ORIGINAL ARTICLE

Medical Utilization of Silver in Avicenna's *Canon of Medicine*

Abstract

Archaeological researches indicate that the use of silver was common in various practices; there were numerous mints for silver coinage across Sassanid Persia (circa 620 AD) indicating that Persians were familiar with silver mining and its refining process. Medical practice also benefited from that expertise, and in the course of the following centuries new forms of utilizing silver began to emerge. This study focuses on one text belonging to the eleventh century; Avicenna's (IbnSina) *Canon of Medicine*. This study found different forms of silver in his book including splinters of silver (*Sohaala*), silver litharge (*Qaleemia*), dross of silver (*Khobth*) and burnt silver (*Ihragh*) along with their methods of preparation and medical applications. Some silver medical devices were also found in this book including a silver tube as a breathing tube, catheter with silver needle, a silver device called Anboob to excise warts, and a silver thimble for nail protection. Avicenna rarely mentions the source of his information; therefore, the subsequent attempt of this study to trace the origin of his information is mainly comprised of tentative linkages. Nonetheless, it appears that Avicenna took at least a portion of the information on the utilizations of silver from Indian, Greek, Roman and local Persian medical sources or practitioners.

Key words: Avicenna, Canon of Medicine, Silver

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Introduction

An Elamite silver chalice dating back to about 2200 BC shows how far back the use of silver goes in a region today known as Iran[1]. During Darius' reign, silver coinage as well as silver shekels as a measuring unit (3.8 grams) were used[2]. Archaeological researches suggest that numerous mints for coining silver existed across Sassanid Persia (circa 620 AD), from Balkh to Merv, from Rey to Scythia and from Nahavand to Gundeshapur. The considerable precision in the coins' weight (approximately 1.4 gram) and their high silver content (roughly 90 %) is curious[3]. This evidence indicates that ancient Persians were familiar with silver mining and its refining process.

In the course of the following centuries, new discoveries regarding methods of utilizing silver were made. Rhazes (circa 10th cent.) illustrated various methods of silver preparation such as calcination in his book *Kitabul-Asraar*[4], and Omar Khayyam (11th and 12th cent.) calculated the specific weight of silver[5]. It was in the early 11th century that Avicenna (Ibn Sina) compiled silver's medical applications in his *Canon of Medicine*.

Canon is considered as one of the most significant books in the history of medicine. It was one of the most organized and comprehensive books of medicine in its own time[6]. That is perhaps why so many copies of it were made, and many commentaries were written on it across the Islamic world. In the 13th century, it was translated from Arabic into Latin, and was regularly copied and printed across Europe[7]. The influence of *Canon* was so great that it was still being taught as a part of universities' syllabi across Europe as late as the early 18th century[8]. In historical studies as well as in traditional medicine studies, *Canon* can be an interesting subject. This paper aims to study the medical applications of silver in the work.

Forms of Silver in *Canon*

1- *Sohaala* (سهاله)

Splinters of metals, especially gold and silver, were called *Sohaala*[9]. If using the pure form of a metal was intended, splinted metal (*Sohaala*) was used. In the second book of *Canon*, which is devoted to medicinal items (مفرده), medicinal applications of silver are listed: treating mouth infection and relieving heart palpitation. It is important to mention that silver here functions in combination with other drugs, and it

1- Mohammadpanah, 2013.
2- Mahmoudabadi et al, 2009:145-160.
3- Hajvaliee et al, 2009:141-149.
4- Rhazes, 1992: 91.
5- Faghih Ablollahi, 1996:17-24.
6- Osler, 2004.
7- Ostler, 2009.
8- Weisser, 1987.
9- Al-Haj Taha, 1978.

seems it is more of a catalyst than a medicine on its own[10].

2- Silver Litharge (قليميا)/ Dross of Silver (خبث)

Avicenna describes Litharge thus:

"Litharge is obtained from gold, silver and, sometimes from copper and pyrite. However, it is a dross or smoke emanating at the time of metal casting. It is also something which settles down like the scales of metal[11]."

He reserves drying and polishing qualities for silver litharge, and continues that silver in this form is used in ointments to treat scabies, prurigo and severe ulcers with pus[12].

For dross of silver, he describes the same qualities with the addition of preventing bleeding resulted from chronic wounds and haemorrhoid[13].

3- *Ihraagh* (احراق)

Burning silver is a process described in detail in *Canon*. Avicenna obtained burned silver by heating silver *sohaala* up with water, salt and sulfur. He used the resulting product in a complex treatment (originally used in India) for leprosy[14] (Table 1).

Table 1: Medicinal Applications of Silver in Canon of Medicine

Medical/Medicinal Application	Form of Silver
Ulcer, wounds, chronic wounds	Silver litharge, dross of silver
Scabies	Silver litharge, dross of silver
Prurigo	Dross of silver
Mouth infection	*Sohaala*
Heart palpitation	*Sohaala*
Leprosy	Burned silver (*Ihragh*)

Silver Medical Apparatus

1- Silver tube as a breathing tube

Discussing *khonaagh*, Avicenna refers to a hollow tube made from silver or gold to help patients breathe[15]. In traditional medicine, *khonaagh* is a condition which causes swollen tonsils, throat muscles, larynx and oesophagus resulting in shortness of breath or larynx blockage. Today, we know that diseases like diphtheria, croup and pharyngitis could cause *khonaagh*[16]. He finds this condition to have sanguine, bilious or phlegmatic nature; therefore, he prescribes various treatments for it such as phlebotomy, cupping, topical solu-

10- Avicenna, 2005, vol. 2: 81.
11- Ibid: 110.
12- Ibid.
13- Ibid: 181.
14- Avicenna, 2005, vol. 4: 201.
15- Avicenna, 2005, vol. 2: 466.
16- Shirzad et al, 2014: 165.

tions such as gargling, oral solutions such as syrups and enema. But since the treatment would be time-consuming and in the event of an emergency, the patient might be suffocating, he recommends using silver (or gol) tube in order for the patient to be able to breathe[15].

2- Catheter with silver needle

In treating problems in the urinary system, Avicenna used catheter mentioned in *Canon* in arabicized form *qathater* (قاثاطير), in order to inject medicine into the urinary system. This tool as he describes it, has a hard, hollow and thin needle made of silver or several other metals, with a round point with several holes on it. To the other end of the needle, a soft small leather sack is attached. There are two purposes to use this type of catheter: to drain urine or to inject medicine into the urinary system. In the first case, urine is transported from the holes on the top of the needle to the leather sack. In the second case, the liquid medicine is transported vice versa, i.e. from the sack to the urinary system[17].

3- Silver *Anboob* to excise warts

It is a hollow thin silver cylinder with a sharp edge. The cylinder is placed around the wart, and with a sudden pressure and twist excises the wart. After the excision, ghee is applied on the wound forthwith[18].

4- Silver nail protection

If the nail becomes dull, in order for the nail to grow more polished, Avicenna recommends using a silver thimble to protect the nail, and to provide a safe environment for it to grow. The thimble needs to have holes on it for ventilation[19].

Cosmetics

Under the section devoted to hair dye, Avicenna, without referring to sources, describes how others make hair dye from dross of silver: "If dross of silver is cooked in vinegar, on fire and for long, it is very good to blacken the hair". He challenges this process and writes: "In my view, it is better to soak the dross in bitter orange juice instead of vinegar, and leave it for a while instead of cooking it; that would make a good dye"[20] (authors' translation).

Discussion

Alongside Avicenna's own innovations, what probably makes *Canon* a unique work is how it presents its content.

17- Avicenna, 2005, vol. 3: 391-2.
18- Avicenna, 2005, vol. 4: 583.
19- Ibid: 417.
20- Ibid: 370.

It presents all preceding medical knowledge in a novel, organized and comprehensive manner. Unlike Rhazes, Avicenna hardly mentions his references, and this would make it harder to distinguish his innovations from the ancient Greek and Roman imparted knowledge.

Avicenna mentions the source of his information about silver's medical applications only once: in the case of using burned silver in treating leprosy. He is content to just say Indians, and describes the process they recounted[21]. It shows that Indians were familiar with burned silver, which got the name *kushta* later, and its applications. The burned form of metals, including silver, is also mentioned in Pliny the Elder's *Naturalis Historia*[22] and Dioscorides' *De Materia Medica*[23]. Therefore, it would be probable to say that at the time of Avicenna, using burned silver might have been common in a wide range from Rome to India. But only the Indians are said to use burned silver for leprosy, so perhaps that was an Indian innovation.

Silver *sohaala*, on the other hand, was used across the region. In Avicenna's Bukhara, the Persian-speaking population called it *soonesh* (سونش), which is derived from the Farsi verb *soonidan* (سونیدن), meaning to grind[24]. Akhawayni Bukhari, who lived before Avicenna, in his book *Hedayatul-Mota'allemin fit-Tibb*, refers to brass *soonesh*[25]. But the information presented in *Canon* about *sohaala* and its forms are much more extended than Bukhara's records, suggesting that Avicenna used other sources such as Greek, Arabic and Persian.

Silver litharge and dross of silver are also mentioned in Roman works. *Qaleemia* (قلیمیا) is the Arabicized form of *kadimeia*, and *khobth* (خبث) is the translation of *scoria*. It appears that since there is no Arabic equivalent for *kadimeia*, they might not have been familiar with this concept, so they simply transliterated the word. Perhaps this unfamiliarity was the reason why in the following centuries some physicians took the two to be the same, considering that both processes' final products have close medical applications. Avicenna distinguishes the two, and before him, *Khouz*, Dioscorides and Galen used dross in their treatments[26].

Focusing on the medical apparatus, it is perhaps the easiest way to trace the origins of catheter. It is the Arabicized form of Greek *katheter*[27]. Rhazes, in his *Kitab al-Hawi fit-Tibb*, refers the information about catheter to Tiaziq, Al-Hajjajibn Yusuf's court physician, but provides no information regarding the make of the catheter[28]. Akhawayni Bukhari

21- Ibid: 201.
22- Pliny, 1961: 81-85.
23- Dioscorides, 2000: 794.
24- Dehkhoda, 1998, s.v.Soonesh
25- Akhawaini Bukhari, 1992: 593.
26- Rhazes, 2001, Vol. 6: 284.
27- Anonymous, 2016, s.v. catheter.
28- Rhazes, 2001, Vol. 3: 317-18.

provides such information in his book, writing that the catheter is made of silver, gold and brass[29]. A curious point is Akhawayni Bukhari never uses the word catheter; instead, he uses *mebvala* (مبوله). Jorjani in his compendium *Zakhira-e Khawrazmshahi* defines *mebvala* as a urinal[30], and it means the same in Arabic today[31]. Since Akhawayni Bukhari was a Farsi-speaking Bukhara citizen, he might have tried to find an equivalent for catheter. In any case, it seems that Avicenna took the information regarding catheter from Greek sources, but in terms of the make of the catheter, he might have used the knowledge of Bukharan physicians like what Akhawayni Bukhari did.

The origins of other silver tools described in *Canon* are not as easy as that of the catheter to trace, as there are no clues in the names to be followed. They might have been Avicenna's own inventions, and they can be subjects for further studies in this field.

29- Akawayni Bukhari, 1992: 593.
30- Jorjani, 2012: 44.
31- Al-Labadi, 2004: 1429.

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Nasir-ol-Molk Mosque, a historical mosque in Shiraz, Iran.

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