

ORIGINAL ARTICLE

A Short Review on the History of Anesthesia in Ancient Civilizations

Abstract

Anesthesia is one of the main issues in surgery and has progressed a lot since two centuries ago. The formal history of surgery indicates that beginning of anesthesia backs to the 18th century, but reviewing the history of medicine shows that pain management and anesthesia has a long history in ancient times. The word “anesthesia”, comes from Greek language: an-(means: “without”) and aisthēsis (means: “sensation”), the combination of which means the inhibition of sensation. The oldest reports show that the Sumerians maybe were the first people that they cultivated and harvested narcotic sedative like the opium Poppy as early as 3400 BC and used them as pain killers. There are some texts which show us that Greek and Mesopotamia’s doctors prescribed alcoholic beverages before their surgeries. In the Byzantine time, physicians used an elixir known as “laudanum” that was a good sedative prior the patient’s operation. Ancient Persia and China were as the biggest civilizations, of which medicine anesthesia had a great role in. Also, Persian and other Muslim physicians developed the field of anesthesiology in early medieval era which is called Islamic Golden Age.

Key words: Anesthesia, History, Ancient history, Persian medicine

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Introduction

Anesthesia is one of the main issues in surgery and has progressed a lot since two centuries ago. Anesthesia help the physicians to use invasive ways for their treatments; also patients did not feel any pain during surgeries, and their recovery was also faster. Pain management helped people not only during surgeries but also in every painful or unpleasant procedure like endoscopy or dentistry problems^{1,2}.

The formal history of surgery indicates that the beginning of anesthesia backs to the 18th century and to the usage of Ether for induction of anesthesia, and *Dr. Morton* is named as the first person who used anesthetics³, but reviewing the history of medicine reveals that anesthesia dates back to ancient civilizations centuries ago.

From long time ago, physicians searched for a way to reduce their patients' pains during their treatments. Amputation was a common way for doctors to terminate the patient's pain, but it needed a very strong physician for cutting off that organ; a person who could help the doctor by keeping the patient fit, and a patient who could tolerate a very severe pain. On the other hand, these people were at high risks for infections, and it made a really tragic scene that few people could tolerate it. In an amputation that held many years ago, the patient and the person who helped the doctor passed away because of gangrene as the force of the sword had cut patients leg and that person's hand, and one person died because of the really rough scene. Although it was not a good way and had a lot of side effects, it was sometimes a common way, and the tools of amputation progressed day by day⁴⁻⁶.

Therefore, to clarify an important part of the history of surgery, we aimed to investigate the first pieces of evidence in the history of anesthesia in ancient civilizations in this study. In this way, we looked at the long history in a short essay by reviewing the papers published in the literature. For this purpose, indexing databases including PubMed, Scopus and search engine of Goggle Scholar as well as main anesthesia text books like "Miller's anesthesia" were searched. Finally, the results were presented as introducing the role of main ancient civilizations including ancient Egypt, Persia, India, China, Greek and Romans and Islamic era.

Ancient Egypt and Mesopotamia

It seems that Sumerians maybe the first people who recorded their anesthesia efforts in the history in the year 4200 BC. It has been reported that they were planting poppy, and after collecting that, they crushed it, and at the end they made a kind of herbal mixture for incense, and they called this pro-

- 1- Miler, 2010: 3-48.
- 2- Bruno, 2016.
- 3- Miler, 2010: 3-48.
- 4- Sachs, 1999: 1088-1093.
- 5- Sellegren, 1982: 13.
- 6- Vanderwerker, 1976:15-16.



cess fumigation. When they burnt this combination, it made a good odor, the smell of which decreased patients' pain and gave a sense of relaxation. This kind of medical practices were done in temples with special ceremonies and prayers, and as a part of the tradition, they taught it in private groups at that time⁷.

Ancient Egyptian medical papyri are as hieroglyph tablets and known as the oldest remained medical texts (1200-1900 BC)⁸. Herbal and medical treatments and surgical procedures have been described in both hieroglyph tablets and papyrus. Herbal prescriptions include different plants like Mandragora, Cannabis and Belladonna. The opium poppy was used by ancient medicine and it affected Greek, Indian and Alexandrian medicine. The Egyptian and Assyrian physicians had a special quick way for obtaining sleep for their patients. They compressed the carotid vessels of the neck, and this way, they inducted a quick anesthesia. Greek physicians followed this way for their anesthesia as well⁹.

Physicians in ancient Egypt had different surgical instruments and different analgesics like a kind of extract that they got from mandrake fruit¹⁰. *Imhotep* (2650–2600 BC) has been used as a kind of needle, nowadays known as Chinese needles for injection for anesthesia. Also, they used mixture of vinegar and crushed marble stone named "*Mamfis*" as an anesthetic so that pharaonic physicians could cut the wounds and cauterize them without much pain¹¹.

Some discovered papyri showed the ancient Egyptian tried to use different materials like opium in inhalation treatments. In the *George Eiberas's* Papyrus which dates back to 1500 BC, the use of opium as painkiller and sedative and it has mentioned in other Egyptian papyri that ancient physicians used different plants with special medical formulations to make some inhalation drugs for treatment of different diseases especially in cases which were really painful and patient had to tolerate severe pain. Also, it has been mentioned in papyri that they used plants as the painkiller for their injuries^{12, 13}.

Ancient India

Ancient Indian text, called as *Vedas*, dates back to 500-1000 BC. In the 4th volume that is famous to *Atharvaveda* (means Science of Charms), the ancient writers knew the *Bhang* (hemp, *Cannabis sativa* L.) as the "five kingdom of herbs with lots of benefits, and the most important fact about it is that it can release us from anxiety". Later, in the ancient India, it became popular as the drink, and they knew it as a drink that could make people warm and happy. They believed

- 7- Maher, 2012.
- 8- Leake, 1952: 7-10.
- 9- Takrouri, 2006: 1.
- 10- Askitopoulou, 2012: 31-45.
- 11- Blomstedt, 2014: 2014.
- 12- Maher, 2012.
- 13- Blomstedt, 2014: 2014.



that it could improve mental powers; also it was useful for removing swelling and either phlegms. It has been mentioned that the hemp plant is holy in *Hindu*, and they believed that a guardian always lives in leaf of *Bhang* and seeing water. Leaves or plant of *Bhang* in dream means luck. They believed that good incidences can never come to a person who does not respect the holy *Bhang* leaf and its root, and even *Bhang* can forecast satisfaction and joy¹⁴. It can be used in the surgeries as the pain killer. Also, *Sushruta* (600BC, one of the great physicians and surgeons in ancient India)¹⁵ said that strong alcohol should be used for that patient to decrease the pain¹⁶.

Ancient Persia

Shahnameh (the book of Kings) which is written by *Ferdowsi* (940-1020AD) on pre Islamic and ancient history of Iran¹⁷ showed that the general anesthesia had been described in Old Persian texts, and maybe they used it for surgeries in the ancient times. *Ferdowsi* mentioned that old Persians used the combination of camphor and cannabis for pain management during cesarean section of *Roudabeh* and the birth of *Rostam* who was a great hero in ancient Persian myths. This is the first announced cesarean section in the history that is called *Rostam-zad* (birth of *Rostam*; Figure 1)¹⁸. It has been mentioned that Persian and Indian surgeons were highly respected and had operating skills^{19, 20}. The Persian physicians used hemp as an important anesthetics. In *Avestan* language (ancient Persian language dates back at least to 1000 BC), they call it *Banghā*. Ancient Persian physicians also used different kinds of analgesic plants such as opium poppy (*Papaver somniferum* L.; *Gāokerenā* in the *Avestan* language) and henbane (*Hyoscyamus niger* L.; *Mang-i-Gaštāspi* in *Pahlavi* manuscripts) for anesthesia²¹.

Ancient China

According to the earliest remained evidence, the history of anesthesia in China dates back to 500 years BC. There was one earliest known doctor in ancient China who was *Bian Que*. He used herbs and wine for providing anesthesia²². The first surgeon mentioned in the history of China was *Hua Tuo* (108 - 208 AD). He performed great works in the field of anesthesia, surgery and acupuncture. Most of his patients were cured with a complicated concoction of different herbs, and most of his patients were fully recovered after surgeries. He gave his patients an anesthetic drink and made them insensible, numb and drunk before operations²³. He used his *ma fei san* preparation (*ma*=cannabis, hemp; numbed- *fei*=boiling;

- 14- Bushak, 2016.
- 15- Bath, 2016.
- 16- Chakravorty, 1970: 113-8.
- 17- Kariminejad, 2012: 34-9.
- 18- Sachs, 1999:1088-1093.
- 19- Dabbagh, 2014: e15363.
- 20- Dehesh, 1975: 377-382.
- 21- Zargaran, 2013: 2002-4.
- 22- Xiaomei, 2014: 345-354.
- 23- Chu, 2004: 211-216.



bubbling-*san*=break up, scatter) regularly as an herbal anesthetic that mostly contained cannabis²⁴. Before this magical drink, other Chinese physicians hit the patient's head or injured him for loosing blood and inducing unconsciousness. According to a myth, while Hua was gathering herbals in the wilderness once, he found a deer that was going in the lawn, and it looked unsteady and dizzy; suddenly after eating a certain herb, the animal seemed to feel well as if the pain had vanished, so Hua Tao personally tasted different herbs out of curiosity, and he finally found some herbs that made his mouth numb, and this was how he found herbs and used it for anesthetic purposes. These herbs actually were the basis of his great *Ma-fei-san* that made him immortal in the history of medicine and anesthesia. This was how accidentally the history of anesthesia begins in China^{25, 26}.

- 24- Tubbs, 2011: 1357.
- 25- Combes, 2004.
- 26- Fu, 2009: 879–885.



Figure 1. A picture showing cesarean section of Rostam, the Persian myth in the book of *Shahnameh* (written by Ferdowsi in the early 11th century AD).



Ancient Greece

We can find the first evidence on the induction of anesthesia in Greek civilization by soporific substance in the old manuscripts about a myth of the Golden Fleece (8th century BC)^{27, 28}. Also, other pieces of evidence are in the Greek mythic text like Homer's epic texts (the *Iliad* and the *Odyssey*) that date back to the second half of the 8th century BC²⁹. There were too many examples of signs of hypnosis and analgesia during the administration of drugs and also their adverse effects³⁰. There was found to be a close relation between anesthesia and sleeping and also death³¹. Besides the myths, "*Hippocrates*" (460 to 375BCE) who was one of the most important characters in the history of Greece medicine presented the first medical descriptions of anesthesia in Greek medicine³². His students, in cooperation with this great physician, started the first systemic studies about sleeping and dreams and collected data about it and looked through sleeping from medical aspect. In contrast to the previous scholars like *Homer* whom related the Hypnos to the darkness, extinction and death, the *Hippocratic physicians* knew the necessity of sleeping for the human health. A lot of articles have argued the use of opium at that time. Some say that maybe they used it in religious ceremonies of the goddess, or they used it as the healing properties as it made people feel delusion or dream or caused hallucinations like in the cult of *Asclepius* later that time³³. Among all the different plants in ancient time, the earliest most famous one for reducing pain was poppy which was known as the symbol of god Hypnos³⁴. They used poppy capsules and knew this plant as the symbol of sleep of nature, and some others knew it as the richness, immortality and fertility symbol. They believed that this plant represents a natural cycle that is sleeping and awakening, and it is similar to death and rebirth^{35, 36}. Of course, there was not any direct referrence to the pharmacologic effects of anesthetics³⁷.

Rome and Byzantine

Medication and drugs in ancient Rome made the physicians' job so easier. These drugs were not just painkillers. They used variety of substances for anesthesia and analgesic during surgeries and also for curing patients³⁸. There were examples of using anesthetics before surgery. *Dioscorides* (first century AD), Greek physician and surgeon in Roman's military prescribed a mixture of mandrake and wine before limb amputation. *Celsus* (circa 14–37AD) suggested applying opium as an anesthetic for surgery^{39, 40}. In this era, a new door in medicine was open for physicians and helped them

- 27- Askitopoulou, 2015: 70-75.
- 28- Astyrakaki, 2007: 81-85.
- 29- Askitopoulou, 2015: 70-75.
- 30- Ntaidou, 2012: 22-7.
- 31- Bresson, 2013: 1257-9.
- 32- Astyrakaki, 2010: 188-94.
- 33- Askitopoulou, 2015: 70-75.
- 34- Askitopoulou. 2000: 486-491.
- 35- Askitopoulou, 2015: 70-75.
- 36- Askitopoulou. 2000: 486-491.
- 37- Astyrakaki, 2010: 188-94.
- 38- Adkins, 2014: 391-393.
- 39- Takrouri, 2010: 4-8.
- 40- Kirkup, 1988: 15-30.



to promote antidotes; this achievement was because of the fear of poison that was a catalyst for doctors to do frequent tests about antidotes and create many different drugs. On the other hand, many deaths were attributed to poisoning for other reasons. Surgeons at that time just wanted to decrease patients' screaming and fear; however, the pain of patients during medical interventions scared many people. Opium was used because of its slight amnesia and hypnotic feature by limiting patient's movement and numbness property, and was preferred because of its analgesic properties and made patients bradycardia as the popular and important drug in ancient Rome^{41, 42}.

After the decline of the great Roman Empire, Byzantine was the apparent Greco-Roman culture and civilization⁴³. Byzantines were familiar with carotid vessel and knew that compressing it causes a quick loss of consciousness. Also, they used medications for anesthesia and pain management⁴⁴.

Early Medieval age – Islamic era

Medical sciences flourished in the early medieval era (9-12th century AD) which is called Islamic Golden Age by most Persian physicians like *Rhazes* (865-925AD), *Haly Abbas* (949-982AD), *Avicenna* (980-1032AD) and *Jorjani* (1042-1137AD)^{45, 46}. Surgery and operations using anesthetics and analgesics progressed and developed by Muslim physicians during this period⁴⁷. Persians used the term "*Tnvym*" for a condition in which the patients were sleepy to tolerate the pain⁴⁸. Using single and compound drugs in oral, nasal and topical dosage for anesthetics became common. Some of the medicinal plants used as anesthetics were hemlock (*Conium maculatum* L.), mandrake (*Mandragora* sp.), henbane (*H.niger*), opium poppy (*P.somniferum*), and black nightshade (*Solanum nigrum* L.). Rhazes was one of those great physicians who did a lot of research on controlling pain. He was the first clinician who used general inhalation as anesthetic for the patients⁴⁹. Avicenna, another Persian prominent physician had a comprehensive description of pain killers like opium and its derivatives. He talked about all conditions for pain killers and also the adverse effects and solutions⁵⁰. Avicenna mentioned that opioids can cause a deep sleep for people using them⁵¹. He also introduced various methods for anesthesia and surgical analgesia. He used different amounts for pain management like smoke, oils, pills, ointments, drug-impregnated sponges, drinks, etc⁵². According to him, there are three kinds of drugs for reducing pain: 1) those that decrease consciousness level and induce sleep; 2) those that eliminate pain; and 3) those that decrease feeling pain. He

- 41- Adkins, 2014: 391-393.
- 42- Spore, 1962: 356-359.
- 43- Goodrich, 2004: 1-13.
- 44- Robinson, 1947: 62-63.
- 45- Zarshenas, 2015: 237-41.
- 46- Zarshenas, 2012: 2764-5.
- 47- Ghaffari, 2015: 173-7.
- 48- Alembizar, 2016: S21.
- 49- Ibid.
- 50- Heydari, 2013: 101-12.
- 51- Savaei, 2010: 37-45.
- 52- Dabbagh, 2014: e15363.



also classified pain into 15 different groups⁵³⁻⁵⁵. Later, *Ibn al-Quff* (1232-1286AD), the Arab surgeon, wrote a special chapter on pain relief in his surgical book entitled “*al-Umdah fi Sinaat al-Jirahah*”. He mentioned many herbal remedies like opium, mandrake, with henbane (*Hyoscyamus albus* L.), belladonna (*Atropa belladonna* L.), hemp, *Canabis indica* and wild lettuce (*Lactuca virosa* L.)⁵⁶.

53- Ibid.

54- Nasser, 2009: 78-80.

55- Sajadi, 2009: 640-643.

56- Takrouri, 2010: 4-8.

Conclusion

The current study shows anesthesia has a deep history in ancient civilizations, and it is not a new concept. Surgeons have revealed the need to control pain during medical history, and it has always been a concern for them. They have tried to find an answer to this and discover new methods and approaches to control pain. The present research on anesthetic drugs is a report of the results of physicians' experiments for the centuries. It is a chain, and the present time makes a ring of this; today is the history for the future.

Conflict of interest

Authors have no conflict of interest

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