

# The Use of Morphine and Scopolamine to Induce Twilight Sleep

In 1907, researchers Bernhardt Kronig and Carl Gauss combined the drugs morphine and scopolamine to induce twilight sleep in women during childbirth. Physicians in the early twentieth century in Germany used twilight sleep, Dammerschlaf, to cause women to enter a state of consciousness in which they felt no pain and did not remember giving birth. Twilight sleep was associated with increased use of forceps during delivery, prolonged labor, and increased risk of infant suffocation. Because of those disadvantages, physicians stopped using morphine and scopolamine to prevent pain during childbirth. Morphine and scopolamine were among the first anesthetics to be used during childbirth, and after physicians stopped using them, researchers searched for safer alternatives.

Pregnancy researchers Kronig and Gauss developed twilight sleep as a method to minimize the pain women experienced when giving birth. During the late 1800s, women sought methods to relieve pain during childbirth. Scientist first discovered scopolamine and morphine in the late eighteenth and early nineteenth centuries, but physicians did not use the two drugs to alleviate pain from childbirth until the early twentieth century. Physicians used the combination of morphine and scopolamine because those drugs decreased pain and impaired memories.

In 1803, Friedrich Wilhelm Sertürner, a drug researcher in Germany, discovered morphine. Sertürner isolated morphine by dissolving opium, an extremely addictive chemical substance derived from the flower of the opium poppy, in acid and then neutralizing the compound with ammonia. After his discovery, Sertürner conducted multiple experiments to test the effects of morphine. In his early studies, he gave morphine to stray dogs and rats. However, many of his animal subjects died as a result of a high dose of the drug. After his animal experiments, Sertürner conducted experiments on humans. He and three friends ingested lower doses morphine. From his human experiments, Sertürner concluded that small doses of morphine relieved pain and gave users a sense of euphoria. Sertürner also found that larger doses of morphine caused nausea, vomiting, slowed breathing, and psychiatric effects.

Following Sertürner's work, morphine became a popular pain reliever. By the mid-nineteenth century, drug manufacturers produced morphine commercially and physicians provided it to their patients. People took morphine orally before the hypodermic needle was developed in 1853. After the invention of the hypodermic needle, physicians could inject morphine directly into a patient's bloodstream. During the American Civil War, from 1861 to 1865, field surgeons administered morphine to injured soldiers. Those soldiers were some of the first individuals to develop morphine addiction and morphine dependence, then called Soldier's Disease. Although the drug was addictive, physicians continued to prescribe morphine to relieve pain. Researchers continued to study the use of morphine in medical settings.

Scopolamine, the second drug used in twilight sleep, was isolated from a plant named after Giovanni Antonio Scopoli, a physician in the eighteenth century. Scopoli studied plants in Carniola, a historical region that later became part of the country Slovenia. In 1569, Scopoli described a plant that he called Lithophilia, later renamed *Scopolia carniolica* or the henbane bell, a short shrub with purple flowers. At the end of the nineteenth century, Ernst Schmidt, a researcher in Germany, isolated a chemical from the plant and called it scopolamine. Scopolamine is a drug that causes amnesia, or the inability to form new memories. Scopolamine has several side effects which include dizziness, confusion, and hallucinations.

Richard von Steinbüchel, a physician in Germany in the early twentieth century, recommended using scopolamine to alleviate pain during labor and delivery. In 1902, Steinbüchel researched the effects of combining morphine and scopolamine as a general birth anesthetic. Steinbüchel found that a small dose of scopolamine caused laboring women to enter a mental state in which they were fully conscious, yet unable to recall their labor and delivery.

After Steinbüchel's work, Kronig and Gauss studied the use of morphine and scopolamine to relieve pain during child birth. Gauss administered the mixture of morphine and scopolamine to pregnant women during labor. He used the combination in over 600 laboring women. Gauss wrote that the combination of morphine and scopolamine was associated with an increased rate of recovery for women in postpartum, or the period of time following childbirth. Gauss stated that the drug combination was associated with fewer maternal and infant complications. Kronig elaborated on Gauss' results, recording his own observations of using of morphine and scopolamine in approximately 1500 pregnant women.

Gauss induced twilight sleep when a woman began to experience labor pains. First, he injected a mixture of morphine and scopolamine into the woman. The ratio of morphine to scopolamine depended on the woman. After the first injection, Gauss gave subsequent injections of scopolamine to prevent the woman from remembering the experience of childbirth. To reduce the woman's screaming and thrashing, Gauss used leather straps to restrain the woman to a padded bed and placed her in a dark room. Gauss covered her eyes with gauze and put oil-soaked cotton in the woman's ears so she could not hear.

In 1914, Marguerite Tracy, an editor of the McClure's Magazine in the United States, advertised twilight sleep as a new delivery method in which women did not feel pain. At the time, physicians used the chemicals chloroform and ether to make women unconscious during childbirth. In contrast to the use of chloroform and ether method during childbirth, women were fully conscious during twilight sleep. During twilight sleep, women were still able to follow a physician's instructions. Proponents of twilight sleep stated that women's participation in the birthing process resulted in better health outcomes for pregnant women and infants. Despite the advertised benefits of twilight sleep, many physicians noted their skepticism of the method.

Physicians questioned the safety of Kronig and Gauss's twilight sleep. They argued that physicians could not maintain an accurate combination of morphine and scopolamine. If the drugs were prepared incorrectly, pregnant women were at risk of overdose. Overdose of those drugs could result in prolonged labors and an increase use of forceps during delivery. Physicians also noted that too little was known about how much of the drugs an individual patient needed. They also noted that inducing twilight sleep too quickly could cause a lethal overdose in pregnant women. The physicians argued that injections of morphine and scopolamine, meant to be given when labor began, were sometimes given too early because women experienced false labor pains. Physicians questioned the value of relieving all pain associated with childbirth. Physicians claimed that an infant could become saturated in morphine, its life jeopardized, if morphine was used in large quantities.

Twilight sleep had many side effects. Scopolamine often disoriented pregnant women during labor, causing them to scream and thrash. Additionally, women in twilight sleep experienced prolonged labor. Prolonged labor caused the pregnant woman and her infant to be exposed to morphine and scopolamine for a longer time, increasing the risk of overdose. Twilight sleep could endanger the infant by causing asphyxia, or suffocation. Asphyxia could lead to infant death. More often, physicians had to use forceps, spoon-shaped metal tongs used to pull infants out of the birth canal, during twilight sleep deliveries. Forceps increased the risk of bodily harm to the pregnant woman and her infant.

Despite those risks, twilight sleep became more common during the early twentieth century. The number of women seeking twilight sleep outnumbered the number of physicians willing to use it. As a result, untrained nurses administered mixtures of morphine and scopolamine. The number of cases of twilight sleep performed incorrectly increased. People were more aware that incorrect dosages of morphine and scopolamine could cause women to overdose and die. The demand for twilight sleep began to decrease as people noticed its side effects. In 1915, a leading advocate for twilight sleep in the United States, Francis Xavier Carmody, died giving birth to her third child

while in twilight sleep. According to historian of medicine Mark Sloan, Carmody's husband and doctor denied that she died of complications related to twilight sleep. Although twilight sleep was not recorded as Carmody's official cause of death, the use of twilight sleep decreased afterward. Physicians and patients sought safer anesthetics for relieving pain associated with childbirth.

In 1921, physician Robert Ernst House performed experiments to test the effects of morphine and scopolamine on the memories of women in labor. House concluded that women in twilight sleep could not tell lies because they lacked the ability to imagine under the drug combination. After House's experiment, police considered scopolamine to be a truth serum and used it in investigations throughout the 1920s. Police stopped using scopolamine in the 1930s due to side effects like hallucinations, disturbed perception, rapid heart rate, and blurred vision.

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