

HISTORY OF ONCOLOGY

Rhazes' (864-925) views on cancer and the introduction of chemotherapy

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Summary

Abu Bakr Muhammad ibn Zakariya al-Razi, known also by his Latinized name Rhazes, stands among the Arabo-Islamic physicians as the most important medical figure of his time. His contribution to medicine is considered vital as through his work and translations, the ancient Greek medicine along with the Arabian innovations, were spread in the Western medical literature. In his masterpiece entitled: "The comprehensive book on medicine", known also as "The large

comprehensive or Continens Liber", he had thoroughly studied cancer, discussing its diagnosis and treatment. He was among the pioneers to introduce the notion of chemotherapy by combining alchemical, chemical, medical and pharmaceutical knowledge.

Key words: arabo-islamic medicine, history of oncology, cancer treatment

Introduction

During the era of the Byzantine Empire, medicine was based on the achievements of the ancient Greek period. The contribution of Byzantine physicians to oncology was limited either due to the fact that the ancient Greek medicine was ahead of its time or due to the restrictions imposed on its practice by the Church [1]. However, in that time, few medical scholars such as Aetius of Amida (502-575), Paul of Aegina (ca 625-690) and Cleopatra Metrodora (ca 7th century AD) achieved greatness in the field of cancer treatment [2,3]. Ancient Greek medicine dominated medical practice in Byzantium and it was soon translated from the Arabo-Islamic school. Rhazes (Figure 1), a key figure of Arabo-Islamic medicine, introduced the translated writings of the Hippocratic School of Medicine and

Galen and promoted medical knowledge, adding also his own observations. In the field of oncology, he contributed to the notion of chemotherapy as an anticancer method in Arabian medicine [1,4].

Rhazes' life and work

Rhazes was born in 864 in the ancient Persian city of Al-Ravy, about 30km south of Teheran and we have little reliable information about his life. Although he was fond of music, medicine attracted his restless spirit. He had been the pupil of the Arab Nestorian Christian physician Hunayn Ibn Ishaq (809-873), who was an authority in the ancient Persian, Hindi and Greek medicine. Simultaneously, he attended philosophy classes under the guidance

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Figure 1. Rhazes, Arab physician and alchemist, in his laboratory at Baghdad. Oil painting by Ernest Board (1877-1934).

of the Persian Muslim polymath Adu Zayd Ahmed Ibn Sahl al-Balkhi (850-934 AD). Soon, he became a head physician in the Muqtadari Bimaristan (Hospital) of Baghdad under the patronage of the Persian scholar and physician Abu al-Hasan Ali ibn Sahl Rabban al-Tabar (ca 9th century AD). Under the reign of Al-Muktafi Bi-Ilah (877-908), Rhazes was commissioned to build a new hospital, which should be the largest of the Abbasid Caliphate. He was an exceptional lecturer, attracting several students, gaining the honorific title of “Sheikh”, given to one entitled to teach and surrounded by several circles of students of different levels [4-6].

Rhazes wrote several medical treatises and translated various works from the ancient Greek school of medicine. In his masterpiece “Al-Kitab al Hawi” (The Comprehensive book on Medicine, also known as *Continens Liber*) (Figure 2), a 23-volume set of medical textbooks, he established gynaecology, obstetrics and ophthalmic surgery during the medieval times. In his book “Doubts about Galen”, he had rejected several views of the authoritarian Greek physician Galen (130-201), which were con-

sidered fundamental since the era of Andreas Vesalius (1514-1564). His monograph “The Diseases of Children” was the first to deal with paediatrics as an independent field of medicine, distinguishing also smallpox from measles. He had also studied mental illnesses in his book “Mental Health” [4,7,8]. He developed pharmacy tools such as mortars, flasks, spatulas and phials, which were used till the early 20th century [4,9]. Furthermore, he was a skilful surgeon who introduced new instruments, used animal guts in surgical sutures and was the first to administer opium as an anaesthetic during operations [1,10], exerting thus a great influence on contemporary surgery, forming almost a school of his own. Finally, Rhazes had literally founded ethics in the Arabian world by embracing the Hippocratic views, stating: “the physician’s aim is to do good, even to his enemies... and my profession forbids us to do harm to our kindred, as it is instituted for the benefit and welfare of the human race, and God imposed on physicians the oath not to compose mortiferous remedies” [4].

Rhazes’ views on cancer

According to ancient Persian physicians, cancer was a malignant, particularly challenging entity and no definitive treatment was to be expected. They defined cancer as a hard lump with a dark colour, abnormal appearance and uneven margins, depicting peripheral outgrowths which gave an appearance similar to a crab, and hence it was called “cancer”, the Greek word for crab. Rhazes’ book “*Continens Liber*”, was the most prolific medical text concerning the description, diagnosis, differential diagnosis and prognosis of cancer, as well as its therapeutic approaches [11]. Rhazes noted that cancer occurs in every part of the body, with breast to be the most common localisation. In the place that malignancy grew, the surrounding tissues were affected and the veins were becoming distended, containing dark phlegma. As a supporter of the Hippocratic doctrine of the four humours, he had categorized diseases according to the fluids in excess found in the body. The dark phlegma could be relieved if the surgeon squeezed out the vessels during the excision of the tumour [11,12], a theory which was embraced centuries later by Joseph-Claude-Anthelme Récamier (1774-1852) [13]. Rhazes believed that the dysfunction of the liver and spleen could provoke an abnormal production of harmful substances in the body and alongside with some food products, they were the main reasons for a malignancy to appear. However, he sustained that cancer was impossible to be recognized at its early stages, when it has the size of a fava



Figure 2. Frontispiece of "Continens Liber" published in Venice in 1529.

bean, is movable and presents no adhesion. However, he mentioned that in later stages, the mass was growing, becoming immovable, ulcerated, and congested vessels appeared, surrounding the afflicted organ, giving sometimes metastasis [11].

On treatment, Rhazes believed that purging of harmful humors by venesection and purgative drugs could have been curative, but he had also suggested bloodletting as a preventive measure, sustaining that blood contained the causative material of cancer. As a fatal disease, cancer should have been confronted as early as possible with surgery and drugs prescription. Nevertheless, no surgery should be attempted unless the cancer could be excised completely. Moreover, he mentioned that physicians should not be blamed in the case that a patient could not be cured, as cancer was almost

an untreatable condition. He was among the pioneers who suggested that surgery, as a monotherapy, should be performed in superficial tumours at early stages, while it was inferior to treatment with drugs for advanced cancers [1,11,12].

A step towards alchemy and pharmacy: the introduction of chemotherapy

Rhazes, as most physicians of the Arabo-Islamic world, believed both to a close collaboration with pharmacists and to a self-production of drugs. With extensive knowledge in alchemy, he prepared his anti-cancer agents from plants, minerals and animal tissues. Being chemist and physician, he had isolated a series of chemical substances and used them in cancer therapeutics. In cases of ulcerated tumours he was applying hot oil, mercurial ointments and arsenic, in various dosages. Moreover, he had extensively used chemicals that were discovered by other Arabic chemists, like alcohol, laudanum and benzoin, creating in a way the first organized "chemotherapy" [1]. A lotion prepared from carbonate of lead was also considered as highly effective in cancer as well as the consumption of the cooked mixture of viper's meat, water, salt, dill and wine made from aromatic herbs [14]. Rhazes could be considered as the first true oncologist, the first who used excessively chemotherapy and established scientific methods to medicine and pharmacy [1,15,16].

Conclusion

Abu Bakr Muhammad ibn Zakariya al-Razi cared a lot for the poor and he wrote a treatise to support them entitled: "For one who has no physician to attend him". During a period he felt in disgrace, due to war turbulence and a political fallout with some of the leading Islamic clerics. He had lost his privileges and was prohibited to practice medicine, while was blinded by an assailant. The most significant Arabic physician, the most prolific scholar and medical writer of the Islamic world died in 925 in poverty. However, his work was spread all over the Western Europe, influencing the practice of medicine and the approach in cancer [1].

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