The history of bronchial asthma from the ancient times till the Middle Ages

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The aim of the paper is to give an overview of the knowledge on asthma through the history of mankind. The text begins with ancient China and it is finished with the medicine of Middle Age. During this time, a lot of theories came and this appeared about the etiology and therapy of the disease. The paper is giving a short description of the changing medical views during this very long period including China, Egypt Greco-roman period, Mesopotamia, the Hebrews, the physicians of India, the pre-Columbian medicine in the America and the Arabic world, and partly the European medicine of the Middle Ages.

Keywords: bronchial asthma, pathomechanism of asthma, drugs of asthma, historical data

There exists a well-known statement: the books have their own fate (habent sua fata libelli). The diseases also have their own fate: in diverse ages the patients, the physicians and in the last centuries the medical scientists have their own – ever-changing – opinion about the given disease. Bronchial asthma has a very special history from this point of view. The knowledge of mankind about this medical problem has accumulated for thousands of years.

According to the legends, we have been using efficient drugs against bronchial asthma for as long as 5000 years. The big civilizations have dealt with the problem, searched for knowledge on the etiology and therapy. After many false doctrines we came slowly nearer to the real pathomechanism, evidence based drugs and beneficial way of life.
Writings from ancient China, pharaonic Egypt, Mesopotamia and the Greco-Roman period, as well as from the ancient Hebrews, reveal much about scientific thinking during the era designated as Early History. Although these records are open to interpretation, they may, in fact, contain the earliest descriptions of diagnoses and treatments of allergy and asthma.

In studying documents from ancient China, Egypt, Greece, Rome, etc., it is difficult to determine whether individuals were responsible for the novel medical observations and techniques described, or whether the new information represented accumulated knowledge handed down from generation to generation before recorded history. One certainty is that medicine in these cultures, as well as among the Hebrews, was closely interwoven with religious practice.

**Ancient China**

Ephedra, known by the inhabitants of China longer than five thousand years ago as *ma huang*, is a remedy whose medicinal benefits were recognized and employed for millennia before its pharmacological properties were characterized. *Shen Nong*, is said to have tasted every one of the herbs he cultivated to cure the sick, including ephedra. Ephedrine, the active ingredient in ephedra, relieves bronchospasm, produces vasoconstriction, reverses congestion, and inhibits mucous secretion. The Chinese brought ephedra to Greece, from where it was introduced to other civilizations (22).

*Shen Nong* (c. 2700 BC), also called *Yen Di (Red Emperor)*, is considered as the “Father of Chinese Herbal Medicine,” as well as the “Divine Husbandman.” According to legend, it was *Shen Nong* who first tasted and described ephedra (*ma huang*, the “horsetail” plant in the *Pen-Ts’ai*), which has edible berries that resemble raspberries but are more pungent. There is evidence that ephedra was first used to treat asthma-like symptoms five thousand years ago. *Shen Nong* is believed to be the author of the earliest *Pen-Ts’ai* (“Divine Husbandman’s Meteria Medica”) – a widely used reference work – however, this text most probably was written in the first century BC.

*Huang Ti* was designated the *Yellow Emperor* because he was closely identified with and influenced by the earth and the elements, which were represented by the color yellow. His reign is placed in the twenty-sixth century BC (2697–2598 BC), and he is credited with the composition of the *Nei Ching Su Wen* (“Canon of Internal Medicine”), the world’s oldest treatise of internal medicine (13, 19).

The earliest recorded reference to respiratory distress and perhaps asthma is found in *Su Wen* (“Plain Questions”), the first book of the two-volume *Nei Ching Su Wen*, which recorded discussions between the *Yellow Emperor* and his minister *Ch’i Po* on philosophy, medicine and religion. Among its many passages, the *Su Wen* described a disorder characterized by wheezing.

The seasonal aspect of respiratory disease is also discussed in the *Su Wen: When the disease is located within the lungs it should improve during winter. If it does not improve during winter it will become more serious in summer. If death does not follow
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in summer, it can be warded off during the period of the long summer evenings, but the disease will again arise in fall. One should avoid eating and drinking cold things and one should not wear chilly clothing (13).

Contrary to the teachings of Chinese tradition, the discussions attributed to the Yellow Emperor and his minister may actually represent the accumulated observations of later Chinese scholars and physicians (Fig. 1).

Fig. 1. Buddhistic cave-shrine in China, inside on the wall the Chinese traditional medical prescriptions (Longmen VII. century) (Photo by Dr. Zsuzsanna Berzsenyi)
The Ebers Papyrus and other medical works by early Egyptian authors described a sophisticated approach to the practice of medicine. They considered respiration to be the most vital function, although they recognized the heart as the center of the circulatory system. These “ancestors” believed that the functioning of the heart was dependent upon respiration.

Before the Middle Kingdom (2130–1550 BC), illnesses were thought to have natural causes and it was believed that physicians – called swnw – healed through the use of sacred skills. After the Middle Kingdom, however, religion, once a source of scientific inspiration and innovation, became rigid and formal. While Egyptian pantheism once spurred investigation, it eventually stifled it. The belief that illness was caused by supernatural intervention gained prevalence, and magic became more important, than reason in the treatment of disease (7).

The Egyptian swnw were both priests and physicians; thus, medicine was considered a sacred art. Committees of physicians established many of the standards of medical practice. According to custom, if a physician treated an illness in the manner approved by the committee and the patient died, the physician was blameless. If the physician deviated from the recommendations of the committee and the patient died, the physician was liable and could be executed.

The Ebers Papyrus (cc. 1500 BC), which is more than twenty meters long, contains one hundred-eight columns of text on one side and a calendar on the other (Fig. 2). In 1873, it was purchased and translated into German by the egyptologist Georg Ebers. Among the nearly one thousand prescriptions outlined on the papyrus were remedies for asthma, hepatitis, bubonic plague, gonorrhea, scurvy, cataracts, epilepsy, hemorrhoids, etc. (6, 9).

The Ebers Papyrus was first described in the second century AD by the Christian writer Saint Clement of Alexandria (Titus Flavius Clemens, c. AD 150–215?) as a divinely inspired text that contained the worldly knowledge of Thoth (god of wisdom). The Papyrus was unearthed in Thebes in 1862 from between the legs of a well-preserved mummy. Georg Moritz Ebers (1837–1898), who collected and studied antiquities, purchased the papyrus in Luxor eleven years later. The text was written in hieratic script, a system of abbreviated, cursive writing used by priests and physicians that was contemporary with, but simpler than, hieroglyphics. Hieratic script was inscribed on wood or papyrus by using reed pens, in contrast to hieroglyphics, which were chiseled into stone. The Ebers Papyrus contains monographs and excerpts that may predate their inscription by at least one thousand years (6).

The repetitive style of this paragraph suggests that the Ebers papyrus was transcribed directly from more than one older source, and the anonymous author acknowledged that it was a compilation.

Asthma was considered to be a whdw (disorder or foulness) of the metu (ducts that were thought to distribute air and water to the organs, including the lungs). Therefore, physicians attempted to heal the metu by dispelling the whdw. The effectiveness of
various remedies is difficult to determine, however, because many of the substances of
the materia medica described in the Ebers papyrus are unknown today; for example, the
name of a plant is of little meaning when a similar word did not survive to be included
as part of a modern language. Among the identifiable substances commonly prescribed
for respiratory problems were frankincense, yellow ochre and grapes (Fig. 3).

The Ebers papyrus also recommended the use of a special apparatus for inhalation
in cases of restricted breathing: Thou shalt fetch seven stones and heat them by fire,
thou shalt take one thereof and place a little of these remedies on it and cover it with a
new vessel whose bottom is perforated, and place a stalk of reed in this hole, thou shalt
put thy mouth to this stalk so that thou inhalest the smoke of it.

Fig. 2. A part of the Ebers papyrus (cc. 1500 BC)
Asthma in the Greco-roman period

In ancient Greece there was a cult based upon the philosophy of the deified physician, Æsculapius (deified, c. 1200?–900? BC). Trained by Chiron, the centaur who had taught the art of medicine to Achilles, Æsculapius was said to be a doctor of such extraordinary talent that he could raise the dead. Among his many children were Panacea, who was the embodiment of knowledge of all of the earth’s remedies, and Hygeia, who was concerned with public health (Fig. 4). Æsculapus’ accomplishments eventually aroused the envy of the gods, who struck him dead, but later enshrined him in Mount Olympus.

Hippocrates the Great, was born on the island of Kos (cc. 460–377 BC) regarded as the “Father of Medicine”, based his teachings upon objective observation and deductive reasoning (Fig. 5). In the development of medical practice as a profession, Hippocrates became the most renowned and influential physician in western history; his ideals and principles were incorporated into the “Hippocratic Oath,” the ethical code still studied by students in many medical schools. Among his numerous contributions to medicine, Hippocrates described “panting,” which he termed asthma. In his writings, he noted “Such persons as become hunch-backed from asthma or cough, before puberty die.” Hippocrates is also believed to be one of the first physicians to understand the relationship between the environment and respiratory ailments (3).
Hippocratic medicine identified four humors: blood, phlegm, yellow bile and black bile; of which phlegm and bile were considered the most important. Health was believed to be related to a delicate balance among the humors; a person became ill when there was an excess of one of the four. Hippocrates hypothesized that asthma, which he equated with any form of panting, developed consequent to a “cacochymia” (disequilibrium) of the humors which caused phlegm (the evil humor) to arise in the brain, pass through the pituitary gland, condense in the nasal cavities, and flow into the lungs. The lungs would ultimately be blocked due to an excess of “catarrh.” He described panting which he termed asthma. Similar to “rheum,” catarrh is from the Greek meaning “flowing down.” Hippocrates describes this process in his essay *Airs, Waters, Places*, which correlates illness with climate and location (12).
Greek and Greek-influenced physicians continued to use “asthma” to describe a degree of respiratory distress rather than a syndrome. The word asthma is from the Greek for “wind” or “to blow.” The Roman encyclopaedist Aulus Aurelius Cornelius Celsus (first century BC), the first medical historian, described asthma in *Book Four of his De Medicina* as the inability to breathe without making noise and gasping. As treatment, *Celsus* suggested bleeding, purgatives, hot wet compresses, emetics and diuretics.

*Aretaeus the Cappadocian* (c. second century AD), a Greek physician who practiced in *Rome* and *Alexandria*, is credited with the earliest documented description in existence in Western literature of what is now recognized as asthma. He incorporated the symptoms previously described into one syndrome. Aretaeus received little attention during his own era, but two of his treatises, written in ionic dialect, were rediscovered in 1554: *On the Causes and Symptoms of Acute and Chronic Diseases and On the Treatment of Acute and Chronic Diseases.*

Fig. 5. The ruins of the hospital of Hippokrates on the island Kos (Photo by Endre Cserháti)

Among other diseases, these writings described asthma. They also revealed that during the course of his career, *Aretaeus* had revived the work of *Hippocrates*. *Aretaeus* is now regarded as second only to *Hippocrates* in the application of keen observation and ethics to the art of Greco-Roman medicine (1):
If from running, gymnastic exercises, or any other work, the breathing becomes difficult, it is called asthma, and the disease orthopnoea is also called asthma, for in the paroxysms the patients also pant for breath. The disease is called orthopnoea, because it is only when in an erect position that they breathe freely, for when reclined there is a sense of suffocation. From the confinement in the breathing, the name orthopnoea is derived...

...The lungs suffer, and the parts which assist in respiration, namely the diaphragm and thorax, sympathize with them. But if the heart be affected, the patient could not stand out long, for in it is the origin of respiration and of life.

The cause is a coldness and humidity of the spirit (pneuma), but the material is a thick and viscid humour. Women are more subject to the disease than men because they are humid and cold. Children recover more readily than these, for nature in the increase is very powerful to heat. Men, if they do not readily suffer from the disease, die of it more speedily. There is a postponement of death to those in whom the lungs are warmed and heated in the exercise of their trade, from being wrapped in wool, such as the workers in gypsum, or braziers, or blacksmiths, or the heaters of baths.

The symptoms of its approach are heaviness of the chest; sluggishness to one’s accustomed work, and to every other exertion; difficulty of breathing in running or on a steep road; they are hoarse and troubled with cough; flatulence and extraordinary evacuations in the hypochondriac region, restlessness; heat at night small and imperceptible; nose sharp and ready for respiration.

This passage illustrates the increasing sophistication of physicians represented by Clarissimus (“most brilliant”) Claudius Galenus (AD 129–c. 199). Galen studied in his native city of Pergamon, Asia Minor, which was one of the centers of the cult of Æsculapius. He was well-versed in philosophy, mathematics, and logic before leaving this city for Smyrna and Corinth. He read Hippocrates and completed his education at the university and medical center in Alexandria, Egypt – at that time, the best school in the world for the study of anatomy (18).

Galen circumvented the Greco-roman prohibition against dissection of the human body by operating on pigs and other animals and extrapolating his findings to human anatomy. He was the first to discover that respiration was the result of muscular contraction and not the expansion caused by breath warming the heart. He proved his hypothesis through the simple observation that the respiratory rate could be controlled consciously.

Pliny the Elder (Gaius Plinius Secundus) criticized the practices of the Greeks, but his encyclopedic Historia Naturalis (“natural history”) was greatly influenced by the Hellenic tradition. Although he hoped to emulate Greek scholarship, Pliny’s work was unreliable. He acknowledged pollen, which he knew had a role in plant fertilization, as a source of respiratory distress, and he recommended the use of ephedra (called “anabis”) in red wine as a remedy for asthma. He also dealt in folklore, suggesting, for example, that drinking the blood of wild horses was effective, as was fox liver in red wine or millipedes in “thrice seven” number of insects soaked in Attic honey and taken internally.”
Mesopotamian art of medicine

Over centuries, learned Greeks began to differentiate medical fact from superstition. When Herodotus (c. 484–430? to 420? BC), the Greek celebrated as the “Father of History,” traveled to Babylonia, he was dismissive of the medical techniques in that region. According to Herodotus, there were no physicians in Babylonia: the sick were taken to the marketplace where a passerby evaluated their condition and questioned them. If the passerby had experienced a similar malady, he or she might have suggested a remedy. Herodotus’ description, of course, was not correct; there had long been physicians in Mesopotamia. Medical doctors were regulated by the Code of Hammurabi (r. 1792–1750 BC), and many of their prescriptions, potions, and healing spells survive on cuneiform tablets.

These tablets recorded symptoms of dyspnoea, for example, “If a man’ lungs pant with his work,” and “When the breath of a man’s mouth is difficult.” An apparatus to ease breathing was also described. The Code instituted strict public health regulations; intervention into private life was permitted when infractions were suspected. However, in the majority of medical texts written by successive generations of Sumerian, Babylonian and Assyrian physicians, illnesses such as asthma were attributed to commission of a sin or possession by a demon, and cures were sought through repentance or magic (10, 20).

The Hebrew heritage

The early Hebrews were a relatively small group of nomadic people who, during the course of their history, were subjected to wars and conquests, and endured famine, exile and captivity. In the face of these tumultuous events, they remained united by rigidly codifying their beliefs and culture. Although some references to older philosophies survive within the biblical texts, the Hebrews were committed to one God, and the preponderance of their literature describes and supports their relationship with him.

Early Hebrew civilization was distinguished by the belief in a single God as the source of all life and death (Fig. 6). Some narratives suggest that at one time the Hebrews believed that catastrophes were due to supernatural interventions unrelated to God, and the phrasing of many psalms suggests that incantations were adapted into prayers. In addition, practices once associated with magic, such as the wearing of phylacteries (ritual wearing apparel) and the posting of mezuzot (small parchment scroll with ritual text), were redefined within the monotheistic religious and legal system of Judaism. Yet, as the culture became more sophisticated, a significant distinction between magic and religion emerged. Disease, excluding “everyday” disorders, represented divine displeasure, a consequence of sin, which altered the approach to treatment. Epidemics reflected God’s wrath.
Fig. 6. According to Hebrew customs, the contagious patient has to bring turtle-doves to the priest after healing.
Although Jewish tradition rejected any practice that might “harm” a corpse, including autopsy and embalming, it is clear from the Babylonian Talmud that the Jews had a relatively sophisticated comprehension of human anatomy and physiology for the time. The Talmud explicates, through its analysis of case law, much of what the community understood about human health and illness. For example, the Jews regarded the liver as the source of blood and, therefore, life, whereas the heart was the home of the soul. The Talmud also offers a collection of prescriptions, categorized according to parts of the body (10, 16). In Chapter IV, “Sickness and Their Treatments,” diseases of the lungs are described, including an observation on breathing:

_The breathing of individual people differs, all according to the spirit for which God maketh a weight. Some people have a long (projecting) breath whereas others have a short breath; the latter, if he is possessed with ruach katakton..._

[The Hebrew word _katakton_ refers either to the Greek _katakton_, fragilis, or, according to an other reading: _katariton_, equivalent to the Greek _katarryton_ meaning catarrhal.]

Both the Talmud and the Bible offer rational advice regarding medical treatment. Among the discourses in the Talmud is a deliberation on the use of “hiltith”, an Arabic term for _asafetida_, an odoriferous gum resin of oriental plants of the carrot family, genus _Ferula_. Commonly used in folk medicine as a prophylactic agent against an array of diseases, asafetida is mentioned in the Assyrian Herbal, a cuneiform tablet from King Ashurbanipal’s (r. 668–627 BC) library in Nineveh dating from 669 to 626 BC. It was believed that the digestion and elimination of this volatile oil through the lungs could prevent and treat bronchitis, whooping cough, and asthma. As the Talmud explains:

_What is it made for? [As a remedy] for asthma [literally, “heaviness of heart”]. R. Aha b. Joseph suffered with asthma. He went to Mar Ukba, (who) advised him, “Go and drink three [gold denar] weights of hiltith on three days.” He went and drank it on Thursday and Friday. The following morning he went and asked (about it) in the Beth hamidrash (to ask whether he could take it on Sabbath)._

**The medicine in India**

One section of the Susruta Samhita contains a lecture that described the anatomy and dissection of the human body (Fig. 7). Indian physicians believed that “winds” were essential to the functioning of the body and that these winds, of which there were five, were inhaled through the breathing process. If one of the winds was functioning improperly, _juices (dosas)_ took control of the body and caused sickness. Direct physical observation allowed these physicians to note that a person draws breath 22,636 times a day, or sixteen times per minute (20).

Indian pharmacology was quite advanced, and the medicinal plants and therapies from the Indian subcontinent were exported to Greece and Egypt soon after Alexander’s invasion. Susruta noted that many of his teachings, which included herbal remedies, were derived from the medical text Ayurveda. Of note were two herbs recommended
because of their relaxant properties: *Saussurea lappa* (kuth root) and *Nardostachys jatamansi* (*Datura or thorn-apple*), from which stramonium was extracted. All Western works based on the Indian pharmacopoeia, such as *Dioscorides’ Materia Medica*, remained standard reference books well into the seventeenth century in Europe. The British army, following its nineteenth century incursion into India, introduced to the
West the practice of smoking stramonium as a treatment for asthma – substituting the temperate genus *Datura stramonii* for the tropical genus *Datura ferox*.

**Pre-Columbian medicine in America**

In the Americas in ancient times, respiratory disease was treated by a combination of medicaments derived from plants and religious or ceremonial customs, such as sacrifices to the rain god *Tlaloc*, as practiced by the *Aztecs* well before the arrival of *Columbus* (Figs 8, 9).

![Fig. 8. The god of medicine who is smoking curative herbs (Palenque, Mexico)](image)
The early peoples of South America and Mexico utilized natural resources as cures and for construction of medical instruments. Although the use of rubber in medical instruments did not spread to Europe for three hundred years following the Spanish conquest, evidence exists that the ancient Mexican civilizations developed an enema syringe and other devices from the natural latex of the rubber tree. Further, the Aztecs referred to a region on the coast of the gulf of Mexico as “Olman,” signifying that it was the “land of rubber.” This material was also used in other ways. Physicians applied large plasters containing juice from the rubber tree, which served as a blistering agent, for the treatment of chest disorders and rheumatism. Herbal remedies that were discovered following Columbus’ landing in the New World were the dried root of the Brazilian shrub ipecacuanha (Cephaelis), which possesses expectorant properties, and balsam, used as a component of some cough medicines even today. Atochietl and tzompilibuixxihuitl were pungent inhalants used to clear the head. “He who is troubled with dripping nose or coryza is to sniff the herbs atochietl and tzompilibuixxihuitl and help the coryza thus.” Tepopote, a native name applied to several species of ephedra, was also used as an herbal remedy for coryza (4, 15).
In Peru, the Incas benefited from centuries of accumulated herbal lore. The Spanish, who vanquished the Incas in the sixteenth century, were amazed by the Incas’ use of healing drugs. In fact, many Spaniard preferred Incan physicians (hampi-camayoc, or possessors of medicine) to Spanish physicians. Chief among the Incan armamentarium was the dried leaf of *Erthroxylon coca*, whose principal alkaloid, *cocaine*, is an effective local anesthetic. Centuries later, cocaine was also used in proprietary and prescription medicines in the United States and Europe for the treatment of rhinitis and asthma.

The Middle Ages

For the most part, only few new developments in medical research were initiated in Europe during the Middle Ages. Physicians considered the classic works of Hippocrates and Galen to be definitive, and most concentrated solely on improving the comfort of the sick. During this time, however, translations of the works of Galen stimulated some innovations in the Arabic culture, where medicine flourished (14).

Born near Tehran, Abu Bakr Muhammad ibn Zakarya ar-Razi, known in Europe as Rhazes, (c. 865–932) was a Persian who wrote in the Arabic language and was familiar with the Arabic culture.

After being selected to build and head a new hospital in Baghdad, Rhazes devised a novel method for choosing a construction site. He placed chunks of meat throughout the city and chose the location where the meat had rotted least, deducing that the site was most conducive to health and was thus the best location for a hospital.

Among his medical tomes was *A dissertation on the cause of the Coryza which occurs in the spring when the roses give forth their scent*, the first description of seasonal allergic rhinitis, or what was then referred to as “rose fever.”

In his medical encyclopaedia *El Havi*, Rhazes also discussed an asthma treatment that had been recommended by a contemporary:

*Noted is Ben Mesue’s treatment for asthma and shortness of breath two drachmas of dried and powered fox lung and decoction of figs added to a drink. In differing with Galen who reported many cured of asthma with owl’s blood in a drink or giving owl’s flesh with food and drinking its blood afterwards – owl’s blood is not to be given in any case of asthma having seen it administrated and useless* (8).

Avicenna (980–1037), was lauded by his contemporaries as the “Prince of Physicians” (Fig. 10).

Avicenna’s single most famous work was *al-Quanun fi al-Tibb* ("The Canon of Medicine"): this quintessential medical textbook was required reading throughout the Islamic and Christian worlds for more five hundred years after his death (2, 5).
Maimonides (1135–1204) served as physician to the court of the legendary sultan Saladin (1137 or 1138–1193) and attended the Muslim leader’s son who suffered from chronic asthma. In this Treatise on Asthma, in addition to suggesting comprehensive treatment measures, including rest, good personal hygiene, environmental hygiene,
equanimity, and avoidance of opium, Maimonides focused on the effects of diet on health and made a number of suggestions to the sultan regarding food selection for the prevention of asthma attack. Nuts (which he believed filled the head with gases), fowl, milk, and legumes were forbidden, as were vegetables of a cooling and moist nature, such as lettuce, mallow, taro, turnip, cauliflower and eggplant. Foods thought to be beneficial to the patient with asthma included roe, ram, hare and “the soup of fat hens” – chicken soup. Maimonides’ most highly recommended treatment, a small quantity of wine, could not be prescribed for his royal patient who, as a Muslim, could not imbibe; however, the physician offered a honey-based drink as a substitute (17).

The Italian coastal town of Salerno had been famous for centuries for its numerous physicians, who were probably attracted there by the many patients who made pilgrimages to the enshrined remains of Saint Matthew the Evangelist. A prominent medical school was established in Salerno, according to legend, by a Greek, a Latin, an Arab and a Jew.

The Salerno Medical School is perhaps best known for enrolling women and for teaching the *Regimen Sanitatis Salernitanum* (*The Salerno Book of Health*) in verse form. These verses were eventually translated into many languages. The Salerno Book of Health discussed “The matter that causeth Asma” (11, 21).

The rationale for this paper is obvious. In current allergy and immunology texts space limitations dictate that the wealth of important, new information takes precedence over the historical perspective; yet a historical perspective on the speciality is invaluable and must not be lost. Our history is one of extraordinary physicians and scientists with keen intellect open minds and outstanding powers of observation.

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