

THE HISTORY OF THE FORMATION OF THE SCIENCE OF HUMAN REVIVAL

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Annotation

Historically, it was believed that once a person dies, it is impossible to bring them back to life, while religious views have held that it was considered blasphemy to attempt to do so. Only from the second half of the 18th century did people begin to believe in the possibility of resuscitation. Another 200 years passed before by the 60s of the XX century it became a practical reality that resuscitation and saving human lives are possible using the achievements of science in circulatory disorders. However, over the years many important discoveries were made. But because clinical problems were not well understood, resuscitation components were tested individually, and potentially effective treatments were replaced with useless ones, it took much longer to achieve certain successes. In this article, we briefly outlined the history of the development of cardiopulmonary resuscitation.

Keywords: resuscitation , heart massage, cardio-pulmonary resuscitation, artificial respiration, defibrillation.

It is obvious that since the appearance and death of a person, injuries caused by various diseases, natural disasters and accidents occasions caused him to seek medical attention. Early methods of caring for patients and the wounded arose as a result of observation of natural phenomena, animal behavior, experience, trial and error methods passed down from generation to generation. All of these factors are critical to the development of successful health care practices. At a later stage in the development of natural phenomena, they were explained with the help of magic. Shamans or magicians who claim to be intermediaries between man and supernatural powers and spells . As the influence of religion on people's lives grew, they became more and more dependent on witchcraft. . Due to the fact that the accumulated experience was preserved in writing by the priests, the first hospitals began to appear around the temples [1] . Historical evidence of first aid in situations that threaten the health or life of a person has been found in many archaeological studies. The history of Persian neurosurgery, in which trepanation of the skull was performed during the Mesolithic period, that is, 10-12 thousand years ago, dates back to the third century BC, when archaeologists discovered a skull with a triangular surgical scar belonging to a 13-year-old girl with hydrocephalus [2]. The study of the found skulls showed that the effectiveness of such operations in the Neolithic period was 10%, and in the Bronze Age, 30% [3].

Most ancient written sources mention measures aimed at saving the life of a drowned victim. In these cases, the main treatment was to remove water from the respiratory tract. In Egypt a drowned person was hung by his leg, the chest was compressed and stretched. In Japan, as in

China, the victim was hung on the back of a bull, it was believed that its movement draws water from the respiratory tract.

About 440-350 years. BC e. Hippocrates wrote the Corpus hippocraticum, a collection of medical texts. He is also the author of the guiding principle ("primum non nocere" - causing harm in the first place) in health care to this day.

Hippocrates also performed the first tracheotomy, the purpose of which was to save the patient's life by allowing him to breathe [4]. However, a bas-relief dating back to 3100 BC, found in ancient Egypt, shows that such an operation was carried out [5]. The process of a key tracheotomy was repeatedly described by Galen of Pergamon, who lived between 129 and 199 AD, the most prominent physician of antiquity after Hippocrates and Abu Ali Ibn Sina (980-1037), who was called the prince of healers, the most widely read physician in Arab and European countries [6]. The Babylonian Talmud, a collection of Jewish oral tradition of the 6th century, says that a hole is drilled in the trachea of a wounded lamb in the neck, a hollow cane is inserted and a life is saved [7].

In the Middle Ages, European medicine was strongly influenced by the teachings of the Church. During this period, epidemics of cholera and leprosy raged in Europe. It is during this period that we can observe the beginning of preventive, isolation and quarantine measures. events. Byzantine medicine, preserved from antiquity to the Middle Ages - the Renaissance, lagged behind Arab and Jewish medicine due to the fact that it went in a different direction. Arabic and Jewish medicine prospered, while they also offered their services in Europe [8].

Separately, it is necessary to note the significant contribution of our compatriot Abu Ali Ibn Sina, who is considered a mature scientist in the Arab world.

Recent studies have shown that Ibn Sina made many discoveries in areas of neurology such as neuroanatomy, vasovagal syncope, facial paralysis, spinal cord injury, tremora, headaches and neurosurgery [2]. The "laws of medicine" he created were translated into Latin in the 12th century in Spain and were used as the main literature in European medical journals until the 17th century [9].

During the Renaissance anatomy research has advanced significantly, which has led to many important discoveries about the structure and functioning of the human body. The most important discoveries were made as a result of research carried out in the 16th century by the outstanding anatomist Andreas Vesalius (1514-1564). During the Renaissance of anatomical sciences and the rise of medicine stimulated the development of all areas [10].

Since for centuries it was believed that all life processes are provided by respiration, life-saving efforts focused on breathing and its restoration. Over the centuries, methods of artificial respiration were invented and improved, as a result of which it finally took the form used today. Starting from the 16th century for almost three centuries, methods of blowing hot air and smoke into the victim's mouth have been widely used [4]. Until 1812, the British Royal Navy used a method of reviving, borrowed from the North American Indians, which consisted of blowing tobacco smoke [11]. In 1555, the aforementioned Vesalius, while studying the anatomy of a dog, used reeds placed in the trachea to provide artificial respiration [12]. In 1732, the surgeon William Tossach saved the life of a miner for the first time by performing the mouth-to-mouth breathing method [13].

In 1774, the physician Alexander Monroe Secundus recommended a method of introducing air into the lungs with the help of a bellows connected to a special tube tightly inserted into one of the nostrils. In 1776, William Cullen first described endotracheal intubation as a method of lung ventilation. [14].

In mouth-to-mouth breathing, the air sent out by the rescuer was often considered "dead air" due to the fact that it passed through another person's lungs. For this reason, other methods of artificial respiration have been studied and tested. Henry Robert Sylvester 1861 developed a method in which the patient alternately raises his hands and presses them to his chest [15] . (1Fig. 1).

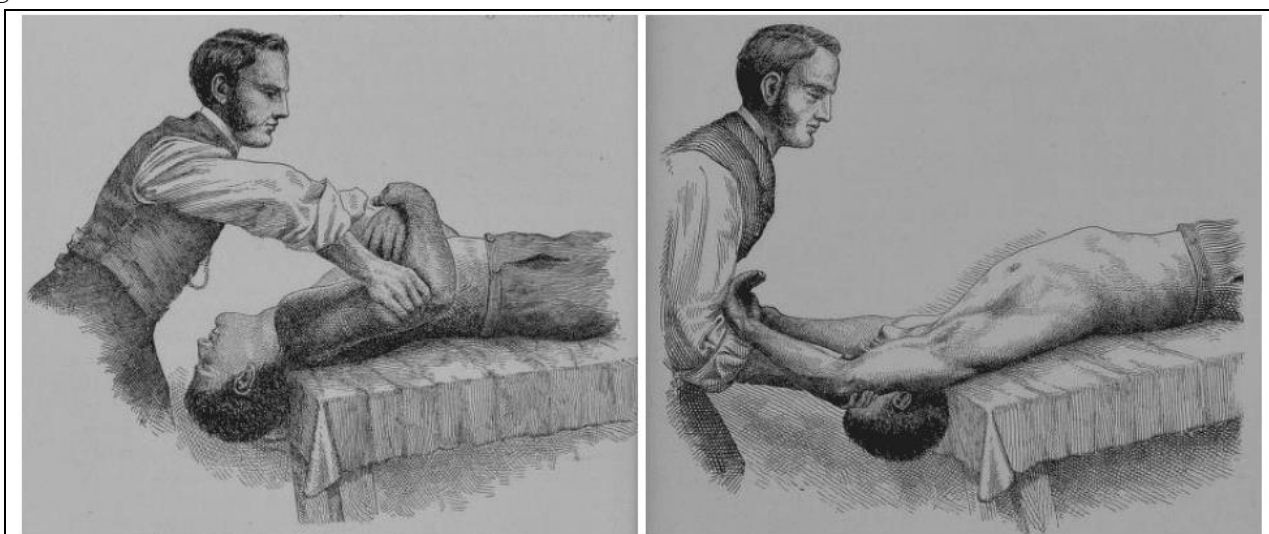


Figure 1. CPR by Henry Robert Sylvester.

In addition, the following methods were developed: schaffer (since 1903), Holger-Nilsson (since 1932). The Holger-Nielson method was used until the 1960s [16].

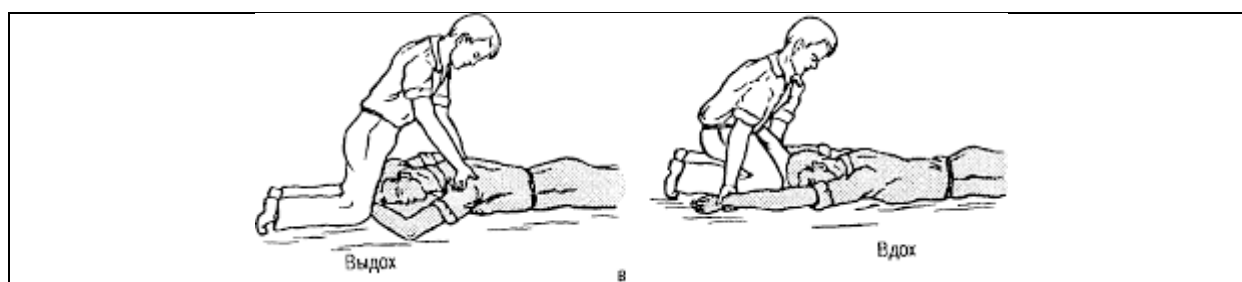
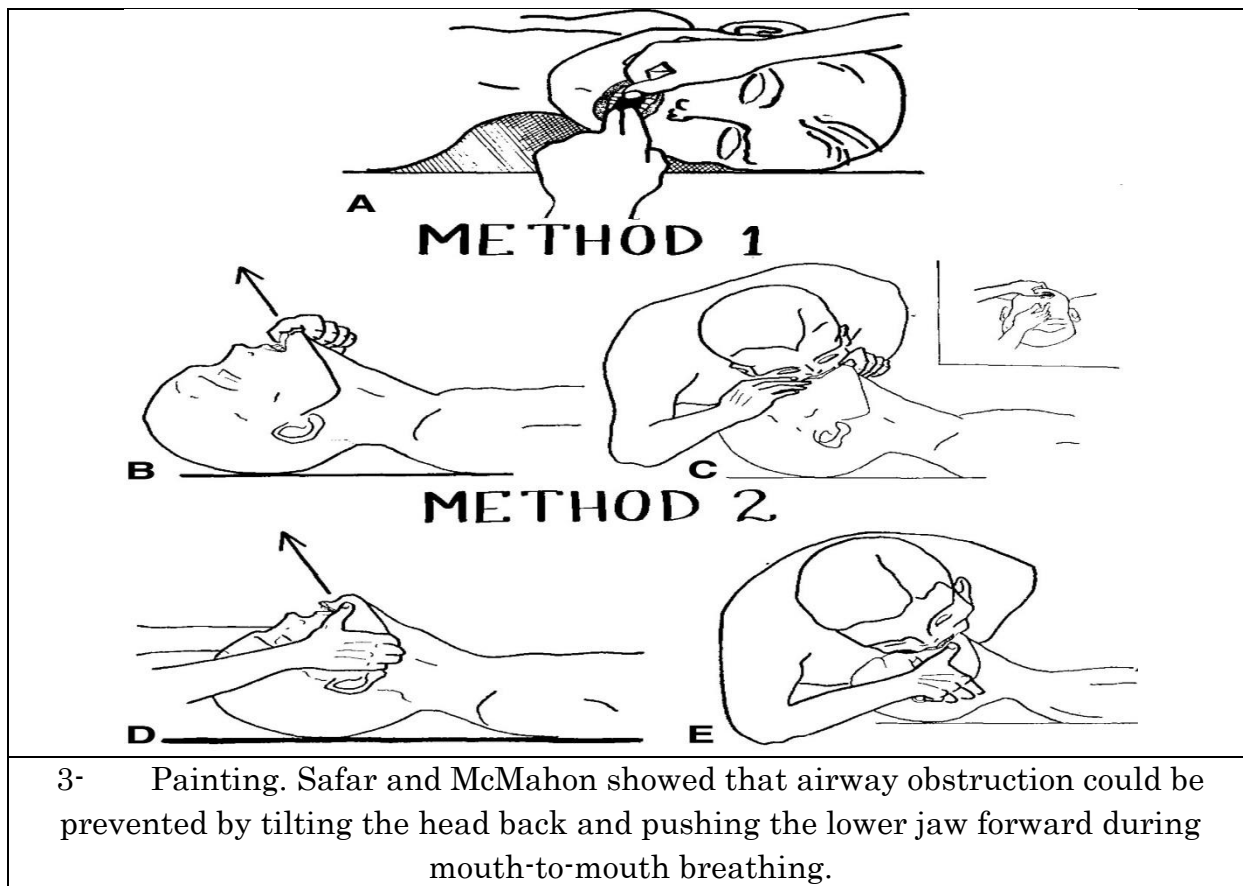


Figure 2. Artificial respiration according to the Holger-Nielson method.

However, even in 1972, an Australian first aid textbook recommended artificial respiration using the Sylvester method [17].

By 1954, Gina James Elam (Fig. 4) proved that oxygen in the air supplied from mouth to mouth can provide adequate ventilation [18]. Peter Safar (Fig. 5) in 1956-1957 Conducted experiments with volunteers, in which Elam also participated, showed that ventilation performed by artificial respiration from mouth to mouth was effective, and not the Holger-Nielson and Sylvester methods without main work, and airway obstruction could be prevented, throwing his head back [19,20,21,22].



Resuscitation techniques developed by Safar and Elam in 1960 have been accepted and recommended by the National Academy of Sciences, the American Society of Anesthesiologists, the New York Medical Society and the American Red Cross [23]. Thus, resuscitation took on a modern look, and Safar and Elam became the “founding fathers of the “modern ambulance”.

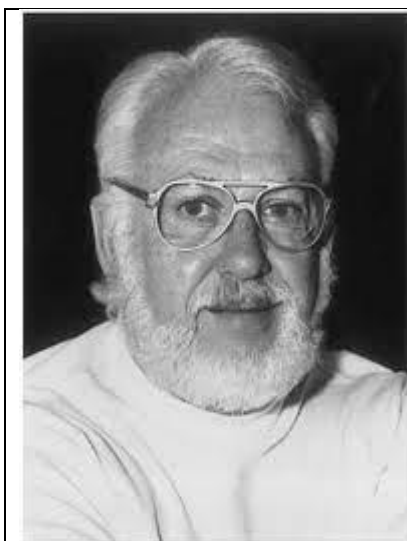


Figure 4. James Elam



Figure 5. Peter Safari

Although the relationship between heart rate and pulse rate was described around 3000 BC. [24], the first fundamental observations of the cardiovascular system date back to the Renaissance.

In 1542, the French physician, astronomer and mathematician Jean Fernel observed the compression of the heart cavities and the subsequent expansion of the arteries. For his part, the London physician William Harvey (1578-1657) formulated the theory and concepts of blood circulation in 1628 [25].

In 1849, John Snow, the founder of modern epidemiology, wrote that chloroform used for anesthesia causes cardiac arrest (26) . Physicians could not do anything about anesthesia-induced circulatory arrest until the successful open heart massage performed by Christian Igulsrud in 1901 [26].

Moritz Schiff introduced the term "cardiac massage" to science in 1874, observing the pulsation in the carotid arteries when a dog's heart is squeezed by hand[28].

In 1898, Théodore Tuffier and Louis Gallion were the first to successfully perform direct cardiac massage [29].

The pioneer of chest compressions was Rudolf Behm, who In 1876, he made and documented attempts to restore blood circulation using this method. In 1892, Friedrich Maas performed the first successful external breast massage, but he did not arouse much interest in the medical community of the time [30.31].

that Guy Knickerbocker, studying the effects of defibrillation in dogs, noticed that when the electrodes were pressed tightly against the chest, this caused an increase in blood pressure (32) . In 1958, William C. Ouwenhoven, James Judd and Guy Knickerbocker reinvented external cardiac massage by experimenting with pressure force, compression site and speed. [33, 34].

In 1887, the English scientist August Waller first recorded the electrical activity of the heart [35]. However, the Dutch doctor William Einthoven is considered the discoverer of electrocardiography. It is he developed a system of limbs known as the triangle of Ein aries, and its theoretical provisions still serve as the basis for the application of the electrocardiogram [36]. William Einthoven was awarded the Nobel Prize in 1924 for the above discovery.

With the discovery of the electric current, ideas appeared on how to use this phenomenon in medicine. As early as 1792, the English scientist James Curry recommended the use of an electric current to bring the heart back to normal. In 1802, in England, the Royal Society for the Protection of Animals proposed in their report the use of electricity to distinguish real death from apparent [37]. In 1849, Carl Ludwig and his student Moritz Hoffa observed and documented ventricular fibrillation caused by electric current [38] . John Macquilliam _ in 1889 first came to the conclusion that atrial fibrillation of the ventricles is a mechanism that causes sudden death of a person. In 1899, two physicians, Jean-Louis Prevost and Frédéric Battelli proved that even a small amount of electricity transmitted through the chest can lead to ventricular fibrillation, while high voltage electricity can successfully restore sinus rhythm. However, this information did not attract much attention [39].

The following years provided much new information through experiments on the use of electricity in animals. In 1947, all these experiments culminated in the first successful external defibrillation, performed by cardiac surgeon Claude Beck. A 14-year-old female patient had circulatory arrest due to the mechanism of ventricular fibrillation during chest deformity surgery . After a 70-minute outdoor heart massage, he used a defibrillator, created in collaboration with surgeon James Rand, which ran on alternating current directly from the outlet. After the second beat, sinus rhythm was restored and, as a result, the child survived

without complications (40) . This event led to worldwide acceptance of defibrillation as an effective treatment. In 1956, Paul Zoll hastily performed external defibrillation with AC (41) . Shortly thereafter, in 1960, Fred Zakuto used an external automatic defibrillator for the first time in Paris. The device could detect ventricular fibrillation based on ECG and perform external defibrillation until cardiac function was restored [42].

Early defibrillators weighed several tens of kilograms and, due to their size and weight, were intended only for use in a hospital. This continued until Frank Pantridge , together with engineer John Anderson, created a portable defibrillator weighing 3.2 kg, which they presented to the public in 1971. Anderson and Jennifer Age then developed the semi-automatic defibrillator and the automated portable external defibrillator in the late 70s and 80s [42].

As knowledge and skills continue to develop, the operation of the portable defibrillator will gradually move from doctors to paramedics, from them to firefighters, and finally into the hands of the public through the defibrillation training program. It cannot be denied that such a solution is preferable, its role in saving human lives is high [42].

James Elam, Peter Safar and William Kouwenhoven are undoubtedly the fathers of modern critical care. The first two introduced artificial respiration into science, and the third brought chest compressions into science, and if we add defibrillation to this, the picture of modern resuscitation will be fully formed. The results of their joint study were first presented on September 16, 1960 at the Maryland Medical Society meeting in Ocean City and have been widely accepted in the medical community for decades. [43].

Peter Safar has also been involved in the education of the population in first aid, the development of standards, textbooks and courses in cardiopulmonary resuscitation [44, 45].

To promote education and popularize knowledge and skills in the field of resuscitation, the Norwegian toy manufacturer Osmund Laerdal, in collaboration with Bjornen Lind, created the Resusci Anne doll in 1960. A young woman who drowned in the Seine River was chosen as the prototype of the mannequin's face (Fig. 6). Thus, the correct and effective conduct of cardiopulmonary resuscitation in case of sudden cessation of blood circulation has also been taught to witnesses of the incident who do not have professional medical training [46].



Figure 6. Rhesus Ann dummy

The American Heart Association was the first organization to widely and publicly promote new resuscitation techniques. The simple rules underlying the abbreviation ABC (a - airway - I opening of the upper respiratory tract, B - breathing - breathing and C - circulation - blood circulation) have spread throughout the world [43].

In 1966, the US National Academy of Sciences organized the first CPR conference, the main purpose of which was to establish standards and principles for teaching resuscitation. However, since 2000, the International Liaison Committee on Resuscitation - ILCOR publishes new resuscitation guidelines based on the latest research and scientific reports on the principles and methods of resuscitation every 5 years.

Another important development was the development in 1970 by anesthesiology professor Friedrich Wilhelm Ahnefeld of the concept of the "chain of survival". His proposal, based on solid scientific evidence, describes the key elements or links in the chain providing effective assistance to victims, which range from early diagnosis, first aid and alerting emergency services to treatment in a medical facility. [47,48,48]. Currently the most efficient medical rescue systems in the world are based on the concept of "chain of survival" (Fig. 8).

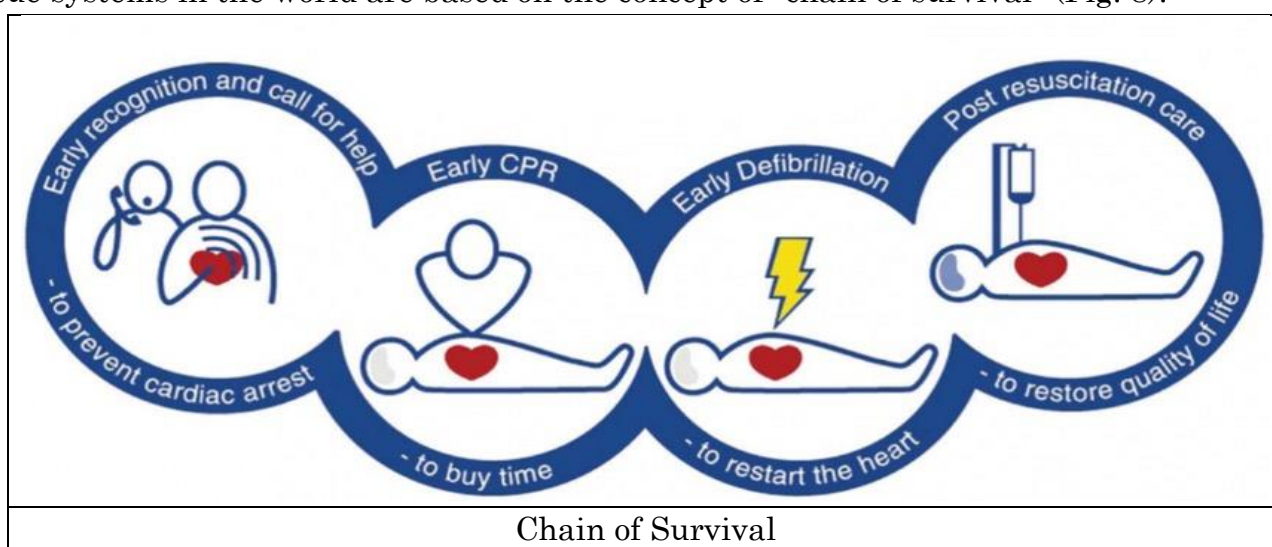


Table 1. Emergency medical care and cardiopulmonary resuscitation main stages in the development of C

date	main events
8000-10000 years BC e.	First trepanation of the skull
3100 BC __ e.	Description of the tracheostomy on the papyri of ancient Egypt
3000 to . n. e.	About the Smith Papyrus relationship between heart rate and pulse
900 BC e.	According to the Old Testament, the prophet Elijah (Prophet Elijah the toothy), who resurrected his child and the son of the widow of a Shunam woman by artificial respiration.
4th-5th century BC . e .	The era of Hippocrates of Kos, who performed the first practice of tracheotomy.
1628	William Harvey published an article explaining the circulatory system.
1732	William Thossach resuscitated a miner by inhaling from his mouth V mouth, which was the first case mentioned in the medical literature.
1774	Alexander Monroe Secundus recommended mechanical ventilation using fur connected to a tube inserted into one of the nostrils.
1776	William Cullen was the first to compile the Manual of Tracheal Intubation.
1782	The Royal Society for the Protection of Animals in London endorses a method of artificial ventilation using inflatable furs for drowning people.
1792 _	James Curry recommends using electricity to restore the heart.

1849	Carl Ludwig and Moritz Hoffa observes and documents atrial fibrillation of the ventricles.
1857 _	Marshall Hall _ proposed artificial respiration.
1858 _	Henry Robert Sylvester develops his method of artificial respiration.
1874	Moritz Schiff recorded the appearance of a pulsation in the carotid artery after manual compression from both hearts. This led to the term "cardiac massage".
1887 _	Waller records the first electrocardiogram.
1895	William Ainthofen labeled the various changes on the electrocardiogram as P, Q, R, S, and T.
1898 _	Théodore Tuffier and Louis Gallion were the first to successfully resuscitate a patient with an open heart massage.
1900 _	Jean Prusn and restored ventricular contractility by performing an open heart massage combined with ventilation through a tracheostomy handset.
1932	Holger Nielsen developed his own rules for cardiopulmonary resuscitation ..
1947	Claude Beck performed the first successful external defibrillation.
1954 _	James Elam was the first to prove that oxygen in the air, given by a mouth-to-mouth rescuer, could provide adequate ventilation. lungs.
1956 _	Paul Zoll performs the first successful external defibrillation using direct current.
1956-1957	Peter Safar proved the effectiveness of backward tilting oral ventilation to prevent airway obstruction
1958 _	William Kouwenhoven, James Judd and Guy Knickerbocker proved the effectiveness of external heart massage.
1959	Bernard Lown successfully cardioverted a patient with recurrent ventricular tachycardia
1960 _	Osmund Laerdahl and Bjorn Lindem developed the Resusci Anne Training maneken for CPR training.
1960 _	Resuscitation techniques developed by Safar and Elam in 1960 years, have been recommended by the National Academy of Sciences, the American Society of Anesthesiologists, the New York Medical Society and the American Red Cross.
1960 _	Fred Zakuto used the first external automatic defibrillator.
1961 _	Adams Cowley introduced the term "golden hour" into science.
1966	CPR techniques developed by Elam and Safar have been recommended by the American National And cademi to her Science , the American Association of Anesthesiologists, the New York Medical Society , and the American Red Cross Society.
1970 _	Friedrich Wilhelm Ahnefeld developed the concept of the "chain of salvation
1970-80 g g	John Anderson and Jennifer Agi created a portable external semi-automatic and automatic defibrillator.
In 1971	The 3.2 kg defibrillator invented by Frank Pantridge and John Anderson was put into use .
2000 to present	International Liaison Committee for Resuscitation (International Liaison Committee on Resuscitation - ILCOR) began to update the basic principles, rules and methods of resuscitation every 5 years

CONCLUSION

Life and health are the most valuable assets that each of us can have. Therefore, it is not surprising that since ancient times they have been taken care of , they have tried to develop effective methods of rescue procedures (Table 1). The methods of providing medical care in the early stages of human development seem illogical from the point of view of today, but without them, medicine would not have reached its current heights.

Advances during the Eastern Renaissance were a turning point in improving the quality of medical care. However, studies of the anatomy of the body and numerous experiments during the Renaissance in Europe introduced a qualitatively new direction into medicine. However, only the inventions made in the second half of the 20th century made it possible to formulate modern methods and rules for saving the life of the victim. James Elam, Peter Safar, and William Kovenhoven laid the foundation for modern CPR, and the golden hour [49] and the concept of the chain of survival determined the effectiveness of medical and emergency care systems.

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