



Commentary

# Lethal drugs in capital punishment in USA: History, present, and future perspectives

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## Summary

Lethal injection is the preferred method for the execution of condemned prisoners in the United States. A recent decision of The European Union to prohibit the export of drugs used in capital punishment to the USA along with domestic firms ceasing to manufacture these drugs has resulted in a drug shortage and a search for alternative drugs and new drug combinations that have not been previously validated for inducing death. As a consequence, some of the executions did not proceed as expected and sparked public debate regarding whether recent executions by lethal injection serve the purpose of avoiding “cruel and unusual punishment” in executions. Moreover, a cottage industry comprised of compounding pharmacies has emerged as a source of drug combinations used in capital punishment. Although there is a growing trend toward the abolishment of capital punishment in United States, the controversy concerning the efficacy of drug and involvement of health care professionals in the execution procedure is far from over.

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*Keywords:* Capital punishment; Midazolam mishaps; Lethal injection; Barbiturates; Pancuronium bromide; Potassium chloride; Ethics; Compounding pharmacies

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## Introduction

Capital punishment by means of lethal injection has been the subject of intense discussion among Americans when unanticipated adverse events occurred during executions of several prisoners including Clayton Lockett in Oklahoma and Dennis McGuire in Ohio.<sup>1,2</sup> Mr. Lockett’s vein was reportedly ruptured with the administration of the last two drugs of the three-drug

cocktail planned for the execution. Reports indicated that Mr. Lockett lived for 43 min, convulsed, raised his head, and even uttered words during the procedure indicating tremendous discomfort and pain.<sup>3</sup> Such unintended consequences of the procedure fueled pre-existing controversies surrounding the lethal injection. Although capital punishment by means of lethal injection has been broadly covered by numerous

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journals of different disciplines from a variety of perspectives (e.g. social, ethical, and legal aspect), a comprehensive article covering recent developments in this arena is much needed to educate pharmacists and other health care professionals. This review complements the existing literature pertaining to the use of lethal injection in capital punishment in addition to covering several relevant topics including historical perspectives of lethal injection as a means of capital punishment, the trend of lethal injection in the U.S., the drugs used in the procedure and their mechanisms of action, and the ethical dilemma among health care professionals in participating in the execution procedure and in the acquisition of drugs for lethal injection from compounding pharmacies. This paper provides a comprehensive overview on lethal injection for professionals in health care.

### Historical perspectives

The use of chemicals in capital punishment can be traced back to the ancient human history. It is widely believed that the Greek philosopher Socrates was forced to drink hemlock-extract to end his life in 399 BC.<sup>4</sup> By then, plant-based extracts that were known to cause death were sought as an alternative to decapitation and other inhuman means of execution of a condemned person. History evolved over time in the favor of more humane approaches of execution. As a result, application of drug in execution was considered in mid-18<sup>th</sup> century in Europe.

The execution of condemned prisoners in a humane and painless manner was the central motive behind the consideration of lethal injection as an execution method. Great Britain considered this approach to replace traditionally adopted hanging, but a five-year study from 1949 to 1953 called the “Great Britain’s Royal Commission on Capital Punishment” had many concerns that ultimately rejected lethal injection from public policy.<sup>5</sup> The major concerns of the study were that there was not enough evidence to guarantee it would work in humans without causing suffering, and that it might not work, or be exceedingly difficult in prisoners who had veins that were not conducive to placing an IV line or those who resisted.<sup>6</sup> The commission put a great deal of emphasis on the opinions of medical professionals and medical organizations, which was not the case with lethal injection in the United States. Lethal injection as a means of capital punishment was considered in the United States around

1888, but was turned down by the governor of New York over concerns that the public would associate doctors and other medical professionals with inducing death.<sup>5</sup>

Continuing from the 1888 discussion, Oklahoma was the first state to adopt legislation for lethal injection in 1977. This alternative method was mainly advanced by a group of politicians and one physician.<sup>5</sup> Oklahoma State Representative Bill Wiseman and Oklahoma State Senator Bill Dawson contacted Oklahoma’s Chief Medical Examiner, Dr. Jay Chapman, to inquire how execution utilizing medications could be achieved. Dr. Chapman developed the Chapman Protocol, billed as a “new” and “more humane” way of executing by administering lethal doses of drugs. This protocol administered an intravenous infusion of high doses of two drugs: an ultra-short-acting barbiturate, such as sodium thiopental, and a paralytic agent.<sup>5</sup> In 1978, Dr. Chapman added a third drug to the protocol, potassium chloride to induce cardiac arrest. This modification resulted in the three-drug protocol that were adopted by states over the years.<sup>7</sup>

The first execution with the use of lethal dose of drugs injection occurred in Texas in 1982.<sup>8</sup> Under the close supervision of two doctors, a 40-year old African-American male was injected with a high dose of sodium thiopental that induced his death within minutes. Witnessing this successful execution, many states quickly followed the move of Oklahoma to authorize lethal injection as an execution method.<sup>9–13</sup> Although the purpose of lethal injection was to cause death without the involvement of any unusual cruelty, as outlined in the eighth amendment of the U.S. Constitution, an unusual sequence of adverse drug events that followed the administration of lethal drugs until the death of the condemned person raised the question regarding the validity of this means of capital punishment.<sup>14</sup>

### *Trends in capital punishment and lethal injection*

The number of capital punishments in the U.S. has seen in a consistent decline since 2000 (Fig. 1). Eighty-five executions were carried out nationwide in 2000, whereas there were only 39 of them in 2013. Maryland joined 17 other states in 2013 to abolish the provision of capital punishment.<sup>25</sup> However, a majority of U.S. states (32) are still holding this provision. Among the means of capital punishment, lethal injection has been the most popular. During the past 39 years,

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