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## **A brief historical outline of the development of labor analgesia**

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**Abstract**

Birth of a child is a unique time in the life of every woman. Unfortunately, labor is often one of the most painful and traumatic experiences suffered in woman's life. In the modern obstetrics pain of labor and methods of its mitigation are the main problem for both, patients and medical staff. In this paper the most important steps of the development of labor analgesia were described.

**Key words:** chloroform, epidural anesthesia, labor analgesia, nitrous oxide, twilight sleep

Due to the fact that pain is an inherent aspect of human existence, in the literature on the history of anesthesia we can find numerous descriptions of various methods, which were used to relieve the sufferings of the laboring women. Medieval manuscripts, according to accepted by the church methods of treating pains during labor, included use of amulets, semi-precious stones, or magic belts [1]. Later, at the turn of the seventeenth and eighteenth century in France, psychological methods were favored which throughout compassionate attitude, providing information about the progress of labor or flipping attention of laboring woman sought to reduce the sensation of pain. Additionally, French midwives used for this purpose also various fungi, herbs and spices [1,2]. At a similar time in southern Europe more invasive methods to alleviate labor pain were used. These were so-called “sleeping sponges” soaked with a liquid containing an extract from henbane, hemlock, mandrake and ground ivy. After placed in the airways they operated as narcotic and analgesic. This method, however, met with a heavy resistance from the then men due to the fact that the anesthetic effect of such mixture was attributed to the action of spells [2]. More known substances were also often widely used in analgesic purposes. It should be mentioned ethyl alcohol, which was often used by midwives to anesthesia, despite the many voices criticizing it is too frequent use in excessive doses. Often, non-controlled supply of alcohol put laboring women in a state of drunkenness, disturbing the physiological parturition [3]. Regretting the fact that the suffering of women during labor commonly meets with ignorance and indifference, the Scottish obstetrician James Young Simpson (1811-1870) said that "nobody counts with the needs of women" [4]. The reflection of this may be the fact that the only available method of the delivery analgesia in Victorian times were blood droppings, often leading to fainting.

A new chapter in the history of the delivery analgesia brought nineteenth century. That's when, in spite of opposition from the ecclesial and medical environments, as well as from the society itself, was made the first of four most important developmental steps of anesthesia for labor. In 1847 for the first time for anesthesia of laboring woman was used chloroform in the form of inhalation and the doctor who did it was, above mentioned obstetrician, James Young Simpson from Edinburgh. He believed that, both his duty and his privilege, was to use all available methods that could relieve the physical suffering that accompanies the woman during childbirth

[5]. Opponents of analgesia referred to the Holy Bible - Book of Genesis where it is written: "To the woman he said: I will make your pains in childbearing very severe; with painful labor you will give birth to children....". They believed that the pain experienced by a woman during labor is a consequence of the curse of Eve for her disobedience in paradise and suffering is inscribed in the natural history of successive generations, in which the people should not interfere. Simpson tried to fight this theory through both, his medical activities as well as, the publication of texts of a polemic nature [6]. Opposition from the medical environments was often even more pronounced than on the part of the church community. For example, Charles Meigs (1792-1869) from the USA was an ardent opponent of any use of anesthesia during labor because he thought that childbirth is a natural process that does not require any medical intervention. Interestingly the use of chloroform during surgery is not met with such lively criticism from operators as its use during childbirth. Opponents of anesthesia during labor argued their opinion with a lack of acceptance for the behavior of women being under the influence of inhaled analgesics like in the state of alcoholic intoxication and their frequent loud stories about their erotic dreams. Looking back, one can come to the disappointing conclusion that in Victorian England it was often the representatives of the medical professions who questioned and rejected the possibility of relief for women during childbirth.

As the acceptance for the use of inhaled analgesics during labor increased, new measures and methods of pain relief were described and discovered. In 1902, Austrian physician Richard von Steinbuechel (1865-1952) for the first time used morphine and scopolamine for analgesia a woman in labor. Carl Gauss from Freiburg (1875-1957), who studied this technique of anesthesia called it later "twilight sleep" [7]. The introduction of this method of anesthesia in clinical practice provoked a lively discussion into the medical community around the world, particularly in the United States and the United Kingdom, meeting often with critical reviews. According to the protocol of von Steinbuechel 10 mg morphine and 0.45 mg of scopolamine at the onset of labor was used and then these doses were repeated every two hours as long as it was needed. The main undesirable side effect of this method was the state of intoxication of the mother and respiratory distress of the newborn [7]. Gauss stated that the degree of sleepiness in infants depends on the amount of morphine administered and the use of higher doses of scopolamine at the expense of reduced doses of morphine results in a better state of the neonates. He introduced the term "oligopenia" which describes the state of respiratory depression in which children of mothers anaesthetized by this method were born. This took place before the introduction into neonatal assessment the scale developed in 1949 by Virginia

Apgar (1909-1974). In his publications Gauss also pointed out that the vast majority of women giving birth with the use of this method of anesthesia, does not remember the birth of her child. Numerous side effects of scopolamine in pregnant women were reported in the medical literature, but they were not considered as significant. Among the most common side effects mentioned flushing, hallucinations and thirst. As reported the action "Twilight Sleep", famous American anesthesiologist doctor Gertie Marx (1912-2004) stated: "You can have the impression that young women hover over the bed, and then give birth to her baby on the floor and through further 24 hours do not realize of the fact that they are mothers" [8]. Most women unaware of the side effects of this method, saw in it the only possibility to overcome the suffering associated with the act of childbirth. In the US and the UK, a group of activists led efficient and successful campaign to promote the widespread use of "twilight sleep" as the only means of birth free from pain, which was exemplified by, widely read at that time (1914), publications in "McClure's Magazine" written by Marguerite Tracy and Constance Leupp [9]. This led to the Twilight Sleep Foundation National Association, founded on the initiative of representatives of the upper class, whose aim was to popularize and disseminate access to the treatment of labor pain. Anticholinergic side effects observed in mothers and neonatal respiratory depression, dependent on the use of opioids, were ignored or unnoticed by unprofessional press, which published articles promoting this method. As then it was estimated, the percentage of newborns in bad condition hesitated from 26% to 62%, depending on the protocol used for evaluation and experience of the physician who was present at delivery [7]. Already then, the problem of the poor condition of the newborns and severe postpartum hemorrhage were reported by well-known American obstetricians - Joseph De Lee (1869-1942) from Chicago, and John Whitridge Williams (1866-1831) from Baltimore [10]. After some time critical opinions from the medical community began to prevail over the popularized by the National Twilight Sleep Association and by the popular press, unlimited use of this form of analgesia. Another argument, against using of this method of analgesia, which caused its discreditation in the eyes of public opinion in the United States, was the death of Mrs. Charlotte Carmody, who was a hot advocate of the "twilight sleep", but who died as a result of intrapartum complications associated with its use. Despite this, the use of "twilight sleep" was continued in various drug combinations for many years all over the world.

An extremely important step in the development of the obstetrical analgesia was the use of nitrous oxide during childbirth in 1880 by a Russian doctor Stanislav Kliclowicza from St. Petersburg [11]. He used a mixture consisting of 80% nitrous oxide and 20% oxygen to yield a

good analgesic effect with no adverse effect on mother and child, as well as onto the uterine contractions. The main drawbacks of this method was its high price and lack of patient mobility during labor. Over the next few decades, many clinicians have sought to improve the method of administration of nitrous oxide during labor. In 1933 British physician, dr. Robert James Minnitt (1889-1974) developed a camera with a fixed mixing ratio of nitrous oxide from air in a ratio of 35% to 65% [12]. Then, in 1949 E.H. Seward presented a Danish apparatus that administered a mixture of 75% nitrous oxide and 25% oxygen. Such selection of gases and their proportions prevented the occurrence of hypoxia in the mother and child [13]. The problem of portability of the apparatus supplying the mixture of nitrous oxide and oxygen was finally dissolved in 1961 by Michael Tunstall (1928-2011), who used a mixture of these gases, commonly known as Entonox, in a single cylinder. The proportions of 50% of nitrous oxide and 50% of oxygen determined by him, turned out to be safe for both the woman and her child, and placing the ready mixture into one container significantly increased the mobility of laboring women using this form of analgesia [14].

One of the major steps in the development of intrapartum relief of pain was epidural analgesia, with 30-35 ml of a 0.5% solution of procaine and adrenaline, used for the first time in 1909 by the German physician Walter Stoeckel (1871-1961) [15]. In his work he described in details 141 cases of the use of this method, proving that it is highly effective in eliminating pain, and at the same time devoid of side effects typical of then popular method of "twilight sleep". Currently, lumbar epidural anesthesia is considered as "the gold standard" of intrapartum analgesia.

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