apply repellent plasters until it softens, and tie it with a hard dressing, if it does not decrease in size, they should apply resolvent plasters without opening many spots. Do not get inside [the mass], but open it from the outside. If it opens on its own and a fistula occurs, of course, this injury erodes the bone and decomposes it. Insert seton immediately, no matter how many holes there are. Until it detaches and falls off, apply camphor ointment or medulla spinalis. Insert worn out cotton and sponge into its holes so that it heals completely. Sprinkle small orpiment disk, until it reaches the bone. If the bone is decomposed, clean it, and then, let it heal it with miṣrī ointment, and bandage tightly with a noose, and smear rose oil* (18, ff.37v-38r) (Fig. 4).

[1] This sentence does not exist in *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa*, but it is in *'Alā'im-i Jarrāḥīn* (15, f.80r).

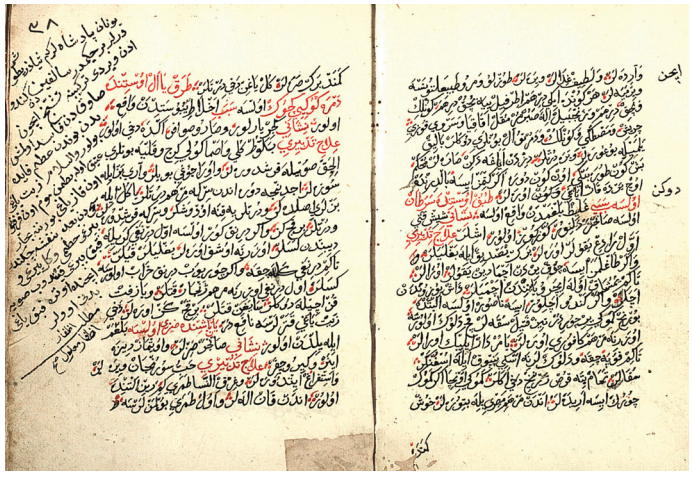

Figure 4. Pages where Surgeon Mas'ūd's deals with cancer on the heel in *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa* (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, Süleymaniye Yazma Eser Kütüphanesi, İsmihan Sultan Koleksiyonu, no. 332 [Süleymaniye Manuscript Library, İsmihan Sultan Collection, nr. 332], ff.37v, 38r) (Courtesy of Türkiye Yazma Eserler Kurumu Başkanlığı, İstanbul, Turkey).

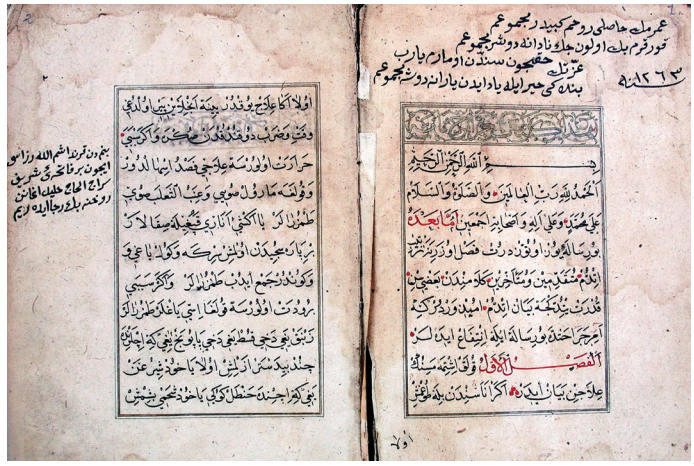

Figure 5. The first pages of *Jarrāh-nāme* of unknown author (İstanbul Arkeoloji Müzesi Kütüphanesi, no. 729 [İstanbul Archeology Museum Library, nr. 729]; 910/[1504], ff.1v, 2r)

Jarrāh-nāme of Unknown Author

The author reports that he composed the book on 134 chapters, and that he wrote this work using the works of both his predecessors and his contemporaries (19, 23). Although it is written on the last page of the copy of İstanbul Archeology Museum Library, nr. 729 that this copy was completed in 910/1504, it was probably written in the last quarter of the 15th century (23, 24) (Fig. 5).

In this work, the treatment of cancer is generally mentioned without specifying the place of occurrence.

> ***The eighty-fourth chapter announces the swelling called cancer.***
>
> *It is a hard swelling. In most cases it is fatal. It is firmly attached to the body, has roots, green veins stretch around it and it becomes enlarged. It is very harmful. At times it starts the size of a chickpea and then becomes the size of a very small melon. At times it starts very painful and no ointment can calm it, and it also becomes warm. First, it is colored as the skin is, then it turns a bluish color. It is possible to treat it if it causes little pain. The treatment: If it is in a suitable place for removal, it should be cut out and cauterized, these are beneficial. First a venesection should be performed on the median vein. After that the black bile should be purged numerous times. Food that increases the black bile is to be avoided. Warm meals should not be eaten. Lamb, chicken and fine wine should be used. If the swelling grows the situation should be handled in such a way that it does not split, and the swelling should not be bandaged and anointed with warm objects. Treatment should be performed with cold instruments. They [the surgeons] should anoint it with flea seed jelly, ceruse, vinegar and Armenian bole. And again, they should anoint it with the following special ointment. Description: It should be anointed with ceruse and washed zinc crushed together with rose oil and purslane water or pumpkin juice or flea seed reduced to a jelly. This ointment is extremely beneficial for cancer that is both ulcerated and not-ulcerated if God will* (19, ff.89r,v-90r) (Fig. 6a, b).

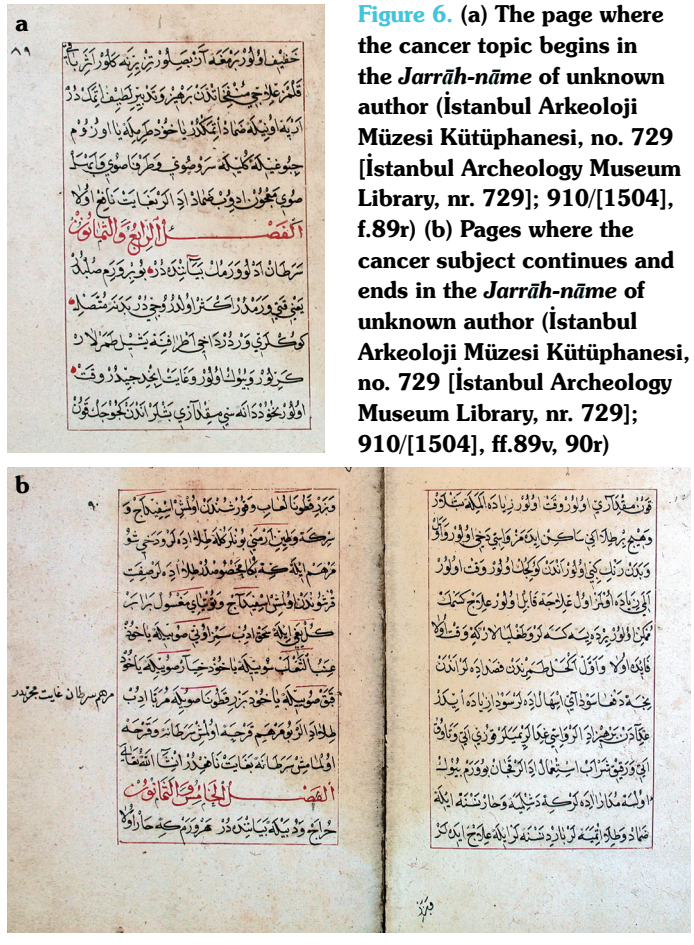

Figure 6. (a) The page where the cancer topic begins in the *Jarrāh-nāme* of unknown author (İstanbul Arkeoloji Müzesi Kütüphanesi, no. 729 [İstanbul Archeology Museum Library, nr. 729]; 910/[1504], f.89r) (b) Pages where the cancer subject continues and ends in the *Jarrāh-nāme* of unknown author (İstanbul Arkeoloji Müzesi Kütüphanesi, no. 729 [İstanbul Archeology Museum Library, nr. 729]; 910/[1504], ff.89v, 90r)

DISCUSSION

The medical paradigm of the classical period in the Ottoman Empire (1450–1730) was based on the theory of humoral pathology, which was the medical paradigm of the Islamic geography in medieval times. The humoral theory was transferred to medicine from the four-element theory of Empedocles (492–432 BC) by Hippocrates (25, 26). If the supposed similarity between the universe (macrocosm) and human (microcosm) is taken into account, the elements that compose them must be similar and even the same: Four Elements (Anāṣir Arbaʿa) – Fire (Hot-Dry), Air (Hot-Wet), Water (Cold-Wet), and Earth (Cold-Dry) – of the universe correspond to Four Humors (Akhlāṭ Arbaʿa) – Yellow Bile (Hot-Dry), Blood (Hot-Wet), Phlegm (Cold-Wet), and Black Bile (Cold-Dry) – in human. In this theory, health depends on the balance of humors in the body according to the person's temperament (25, 26). In every organ, these humors are different, but they exist in a certain balance within themselves. In other words, the warmness, coldness, wetness and dryness of each organ are different. For this reason, an organ that becomes ill is treated according to its characteristics coming from four elements, in other words, with simple or composite drugs and diet that have the opposite characteristics of the feature (26). The basic view is *contraria contrariis curantur* (27). Diseases are treated by evacuative methods such as venesection (faṣd), cupping (ḥicāmat) without or after the scarification (sharṭ), leeching (ʻalaq), enema (ḥuqna), vomiting (qayʾ), and urination (idrār al-bawl). Ligature (of veins) (rabṭ), excision (qaṭʿ), incision (baṭṭ and batr), and cauterization by fire (kayy) are of surgical interventions (12, 25).

Haly Abbas, in *Kitāb Kāmil al-Ṣināʿat al-Ṭībbiyya*, deals with the subject of *saraṭān* in the 32th chapter of 13th treatise of his book. He states that cancer arises from black bile, when it hardens and grows, its cure is not possible and its recovery is not imminent. He states that surgery can be performed on the limb where it is possible to cut the cancer with its root without leaving anything from it, but this situation is rare. If the beginning of the swelling is known, if the age, condition and temperament of the patient are suitable for venesection, blood should be taken from the appropriate side of the limb where the swelling is located, and if the patient is a female, the menstrual blood should be helped to flow. The body should be cleansed from the humor with laxatives that remove black bile (13, 28). Haly Abbas deals with the surgical treatment of cancer in the 12th chapter of the 19th treatise of his book. In this chapter, Haly Abbas states that although it is rarely seen in other organs of the body, cancer mostly occurs in the breast and uterus of women, and there is no surgical treatment for cancer in the uterus. According to Haly Abbas, in cancer in the breast and in one of the visible organs without a large artery or nerve in its vicinity, after the body is emptied by venesection and cleansed with laxatives many times, the swelling should be cut off and it should be carved to the very end so that nothing remains from the root of the swelling, and then it should be allowed to flow and the surrounding veins should be squeezed until the blackish thick blood comes out. Then this area should be treated with ointments, oils and wound medications. However, Haly Abbas does not report anything about cauterization and ligation (13, 29).

Chapter 50 of the first part of 30th treatise of Albucasis's *al-Taṣrīf* is about the treatment of cancer with cauterization. Albucasis reports that if the cancer is in its initial stage and if it is desired to prevent its spread, it is appropriate to cauterize the periphery of the cancer with a circular cautery. He writes that some physicians say that a large cauterization can be done in the middle, but this is not true for him because, as he has seen many times, it can become ulcerated. He finally adds that the right thing is peripheral cauterization with a circular cautery, or multiple cauterizations (15). In the 53th chapter of the second part of the 30th treatise, Albucasis writes that if the cancer is in the breast, thigh or similar places where complete removal is possible, especially in small and early stages, he recommends that surgical intervention be tried. After the patient is placed in the appropriate position, he recommends that the tumor be completely removed with a circular incision, and states that the blood should flow for a while, and if there is a severe bleeding due to the cutting of the artery or vein, he recommends that the vessel be cauterized until the bleeding stops (15).

Avicenna, in *Kitāb al-Qānūn fī al-Ṭībb*, writes that cancer is a melancholic swelling and is caused by the burning of bile. He states that the treatments applied to the place where carcinogenic tumors are located have four goals: I. To destroy the cancerous structure from the root, which is difficult, II. To prevent cancer from increasing, III. To prevent wounds, and IV. To treat the carcinogenic structure containing pus. Avicenna states that small tumors sometimes can be removed by cutting them. If it is possible to destroy it in some way, this is done by cutting off its ligaments and also cutting off the surrounding veins that come to its mass and feed it. A large amount of blood is then taken out from patient. Cleansing the body by removing the bad matter is done by blood-letting. He writes that sometimes cauterization is of great benefit, but if this is close to the head or respiratory organs, the result may be different (30).

Although some examples were seen earlier in the Turkish-Islamic world, the Turkish translation trend in Anatolia, which started with translations of some religious, scientific and literary works from Arabic and Persian into Turkish and continued with original Turkish works, has also affected medical works starting from the 13th century (31). Especially since the middle of the 14th century, medical works have been written in Turkish. *Begs* of Turkish principalities in Anatolia, who generally did not know Arabic and Persian, wanted the works to be written in Turkish, so they considered both themselves and the public to benefit from them (26). When the medical works belonging to this period (31, 32) are reviewed, it is noticed that nearly half of them are the works translated into Turkish. In this context, Ottoman *jarrāh-nāmes*, which are the subjects of our study, should be evaluated within the scope of translated medical works that were created during the medical language being Turkish.

It is seen that almost all of the Ottoman *jarrāh-nāmes* in the classical period contain important chapters on cancer (24) and deal with this subject within the scope of medical practices in the Islamic civilization in the medieval times. Although it is seen that the original work, which was translated by Surgeon Masʿūd, was written before the works of the aforementioned physicians, it can be evaluated within the same tradition in terms of reflecting the medical paradigm of his period, namely the humoral pathology theory. While the cause of cancer is reported as thick humor or thick phlegm in the *Tarjamat al-Khulāṣa fī Fenn al-Jirāḥa*, it is described as black bile, in accordance with what other authors report, in the *Jarrāh-nāme* of unknown author. And also, it is realized that the information about surgical intervention for cancer in the *Jar-*

rāh-nāme of unknown author coincides with the information provided by Haly Abbas and Albucasis, and indirectly Paul of Aegina, who was one of their sources (12, 29). In fact, among the sources of *Jarrāh-nāme* of unknown author are Rhazes, Haly Abbas, Avicenna, Ibn Hubal, along with Hippocrates and Galen (23, 24).

CONCLUSION

In general, it is seen that almost all of the examined works are translations and do not give new information on cancer different from their predecessors. On the other hand, considering the fact that the language of science of that period was Arabic in the Eastern world and Latin in the Western world, the importance of Turkish *jarrāh-nāmes* like other Turkish medical works becomes evident. These Turkish *jarrāh-nāmes* possibly made medical and surgical information accessible to those who wanted to have it at those times.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – AA, UE, DB; Design – AA, UE, DB; Supervision – AA, UE, DB; Analysis and/or Interpretation – AA, UE, DB; Literature Search – AA, UE, DB; Writing – AA, UE, DB; Critical Reviews – AA, UE, DB.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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