IN THE UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF OKLAHOMA

RICHARD GLOSSIP, et al.,	)	
	)	
Plaintiffs,	)	
	)	
-vs-	)	Case No. CIV-14-0665-F
	)	
RANDY CHANDLER, et al.,	)	
	)	
Defendants.	)	

FINDINGS OF FACT AND CONCLUSIONS OF LAW

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I. Introduction

The plaintiffs, Oklahoma inmates awaiting execution, challenge the constitutionality, under the Eighth Amendment, of Oklahoma's protocol for execution by lethal injection. Defendants are various Oklahoma officials charged with responsibility for implementation of that protocol. After three trips to the Supreme Court, much motion work, and a nonjury trial, the matter is now ready for entry of final judgment. The court's findings of fact and conclusions of law, entered pursuant to Rule 52(a), Fed.R.Civ.P., are set forth below. The final judgment will also be entered today.

II. Findings of Fact

A. Procedural history

This action was filed in 2014, as a challenge to Oklahoma's then-existing protocol for execution by lethal injection. A preliminary injunction hearing was held in December, 2014, resulting in denial of a preliminary injunction to block the executions of Charles Warner and three other inmates. Denial of the preliminary injunction was affirmed by the Court of Appeals. Warner v. Gross, 776 F.3d 721 (10th Cir. 2015). The Supreme Court affirmed that judgment. Glossip v. Gross, 576 U.S. 863 (2015). In the meantime, Charles Warner, having been denied emergency relief, was executed by lethal injection in January, 2015.[1]

A series of mishaps, some more serious than others, with respect to Oklahoma's implementation of its lethal injection protocol resulted in a state grand jury investigation and a protracted period of development of a new protocol. A new protocol was promulgated in February, 2020. That precipitated the filing of the third

[1] Other orders in this case are published as Glossip v. Chandler, 554 F.Supp.3d 1176 (W.D. Okla. 2021) (summary judgment); Glossip v. Chandler, 2021 WL 4760383 (W.D. Okla. Oct. 12, 2021) (denying reconsideration, and other matters); and Glossip v. Chandler, 2022 WL 136886 (W.D. Okla. Jan 14, 2022) (denying preliminary injunction).

amended complaint, doc. no. 325, which remains the operative complaint in this case.

The nature and status of the claims asserted in the third amended complaint is shown in this table:

Count I	Fifth[2] Amendment Due Process claim based on asserted failure to disclose sufficient information re: development of the protocol and execution procedures. **Dismissed** per order at doc. no. 349.
Count II	Eighth Amendment claim asserting that constitutionally impermissible pain and suffering will result from the use of the three-drug lethal injection protocol (midazolam, vecuronium bromide and potassium chloride). Defendants' motion for **summary judgment denied**; Count II was tried to the court in February and March, 2022.
Count III	Eighth and Fifth[3] Amendment claim asserting "deliberate indifference" to the serious medical needs of the plaintiffs. **Dismissed** per order at doc. no. 349.
Count IV	First, Fifth[4] and Sixth Amendment claim asserting unconstitutional denial of access to counsel and the courts. **Summary judgment granted** on motion of the defendants per order at doc. no. 449.
Count V	18 U.S.C. § 3599 claim asserting intentional deprivation of right to counsel. **Summary judgment granted** on motion of the defendants per order at doc. no. 449.
Count VI	Ex Post Facto claim under U.S. and Oklahoma Constitutions, based on substitution of midazolam. **Summary judgment granted** on motion of the defendants per order at doc. no. 449.
Count VII	Fourteenth Amendment Due Process claim based on use of midazolam instead of barbiturate. **Summary judgment granted** on motion of the defendants per order at doc. no. 449.
Count VIII	Religious freedom claim asserting violation of plaintiffs' sincerely-held religious beliefs resulting from necessity of proposing a feasible alternative method of execution. **Dismissed** per order at doc. no. 349.
Count IX	Eighth and Fourteenth Amendment claim asserting that plaintiffs will be subjected to constitutionally impermissible human experimentation. **Summary judgment granted** on motion of the defendants per order at doc. no. 449.

[2] As was noted at an earlier stage of this action, the Fifth Amendment does not apply to the defendants in this case. Doc. no. 349, at 4 (Count I construed as asserted under the Fourteenth Amendment).

[3] See note 2. Plaintiffs elected not to persist with their Fifth Amendment Due Process claim. Doc. no. 349, at 8.

[4] See note 2.

Count X	First and Fourteenth Amendment claim asserting denial of right of access to governmental information. **Summary judgment granted** on motion of the defendants per order at doc. no. 449.

As can be seen, the only claim remaining for trial was the Count II claim, asserting that execution by lethal injection, using the three-drug protocol specified in Chart D of the 2020 protocol, violated the Eighth Amendment's prohibition of cruel and unusual punishment. *See*, doc. no. 629 (Final Pretrial Report), at 4, ¶ 5. That claim was tried in a nonjury trial which began on February 28, 2022 and was completed on March 7, 2022. Twenty-eight plaintiffs, all awaiting execution, remained in the case at the time of trial.[5]

The trial transcript has been filed and the parties have submitted their post-trial filings.[6] Doc. nos. 643 and 644. The matter is ripe for decision.

B. The 2020 Protocol

The 2020 protocol, entitled *Execution of Inmates Sentenced to Death*, was adopted with an effective date of February 20, 2020.[7] PX 45.[8] The protocol includes

[5] The plaintiffs remaining in the case are: James A. Coddington, Benjamin R. Cole, Carlos Cuesta-Rodriguez, Richard S. Fairchild, Wendell A. Grissom, Marlon D. Harmon, Raymond E. Johnson, Emmanuel A. Littlejohn, James D. Pavatt, Kendrick A. Simpson, Kevin R. Underwood, Brenda E. Andrew, Richard E. Glossip, Phillip D. Hancock, Alfred B. Mitchell, Tremane Wood, Wade Lay, Ronson Kyle Bush, Scott Eizember, John F. Hanson, Mica Alexander Martinez, Ricky Ray Malone, Clarance Goode, Anthony Sanchez, Michael Dewayne Smith, James Ryder, Richard Rojem and Jemaine Cannon. Three plaintiffs were executed after the court denied the defendants' motion for summary judgment but before this case was tried (John Grant in October, 2021, Donald Grant in January, 2022 and Gilbert Postelle in February, 2022).

[6] The trial transcript was filed on April 8, 2022, doc. no. 640. In these findings, references to the trial transcript are: Tr. __, with a parenthetical reference to the name of the witness where appropriate.

[7] Within the Oklahoma Department of Corrections, the document as a whole is called a "policy," and the only part of the document the DOC refers to as a "protocol" is Attachment D, which governs preparation and administration of the lethal injection drugs. Tr. 1042. In this litigation, however, the entire document has been referred to generically as the protocol, so the court will stay with that terminology.

[8] In these findings, PX refers to plaintiffs' exhibits and DX refers to defendants' exhibits.

detailed provisions with respect to (i) the staffing required to conduct an execution, (ii) qualifications of the Intravenous Team ("IV Team"), (iii) training of team members, (iv) designation and escort of execution witnesses, (v) procedures to be followed in the days and weeks preceding an execution, (vi) news media access, (vii) IV insertion, (viii) procedure in the execution chamber, (ix) post execution procedures, (x) after action reviews, and (xi) the preparation and administration of the lethal injection drugs.

The lethal injection drug combination relevant here is that set forth in Chart D, PX 45, Attachment D, p. 3. Chart D calls for the administration of the following substances in the order shown:

1. 500 milligrams midazolam (via two syringes)
2. 60 ml. heparin/saline
3. 100 milligrams vecuronium bromide[9] (via two syringes)
4. 60 ml. heparin/saline
5. 240 milliequivalents potassium chloride (via two syringes)
6. 60 ml. heparin/saline

C. The effect of vecuronium bromide as used in the protocol

Vecuronium bromide is a drug used, clinically, as a muscle relaxant. A typical clinical dose is 20 to 30 milligrams. When administered in the dosage called for in Chart D (more than ten times the dosage specified on the FDA-approved label), vecuronium bromide functions as a paralytic, rendering the inmate unable to move (and thus unable to give any indication of pain or other distress). As a paralytic, vecuronium bromide will stop breathing (by stopping the diaphragm), but it will not stop the heart. An inmate who is alive, sensate and paralyzed by vecuronium bromide would have a sense of suffocation. (This is the "substantial, constitutionally

[9] Chart D provides for the use of pancuronium bromide or rocuronium bromide as alternatives to vecuronium bromide.

unacceptable risk of suffocation" noted by the Supreme Court in Baze v. Rees, 553 U.S. 35, 53 (2008).)

D. The effect of potassium chloride as used in the protocol

Potassium chloride is a salt which is used clinically to replace potassium if the patient's potassium level is too low. It can also be used in heart surgery to make the patient's heart stop for purposes of the surgery. Potassium chloride is used in the Oklahoma protocol (at a dosage several times higher, and more concentrated, than any clinical dose) to induce cardiac arrest–fatal heart stoppage if the inmate is still alive when the potassium chloride is pushed. Administration of 240 milliequivalents of potassium chloride to a sensate inmate will cause pain and suffering.

The administration of potassium chloride, causing the heart to stop, renders vecuronium bromide essentially superfluous to the accomplishment of the purpose of the execution. As Dr. Mark Edgar explained, the paralytic effect of vecuronium bromide stops breathing, which is unnecessary if the inmate's heart is going to be stopped with potassium chloride. Tr. 208.

E. The pharmacology and clinical uses of midazolam

Gamma aminobutyric acid–GABA–is a neurotransmitter found in humans. Specifically, GABA is an *inhibitory* neurotransmitter. It is released at synapses between the neurons and "modifies electrical activity in the brain." PX 64.[10] It does that by acting at specific receptor sites. As a benzodiazepine, midazolam is a potent central nervous system depressant which exerts its action through $GABA_A$ receptors in the central nervous system by chemically binding to the $GABA_A$ receptors. Those receptors are "the key targets that mediate most of the clinically important effects of

[10] Bai, et al., "Distinct Functional and Pharmacological Properties of Tonic and Quantal Inhibitory Postsynaptic Currents Mediated by γ-Aminobutyric $Acid_A$ Receptors in Hippocampal Neurons," *Molecular Pharmacology*, vol. 59, 814 (2001).

IV anesthetics." PX 474.[11] The net effect of all this is that the flow of chloride ions into the nerve cells is increased, inhibiting the neuron–the neuron "does not fire as easily." Tr. 21 (Dr. Stevens). Central nervous system activity is thereby depressed.

As described in the FDA-approved label (which the court finds to be a reliable source of information about midazolam), midazolam is a Schedule IV drug which is, as noted above, in the benzodiazepine category. DX 44. (Other benzodiazepines include Valium and Xanax.) When midazolam is "given intravenous as an anesthetic induction agent, *induction of anesthesia occurs* in approximately 1.5 minutes when narcotic premedication has been administered and *in 2 to 2.5 minutes without narcotic premedication or other sedative premedication*." *Id.* at 4 (emphasis added).

The FDA label states that midazolam may be used "either alone or in combination with other CNS [central nervous system] depressants" in such procedures as bronchoscopy, cardiac catheterization and suture of lacerations. *Id*. at 8. The FDA label, after admonishing practitioners in several places about the importance of administering midazolam slowly, cautions that "rapid intravenous administration" of midazolam–which is exactly that the Oklahoma protocol requires–"may result in respiratory depression, airway obstruction and/or arrest." DX 44 at 18.[12] Reactions to midazolam can include agitation, hyperactivity, involuntary movements, "retching" and, in 2.6 percent of patients, "vomiting." *Id*. at 9, 16, 17. (The difference, if any, between "retching" and "vomiting," as those terms are used in the FDA label, is unclear.) A clinical dose of midazolam (much

[11] Vyuk, et al., "Intravenous Anesthetics," Ch. 23 in *Miller's Anesthesia* (Elsevier Health Sciences, 2014), 653.

[12] This statement by the FDA is supported by the literature. *E.g.*, PX 396: Reves, et al., "Midazolam: Pharmacology and Uses," *Anesthesiology*, vol. 62, 310 at 312 (1985): "Midazolam produces some respiratory depression."

lower than the dose called for in Chart D) will typically begin to take effect in thirty to sixty seconds or not much longer. Tr. 635 (Dr. Antognini).

The FDA warns–in a black box warning on the midazolam label–that intravenously-administered midazolam can cause respiratory depression and respiratory arrest. DX 44, p. 2.

At the trial, there was considerable debate as to just what "induction" of anesthesia means, as that term is used in the FDA label and elsewhere. The gist of plaintiffs' argument, as discussed later in these findings, is that "induction" of anesthesia really means nothing more than getting the sedation started, and cannot be taken to connote arrival at a deep plane of anesthesia (which plaintiffs assert requires the use of other agents, such as anesthetic gasses). For present purposes, it is worth noting that the FDA label states that: "If needed to complete induction, increments of approximately 25% of the patient's initial dose may be used; *induction may instead be completed* with inhalational anesthetics." DX 44 at 21 (emphasis added).

F. The four recent Oklahoma executions

In the weeks before this case was tried beginning on February 28, 2022, four Oklahoma inmates, three of whom were plaintiffs in this case, were executed by lethal injection under the Oklahoma protocol. Those were: John Grant (executed on October 28, 2021), Bigler Stouffer (December 9, 2021), Donald Grant (January 27, 2022) and Gilbert Postelle (February 17, 2022). Various combinations of plaintiffs' and defendants' witnesses viewed all four of these executions.

In assessing the testimony from witnesses who viewed or participated in these executions, it should be borne in mind that little, if anything, relevant to the issue of infliction of pain and suffering can be inferred from anything the inmate did (or, more to the point, did not do) after the vecuronium bromide was pushed. Plaintiffs correctly assert, and defendants do not dispute, that after the vecuronium bromide

takes effect, a sensate inmate would be unable to describe or otherwise communicate about any pain he may be experiencing. Consequently, the probative eyewitness testimony bearing on the issue of what the inmate may have been feeling as the execution took place is the testimony describing observations beginning with the injection of the first syringe of midazolam and ending with the injection of the first syringe of vecuronium bromide.

It should also be noted, preliminarily, that the court's findings as to the four recent executions are based on testimony given by both fact and expert witnesses.[13] The expert witnesses' descriptions of what they saw are, course, based on their observations of objectively verifiable facts, as viewed, in some respects, through the lens of their professional expertise. Consequently, it is appropriate here to comment briefly on the battle of the experts in this case. Rarely, in any field of litigation, does a court see and hear well-qualified expert witnesses giving expert testimony as squarely–and emphatically–contradictory, on the issues at the heart of the matter, as in this case. Some of the opposing experts in this case have squared off in other midazolam challenges in other courts around the country, in what amounts to a midazolam roadshow.[14] On the whole, the results in those cases have not been favorable to the inmates awaiting execution, but extended analysis of how some of the experts in this case have fared in other cases is not necessary here. There is one

[13] Preliminary injunction hearings were held in this case on October 25, 2021 (relating to John Grant, Julius Jones, Donald Grant and Gilbert Postelle) and on January 10, 2022 (relating to Donald Grant and Gilbert Postelle). At the trial on the merits, the parties agreed that the testimony of fact witnesses at those hearings would be deemed incorporated into the trial record. Tr. 1021, 1119. The findings the court now makes as to the four recent executions are based in part on the fact witness testimony from those hearings.

[14] For instance, three of plaintiffs' expert witnesses in this case (Drs. Stevens, Van Norman and Williams) and two of defendants' experts (Drs. Antognini and Buffington) testified in the McGehee case in Arkansas. McGehee v. Hutchinson, 463 F.Supp.3d 870, 908 (E.D. Ark. 2020), *appeal docketed*, No. 21-1965 (8th Cir. April 30, 2021, argued and submitted January 12, 2022).

fresh face in this case, and a credible one at that. That is Dr. Ervin Yen, a practicing anesthesiologist who has administered midazolam and observed its effects thousands of times.

1. The John Grant execution

John Grant was executed on October 28, 2021. PX 802. He was served a meal at 5:13 p.m. on October 27, the day before he was executed. Grant was still "drinking soda" and eating at 10:15 p.m. on October 27. Jan. 10, 2022 Tr., doc. no. 585, at 181 ("1/10 Tr."). At 3:15 p.m. on October 28, just before he was taken to the execution chamber, Mr. Grant was eating chips and drinking soda (Mr. Pibb Xtra). The Grant execution began shortly after 4:00 p.m. The curtain between the execution chamber and the viewing rooms was raised at 4:08 p.m. PX 802, p. 4.

The first syringe of midazolam was pushed about one minute after the curtain was raised. PX 802, p. 4. Dr. Yen (observing the execution at the request of the defendants) noticed, at that point, "bubbles … [of] a different color" in the IV line. Tr. 1129. Grant appeared to lose consciousness in less than a minute. Soon after that, Grant's chest and abdomen moved up and down in a "rocking boat" motion, something Dr. Yen has never seen in a person who was conscious. Tr. 1110, 1130. The probable cause of that was obstruction of Grant's breathing due to blockage of his throat by his tongue.[15] Tr. 1130. This was a natural result of administration of 500 milligrams of midazolam. Tr. 1139. Dr. Yen saw no purposeful movements after the rocking boat motion started. Tr. 1131.

[15] The possibility of airway obstruction as a result of administration of midazolam is not a concept new to this case. Dr. Van Norman, an expert witness retained by plaintiffs in this case and in the Arkansas case, testified about midazolam-induced airway obstruction in the Arkansas case. McGehee, 463 F.Supp.3d at 883.

Plaintiffs have placed considerable emphasis on the fact that John Grant "vomited" after the midazolam was pushed. Doc. no. 594, at 10, 11. The Department of Corrections log reflects that the midazolam was pushed at 4:09 p.m. and "Inmate vomiting @ 1610 [4:10 p.m.]." PX 802, p. 4. There was a fair amount of debate at the trial as to whether this was actually propulsive vomiting (the forceful ejection of gastric contents) or a more passive flow of gastric contents from Grant's stomach as his muscles relaxed, due to the effects of midazolam, while he lay strapped down in a supine position on the gurney.

As has been discussed, the FDA label discloses that "retching" or "vomiting" can occur as a result of administration of midazolam in a clinical setting. It is also fair to say, in general, that most any adverse effect a clinical dose of midazolam might have, as administered *slowly*, per the FDA's repeated cautionary advice, will be aggravated when a massive dose is pushed essentially all at once. And before addressing this issue, it is worth noting that (i) whether it was propulsive vomiting or something more passive, Grant's substantial intake of food and beverages in the hours before he was executed would naturally have predisposed him to loss of gastric contents–regardless of whether midazolam was a causal factor–while he lay on the gurney, (ii) whether it was vomiting or something more passive, the fact and cause of the loss of gastric contents is of no moment, in the context of the issues in this case, if this all occurred after Grant had been rendered insensate by midazolam, (iii) there would in any event remain a question as to whether the vomiting, alone or in combination with aspiration of gastric contents in the few minutes before death, would amount to the severe pain and suffering which the Supreme Court has said must be proven in a method-of-execution challenge, and (iv) there would in any event remain a question as to whether this episode, during the John Grant execution, even if it entailed the requisite severity of pain and suffering, is something that is

"sure or very likely" (in the sense those words were used by the Supreme Court) to occur in future executions under Chart D.

Dr. Van Norman, who did not witness the John Grant execution, opined, based on photographs showing liquid residue on the floor a few feet away from the gurney, that Grant's loss of gastric contents was the result of "propulsion" of vomit, not passive regurgitation. Tr. 504. PX 37, p. 190 (photograph).[16] She assumed, without explanation, that this episode of "active vomiting" indicates that Grant was conscious. Tr. 504.

Eyewitness accounts, taken together with a series of photographs of the gurney and the floor around the gurney, are at odds with Dr. Van Norman's opinion. Justin Farris, the Oklahoma Department of Corrections Director of Operations, was in the execution chamber. On the subject of John Grant's vomiting, Farris testified that the vomit came out of Grant's mouth, onto the pillow, and "was running from the floor out that way." Tr. 991. Dr. Yen, also an eyewitness, testified that the vomit was visible on the floor (in the area pointed out by Dr. Van Norman, referring to DX 37, p. 190) because it "hit the ground and spread." Tr. 1133. It did not propulsively come out of Grant's mouth. Tr. 1134. Consequently, Dr. Yen described this as regurgitation, not vomiting. Tr. 1132. The regurgitation occurred because Grant lost muscle tone as a result of unconsciousness and hypoxia. Tr. 1135. He was under general anesthesia–unconscious–when he was regurgitating.

The photographic evidence supports the testimony of Mr. Farris and Dr. Yen. DX 37, p. 190 (Bates 3478) does show residue out to the side of the gurney (on Grant's right side), as described by Dr. Van Norman. The flow of the liquid across

[16] At trial, pages of some exhibits (mostly ones which were viewed electronically) were referred to by their PDF pagination. An example is PX 37, p. 190. The PDF pagination, although frequently used for reference purposes at trial, does not appear in the hard copy of the exhibit. In this instance, the hard copy of PX 37, p. 190 is Bates stamped 03478.

the floor in that direction is shown by p. 244 (Bates 3532). The fact that there was an abundant supply of vomitus is shown by p. 241 (3529), which depicts the residue of what was clearly a substantial quantity of liquids and solids on the sheet and the pillow. (Obviously, the liquid and solids which remained on the pillow next to Grant's head were not propulsively ejected away from the gurney.) There was a large enough quantity that the liquid also flowed over to the *left* (Grant's left) side of the gurney, as shown by the photos at pp. 187, 199 and 206 (3475, 3487 and 3494). Dr. Van Norman's opinion that Grant experienced propulsive vomiting is undermined by the credible testimony of eye witnesses, which is supported by the photographic evidence.

The court also rejects Dr. Van Norman's speculation that Grant was conscious during this episode, whether it was vomiting or passive regurgitation. As these findings already suggest, and as is discussed in more detail below, the effect of the massive dose of midazolam was to render Grant unconscious before he lost his gastric contents. In fact, that physiological result of administering that massive dose of midazolam to a man with a full stomach was unsurprising.[17] Tr. 1135.

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[17] This makes it unnecessary to dwell on the question of whether the discomfort of vomiting (and probably aspirating vomit) while conscious and strapped down on a gurney would satisfy the Supreme Court's standard for severe pain and suffering. The court has no reason to revisit its finding on this issue, in the context of a motion for preliminary injunction, in January, 2022:

> If, contrary to the court's findings (which are compelled by persuasive evidence), Grant did experience conscious pain and suffering as he was executed, the interval within which he would have experienced pain and suffering would have been very short–less (probably quite a bit less) than five minutes. To be sure, the "pain and suffering" would have been more than negligible, mainly because, being strapped down in a supine position, Grant would have had no way to stop or otherwise alleviate the combined effect of simultaneously regurgitating and struggling to breathe. But the court concludes that pain and suffering of that duration and magnitude, if it occurred at all, falls short of the severity required, for Eighth Amendment purposes, by the Supreme Court's lethal injection trilogy.

Glossip v. Chandler, 2022 WL 136886, at *5 (W.D. Okla. Jan. 14, 2022).

A consciousness check was performed at approximately 4:15 p.m. PX 802, p. 4. The consciousness check consisted of a sternum rub and raising Grant's eyelids. The sternum rub, performed by the doctor assisting in the execution chamber, was described by Mr. Farris: "he takes his knuckles through the sternum and rubs it really hard." 1/10 Tr. 189.

The doctor concluded that Grant was unconscious, which he indicated (per agreed upon procedure) with a knock on the door. The announcement of Grant's unconscious state was made at 4:15. PX 802, p. 5. The vecuronium bromide was pushed immediately. *Id.* Grant did not move after that. The two syringes of potassium chloride followed at 4:18 and 4:19. He was pronounced dead at 4:21 p.m. *Id.*

The placement of the straps on Grant's chest did not impair the doctor's ability to perform the sternum rub. As was noted by Dr. Van Norman, PX 37, p. 186 (3474) shows the large chest straps placed in such a way that there would have been little room left to perform a sternum rub. But that photo does not show how the straps were actually arranged during the execution. As credibly explained by Mr. Farris, during the execution, the point of intersection of the four straps was lower than is shown in this photograph. Tr. 990. Notably, Farris's explanation is consistent with the placement of the chest straps on Gilbert Postelle, as shown in PX 837, p. 7 (Bates OAG – 024457). On Postelle's chest, the four straps converge at a centrally located metal fitting, leaving several inches of Postelle's sternum area uncovered by straps.

At about the time the announcement of unconsciousness was made, Grant was breathing, although his "cheek fluttered," his mouth opened and then his "chest settled". 1/10 Tr. 19. The last round of drugs was pushed at approximately the 8 or 8 1/2 minute mark. At approximately the 12 minute mark in the execution process, Grant was pronounced dead. 1/10 Tr. 19.

2. The Bigler Stouffer execution

Bigler Stouffer, accompanied by a chaplain, was executed shortly after 10:00 a.m. on December 9, 2021. The curtain was opened at 10:00 a.m. The first syringe of midazolam was pushed at 10:01; the second was pushed at 10:04. PX 42, p. 4. Dr. Yen, viewing the execution from the witness room, concluded that Stouffer was unconscious very soon–30 to 45 seconds–after the midazolam was pushed. Tr. 1146. This observation, which the court finds to be credible, is consistent with the Department of Corrections log, which notes that Stouffer was "Speaking to Chaplain and then started snoring." PX 42, p. 5. This consisted of "deep sleep. Snoring." PX 42, p. 4. Stouffer was confirmed to be unconscious at 10:07. As recorded in the Department of Corrections log, this consisted of "Verbal, Sternum rub, pinch right Forearm." *Id.* As described by Dr. Yen, the consciousness check consisted of the doctor putting his hands on Stouffer's chest, applying pressure, and shaking him. Dr. Yen could see Stouffer's body shaking. Tr. 1146. The vecuronium bromide was pushed immediately after Stouffer was determined to be unconscious, followed by the two syringes of potassium chloride at 10:11 and 10:12. He was pronounced dead at 10:16 a.m. *Id*.

This is as good a place as any to address a discrepancy relating to drug nomenclature. This occurred with respect to the Stouffer, Donald Grant and Postelle executions and, it is fair to assume, with respect to the John Grant execution. The Oklahoma protocol provides for the use of vecuronium bromide or pancuronium bromide or rocuronium bromide as the paralytic agent.[18] PX 45, p. 39, ¶ (C)4(b).

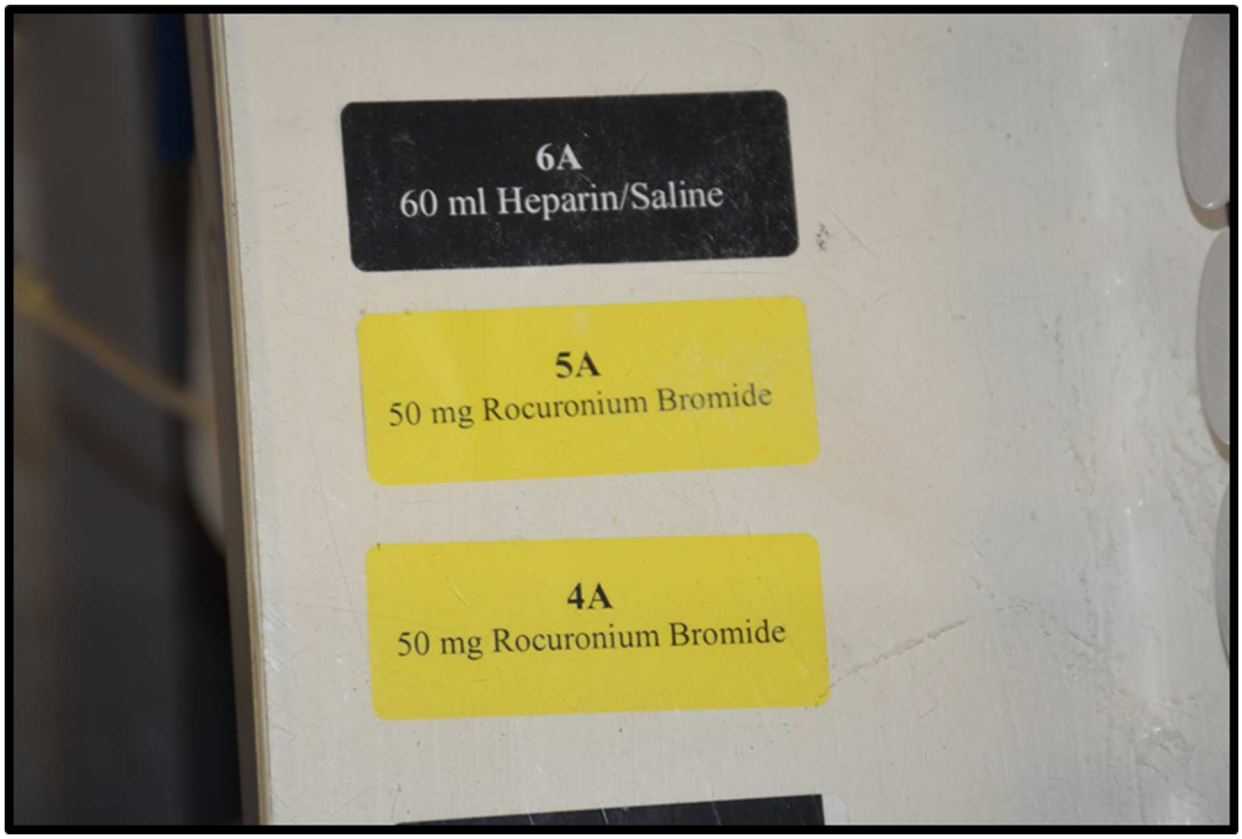
[18] Rocuronium bromide is also specified, along with vecuronium bromide, in the Alabama three-drug lethal injection protocol. Saunders v. Hamm, 2022 WL 493693, at *12 (M.D. Ala. Feb. 17, 2022). Likewise for Florida, Ohio and Tennessee. *See*, Brant v. Reddish, 2019 WL 4600366, at *5 (M.D. Fla. Sept. 23, 2019); Conway v. Shoop, 2020 WL 3403210, at *3 (S.D. Ohio June 19, 2020); and King v. Parker, 467 F. Supp. 3d 569, 571 (M.D. Tenn. 2020).

The paralytic designated for use in the four recent executions was vecuronium bromide.

The protocol calls for the setting of primary and backup IV catheters. *Id*., p. 42, ¶ F(4). The two sets of syringes (one for the primary IV line and one for the backup) are to be attached, in the proper drug sequence, to manifolds which in turn are connected to the IV lines. PX 837, p. 9 (OAG – 024459), relating to the Gilbert Postelle execution, shows this arrangement:

The protocol requires each syringe to be put "in its corresponding place in the shadow board which is labeled with the name of the chemical, color, chemical amount and the designated syringe number." PX 45, p. 40, ¶ D(3). As the photograph suggests, the "shadow board" functions more or less as a color-coded visual template for correct placement of the drug syringes on the IV manifold. The syringes for the paralytic were properly labeled: vecuronium bromide. But the

corresponding yellow labels affixed to the shadow board said "50 mg Rocuronium Bromide," as shown in PX 837, p. 12 (OAG – 024462):



This discrepancy in nomenclature was addressed with Mr. Farris at trial. He testified that he personally verified the drugs used in the Donald Grant and Postelle executions. Tr. 996, 1032. This is consistent with the DOC's logs of those executions. Those logs, which allow the record keeper to indicate which of the three authorized paralytics was used, indicate that vecuronium bromide was used. DX 159; PX 813. The same is true for the John Grant and Stouffer executions. PX 802; PX 42. But for Oklahoma's previous problems with using the right drugs, this discrepancy probably wouldn't have been worthy of mention at the trial of this case. The displeasure of Department of Corrections Director Scott Crow with this discrepancy in the nomenclature on the label on the shadow board was evident and

is understandable. Tr. 1038. The court is satisfied that vecuronium bromide was used in each of the four recent Oklahoma executions.[19]

3. The Donald Grant execution

Donald Grant was executed, with a chaplain present, shortly after 10:00 a.m. on January 27, 2022. The curtain was opened at 10:00. The two syringes of midazolam were pushed at 10:03 and 10:06. PX 810, p. 4. This execution was witnessed by Dr. Joseph Antognini. By Dr. Antognini's account, which the court finds credible, Grant became "more subdued" at the two minute point and seemed to fall asleep at 10:05. He gave no appearance of consciousness after that. Tr. 736. Grant soon started a "rocking boat" motion, which Dr. Antognini took to be an indication of complete or partial airway obstruction. Tr. 736-37. This would have been due to either partial airway obstruction or total airway obstruction in combination with diminished respiratory effort. Tr. 737. Grant was confirmed to be unconscious at 10:08. The log records the consciousness check as "sternum rub; verbal or painful stimulation." PX 810, p. 4. As described by Dr. Antognini, the consciousness check consisted of a sternum rub and speaking loudly: "Donald, Donald" (heard through the glass, with the microphone off). The chest straps did not cover Grant's entire sternum. Tr. 749-50. The person performing the consciousness check also squeezed Grant's right arm and wrist. Tr. 739.

The two syringes of vecuronium bromide were pushed at 10:09 and 10:10. Grant stopped breathing at 10:10 and the two syringes of potassium chloride were pushed at 10:12 and 10:13. He was declared dead at 10:16 a.m. PX 810, p. 5.

[19] It is worth noting that the Supreme Court has observed, in this case, that "all agree" that vecuronium bromide and rocuronium bromide are "functionally equivalent for purposes of this case." Glossip, 576 U.S. at 873.

4. The Gilbert Postelle execution

Gilbert Postelle was executed on February 17, 2022. The curtain was opened at 10:00 a.m. The syringes of midazolam were pushed at 10:01 and 10:03, after which Postelle wiggled his hands and feet for a time. PX 813, p. 4; Tr. 573-74 (Dr. Van Norman). The log records that at 10:03, Postelle was snoring and that his eyes were partially open. PX 813, p. 4.

Postelle stopped moving about 2 ½ minutes after the execution began. Then, a few seconds later, one or more of his fingers moved. Tr. 1151 (Dr. Yen). Dr. Yen concluded that this was not purposeful movement and that Postelle was unconscious at that point. Tr. 1151. Mr. Farris described it as a "twitch." Tr. 1018.

Dr. Van Norman noted movement in some of Postelle's fingers at or soon after 10:09, which she described as "a conscious movement." Tr. 594-95. The court evaluates that observation in light of Dr. Yen's testimony that finger movement would not be a disturbing thing to see in a patient under general anesthesia. Tr. 1108. (It is common for patients to move while under general anesthesia, which is one of the reasons surgical patients are also given muscle relaxants. Tr. 677 (Dr. Antognini). The movement in patients to whom a muscle relaxant has not been administered can include arms, legs and fingers. Tr. 1108 (Dr. Yen).)

The consciousness check was performed at 10:06, with a notation in the log that the check consisted of "sternum rub; physical and verbal stimuli." PX 813, p. 4; Tr. 1019 (Farris). As described by Dr. Van Norman, the person performing the consciousness check did a sternum rub and shook Postelle. Tr. 577, 592, 607 (per Dr. Van Norman, a "mild to moderate" sternum rub). But she opined that the sternum rub "was not appropriately carried out." Tr. 601. In her view, it should have been done for thirty seconds or more. Tr. 608. As described by Dr. Yen, the consciousness check consisted of the doctor, using both hands, putting his hands on

Postelle's chest twice and shaking him vigorously. Tr. 1153. Dr. Yen disagreed with Dr. Van Norman's criticism of the adequacy of the consciousness check. Tr. 1155.

Postelle was declared unconscious at 10:06 and the two syringes of vecuronium bromide were pushed at 10:07 and 10:08, followed by the potassium chloride at 10:10 and 10:11. He was pronounced dead at 10:14 a.m. PX 813, p. 5.[20]

G. Glossip first prong: The challenge to midazolam as used per Chart D

As will be seen, the court's findings on the ultimate issue of whether midazolam can be relied upon to render an inmate insensate to pain culminate in a finding that midazolam, administered as specified in the Oklahoma protocol, does, in fact, reliably achieve the anesthetic desired effect. But several matters should be addressed preliminarily.

1. Dosage, speed of administration and duration.

The first thing that needs to be borne in mind about midazolam as used for lethal injection under the Oklahoma protocol is that the Chart D dose is a massive dose–many times higher than any clinical dose–which is injected in an exceedingly

[20] At the October 25, 2021 preliminary injunction hearing (see n. 13, above), the court heard testimony from Spencer Hahn with respect to the Alabama executions of Willie Smith and Ron Smith. At the conclusion of that hearing, the court made findings which addressed, among other things, Mr. Hahn's testimony. *See*, transcript of October 25, 2021 hearing, doc. no. 537, at 142-145. There is no need to repeat here the court's findings as to the matters testified to by Mr. Hahn. The court adheres to those findings. In particular, the evidence received at the trial on the merits in this case gives the court no reason to revisit its October 25 findings as to the significance of the movements described by Mr. Hahn. On January 10, 2022, at a hearing on a motion for preliminary injunction filed by Donald Grant and Gilbert Postelle, the court heard testimony from Julie Gardner and Meghan LeFrancois with respect to the execution of John Grant. In an order filed on January 14, 2022, the court made its findings–for purposes of the motion then before the court–as to the John Grant execution. *See*, Order of January 14, 2022 at doc. no. 587 (Glossip v. Chandler, 2022 WL 136886, at *2-*5 (W.D. Okla. Jan. 14, 2022)). The findings the court now makes as to the execution of John Grant take into account the testimony of Ms. Gardner and Ms. LeFrancois at the January 10 hearing.

short period of time. The speed with which midazolam is pushed into the IV lines when used for lethal injection far exceeds the rate repeatedly specified–with accompanying cautionary language–in the FDA label, as discussed above. As for the duration of the desired effect of an injection of 500 milligrams of midazolam, it is necessary only to note at this point that plaintiffs' focus on the question of whether midazolam can be used to *maintain* anesthesia (it can) ignores the fact that in an execution by lethal injection with the Chart D drugs, anesthesia or deep sedation is only required for a few minutes, as indicated by the chronologies of the four recent Oklahoma executions. If the inmate is rendered insensate by the time the second and third drugs are pushed and accomplish their purpose, the question of how much longer the 500 milligrams of midazolam might have rendered him insensate is irrelevant.

2. What is "induction"? What is "general anesthesia"?

Induction. The fact that midazolam is approved (by the FDA and in the literature) for "induction of general anesthesia" triggered a semantic dispute at trial. The debate at trial as to just what "induction" of anesthesia means, as that term is used in the literature on midazolam, boils down to this: plaintiffs' experts testified that midazolam cannot be relied upon to render an inmate insensate to pain during execution under the Oklahoma protocol. Defendants' experts testified to just the opposite. Consequently, both sides have quite understandably sought corroboration from credible, unbiased sources. Literature–not the least of which is the FDA-approved label–stating that midazolam is suitable for use in "induction of general anesthesia" is abundant. DX 44, p. 8.[21] As has been noted, the FDA label

[21] *See also, e.g.*, PX 396: Reves, et al., "Midazolam: Pharmacology and Uses," *Anesthesiology*, vol. 62, 310 at 317 (1985): "Midazolam may be used intravenously for the induction of anesthesia (table 2). Induction is accomplished when there is unresponsiveness to command and loss of the

also tells us that "[w]hen midazolam is given intravenous as an anesthetic induction agent, *induction of anesthesia occurs* in approximately 1.5 minutes when narcotic premedication has been administered and *in 2 to 2.5 minutes without narcotic premedication or other sedative premedication*." *Id.* at 4 (emphasis added). If "induction" connotes nothing more than the first, preliminary leg of the journey to a deep plane of anesthesia, then defendants don't get the benefit of the corroboration which might be derived from the objective literature when it states that midazolam is usable for induction. This all led to the following colloquy between the court and Dr. Antognini:

> THE COURT: Let me ask a question. Counsel on both sides have made admirable attempts to teach me, through witnesses, the difference between "induction," on one hand, and "general anesthesia," the maintenance phase of general anesthesia, on the other hand. And Dr. Antognini, you may not be able to answer this, and if you can't, then tell me. But I gather, first of all, from your testimony, that once an induction agent is used for the induction, first of all, then there is typically, if you will, a handoff to some other agent to maintain general anesthesia; is that basically correct?
>
> THE WITNESS: Yes.
>
> THE COURT: So let me put it in very basic laymen's terms, then. If you have, to your satisfaction, *induced anesthesia with midazolam* and

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eyelash reflex." The Reves study treats as unremarkable the proposition that midazolam induces anesthesia in unpremedicated patients (*e.g.*, patients for whom no other induction agent is used): "The dose of midazolam required to induce anesthesia is higher in unpremedicated healthy patients (up to 0.3 mg/kg) than in premedicated patients." *Id.* A midazolam dosage of 0.3 milligrams per kilogram translates to a 30 milligram dose in a man weighing 220 pounds–less than one tenth the dosage called for by Chart D.

And see, PX 344: Miyake, et al., "Electroencephalographic response following midazolam-induced general anesthesia: relationship to plasma and effect-site midazolam concentrations," *J. of Anesthesiology*, vol. 24, 386 (2009): "Midazolam is used for sedation and general anesthesia."

This is an appropriate place to note that a few minutes spent reviewing the parties' respective critiques of the opposing experts (doc. nos. 643 and 644) will reveal that the scholarly studies cited by the parties are generally susceptible to cherry picking–each side can find something to like in most any of the studies.

> are ready to but not yet administering the handoff agent, if you will, and *the doctor turns to you and says, "is it okay to make the incision in this person's abdomen"? What's your answer?*
>
> THE WITNESS: I would say that if I could -- I'm going to answer your question, but I want to qualify it, if I may.
>
> THE COURT: Sure.
>
> THE WITNESS: *If it was a short -- let's say that it was an incision in the abdomen to drain an abscess, where it was going to literally take 30 seconds, then I might say "go ahead." If it's an incision for a major abdominal surgery, where they're going to be there for two hours, then I would start the maintenance phase*, because I know we're going to be there for a long time. So for a very short procedure, I could rely only on the drug for that.
>
> THE COURT: Well, then, am I to understand that a successful induction as -- in that framework, then, *a successful induction gets the patient to the plane of anesthesia that you then want to simply maintain?*
>
> THE WITNESS: That is correct.

Tr. 647-49 (emphasis added).

Dr. Antognini's account is consistent with the meaning of "induction" as that term is used in the medical literature. For instance, a study comparing the performance of midazolam with another benzodiazepine used the following definition of induction: "Induction of anaesthesia was defined as complete with loss of lid reflex *and* failure to respond to oral commands." PX 395 (emphasis in original).[22] "Induction" does not connote just the first step on the journey to a deep plane of anesthesia.

General anesthesia. The American Society of Anesthesiologists (ASA) has published a chart titled "Continuum of Depth of Sedation: Definition of General

[22] Reves, et al., "Comparison of Two Benzodiazepines for Anaesthesia Induction: Midazolam and Diazepam," *Canadian Anaesthetists' Society Journal*, vol. 25, no. 3 (May, 1978), at 211.

Anesthesia and Levels of Sedation/Analgesia." That chart, PX 496, defines general anesthesia as follows:

> **General Anesthesia** is a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

The ASA chart, PX 496, summarizes the gradations of sedation and anesthesia in terms of patient responses and potential complications as follows:

	Minimal Sedation Anxiolysis	*Moderate Sedation/ Analgesia ("Conscious Sedation")*	*Deep Sedation/ Analgesia*	*General Anesthesia*
Responsiveness	Normal response to verbal stimulation	Purposeful** response to verbal or tactile stimulation	Purposeful** response following repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained	May be impaired

With the benefit of the ASA chart, the abundant professional literature in the record, and the testimony of several of the experts who testified at trial, the court finds, quite readily, that (i) the ASA's definition of general anesthesia comports with the sense in which that term was used at trial, and (ii) if an inmate being executed per Chart D of the Oklahoma protocol reaches a state of general anesthesia as defined by the ASA, he will not be sensate to pain resulting from the injection of any of the Chart D drugs (or, for that matter, pain from any other source).

3. Ceiling effect

Seven years ago, in this case, the Supreme Court noted that "Petitioners assert that midazolam's 'ceiling effect' undermines the District Court's finding about the effectiveness of the huge dose administered in the Oklahoma protocol. Petitioners argue that midazolam has a 'ceiling' above which any increase in dosage produces no effect." Glossip, 576 U.S. at 887. Justice Alito's framing of the "ceiling effect" issue is as important now as it was then: "The relevant question here is whether midazolam's ceiling effect occurs below the level of a 500-milligram dose and at a point at which the drug does not have the effect of rendering a person insensate to pain caused by the second and third drugs." *Id.*

Plaintiffs' contentions about the ceiling effect deserve attention because those contentions tie directly into their argument that midazolam "is unable to render a person insensate to pain no matter how much of it is injected into a person." Doc. no. 594, at 13.

As an initial matter, it is unremarkable that, for midazolam or any other drug, there would be a dosage above which an incremental increase in the amount administered would fail to produce a commensurate increase in the effect of the drug. Consequently, there is no reason to dwell on the question of whether midazolam has a linear dose response. Another beginning point for this analysis is the fact that the defendants make no bones about the fact that the 500 milligrams specified in Chart D is a massive dose–far above any clinical dose ever administered and likely well above the dosage at which the incremental effects of increases in dosage taper off to nil. As Dr. Michael Weinberger, one of plaintiffs' experts, explained: "[A]bove a certain dose, you would not see a clinical effect." Tr. 399. Although the evidence is in conflict as to the level at which the ceiling effect sets in, there is no reason to question that fundamental proposition. On that score, Dr. Weinberger referred to a study of the effect of midazolam when used in combination with halothane (an

anesthetic gas) in hysterectomy patients. The authors found that "[f]urther increases in midazolam concentration continued to reduce the MAC [minimum alveolar anesthetic concentration] of halothane but *to a lesser degree*." PX 270 (emphasis added).[23] The short of the matter is that, once the $GABA_A$ receptors are saturated, additional midazolam will not chemically bind to the $GABA_A$ receptors and consequently will have no incremental effect as a central nervous system depressant.

Consistent with Dr. Weinberger's testimony, Dr. Antognini, called by the defendants, did not dispute that there are data showing a plateauing or a ceiling effect. Tr. 671. But, as Dr. Antognini explained: "[T]he question is can you achieve deep -- or unconsciousness, deep levels of anesthesia, whatever term you want to use, to a point where a person would not have the conscious awareness of pain from a noxious stimulus, including the potassium chloride that is used in the Oklahoma protocol." Tr. 671. Dr. Antognini's elaboration is on all fours with Justice Alito's treatment of the ceiling effect seven years ago, in this case, as quoted above.

Plaintiffs' contentions as to midazolam's ceiling effect are, thus, of no moment unless the ceiling effect sets in while the inmate can sense the pain he would endure as a result of the administration of the massive doses of vecuronium bromide and potassium chloride. The evidence satisfies the court that midazolam's ceiling is higher than the dosage required for midazolam to have the effect intended in the Oklahoma protocol.

The most persuasive evidence that a ceiling effect is not problematic in executions under Chart D is the evidence establishing to the satisfaction of the court that midazolam does reliably place inmates under general anesthesia before the vecuronium bromide and potassium chloride are pushed, as discussed in part (5),

[23] Inagaki, et al., "Anesthetic Interaction Between Midazolam and Halothane in Humans," *Anesthesia and Analgesia*, vol. 76, 613 at 615 (1993).

below. Once anesthesia is induced as a result of the administration of midazolam, the injection of additional midazolam will not diminish the effect the drug has already had. Tr. 882 (Dr. Buffington). As Dr. Yen put it, in the context of vecuronium bromide: "You know, if I gave you 20 milligrams of vecuronium, you would not breathe, you would be paralyzed. If I gave you 50 milligrams of vecuronium, a muscle relaxant that paralyzes you, you would not be more paralyzed. You wouldn't be less paralyzed." Tr. 1094.

As measured by the bispectral index (BIS), a person is under general anesthesia at a BIS level of 60 to 40.[24] Tr. 35 (Dr. Stevens), Tr. 756, 757 (Dr. Antognini), Tr. 891 (Dr. Buffington). Midazolam has been demonstrated to be capable of inducing a BIS score well below 60 and in some cases below 40. Tr. 892-894 (Dr. Buffington). Dr. Yen has never used midazolam to get a patient to a BIS level lower than 70, and he wouldn't want to do that, because "there's a chance that the patient could stop breathing, be obstructed, so that's not necessarily my endpoint." Tr. 1243-44. In the case at bar, we are not, of course, concerned with the possible adverse health effects of a midazolam dosage high enough to get the inmate's BIS level below 60. The relevant fact is that, regardless of what BIS level might be achieved with a clinical dose of midazolam (and that will vary from patient to patient), the 500 milligram dose specified in Chart D is, by design, more than sufficient to bring about all of the suppression of central nervous system activity that midazolam is capable of achieving.

4. Pulmonary edema

Pulmonary edema is a condition in which there is "excess fluid in the lungs." Tr. 197 (Dr. Edgar). The physiological effect of pulmonary edema is that "there's a

[24] If a person is fully awake, his BIS level is 100. If he has no brain activity at all, his BIS level is zero. Tr. 32. BIS is determined on the basis of electroencephalographic input. Tr. 771.

problem moving oxygen into the bloodstream and carbon dioxide out of the bloodstream." Tr. 1157 (Dr. Yen). Pulmonary edema can be detected on autopsy: "[W]hen you section [lungs] with a knife, you may find fluid flows out if it's -- if they're quite edematous. And if they're somewhat less edematous, you give them a squeeze with your hand, then the fluid comes out." Tr. 201 (Dr. Edgar).

Dr. Edgar's review of the reports of the autopsies from thirty-two executions conducted using midazolam disclosed that twenty-seven of the inmates had pulmonary edema. Tr. 211. And he cannot rule out that the remaining five also had pulmonary edema. Tr. 212. Dr. Edgar also personally performed the autopsy of an Ohio inmate. He also had pulmonary edema. Tr. 196-97, 252. (Dr. Edgar sees pulmonary edema in about 50 percent of all the autopsies he performs. Tr. 201.)

Dr. Edgar testified that pulmonary edema can be caused by heart failure ("cardiogenic" pulmonary edema) or by "a chemical or a physical problem." Tr. 197. As for the "chemical" problem, early on, Dr. Edgar posited that one possible cause of pulmonary edema in an inmate undergoing execution could be the acidity of midazolam. This was his "initial thought." Tr. 270. But, in Dr. Edgar's estimation, with the benefit of the four recent Oklahoma executions, pulmonary edema induced by the acidity of midazolam has been demoted to "one possibility." *Id*. He elaborated:

> THE COURT: So coming back to your -- the evolution, if you will, of your analysis, based on the four recent Oklahoma executions, I take it you have a somewhat reduced level of confidence that the acidity of the midazolam is a directly causal factor?
>
> THE WITNESS: Exactly right. I think you might ask yourself, well, gee, that seems like a dramatic change, why the sudden change? Well, the only information available to me regarding the mechanism of pulmonary edema in these cases is the executions, the observations made during them and the anatomic observations made after them. So each one is a potentially important data point.

Tr. 271-72.

Thus, as to acid-induced pulmonary edema, plaintiffs did contend at one point that the acidity of midazolam caused edema in inmates undergoing execution with midazolam. Third Amended Complaint, doc. no. 325, ¶ 69. But, in light of Dr. Edgar's testimony (quoted above), plaintiffs have now acknowledged that "[e]vidence from the four recent executions in Oklahoma has reduced Dr. Edgar's confidence in his earlier theory that the pulmonary edema might be caused by an acidic injury to the capillaries of the lungs when midazolam is injected at a high volume and at a rapid pace." Doc. no. 643, at 7-8. This is understandable, given the fact that Dr. Edgar now goes no further than to offer that acid-induced pulmonary edema is "one possibility." Tr. 271. Plaintiffs thus concede that Dr. Edgar "cannot explain the mechanism with certainty at this point." Doc. no. 643, at 8. The only remaining "mechanisms" posited by Dr. Edgar (and to which he testified with noticeably greater certainty) are cardiogenesis and negative pressure in the lungs, caused by obstructed breathing.[25] Tr. 197-98, 200, 267-69. As discussed below, Dr. Yen agrees.

Dr. Edgar very cogently explained that negative pressure pulmonary edema brings fluid out of the small blood vessels and into the lungs "by the person trying to breathe in against an obstruction. And when you do that, it creates a very high negative pressure, almost a partial vacuum, if you will, in the airways and air spaces in the lung. And that vacuum can suck fluid, if you will, out of the capillaries in the lungs." Tr. 268.

[25] Even if the acid induction theory remained in contention, the court would readily conclude that plaintiffs have not carried their burden of proof on this point, for the reasons credibly articulated by Dr. Joseph Antognini (Tr. 694) and Dr. Daniel Buffington (Tr. 920-22).

Dr. Yen, called by defendants, agreed with Dr. Edgar that pulmonary edema can be cardiogenic or can result from negative pressure. As for negative pressure pulmonary edema, "[i]f a person obstructs their airway or partially obstructs, then the diaphragm contracting is actually causing a vacuum in the chest and that can actually suck some fluid out of the blood vessels and into the lung. And I've seen that. And that takes minutes, not seconds." Tr. 1157 (Dr. Yen). In inmates undergoing execution, Dr. Yen believes that pulmonary edema is caused by negative pressure or "cardiogenic shock from the heart not pumping adequately because of lack of oxygen." Tr. 1159. Consistent with that, Dr. Yen noted obstruction of John Grant's breathing, and Dr. Van Norman noted that Gilbert Postelle was "trying to breathe against an obstructed airway." Tr. 1130, 575.

Pulmonary edema can be mild or severe. Dr. Edgar acknowledged that mild pulmonary edema does not entail severe pain and suffering. Tr. 286. In a clinical setting, as pulmonary edema "becomes more severe clinically, it -- the patients begin to feel a sense of -- a sense of doom, a sense of panic, terror, drowning, asphyxiation on the severe end. Those are manifestations of severe pulmonary edema." Tr. 198.

Importantly, Dr. Edgar could not say when in the lethal injection process (prior to injection of the vecuronium bromide) the pulmonary edema began to develop in the inmates whose autopsy reports he reviewed. Tr. 316-17. To his credit–because he did not purport to be an expert on the effects of midazolam–Dr. Edgar could not say whether pulmonary edema had set in "before any given inmate became unconscious or unaware of pain." Tr. 317. He ventured no guess as to what the sensations of pulmonary edema would be in person sedated with a central nervous system depressant. Tr. 289. Dr. Yen testified (credibly, as discussed below) that "those two ways [cardiogenic and negative pressure] of getting pulmonary

edema take minutes, whereas the onset of the unconsciousness is in seconds." Tr. 1159-60.

On the basis of all of the expert testimony addressing the point, it is safe to say that pulmonary edema is found in many inmates–it might well be the vast majority–executed by lethal injection. Cardiogenic pulmonary edema results from impairment or cessation of cardiac activity. Tr. 197-98, 269, 284 (Dr. Edgar); 1157 (Dr. Yen). Negative pressure pulmonary edema results from obstruction of the airway in an unconscious inmate whose tongue–*because* he is unconscious and supine–has settled into the back of his throat. Dr. Antognini persuasively explained that a patient who is conscious can keep his own airway open. Tr. 681-82. This is why Dr. Yen has never seen the "rocking boat" motion (indicative of an obstructed airway) in a conscious patient. Tr. 1110. In contrast, if a person is unconscious, as Dr. Edgar put it, "their tongue can fall back," with the result that "[t]hey're less able to keep their airway patent." Tr. 310-11. The court is persuaded that pulmonary edema from either cause–cardiogenesis or negative pressure–happens (if it happens at all) when the inmate is insensate to pain. Tr. 1159-60 (Dr. Yen).

5. The reliability of midazolam as used per Chart D

The ultimate question before the court on Glossip's first prong is whether midazolam, used as per the Oklahoma protocol, reliably renders the inmate insensate to pain before the vecuronium bromide is pushed and before pulmonary edema sets in, if it sets in at all. We know that Oklahoma's three-drug Chart D protocol does cause death and that–absent a Lockett-type[26] IV access mishap–it causes death within a few minutes after the midazolam is pushed. That leaves the question of

[26] The execution of Clayton Lockett, though ultimately successful, encountered exceptional difficulties in establishing IV access, with the result that Lockett was not pronounced dead until about 45 minutes after the midazolam was pushed. *See*, doc. no. 179, at 10-17.

whether the inmate is exposed to a constitutionally unacceptable risk of a constitutionally unacceptable level of pain during that interval. If the inmate is insensate to pain, it does not matter, under the Fourth Amendment, that he may be paralyzed, that his lungs may be filling with fluid, that he has been injected with 240 milliequivalents of potassium chloride, or that the injection of the last few hundred milligrams of midazolam had no incremental effect.

The opposing experts who testified at trial had respectable paper credentials, although Dr. Stevens brought to the courtroom substantial grist for cross examination.[27] Among the experts called by plaintiffs, Dr. Gail Van Norman was the most emphatic in opining that "to a virtual medical certainty, all four of [the recently-executed Oklahoma inmates] experienced extreme pain and suffering in the form of sensations of asphyxiation, drowning, the onset of paralysis in the injection of potassium chloride during their execution and that they were awake and conscious but unable to respond during that period of time except for the movements that we saw on the part of John Grant and Gilbert Postelle."[28] Tr. 624. The court is unpersuaded. The evidence persuades the court, and not by a small margin, that even though midazolam is not the drug of choice for maintaining prolonged deep anesthesia, it can be relied upon, as used in the Oklahoma execution protocol, to render the inmate insensate to pain for the few minutes required to complete the execution.

[27] *See, e.g.*, Tr. 112-13 (Dr. Stevens describing some of his own midazolam-related work as "amateurish" and expressly disavowing his earlier work in a midazolam case), 114 (acknowledging lack of acceptance of his work relating to midazolam by courts in three states).

[28] It is worthy of note, though determinative of nothing in the case at bar, that, in McGehee, "Dr. Van Norman conceded that she has no direct scientific data to support the proposition that any inmate experienced severe pain and suffering during an execution." McGehee, 463 F.Supp.3d at 913.

Although Dr. Craig Stevens, called by the plaintiffs, acknowledged that midazolam can produce deep sedation (Tr. 14, 47), plaintiffs' witnesses, on the whole, maintained that midazolam as used in the Oklahoma protocol cannot render the inmate insensate to pain during the execution process. As to the pharmacological effects of midazolam, plaintiffs' main witnesses were Dr. Stevens and Dr. Michael Weinberger. Dr. Stevens, a pharmacologist, relied mainly on published studies.[29] Dr. Weinberger, who practices pain medicine, has not put a patient under anesthesia since 1998. Tr. 362, 427. He has no recent experience with midazolam, nor has he done research relating to midazolam, or, for that matter, any other benzodiazepine. Tr. 427-28.

For her part, Dr. Van Norman sought to support her opinion, "to a virtual medical certainty," that Donald Grant experienced severe pain and suffering, by citing the fact that "he continued to try to breathe all the way up until the time he was paralyzed by the second drug of the protocol." Tr. 567-68. Her reliance on the

[29] At trial, the court took a permissive approach–applicable equally to both sides–to the admission of various clinical studies and treatise segments into evidence. For the most part, if not in every instance, the experts testified that they relied, in forming their opinions, on the studies and treatises they cited in their reports or in their testimony. Preferring to evaluate the weight to be given to the studies and treatises in light of the expert testimony and other evidence taken as a whole, the court did not in every instance require a full Rule 703 incantation as a prerequisite to admission of the studies and treatise excerpts. *Cf.* McGehee v. Hutchinson, 463 F.Supp.3d 870, 908 (E.D. Ark. 2020), *appeal docketed*, No. 21-1965 (8th Cir. April 30, 2021, argued and submitted January 12, 2022). It is worth noting that the studies relied upon by both sides can be distinguished from the facts of this case in several ways. Perhaps most importantly, they can be distinguished in terms of dosage, both in absolute terms and in terms of differences between doses administered to study subjects. They can also be distinguished in terms of the study subjects. In some of the studies, the subjects were animals, such as mice (PX 379), squirrel monkeys (PX 379), rats (PX 490) and dogs (PX 428). At least one study used an in vitro technique (*e.g.*, petri dish). PX 64. Some of the studies can be distinguished because they involved midazolam in combination with other drugs by way of premedication or otherwise. Some of the studies can also be distinguished because they don't involve midazolam at all. There is, obviously, no reason to expect that any of the experts' research would have turned up a clinical study focusing on the effects of the injection of a 500 milligram bolus dose of midazolam into a human being.

fact that Donald Grant was breathing as an indication that he was conscious when the vecuronium bromide was pushed struck the court as wholly untenable. She backed off from that position when she was obliged to acknowledge that, in her clinical practice, she sees insensate patients breathing all the time. Tr. 568.

As to the reliability of midazolam to serve its intended purpose under the Oklahoma lethal injection protocol, the court finds, after careful consideration of all of the expert testimony, that the testimony of Dr. Ervin Yen and Dr. Joseph Antognini is the best-supported and most persuasive. The persuasive value of their testimony is rooted in their extensive professional experience administering midazolam, their observations of its effects on their own patients, and, not least, their credible observations from the executions of John Grant (Dr. Yen), Bigler Stouffer (Dr. Yen), Donald Grant (Dr. Antognini) and Gilbert Postelle (Dr. Yen).[30]

Dr. Yen estimates that he has administered anesthesia to more than 25,000 patients, using midazolam with "about a quarter of those patients." Tr. 1081. Dr. Yen has about fifteen to twenty patients a week and uses midazolam with about a quarter of those patients in a normal week. Tr. 1081-82. For his part, Dr. Antognini has served as a professor of anesthesiology at the University of California at Davis and has published research "in the field of mechanisms of anesthesia. I was primarily interested in where, of the central nervous system, where anesthetics work, in the brain, in the brainstem, in the spinal cord, things of that nature." Tr. 626.

[30] Plaintiffs' critique of Dr. Yen's qualifications, doc. no. 643 at 62, is wholly unpersuasive. (The implicit suggestion that Dr. Yen's credibility is somehow diminished by his public service borders on the offensive. *Id.*) The court's confidence in Dr. Yen's expertise (and his credibility, a slightly different matter than expertise) is based predominantly on (i) his vast experience with midazolam and other anesthetic agents and (ii) his cogent explanation of the basis for the opinions to which he testified. The court cannot but note, also, that Dr. Yen was chosen by four of his colleagues in the practice of anesthesiology to be *their* anesthesiologist for their heart surgeries. Tr. 1075-76.

Midazolam takes effect quickly, but, in doses sufficient to induce general anesthesia, it has a long recovery time. Tr. 634-35, 653 (Dr. Antognini). Thus, its main clinical use is as a sedative, because a dose sufficient to take the patient to a state of general anesthesia would take too long to wear off. Tr. 641-43 (Dr. Antognini). As Dr. Yen put it, "patients might stay in the recovery room for too long or in the hospital for too long or at the outpatient surgery place for too long. And the longer a patient stays in the hospital, the more expense that's incurred. The longer they stay in the recovery room, the more expense that's incurred." Tr. 1103. Consequently, it is "pretty unusual" now to use midazolam as the sole drug to induce anesthesia. Tr. 641 (Dr. Antognini).

The FDA label for midazolam gives *separate* treatment to midazolam's sedative effect and its use as an anesthetic induction agent. DX 44, p. 4. The FDA label tells us that "induction of anesthesia" occurs in "2 to 2.5 minutes without narcotic premedication or other sedative premedication." *Id.*[31] As is discussed above, "induction" means arrival at a deep plane of anesthesia, not the first step on that journey. *See also,* Tr. 1084 (Dr. Yen). Dr. Antognini and Dr. Yen concur with the FDA's statement. The matter was articulated well by Dr. Yen. As Dr. Yen put it (and as the court has found), "I heard a lot of talk this week about induction and maintenance. And what 'induction' to me means, is that before the induction, you're awake; after the induction, you are in a state of general anesthesia, according to the chart that you've seen from the American Society of Anesthesiologists. And so I've used it that way." Tr. 1084. Using "induction" in that sense, Dr. Yen testified, and

[31] In the framework of low clinical dosage, Dr. Yen agrees with this time estimate. "[I]t might take a minute or two or even three." Tr. 1104. But "the higher the dosage, the quicker it works." *Id.*

the court finds, that "midazolam alone can be used to induce general anesthesia." Tr. 1086.

Although deep sedation would suffice to eliminate pain from the lethal injection procedure, 500 milligrams of midazolam will easily accomplish general anesthesia. Tr. 1105, 1157 (Dr. Yen). The recipient of that dose will feel no pain. Tr. 1105 (Dr. Yen). Vecuronium bromide will not raise an unconscious person to consciousness, nor will it reverse the effects of midazolam. Tr. 1120 (Dr. Yen). Likewise, injection of potassium chloride will not reverse the effects of midazolam and will not cause an anesthetized person to feel pain. Tr. 1122-23 (Dr. Yen).

The credible evidence persuades the court that there is a high probability, with respect to each of the four recent Oklahoma executions, that the Chart D sequence, beginning with the injection of 500 milligrams of midazolam, worked as intended. It is highly probable that the inmates felt no physical pain other than that associated with the insertion of the IV lines. Tr. 744 (Dr. Antognini, re: Donald Grant), 1140-41, 1148, 1155 (Dr. Yen, re: John Grant, Stouffer and Postelle). Putting the matter in terms of the high bar set by the Supreme Court in Baze and reiterated by the Court, in this case, seven years ago, the evidence precludes any finding that execution by lethal injection under Chart D of the Oklahoma protocol is sure or very likely to cause needless suffering. Glossip, 576 U.S. at 877 (citing Baze, 553 U.S. at 50). It is highly probable that an inmate undergoing lethal injection with the Chart D combination of drugs will become insensate to pain within a very short time after the midazolam is pushed and will remain in that condition until injection of the three drugs causes death.

H. The adequacy of the consciousness check

Common sense tells us that a consciousness check is an important safeguard against infliction of needless suffering during execution by lethal injection.

The Oklahoma protocol requires the IV Team leader to "physically confirm the inmate is unconscious by using all necessary and medically-appropriate methods." PX 45, Attachment D, p. 7. The IV Team must consist of individuals from any of six medically-related fields specified in the protocol: physicians, physician assistants, nurses, emergency medical technicians, paramedics and "Military corpsman or other certified or licensed personnel including those trained in the United States military." PX 45, p. 6. All members of the IV Team "shall be currently certified or licensed within the United States." Team members are screened on the basis of "a review of the proposed team member's qualifications, training, experience, and/or any professional license(s) and certification(s) they may hold." *Id.*

Plaintiffs complain that the protocol does not require the IV Team leader to "have a background in anesthesiology or pain management." Doc. no. 643, at 76. As a baseline, the court will note that the consciousness check which passed muster in Baze consisted of a "visual inspection performed by the warden and deputy warden." Baze, 553 U.S. at 59. And Chief Justice Roberts, writing for the court, observed–in the context of a discussion of the adequacy of that consciousness check–that "an inmate cannot succeed on an Eighth Amendment claim simply by showing one more step the State could take as a failsafe for other, independently adequate measures." Baze, 553 U.S. at 60-61.

The consciousness checks performed in the four recent Oklahoma executions are described in part II (F), above. Bearing in mind, as will be discussed in part III, below, that courts, in method-of-execution challenges, do not sit as boards of inquiry charged with determining best practices for executions, the court finds that, in the four recent Oklahoma executions, the consciousness checks, consisting of various combinations of (i) sternum rubs, (ii) raising eyelids, (iii) speaking loudly, (iv)

pinching and (v) shaking, were adequate. To be sure, Dr. Van Norman thought a sternum rub should last "a full 30 seconds," but Dr. Antognini said that if he "saw an anesthesia resident, for example, doing a sternal rub for 30 seconds, I would be very upset with them." Tr. 602 (Dr. Van Norman), 684 (Dr. Antognini). The court is not required in this case to sort that out. The evidence gives the court no cause for concern that the IV Team will fail to perform adequate and effective consciousness checks.[32]

I. The plaintiffs' proposed alternative methods of execution

The foregoing findings relevant to the first Glossip prong are dispositive of plaintiffs' claims. However, in the interest of resolving as many issues as possible, the court will address plaintiffs' proposed alternative methods of execution (Glossip second prong).

Plaintiffs proffer the following alternative methods: (i) execution using fentanyl in combination with pentobarbital or sodium thiopental (compounded or commercially procured) and (ii) execution by firing squad.

1. Fentanyl plus compounded or commercially procured pentobarbital or sodium thiopental.

A state cannot be faulted for failing to use lethal injection drugs that it is unable to procure through good-faith efforts. Bucklew v. Precythe, ___ U.S. ___, 139 S.Ct. 1112, 1125 (2019). As stated in the conclusions of law (part III, below), the state is not required to use more than ordinary transactional effort to procure drugs for lethal injection.

[32] Notwithstanding plaintiffs' speculative argument based on the protocol's provision for revisions (doc. no. 643, at 75-76), the court is well-satisfied, from the testimony of Department of Corrections Director Scott Crow and Director of Operations Justin Farris, that there is essentially no possibility that the department will water down the provision for consciousness checks.

The credible and uncontradicted testimony of Director of Operations Justin Farris satisfies the court that the defendants have been unable to procure fentanyl, pentobarbital or sodium thiopental–for execution purposes–from commercial sources with ordinary transactional effort. Tr. 1000-04. This comes as no surprise. *See,* Glossip, 576 U.S. at 869-70 (discussion of anti-death penalty advocates' pressure on pharmaceutical companies to refuse to supply lethal execution drugs).

As for compounding, the testimony of Mr. Farris and Dr. Buffington establishes with equal clarity that the sources suggested by the plaintiffs have been unwilling, have lacked the requisite technical proficiency, or have been legally unable to produce compounded drugs for lethal injection purposes. (Mr. Farris: Tr. 1002-03 (dealings with pharmaceutical suppliers), 1004 (contacts with other states), 1004-07 (unsuccessful contacts with compounding labs, including the University of Oklahoma); Dr. Buffington: 927-929 (compounding and related compliance requirements), 942-43 (facilities required for compounding), 944-45 (facilities and materials required for compounding), 948 (search for contract manufacturer of pentobarbital).) Plaintiffs' evidence on the issue of compounding as a source of plaintiffs' preferred drugs does not go much farther than to suggest, essentially hypothetically, that compounding could *possibly* be a way to get the drugs. Plaintiffs' evidence stops well short of establishing, in the face of practical and regulatory hurdles, that compounding is a viable option for the Oklahoma Department of Corrections.

2. Firing squad.

In evaluating plaintiffs' proposed firing squad alternative, it must be borne in mind that analysis under Glossip's second prong "is a *necessarily* comparative exercise." Bucklew, 139 S.Ct. at 1126 (emphasis in original).

Plaintiffs called Dr. James Williams to testify in support of the firing squad alternative. His qualifications to address that subject are impeccable. He clearly believes that "execution by firing squad is feasible and practicable and it's efficacious." Tr. 326. But Dr. Williams did not, in terms, compare the pain incident to a firing squad execution with the pain resulting from execution with midazolam and the other two Chart D drugs. And he did not really go so far as to support plaintiffs' contention that execution by firing squad "causes a quick and painless death." Doc. no. 594, at 17. Citing Dr. Williams' testimony, plaintiffs assert that the "impact of firing squad bullets on a prisoner's cardiovascular bundle will not cause the prisoner pain and suffering in the short time before the prisoner loses consciousness." Doc. no 643, at 39 (emphasis in original). Accepting that as true for the sake of discussion, this proposition ignores the fact that the bullets first have to shatter the inmate's sternum to get to the cardiovascular bundle, then they exit by penetrating the inmate's ribs or spinal column (or both). Tr. 1163 (Dr. Yen). Dr. Williams testified unequivocally that "sternal fractures in a non-gunshot wound situation are very painful." Tr. 346. And he acknowledged that it is "unclear how much a single gunshot wound to the sternum, let alone multiple gunshot wounds in the case of firing squad, how much pain that individual would experience in the short period of time he or she would remain conscious before the heart ceased organized beating." *Id.* After giving that noteworthy disclaimer, Dr. Williams opined that a person shot in the chest (which the court takes, in context, to have been a reference to the sternum[33]) "would not experience anything that most of us would describe as pain." *Id.*

[33] If Dr. Williams was not referring here to the sternum, then his *only* testimony about the pain incident to a sternal fracture is that it is "very painful."

The court is unpersuaded. Though Dr. Williams persuaded the court that execution by firing squad, done right, is highly likely to cause a quick death, it is difficult to conceive that a method of execution which requires the sternum to be shattered as the bullets make their way to the cardiovascular bundle (and on to the ribs or spinal column) can be called painless. In fairness to Dr. Williams, it should be noted that, as an expert testifying on behalf of the party with the burden of proof, he was in the unenviable position of advancing a proposition which, though possibly meritorious, is inherently difficult to prove. These difficulties with the proposition plaintiffs seek to advance through Dr. Williams, in combination with the absence of any explicit attempt to compare the pain of a firing squad execution with the pain resulting from execution under Chart D, cause the court to reject plaintiffs' firing squad alternative.[34]

III. Conclusions of Law

The Eighth Amendment standards governing this case were articulated by the Supreme Court in its lethal injection trilogy, Baze v. Rees, 552 U.S. 35 (2008); Glossip v. Gross, 576 U.S. 863 (2015) (this case); and Bucklew v. Precythe, ___ U.S. ___, 139 S.Ct. 1112 (2019).

"[T]he Eighth Amendment does not guarantee a prisoner a painless death–something that, of course, isn't guaranteed to many people, including most victims of capital crimes." Bucklew, 139 S.Ct. at 1124. Also worthy of note is the fact that the Supreme Court "has yet to hold that a State's method of execution qualifies as cruel and unusual," *id*., and that the deference that is due a state's choice of execution procedures means that courts, in method-of-execution challenges, do not sit as

[34] Oklahoma statutes provide for execution by firing squad in some circumstances. *See,* 22 O.S. §1014. Nothing in this discussion should be understood to shed light one way or the other on the constitutionality of execution by firing squad.

"boards of inquiry charged with determining 'best practices' for executions." Bucklew, at 1125, quoting from Baze, 553 U.S. at 51-52. On this point, it is noteworthy that, in Baze, the Court declined to attribute constitutional significance to the fact that the consciousness check was performed "by the warden and deputy warden through visual inspection," with no particular level of expertise noted to qualify those officials to perform that task. Baze, 553 U.S. at 45, 60.

Glossip First Prong. In Bucklew, the court, summarizing its decisions in Baze and Glossip, held that the inmate who challenges the state's method of execution must show that the state's method presents "a substantial risk of severe pain." Bucklew, 139 S.Ct. at 1125.[35] A method of execution that presents a "substantial risk" is one that "*is sure or very likely* to cause serious illness and needless suffering." Glossip, 576 U.S. at 877 (quoting from Baze, emphasis in original).

The inmate must show that "the risk [of infliction of severe pain] is substantial when compared to the known and available alternatives." Glossip, 576 U.S. at 878 (internal quotation omitted). This is where the second prong comes in.

Glossip Second Prong. It is clear from Bucklew (again summarizing Baze and Glossip) that the alternative method of execution the inmate is obliged to propose must be "feasible and readily implemented," and it must be one that "the State has refused to adopt without a legitimate penological reason." Bucklew, 139 S.Ct. at 1125. To be considered at all, the inmate's proposal must be "sufficiently detailed to permit a finding that the State could carry it out relatively easily and reasonably quickly." Bucklew, 139 S.Ct. at 1129 (internal quotation omitted). And

[35] In In re Ohio Execution Protocol Litig., 946 F.3d 287, 290 (6th Cir. 2019), *cert. denied sub nom.* Henness v. DeWine, 141 S.Ct. 7 (2020), the Sixth Circuit appears to have adopted (much to the consternation of Justice Sotomayor, 141 S.Ct. at 9) the pain associated with hanging as a benchmark. It is not necessary for this court to determine the merits of that approach.

the "mere fact that a method of execution might result in some unintended side effects does not amount to an Eighth Amendment violation." Glossip, 576 U.S at 882, n. 3. States, of necessity, are free to use previously untried methods. It is quite unlikely that an untried method will pass muster as the inmate's proposed alternative: "[C]hoosing not to be the first to experiment with a new method of execution is a legitimate reason to reject it." Bucklew, 139 S.Ct. at 1130.

The proposed alternative need not be one "presently authorized by" state law. Bucklew, 139 S.Ct. at 1128. Thus, the inmate "may point to a well-established protocol in another State as a potentially viable option." *Id*. But it is not enough to argue for "a slightly or marginally safer alternative." Glossip, 576 U.S. at 877 (quoting from Baze). The "difference [in risk] must be clear and considerable." Bucklew, 139 S.Ct. at 1130. That said, in a passage that has a natural tendency to accentuate the importance of the first prong (degree of risk and severity of pain), the Court, in Bucklew, observed that "we see little likelihood that an inmate facing a serious risk of pain will be unable to identify an available alternative—assuming, of course, that the inmate is more interested in avoiding unnecessary pain than in delaying his execution." *Id*. at 1128-29.

A state is not required to use more than "ordinary transactional effort" to obtain drugs for lethal injection. In re Ohio Execution Protocol, 860 F.3d 881, 891 (6th Cir. 2017). "Proof that lethal injection drugs are available with ordinary transactional effort requires more than mere speculation, more than just a showing of hypothetical availability." Middlebrooks v. Parker, 15 F.4th 784, 786 (6th Cir. 2021).

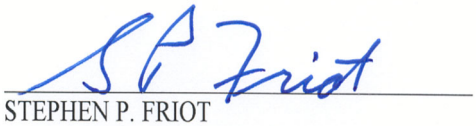
IV. Conclusion

The prerequisites of a successful lethal injection challenge under the Eighth Amendment have been made clear by the Supreme Court in Baze, Glossip and Bucklew. The plaintiff inmates have fallen well short of clearing the bar set by the

Supreme Court. Consequently, the Eighth Amendment, as construed and applied by the Supreme Court in its lethal injection cases, does not stand in the way of execution of these Oklahoma inmates under Chart D of the Oklahoma lethal injection protocol.

A final judgment will be entered forthwith.

Dated this 6th day of June, 2022.



STEPHEN P. FRIOT
UNITED STATES DISTRICT JUDGE

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