No. 1881555

IN THE SUPREME COURT OF ALABAMA

Ex parte Doyle Lee Hamm,	*	
	*	
In re. State of Alabama	*	October 2, 2017, Answer
Petitioner,	*	to this Court's Order
	*	Dated August 25, 2017
v.	*	
	*	
Doyle Lee Hamm,	*	
Respondent.	*	

DOYLE HAMM'S ANSWER DATED OCTOBER 2, 2017,
TO THIS COURT'S ORDER DATED AUGUST 25, 2017

Pursuant to this Court's order dated August 25, 2017, Doyle Lee Hamm respectfully submits the following answer to the Court:

1. Dr. Mark Heath conducted a medical examination of Doyle Hamm at Donaldson Correctional Facility on Saturday, September 23, 2017, and found that, as a result of Mr. Hamm's extensive cranial and lymphatic cancer, cancer treatments, and severely compromised veins, venous access is extremely difficult and it is unlikely that an execution can be accomplished without cruel and needless pain. *See* Preliminary Report of Mark. J. S. Heath, M.D., attached as Appendix A.

2. Based on Dr. Heath's medical findings and conclusions, and given Mr. Hamm's cranial and lymphatic cancer, there is a substantial likelihood that the Alabama Department of Corrections will not be able to accomplish a successful execution in compliance with the Eighth Amendment. It would also be extremely dangerous for the prison personnel because Mr. Hamm has Hepatitis C.

3. Given Mr. Hamm's cancer, and the high likelihood of an unsuccessful execution, undersigned counsel, who is representing Mr. Hamm *pro bono*, respectfully urges this Court to deny the Attorney General's motion to set an execution date. Alternatively, undersigned counsel respectfully urges the Court, prior to setting an execution date, to: (1) order the Attorney General to confidentially disclose to counsel the exact protocol for venous access for lethal injection, along with the complete list of medical equipment that would be used; (2) appoint a Special Master to oversee a proper medical examination (as in the case of Alabama death row inmate David Nelson in 2006) and to reach agreement on a proper protocol for venous access to avoid an unnecessarily cruel and painful execution; and (3) hold a hearing, *in camera* if necessary, to review and approve an agreed-upon protocol for venous access, which would be necessary to humanely achieve lethal injection and prevent an unsuccessful execution. Counsel urges this Court to not set a date for

execution until such an agreement on a protocol for venous access is securely in place.

4. Doyle Lee Hamm is suffering from a serious cranial and lymphatic cancer. Mr. Hamm's case is really not the kind of capital case that should proceed to lethal injection for two interrelated reasons.

I. Mr. Hamm Is Suffering from Cancer

5. First, Mr. Hamm is suffering from a serious cranial and lymphatic cancer. He is not malingering. During the medical examination of Mr. Hamm on September 23, 2017, Dr. Heath observed a quarter-sized, deep, and growing lesion on Mr. Hamm's left cheek that has literally gnawed a 4 to 5 millimeter deep hole into his left cheek. Dr. Heath described this lesion in his report as "a discolored lesion with diffuse margins, approximately 2-3 cm in diameter," and concluded that "there is likely a bone defect in the infraorbital margin (the bone under the eye), in the region of the junction of the zygoma and maxilla. This region of his face (in lay terms, his left cheek) is partially collapsed, resulting in prominent facial asymmetry." *See* Preliminary Report of Mark. J. S. Heath, M.D., ¶10, attached as Appendix A. Dr. Heath was prevented from bringing a digital camera or a film camera into the prison for the medical examination, so undersigned counsel drew a diagram of the lesion on Mr. Hamm's face. *See* Diagram of Lesion on Mr.

Hamm's Face, attached as Appendix B.

6. Dr. Heath found that Mr. Hamm is "gaunt and frail, and had a prominent facial lesion and deformity that was causing him pain." *See* Preliminary Report of Mark. J. S. Heath, M.D., ¶6, attached as Appendix A. The medical records also indicate that Mr. Hamm is in pain and takes heavy doses of prescribed narcotics every day (10 mgs of "Norco" three times a day). Mr. Hamm has been recently treated with serious amounts of radiation and medications.

7. A review of Mr. Hamm's extensive medical records obtained from Donaldson Correctional Facility, which total 777 pages, reveals that Mr. Hamm's lymphatic cancer has recurred and is getting worse. Specifically, the extensive cancer records indicate the following cancer etiology and progression.

8. Mr. Hamm's cancer was originally identified in February 2014, when a pathology report diagnosed "a poorly marginated mass within the left orbit [of the skull] with both intraconal and extraconal components. This appears to extend through the orbital apex via the superior and inferior orbital fissures both of which appear enlarged. The left foramen rotundum is asymmetrically enlarged. The cortex along the lateral aspect of the left vidian canal appears mildly slightly eroded. The lesion probably extends into the left cavernous sinus. There is mild left proptosis." *See* Doyle Hamm Donaldson Medical Records, p.

189, included in Appendix C. In other words, the doctors found that Doyle Hamm had a large tumor in the back of the left eye socket, where the nerves from the brain go to the eye; and that this tumor protruded through the holes (superior and inferior orbital fissures) on both the brain and eye side. The doctors reported their preliminary impression: "Left orbital neoplasm with possible perineural tumor spread to the left cavernous sinus and left masticator space [of the skull]." *See* Doyle Hamm Donaldson Medical Records, p. 189-190, in Appendix C. The pathology reports indicated that these findings were consistent with a "B-cell lymphoma," a type of blood cancer in the lymph nodes. *See* Doyle Hamm Donaldson Medical Records, p. 165, in Appendix C. Another report at the time determined that "The epidermis is ulcerated. Budding from the dermal epidermal junction [where the outer (epidermal) and inner (dermal) sections of the skin meet] are geometrically shaped tumor islands consisting of basaloid cells [this suggests it is a lymphoma]. The tumor islands are mitotically active and demonstrate peripheral palisading. There is peritumoral reactive fibroplasia and cellularity." *See* Doyle Hamm Donaldson Medical Records, p. 174.

9. In April 2014, a CT scan confirmed that the "Left orbit [of the skull] is abnormal, large soft tissue masses seen in the left orbit resulting in expansion of the bony orbit. Proptosis

seen. This mass is surrounding the left optic nerve complex. Posteriorly, the mass extends up to the orbital apex. There is also extension through the inferior orbital fissure into the pterygopalatine fossa, masticator space and the buccal space. There is also suggestion of extension to the left vidian canal" *See* Doyle Hamm Donaldson Medical Records, p. 151. In other words, the cancer extended into the eye through the holes where the nerves go through, and down into the spaces near the cheek bone, the masticator space and the buccal space. This led to a preliminary diagnosis by Dr. Brian Adler of the Brookwood Cancer Center in Birmingham, Alabama, of a "MALT lymphoma or marginal zone lymphoma," and the recommendation for immediate radiation therapy and the possibility of "a Rituxan based regimen that will probably include some cytotoxic chemotherapy." *See* Doyle Hamm Donaldson Medical Records, p. 135. The doctors also found at that time, on examination of Mr. Hamm's abdomen, numerous "granulomata throughout the spleen" and abnormal lymph nodes in the abdomen. *See* Doyle Hamm Donaldson Medical Records, p. 140.

10. In May 2014, the doctors at Brookwood Cancer Center confirmed a primary diagnosis of "Large cell lymphoma unspecified site, Diagnosed 2014 (Active)" and indicated that it was aggressive and fast growing. *See* Brookwood Hamm Report from 2014, p. 10, included in Appendix C. The doctors reported that the "scans demonstrated a large mass in the retro-orbital area

on the left extending into the masseter space [cavity in face above jaw, under temple]. There was a suggestion of widening of the neural foramen [space in spine through which the spinal cord runs]. In the chest were noted numerous abnormal lymph nodes [and] a few small nodes were seen in the abdomen." *See* Brookwood Hamm Report from 2014, p. 10, included in Appendix C. More specifically, the MRI revealed that "there is a soft tissue lesion filling most of the retro-orbital region on the left. There is extension posteriorly through the orbital fissures to involve the pterygopalatine fossa and cavernous sinus regions. From the cavernous sinus region, there may be extension into the middle cranial fossa with some degree of asymmetrical dural enhancement noted" and that "there is also extension of tumor laterally into the infratemporal fossa and masticator space region on the left. Enhancing tumor surrounds portions of the pterygoid musculature, as well as the inferior aspect of the temporalis muscle. There is also tumor surrounding the gasserian ganglion and extending inferiorly along the foramen ovale into the masticator space. Some component of tumor near foramen laccrum portion of the carotid canal cannot be excluded." *See* Doyle Hamm Donaldson Medical Records, p. 129.

11. In June 2014, the doctors confirmed "the presence of a tumor extending through the foramina into the pterygoid space and into the middle cranial fossa. There is involvement of the

cavernous sinus as well as extension into the left side of the nasopharynx." *See* Doyle Hamm Donaldson Medical Records, p. 111. Note that the "nasopharynx" is the back of the throat and the "foramina" is plural of foramen, which means a cavity in the bone; the spinal cord goes through a foramen in this area, so the cancer was right next to the spinal cord. The fact that the cancer was nearing the middle cranial fossa suggests that it was entering the cranial cavity. The pterygoid space is the space where the head and spine meet. The middle cranial fossa is the space in the skull above where the spine meets the head. The doctors reported that "The patient appears chronically ill." *See* Doyle Hamm Donaldson Medical Records, p. 111. The doctors also indicated that "There is some risk of involvement of the spinal fluid." *Ibid.* The treating physician at Brookwood said he would "request approval from the prison medical clinic for the patient to have a lumbar puncture with cytology. In the interval I recommended that we proceed with radiation therapy as he is going to require some form of local treatment even if he takes systemic chemotherapy." *Ibid.*

12. The different diagnoses all concur that the cancer spread from inside the left eye socket (the "left orbit"), through the holes where the optic nerves travel and back into the cavities under the cheek bone and towards the spot where the spinal cord meets the skull.

13. In July 2014, Mr. Hamm underwent radiation therapy, specifically "IMRT to 40Gy over 20 fractions for orbital lymphoma completed on July 11, 2014." *See* Brookwood Hamm Report from 2014, p. 6.

14. By September 2014, the doctors at Brookwood felt that there had been some improvement. They reported that Mr. Hamm had "completed 40 gray for a lymphoma involving the left orbit and skull base. He is feeling better at this time…. Constitutional: Complains of poor appetite and major fatigue. Eyes: Complains of double vision with the left eye and visual difficulties of the left eye that is also dry and red. Complains of some pain in the left eye but has gotten better." *See* Brookwood Hamm Report from 2014, p. 3.

15. One year later, in September 2015, Mr. Hamm showed some improvement, even though there was evidence from the tests of "Abnormal enhancement […] in the left orbit with involvement in the left pterygopalatine fossa and left infratemporal fossa/masticator space region. Abnormal enhancement is also seen in the inferior orbital fissure and in foramen ovale, and along foramen rotundum on the left." *See* Doyle Hamm Donaldson Medical Records, p. 629, in Appendix C. But these "areas of abnormal enhancement are improved in appearance when compared with 3/10/2015 and markedly improved from 9/29/2014." *Ibid.*

16. However, beginning in March 2017, the cancer has come

back and Mr. Hamm has been experiencing lymphadenopathy associated with his earlier diagnosed and treated skull-orbital cancer. In March or April 2017, Mr. Hamm was seen by a doctor in Jasper, Alabama, who conducted a biopsy of eye tissue and found that it was cancerous. The doctor ordered surgery, but Mr. Hamm has not yet been allowed to return for surgery. Mr. Hamm apparently also now has a lesion on his face that is the size of a quarter. *See* Preliminary Report of Mark. J. S. Heath, M.D., ¶10, attached as Appendix A; and Appendix B. On March 7, 2017, Mr. Hamm was complaining of "'knots' on my chest" and the medical team was reporting that "These feel like lymph nodes." *See* Doyle Hamm Donaldson Medical Records, p. 453, in Appendix C. On March 2017, Mr. Hamm reported that he "Need[s] to see the doctor I have lumps in my chest." *See* Doyle Hamm Donaldson Medical Records, p. 472; see also "lumps in chest," *ibid.*, p. 470.

17. A recent visual examination of Mr. Hamm revealed two abnormal lumps on Mr. Hamm, one under his chin on the left side and one on the back right of his neck below his right ear. *See* Report by Nicola Cohen in Update No. 1 filed with this Court on September 1, 2017. Mr. Hamm currently is experiencing lymphadenopathy in his neck, chest and abdomen, which is likely associated with worsening lymphoma cancer. He is in pain and is taking a massive amount of prescribed pain relievers. Mr. Hamm

is not malingering his condition.

II. Mr. Hamm's Veins Are Damaged and Venous Access Would Be Extremely Difficult

18. Second, as a result of a long and complicated medical history made worse by cranial and lymphatic cancer and serious cancer treatments, Mr. Hamm's veins are impaired. It will be extremely difficult to achieve venous access and remotely administer the anesthetic drugs at Holman Prison. Moreover, because of his lymphatic cancer, which causes inflamed abnormal lymph nodes around arteries and veins, it will be anatomically difficult to perform a cut-down or central-line procedure. As a result, there is a substantial likelihood that the Alabama Department of Corrections will not be able to accomplish a successful execution in compliance with the Eighth Amendment.

19. Dr. Mark Heath is a leading anesthesiologist in this country. He has almost 30 years of experience, and practices at one of the leading hospitals in the country, performing on a daily basis anesthesia for open-heart surgeries. Dr. Heath practices at the New York-Presbyterian/Columbia Hospital in New York City, where his duties include, on a daily basis, "obtaining both peripheral and central intravenous (IV) access, the administration of large doses of anesthetic agents, and intensive monitoring to ensure that [his] patients are both safe and fully anesthetized." *See* Preliminary Report of Mark. J. S.

Heath, M.D., ¶1, attached as Appendix A. Dr. Heath has practiced anesthesiology for 29 years and is a professor of clinical anesthesiology at Columbia University in New York City. *See ibid.*, ¶1.

20. Dr. Heath also has experience with lethal injection procedures. Because of his expertise as an anesthesiologist, Dr. Heath has been "called upon to give expert medical opinion in a number of cases involving the use of lethal injection at both the federal and state level, including with the Federal Bureau of Prisons and in the correctional systems of California, Florida, Ohio, and Texas, among others." *Ibid.*, ¶2. Specifically, Dr. Heath was an expert in the Federal District Court litigation surrounding the lethal injection of inmate David Nelson in the State of Alabama, and was present when Mr. Nelson was examined by a cardiac anesthesiologist at Holman Prison in 2006.

21. On Saturday, September 23, 2017, Dr. Heath conducted an extensive medical examination, including a lengthy medical history interview and a substantial physical exam of Mr. Hamm. Dr. Heath concluded, based on his extensive experience obtaining venous access at one of the top-ranked hospitals in the country, that (1) Mr. Hamm's peripheral veins are damaged and will be extremely difficult to access for lethal injection; and (2) access to his central veins through his groin or neck is equally

problematic because of Mr. Hamm's cancerous lymphadenopathy.

22. Dr. Heath found no usable veins on Mr. Hamm's left arm and hand, left leg and foot, right leg and foot, and right arm. Dr. Heath found one "small, tortuous vein" on his right hand "that is potentially accessible with a butterfly needle"; however, lethal injection requires a larger intravenous catheter, much larger than a butterfly needle. Dr. Heath concluded that, "Based on my knowledge of previous Alabama lethal injection procedures and protocols, this small, tortuous vein on his right hand would not provide reliable peripheral venous access." *Ibid.*, ¶7. In lay terms, Dr. Heath found no usable veins for lethal injection.

23. Dr. Heath also found that Mr. Hamm's lymphatic cancer would likely interfere with any attempt to access his central veins. As Dr. Heath explained, Mr. Hamm has "intermittent waxing and waning tumors on his chest, neck, and groins. This likely represents lymphadenopathy (swollen lymph nodes) related to his lymphatic malignancy." *Ibid.*, ¶8. This condition would likely interfere with accessing his central veins. Dr. Heath noted that "Lymphoma, like other cancers, is a progressive disease if not cured. At this point, there may be significant involvement and enlargement of lymph nodes in other areas of his body, including his neck, chest, and groin. If there are enlarged lymph nodes surrounding the veins in his neck, chest, or groin, it would

likely complicate or thwart attempts to obtain central venous access." *Ibid.*, ¶14. As noted earlier in paragraphs 16 and 17, Mr. Hamm's medical records from Donaldson report a nurse or doctor finding knots that "feel like lymph nodes" and a visual inspection also observed lumps on Mr. Hamm's chin and neck. In addition, Dr. Heath reported, from his prior experiences in Alabama, that "To the best of my knowledge, Alabama has limited experience with obtaining central vein access for lethal injection procedures." *Ibid.*, ¶13. In lay terms, central venous access for Mr. Hamm is likely extremely difficult because of the combination of Mr. Hamm's lymphatic cancer and the lack of a fully equipped hospital operation-room set up at Holman Prison.

24. Dr. Heath gave his expert opinion in conclusion: "I have not seen the exact protocol for venous access for lethal injection from the state of Alabama, but based on what I know from the David Nelson case, it is my opinion that the state is not equipped to achieve venous access in Mr. Hamm's case." *Ibid.*, ¶16.

25. Mr. Hamm's case is additionally complicated by the fact that he has Hepatitis C, which is easily transmitted by blood. A messy and potentially bloody attempt at peripheral or central venous access puts the ADOC staff at great risk of contracting Hepatitis C.

26. Dr. Heath's report is attached as Appendix A.

27. In sum, venous access for Mr. Hamm, both peripheral and central, appears extremely difficult, and the attempt would likely be arduous, excessively painful, and likely in violation of the Eighth Amendment. Mr. Hamm does not have accessible peripheral veins and his lymphadenopathy means that his abnormal lymph nodes will likely present obstacles to access and severe complications. All of this would present a serious medical challenge even in a fully functional hospital operating room with a senior anesthesiologist and a team of different specialists and full medical equipment. At Holman Prison, the attempt would likely result in cruel and needless pain in violation of the Eighth Amendment. *Estelle v. Gamble*, 492 U.S. 97 (1976); *Baze v. Rees*, 553 U.S. 35 (2008); *Glossip v. Gross*, 135 S. Ct. 2726 (2015). This Court should not grant the Attorney General's motion to set an execution date.

III. Further Procedures Are Required Prior To Setting an Execution Date

28. If this Court nevertheless decides to move forward, then there are a number of antecedent measures that the Court respectfully should put in place before setting an execution date to ensure that proper procedures and protocols for venous access are agreed upon before execution.

29. First, the Court should order the Attorney General to confidentially disclose to undersigned counsel the exact

protocol for venous access and the list of medical equipment that would be used for venous access in Doyle Hamm's case, including for instance the gauge and length of catheters and/or needles. To date, counsel has still not received any information from the Attorney General about the Alabama protocol for venous access. Counsel renewed his request for the protocol for venous access by letter dated Monday, September 11, 2017, but has received no response. In order to assess the risks of cruel and needless pain, the exact protocol for venous access must be disclosed to counsel, under seal or *in camera* if necessary.

30. Second, the Court should appoint a Special Master to ensure that a proper protocol for venous access is agreed upon prior to setting an execution date. This is precisely the kind of process that the Federal District Court ordered in *Nelson v. Campbell*, Civil Action No. 2:03CV1008-T (M.D. Ala. 2006). David Nelson had severely compromised veins due to years of intravenous drug use. To assist the court in understanding the medical complications present in Mr. Nelson's case, the Federal District Court appointed a Special Master to recommend an independent medical expert, before allowing a date to be set. The Special Master appointed an independent medical expert, Warren Bagley, M.D., an anesthesiologist, to conduct a thorough physical examination of Mr. Nelson's veins for the purpose of evaluating whether venous access would be possible. *See* Report

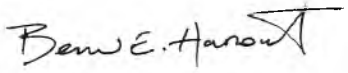
of Special Master on Medical Expert at 1, attached as Appendix D. On October 11, 2006, Dr. Bagley "examined Mr. Nelson with regards to obtaining venous access, visually and with palpitation, and sonographically," and produced a lengthy medical report in which he described the results of his physical examination and analyzed the accessibility of each of Mr. Nelson's veins. *See* Expert Report of the Court's Independent Medical Expert, Dr. Warren Bagley, attached as Appendix E. The purpose of this examination was for the state of Alabama and counsel to agree on a protocol for venous access. Such an agreement would similarly be necessary in Mr. Hamm's case before this Court sets a date, given the complicated medical issues involved in Mr. Hamm's case and the need to avoid cruel and needless pain.

31. Third, this Court should afford undersigned counsel an opportunity to be heard at a hearing before this Court prior to setting an execution date, *in camera* if necessary, in order for this Court to approve any agreement reached with the Attorney General over a detailed protocol for venous access. This Court should review and approve the protocol necessary to humanely achieve venous access and prevent cruel and unusual punishment in Mr. Hamm's case, given his cranial and lymphatic cancer.

32. This Court should not set a date for execution before an agreement on such a protocol for venous access is securely in

place, otherwise it is, realistically, unlikely that a proper protocol will be agreed to before execution, resulting in the substantial likelihood that the Alabama Department of Corrections will not be able to accomplish a successful execution in compliance with the Eighth Amendment.

Respectfully submitted,



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October 2, 2017

CERTIFICATE OF SERVICE

I hereby certify that on October 2, 2017, I served a copy of the attached pleading by electronic mail to Assistant Attorney General Beth Jackson Hughes at bhughes@ago.state.al.us.

BERNARD E. HARCOURT
Counsel of Record

APPENDIX A

Preliminary Report of Mark. J. S. Heath, M.D.

1. My name is Mark J. S. Heath. I am a medical doctor with an active, licensed, full-time medical practice in New York State. I am board certified in anesthesiology. I practice daily at the New York-Presbyterian/Columbia Hospital in New York City, where I provide anesthesia for open-heart surgeries. Core features of my daily practice include obtaining both peripheral and central intravenous (IV) access, the administration of large doses of anesthetic agents, and intensive monitoring to ensure that my patients are both safe and fully anesthetized. On average, I conduct these activities on more than one open-heart surgery every working day. I am board certified in anesthesiology, and have been practicing within this specialty for 29 years (3 years of residency, 1.5 years of fellowship in cardiothoracic anesthesiology and research, and 24.5 years as an attending physician). I hold an appointment as an Assistant Professor of Clinical Anesthesiology at Columbia University in New York City, where I teach medical students, residents, and fellows, primarily regarding the practice of anesthesiology in cardiothoracic cases.

2. Because of my extensive experience in anesthesiology, I have been called upon to give expert medical opinion in a number of cases involving the use of lethal injection at both the federal and state level, including with the Federal Bureau of Prisons and in the correctional systems of California, Florida, Ohio, and Texas, among others. I have previously been involved in the federal litigation surrounding the lethal injection of inmate David Nelson in the state of Alabama, as well as in the cases of other Alabama inmates.

3. At the request of counsel Bernard Harcourt I examined Mr. Doyle Hamm on Saturday, September 23, 2017, in the William E. Donaldson Correctional Facility in Bessemer, Alabama.

4. Prior to the medical examination, Mr. Harcourt provided me with a copy of the medical records that he had received from Donaldson Correctional Facility that included diagnoses and descriptions of the care Mr. Hamm has received for his lymphatic cancer; as well as other medical reports Mr. Harcourt had obtained, including a report by Dr. Fred Dumas dated May 16, 2014; a follow up report by Dr. Dumas dated June 6, 2014; a report by Dr. Sandra Tincher dated July 14, 2014; and an affidavit by Dale G. Watson, PhD, dated July 19, 1999.

5. I brought medical equipment to assist in the medical examination. Unfortunately, because of prison security at the front gate, I was courteously but insistently prevented from bringing the equipment into the prison. This limited my ability to perform a complete examination.

6. I began my examination at approximately 1:45 pm on Saturday, September 23, 2017. Mr. Hamm was cooperative, although somewhat subdued in affect. He appears gaunt and frail, and had a prominent facial lesion and deformity that was causing him pain, but he was not in acute distress. He was breathing comfortably and able to converse and ambulate. Because of equipment limitations, I was not able to measure vital signs. The medical examination was politely but firmly ended at 3:30pm by the correctional staff.

7. I first obtained a medical history from Mr. Hamm. I then assessed Mr. Hamm's peripheral veins, with and without a tourniquet. I used Mr. Harcourt's necktie because I was not

permitted to bring a medical tourniquet into the prison. Mr. Hamm has extremely poor peripheral venous access. There are no accessible veins on his left upper extremity (arm/hand) or either of his lower extremities (legs/feet). He related that all of the veins on these extremities were "used up" by chronic intravenous drug use. There are no accessible peripheral veins on his right arm. On the dorsum of the right hand there is a small, tortuous vein that is potentially accessible with a butterfly needle. Insertion of an intravenous catheter into this vein would be challenging and would have a high chance of rupturing the vein and being unsuccessful. Mr. Hamm related that this vein was previously accessed with a butterfly needle in order to inject contrast dye for a CT scan to assess his facial/intracranial malignancy in 2014, prior to his cancer treatments. A butterfly needle is significantly easier to insert than an intravenous catheter because it is thinner and sharper. The nurse/technician failed to access the vein during the first several attempts, but was ultimately able to access it with that butterfly needle. The access was "positional", meaning that the ability to infuse fluid through the needle was intermittent and depended on the precise depth and angle of the needle. The nurse/technician injected the contrast into this vein while standing right next to his hand and slowly and carefully infused the contrast at a slow and cautious rate. This is the appropriate and necessary practice when injecting fluid into a tenuous vein. Mr. Hamm also related that this vein was accessed with great difficulty in 2014 when he underwent a surgical procedure to biopsy the malignancy behind his left eye. One practitioner (perhaps a CRNA (Certified Registered Nurse Anesthetist)) was unable to access the vein. She called for assistance from a middle-aged man (perhaps a senior anesthesiologist) who was, with difficulty, able to insert a very small intravenous catheter. Based on my knowledge of previous Alabama lethal injection procedures and protocols, this small, torturous vein on his right hand would not provide reliable peripheral venous access.

8. Mr. Hamm relates that he has intermittent waxing and waning tumors on his chest, neck, and groins. This likely represents lymphadenopathy (swollen lymph nodes) related to his lymphatic malignancy. There are many other possible causes of lymphadenopathy, and the only way to determine the actual cause would be to biopsy one or more of these lesions. The extent of these lesions could be assessed with diagnostic studies such as a CT scan, an MRI, or a PET scan.

9. Because of equipment limitations it was not possible to assess the accessibility of the deep veins in Mr. Hamm's neck (internal jugular vein), chest (subclavian vein (behind the collar bone)), or groin (femoral veins).

10. Mr. Hamm has a facial defect under his left eye. There is a discolored lesion with diffuse margins, approximately 2-3 cm in diameter. The lesion is tender, limiting my ability to palpate the underlying bone. There is likely a bone defect in the infraorbital margin (the bone under the eye), in the region of the junction of the zygoma and maxilla. This region of his face (in lay terms, his left cheek) is partially collapsed, resulting in prominent facial asymmetry. As with the lymphadenopathy described above, a biopsy and imaging diagnostic study would be needed in order to assess the cause and extent of this lesion.

11. In October 2006, I was present at Holman Prison when Mr. David Nelson was examined by a cardiac anesthesiologist. Mr. Nelson's situation was very similar to Mr. Hamm's, in that his peripheral venous access was compromised by prior intravenous drug abuse. In Mr. Nelson's

case, a special master was appointed to supervise the litigation. The magistrate approved an examination by an Alabama-licensed board certified practicing cardiothoracic anesthesiologist, Dr. Warren Bagley, to assess Mr. Nelson's veins. I was present during that examination. Dr. Bagley inspected Mr. Nelson's peripheral veins and central veins using physical exam and ultrasonography. Based on my examination and finding of very poor venous access in Mr. Hamm, my opinion is that lethal injection should not be attempted without first obtaining an examination such as that performed by Dr. Bagley on Mr. Nelson.

12. Based on my examination of Mr. Hamm on September 23, 2017, and review of his medical records, I am of the opinion that there are two significant medical problems that require further review before attempting a lethal injection.

13. First, my examination revealed that Mr. Hamm has extremely poor peripheral vein access and that it very likely that the prison will need to resort to obtaining central venous access. It is extremely doubtful, given the way that the correctional staff in Alabama administers the anesthetic agents from another room at distance from the inmate rather than at his bedside, that they will be able to achieve peripheral IV access. To the best of my knowledge, Alabama has limited experience with obtaining central vein access for lethal injection procedures.

14. Second, Mr. Hamm has active B-cell lymphoma, a form of cancer that involves the lymph nodes. A large tumor was diagnosed in 2014 and extended from his left eye into multiple areas of the skull behind the face, and through the skull into the middle cranial fossa (the area surrounding the temporal lobe of the brain). In 2014 he also had enlarged lymph nodes in his

chest, and it is unclear whether these nodes were or are involved in the malignant process. The lymphoma was treated with radiation and medication, with some improvement; however, recent reported symptoms indicate that the malignancy has returned. There appears to have been no follow-up evaluation to determine whether the cancer has spread into lymph nodes beyond his face and skull. Lymphoma, like other cancers, is a progressive disease if not cured. At this point, there may be significant involvement and enlargement of lymph nodes in other areas of his body, including his neck, chest, and groin. If there are enlarged lymph nodes surrounding the veins in his neck, chest, or groin, it would likely complicate or thwart attempts to obtain central venous access.

15. In addition to the pain that would be caused by repeated futile attempts to obtain IV access, there is the risk that the execution team might inadvertently inject the execution drugs into a catheter that is not properly situated in the lumen of the intended vein. If this occurs the execution drugs will infiltrate in the tissue around the vein, and it will not exert its full anesthetic effect. The paralytic drug will very likely be absorbed from the tissue into the circulation more rapidly than the anesthetic drug, which will cause Mr. Hamm to become paralyzed and consciously suffocate. This would be an agonizing death.

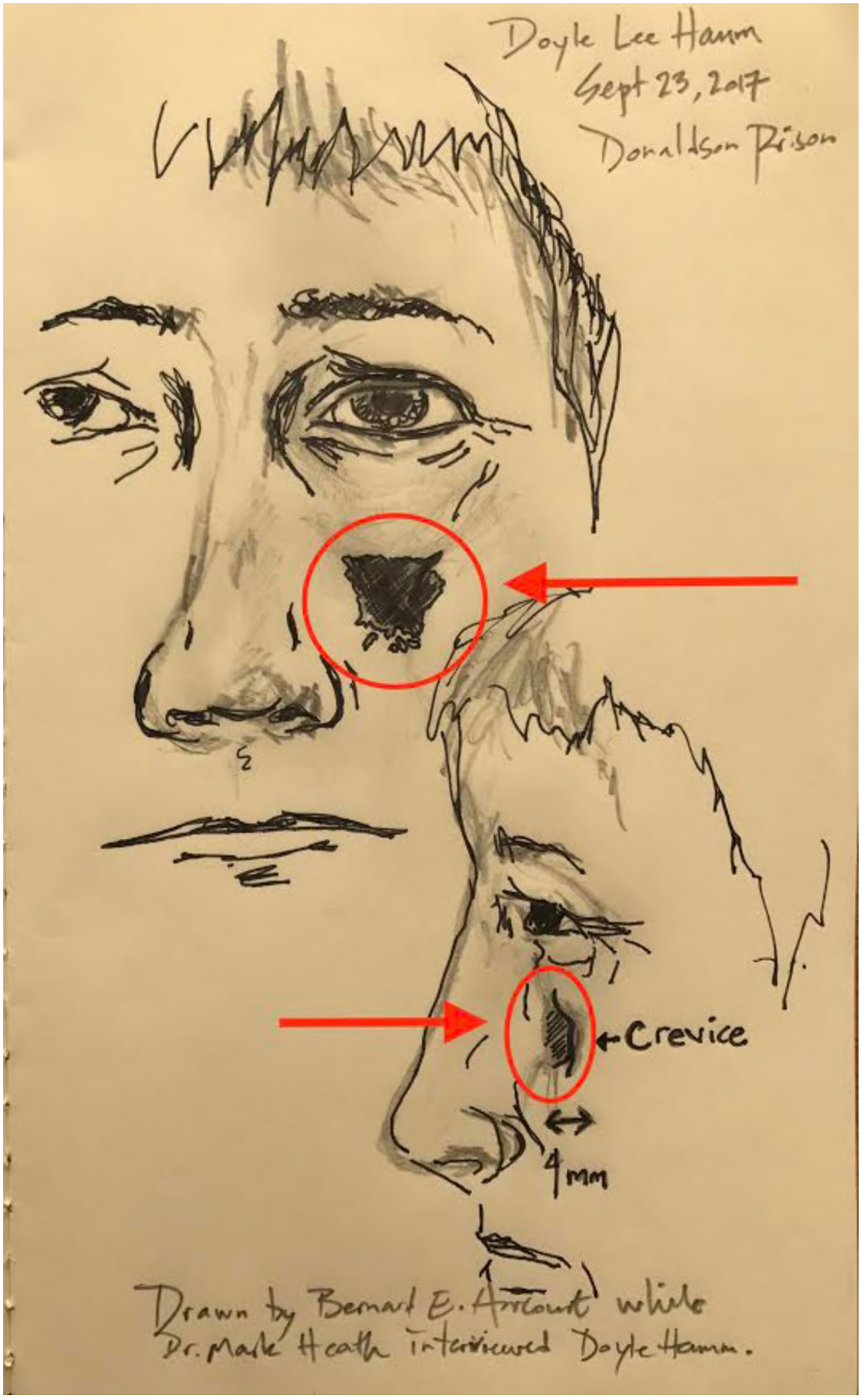
16. In summary, the progressive nature of Mr. Hamm's cancer warrants that a contemporary evaluation of any cancer spread be undertaken before execution is contemplated. In particular, no execution should be contemplated without imaging the central veins to determine whether lymph nodes surrounding these veins are enlarged from the lymphoma. Mr. Hamm's difficult peripheral venous access makes it highly likely that an execution by lethal injection cannot

proceed without obtaining central venous access. It is not clear whether the Alabama prison is prepared to perform central venous cannulation, particularly in light of the possibility of malignant (cancerous) lymph nodes impeding the procedure. I have not seen the exact protocol for venous access for lethal injection from the state of Alabama, but based on what I know from the David Nelson case, it is my opinion that the state is not equipped to achieve venous access in Mr. Hamm's case. Mr. Hamm's difficult IV access greatly increases the likelihood of an inhumane execution due to infiltration of the execution drugs, with the onset of paralysis preceding the attainment of adequate anesthesia.

17. This report represents the chief findings and opinions resulting from my examination of Mr. Hamm. I reserve the right to amend my opinions should the advent of additional information so warrant.

Mark J. S. Heath, M.D.
October 1, 2017

APPENDIX B


Doyle Lee Hamm
Sept 23, 2017
Donaldson Prison
Crevice
4mm
Drawn by Bernard E. Harcourt while
Dr. Mark Heath interviewed Doyle Hamm.

APPENDIX C

* Final Report *

Document type:	CT Maxillofacial wo contrast
Result date:	03 February 2014 20:33
Result status:	Auth (Verified)
Document title:	CT Maxillofacial wo contrast
Performed by:	Franklin, Terri L on 03 February 2014 20:33
Electronically Signed By:	Cure, Joel K MD on 03 February 2014 20:45
Encounter info:	649876794034, UAB HIGHLANDS, 1 Time OP, 02/03/2014 -

* Final Report *

Reason For Exam
graves opthalmopathy vs extraorbital neoplasm vs pseudotumor left eye

RESULTS
Orbit CT without contrast 02/03/2014 20:33:40

Indication: Redness, swelling, blurry vision left eye.

Technique: Axial helical CT images were obtained through the maxillofacial region. 2-D coronal reconstructions were generated from the axial data. DLP: 1357.50 mGy cm. Scan field of view: 200 mm.

Findings: There is a poorly marginated mass within the left orbit with both intraconal and extraconal components. This appears to extend through the orbital apex via the superior and inferior orbital fissures both of which appear enlarged. The left foramen rotundum is asymmetrically enlarged. The cortex along the lateral aspect of the left vidian canal appears mildly slightly eroded. The lesion probably extends into the left cavernous sinus. There is mild left proptosis.

There is loss of fat planes within the left masticator space and the left masticator (especially the left lateral pterygoid muscle) space is probably diffusely involved by tumor.
Impression: Left orbital neoplasm with possible perineural tumor spread to the left cavernous sinus and left masticator space. This may represent an adenoid cystic carcinoma, given this

Printed by: Parker Jr, John Steven MD
Printed on: 02/03/2014 21:31

* Final Report *

pattern. Further evaluation with contrast-enhanced MRI is strongly recommended.

Signature Line
Final Report
Interpreted by: Cure, Joel K MD
Title: MD
Signed Date/Time: 02/03/14 20:45

Completed Action List:
* Order by Yee, Jeffrey L MD on 03 February 2014 19:41
* Perform by Franklin, Terri L on 03 February 2014 20:33
* VERIFY by Cure, Joel K MD on 03 February 2014 20:45

M311244

25 a M 14
1st PET
scan available
RFR.

Patient: HAMM, DOYLE L
MRN: 2875582
Case: S-14-0003616

Collected date: 06 FEB 2014 14:02
Result type: SPF
Result date: 11 FEB 2014 09:29
Result status: Auth (Verified)
Result title: Surgical Pathology Final Report
Performed by: on
Electronically Signed by: Reddy, Vishnu V.B. MD on 11 FEB 2014 09:29
Encounter info: EYE FOUNDATION HOSPITAL, 1 Time OP, 02/20/2014

Diagnosis
Orbit, left mass, biopsy:
- Low grade, small-sized B-cell lymphoma (see Comment).
- Immunohistochemistry reveals the tumor stains positively for CD20 with a proliferation rate of 10 to 15% by KI67.

Vishnu V.B. Reddy MD
(Electronically signed by)
Verified: 02/11/14 09:29
VVR/JW

Reviewed by Resident: Anderson, Frank Lawrence MD, MD

Pathologist Comment
The orbital tissue reveals a small-sized lymphocytic infiltrate invading into fibroadipose tissue and skeletal muscle. Immunohistochemistry stains were performed. The lymphoid cells stain positively for CD20 with about 10 to 15% proliferation rate by KI67. These cells stain negatively for CD10, CD5, CD3, BCL-6, and BCL-1. Controls reacted appropriately. These findings are consistent with a low grade, small-sized B-cell lymphoma.

These results were reported to Dr. John Long at about 1730 hours on February 10, 2014.

Clinical Information
This is a 56 year old male with a history of left orbit mass. Per the history provided per Horizon states that a CT of the skull reveals a history of Grave's ophthalmology vs extra orbital neoplasm vs pseudotumor left eye (performed on February 3, 2014).

Frozen Section Diagnosis
AFS1, Orbit, left mass, biopsy:
- Atypical lymphoid proliferation.(per Dr. Shi Wei)

Gross Description
This case is received in a single container labeled with the patient?s name, medical record number and "1 - orbit mass left orbit". The container is filled with formalin and contains a single orange cassette consistent of frozen section. The specimen now measures 2.1 x 2.0 x 0.1 cm in greatest dimension. The specimen is placed in a biopsy bag and completely submitted. No tissue was submitted for flow cytometry.
Dr. Anderson/Dr. Reddy/sd LYMPH
02/06/2014 18:16:39 CST

5/16/2014

NEW PATIENT CONSULTATION: DOYLE L HAMM MR# 001329103

PRIMARY SITE: Primary 200.70 - Large cell lymphoma unspecified site, Diagnosed 2014 (Active)

PREVIOUS TREATMENT:

HISTORY: 57-year-old incarcerated white male. Patient presents with a several month history of progressively severe bulging and pain in the left eye. Patient has some blurry vision remaining but the patient is not usable for reading or watching television.

Patient had been referred to the Eye foundation where a biopsy was performed. By report this shows a B-cell lymphoma. We have requested a copy of the pathology report but have been unable to obtain one thus far.

The patient was seen in consultation by Dr. Adler. CT scans were performed including noncontrast CT scans of the head chest and abdomen. Scans demonstrated a large mass in the retro-orbital area on the left extending into the masseter space. There was a suggestion of widening of the neural foramen. In the chest were noted numerous abnormal lymph nodes most of which were associated with calcifications. Calcified granulomata were noted within the lung as well. A few small nodes were seen in the abdomen. The pelvis was not imaged.

Patient has been treated with a single large dose of steroids. The patient states that he is bulging of the eye improved temporarily but the pain if anything was magnified.

The patient is referred at this time to discuss radiation therapy. He has not noted any particular change in his vision over the past few weeks but the vision has not markedly improved either.

PAST MEDICAL HISTORY:
cancer, hepatitis c and hypercholesterolemia.

PAST SURGICAL HISTORY:
biopsy (of the left eye).

Brookwood Medical Center
2010 Brookwood Medical Center Drive
Birmingham, AL 35209-6804
Diagnostic Imaging Department
Phone (205) 877-1990 Fax (205) 877-2153

Encounter Type: 2 - Outpatient
Location: BMC - MI

Patient Name: HAMM, DOYLE L
DOB/Age/Sex: 2/14/1957 58 years Male
MRN: 01329103
Acct #: 38321188

Magnetic Resonance Imaging

Accession #: 368-MR-15-006346
Exam Date/Time: 9/16/2015 08:22 CDT
Procedure: MRI Face Neck Orbit w/ + w/o Contrast
Ordering Physician: RODDAM MD,ROY F

Report

MRI facial region

HISTORY: 58-year-old male with left orbital lymphoma

TECHNIQUE: Pre-and postcontrast MRI of the facial region.

FINDINGS: Prior MRI-3/10/2015 and 9/29/2014.

Abnormal enhancement is seen in the left orbit with involvement in the left pterygopalatine fossa and left infratemporal fossa/masticator space region. Abnormal enhancement is also seen in the inferior orbital fissure and in foramen ovale, and along foramen rotundum on the left. Overall, these areas of abnormal enhancement are improved in appearance when compared with 3/10/2015 and markedly improved from 9/29/2014. No definitive signs of bulky mass seen on the current stu involvement of the left cavernous sinus region cannot be excluded.

Remainder of the surrounding soft tissues are grossly normal. The nasopharynx and oropharynx are within normal limits. N definitive signs of adenopathy.

Visualized intracranial structures are grossly normal.

IMPRESSION: Overall, there are areas of abnormal enhancement as described above. However, I do not appreciate any detrimental change from prior exams.

Finalized by Harry Rosenthal, MD
9/16/2015 6:06 PM

Final Report
Dictated: 09/16/2015 12:09 Dictated By: ROSENTHAL III MD, HARRY B
Electronic Signature: 09/16/2015 6:06 pm Signed By: ROSENTHAL III MD, HARRY B

17 Sep 15

Admitting: RODDAM MD,ROY F
Consulting:

Report Request ID: 77302783
Printed: 9/17/2015 06:48 CDT

0600
1000
1800

CORIZON HEALTH

Progress Note

Name: Last Hamm First VI542L MI

Date of Birth: 2/14/1957 ID #: Z-4

R 20/40 L 20/50 BOTH 20/50

Date	Time	Description
9/20/16	7:30	HT: 5'9 BP: 120/84 Temp WT: 140/65 PR: 68 O2: S – I have been Lam O – Inmate has hy involving OS & a admission he compl in his eye c mose reports pain medicat be continued – EOMs intact. A – Continued pain OS c chron hyphema P – Medication renewed. R.T. Rudd
MARCH 2017		WT: 142 BP 130/80 P 97 R 18 T 98 OCSAT 98 Skin S – "Knots" on my chest – x 3 weeks are mildly tender. O – Subcutaneous nodules x 2 cm in diameter – one x 6 cm below R clavicle, one periareolar area & one R post chest. A – Pt feel like lymph nodes but could be lipomas as pt has concern against lymphadenopathy. P – Chest X-ray ordered – will F/U in 1 month. may need biopsy if continues to enlarge. (next page) R.T. Rudd, MD

COMPLETE BOTH SIDES BEFORE USING ANOTHER SHEET

CS1104

APPENDIX D

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF ALABAMA
NORTHERN DIVISION

DAVID LARRY NELSON,	)	
	)	
Plaintiff,	)	
	)	
v.	)	**CIVIL ACTION NO. 2:03CV1008-T**
	)	
DONAL CAMPBELL and GRANT CULLIVER,	)	
	)	
	)	
Defendants.	)	

REPORT OF SPECIAL MASTER ON MEDICAL EXPERT

By order of October 15, 2004, the Court appointed the undersigned as Special Master for the purpose of identifying and recommending to the Court an independent medical expert to assist the Court in understanding and dealing with certain medical issues raised by the parties. The Special Master recommends that Warren Bagley, M.D. be designated as the Court's independent medical expert.[1]

Qualifications of the Independent Medical Expert

The parties appear to be in agreement, and the Special Master concurs, that the Court's independent medical expert should be intimately familiar by education, training and experience with the procedures which are at issue here, namely the various procedures available for obtaining veinous access. It was suggested by counsel for Mr. Nelson that a physician who is board certified in Anesthesiology and who is familiar with and practicing in Cardiovascular Anesthesiology would be desirable because such an individual would likely be more familiar with these procedures and important surrounding issues than would other physicians. The

[1] On March 17, 2005, the Special Master submitted a Report recommending that Dr. Vance Nielsen be designated as the Court's independent medical expert. The Special Master subsequently submitted a Report informing the Court that Dr. Nielsen had requested to be removed from consideration as the Court's independent medical expert, and the Special Master proceeded with identifying another independent medical expert.

Special Master's research and investigation lead him to concur with Mr. Nelson's counsel in this regard. For the Court's reference, attached to this report are information pieces from the American Society of Anesthesiologists (Exhibit A) and the Society of Cardiovascular Anesthesiologists (Exhibit B), both of which Dr. Bagley is a member, describing the general nature of the specialty of Anesthesiology and its sub-specialty, Cardiovascular Anesthesiology.

Qualifications of Dr. Bagley

Before pursuing the specialty of Anesthesiology, Dr. Bagley gained broad experience in the practice of medicine in the United States Army Medical Corps where he served as a Flight Surgeon and practiced in Otolaryngology, eventually becoming Chief of Otolaryngology Services at the U.S. Army Aeromedical Center at Ft. Rucker, Alabama. After completing a residency in Anesthesiology at Walter Reed Army Medical Center in Washington D.C., Dr. Bagley received his board certification in Anesthesiology and served as the Chief of Anesthesia and Operative Services at Ft. Meade, Maryland. He was a Clinical Instructor in Anesthesiology at the Uniformed Services University of the Health Sciences (USUHS) in Bethesda, Maryland and an Instructor in Advanced Trauma Life Support for the American College of Surgeons. Since 1989, Dr. Bagley has worked and taught as an Assistant Professor in the Department of Anesthesiology at the University of Tennessee Graduate School of Medicine and has practiced Anesthesiology and Cardiovascular Anesthesiology at the University of Tennessee Medical Center. His faculty curriculum vitae is appended to this report (Exhibit C). Dr. Bagley also sits on the Cardiac Anesthesia Panel at the University of Tennessee Medical Center. He is a member of the American Society of Anesthesiologists, the Society of Cardiovascular Anesthesiologists, and the International Anesthesia Research Society. The Special Master believes that Dr. Bagley

is clearly a highly qualified physician in the specialty of Anesthesiology who has also practiced extensively in Cardiovascular Anesthesiology.

The Special Master's interview with Dr. Bagley convinces the Special Master that Dr. Bagley is very well-suited for the assignment at hand. He has extensive direct experience with the medical procedures at issue and is willing to assist the Court in its understanding of them and any related matters. Dr. Bagley is independent, in that he has no extra-judicial knowledge of this case, has not previously been involved in any similar matter, and understands that his role would be to assist the Court by providing independent and unbiased information and opinions to the Court. Dr. Bagley is willing to undertake this assignment and can make available the time needed to perform it.

Recommendations for Further Proceedings

The Special Master recommends that the Court appoint Dr. Bagley as its independent medical expert, instruct Dr. Bagley to conduct a physical examination of Mr. Nelson for the purpose of evaluating whether, and if so through what procedures, veinous access may be obtained on Mr. Nelson, and instruct Dr. Bagley to prepare a written report of his findings, along with a report or discussion on any other matters the Court deems appropriate.[2] The Court may wish to invite the parties to suggest issues that they would like to see addressed in Dr. Bagley's report as well. After the report is submitted to the Court and the parties, the Court can determine whether Dr. Bagley should be made available for testimony and cross-examination either by deposition or live. The Special Master will remain available, subject to the Court's direction, to assist in the submission of the report and with any other ancillary matters.

[2] Due to medical ethics considerations, the Special Master recommends that Dr. Bagley be instructed not to give advice or opinions on the proposed execution itself, not to consult with the warden or other prison personnel regarding the proposed execution itself, and not to give advice or opinions regarding the specific execution facilities located at Holman Correctional Facility.

s/David R. Boyd
David R. Boyd
Special Master

OF COUNSEL:
Balch & Bingham LLP
P.O. Box 306
Birmingham, AL 35201-0306
(205) 226-3485
(866) 783-2739 fax

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system and service will be perfected upon the following this the 16th day of June, 2005, to:

Joe W. Morgan, III
Suite B
600 Robert Jemison Road
Birmingham, Alabama 35209

Michael Kennedy McIntyre
H. Victoria Smith
507 The Grant Building
44 Broad Street, N.W.
Atlanta, Georgia 30303

J. Clayton Crenshaw
Assistant Attorney General
Office of the Attorney General of Alabama
11 South Union Street
Montgomery, Alabama 36130

s/David R. Boyd
OF COUNSEL

APPENDIX E

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF ALABAMA
NORTHERN DIVISION

DAVID LARRY NELSON,	)	
	)	
Plaintiff,	)	
	)	
v.	)	**CIVIL ACTION NO. 2:03CV1008-T**
	)	
DONAL CAMPBELL and GRANT CULLIVER,	)	
	)	
	)	
Defendants.	)	

NOTICE OF SUBMISSION OF EXPERT REPORT
OF INDEPENDENT MEDICAL EXPERT

Pursuant to the Order of the Court issued on July 28, 2006, the Special Master hereby submits, as Attachment A, the Expert Report of the Court's Independent Medical Expert, Dr. Warren Bagley.

Should the Court need further information, Dr. Bagley is ready and willing to provide such information through a supplemental report and/or personal appearance before the Court.

David R. Boyd
Special Master

OF COUNSEL:
Balch & Bingham LLP
P.O. Box 306
Birmingham, AL 35201-0306
(205) 226-3485
(866) 783-2739 fax

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing has been served upon the following by Via U.S. Mail, properly addressed and postage prepaid, on this the 31st day of October, 2006:

Joe W. Morgan, III
Suite B
600 Robert Jemison Road
Birmingham, Alabama 35209

Michael Kennedy McIntyre
H. Victoria Smith
507 The Grant Building
44 Broad Street, N.W.
Atlanta, Georgia 30303

J. Clayton Crenshaw
Assistant Attorney General
Office of the Attorney General of Alabama
11 South Union Street
Montgomery, Alabama 36130

David R. Boyd
Special Master

Attachment A

Expert Report of the Court's Independent Medical Expert Dr. Warren Bagley

Report Based upon Dr. Bagley's Physical Examination of David Larry Nelson Conducted at Holman Prison on October 11, 2006

This examination took place in the infirmary area of Holman State Prison on Wednesday 11 October 2006 from 1420-1500 hrs. Present were the examiner (Warren Bagley, MD), Attorney Chris Heinss (Balch, Bingham Special Master), Prisoner's Attorney Victoria Smith, Attorney General's Representative Clay Crenshaw, Prison Warden Grantt Culliver, Prisoner's Expert Witness Mark Heath, MD, and two guards.

I examined Mr. Nelson with regards to obtaining venous access, visually and with palpation, and sonographically. The results of both exams are documented both in writing and with supporting photographs.

Mr. Nelson was asked to lie supine on a gurney. The first examination was visual and with palpation. A tourniquet was applied to the left upper arm, the arm was extended towards the floor from the gurney, and I knelt by the gurney to perform the exam. The reason for this somewhat awkward position is that gravity assists with helping the veins stand out; blood tends to pool in the lowest part of the body.

As can be seen from photos A and B, there are no prominent superficial veins on the forearm which would support an IV of sufficient size (see Glossary) to administer the volume of solution at the necessary rate to perform an anesthetic, administer fluids for resuscitation, etc. The examination included the palmar and volar (see Glossary) aspects of the hand, wrist, and forearm, and the antecubital fossa (see Glossary). The line on Photo B represents the level at which ultrasonic examination of the antecubital fossa occurred.

Photo A

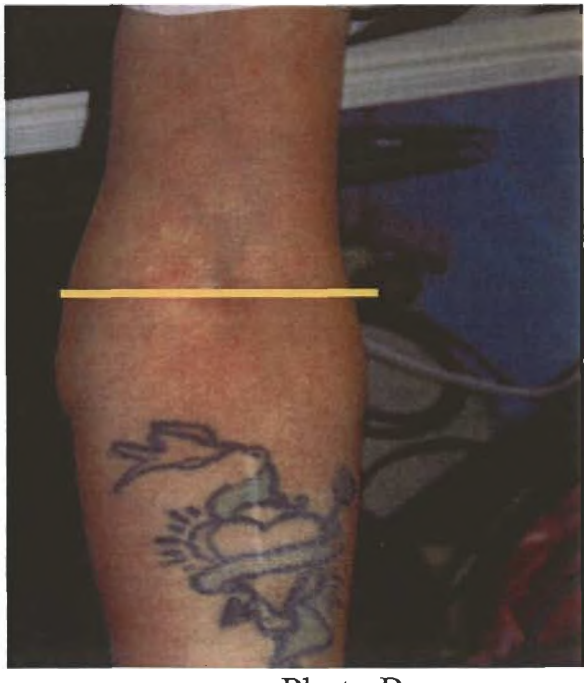


Photo B

The ultrasonic examination (see Glossary) of the left antecubital fossa did not reveal any veins. See Ultrasound 1.

Ultrasound 1.

Note: although the ultrasound exam was performed after the visual/palpatory exam, I present them simultaneously for the sake of clarity.

The second area of examination was the left lower extremity. A tourniquet was applied to the mid-calf and examination of the foot and ankle was carried out, again with the extremity dangling off the gurney and the examiner kneeling.

It should be noted that Mr. Nelson's skin on the lower extremities has hyperpigmented and pitting edema changes consistent with venous stasis (see Glossary) and congestive heart failure. He also has a history of congestive heart failure, and of upper thigh varicosities (see Glossary). Although it is technically possible to insert an IV into a varicosity, it is generally quite painful and not always successful, as varicosities are often tortuous.

The largest and most commonly cannulated (see Glossary) peripheral vein in the leg is the saphenous vein, which courses up the medial (inside) portion of the ankle and leg. While I was not able to see this vein on the left ankle, it was distinctly palpable and clearly visible on ultrasound. See Photos C and D, and Ultrasound 2. Again, yellow line indicates level of ultrasound exam. The white donut-shaped device is the tourniquet.

Photo C

Photo D

Ultrasound 2

The saphenous vein is clearly visible in cross-section as the dark round structure at the end of the arrow. This vein is readily able to be cannulated by persons who are certified to initiate IV therapy, i.e. emergency medical technicians/paramedics who are so certified, military combat medics, nurses, CRNAs (certified registered nurse anesthetists), PAs (physician's assistants) and physicians.

The next area examined was the right ankle, which followed the same protocol as for the left. See Photos E and F, and Ultrasound 3. The saphenous vein in this leg was visible, palpable, and readily visualized on ultrasound.

Photo E

The dark arrows point to the saphenous vein. The yellow line is the level at which ultrasound examination occurred.

Photo F

Ultrasound 3

The dark arrow points to the lumen (see Glossary) of the saphenous vein. This vein is equally accessible as was the left, by the same level of personnel.

The next area examined was the right arm, performed in a manner similar to the left, with the tourniquet in place and the arm extended down towards the floor. The distal forearm and hand were again devoid of visible or palpable veins. The antecubital fossa contained a large vein (the basilic vein) which was visible, palpable, and readily visualized with ultrasound. See Photo G and Ultrasound 4.

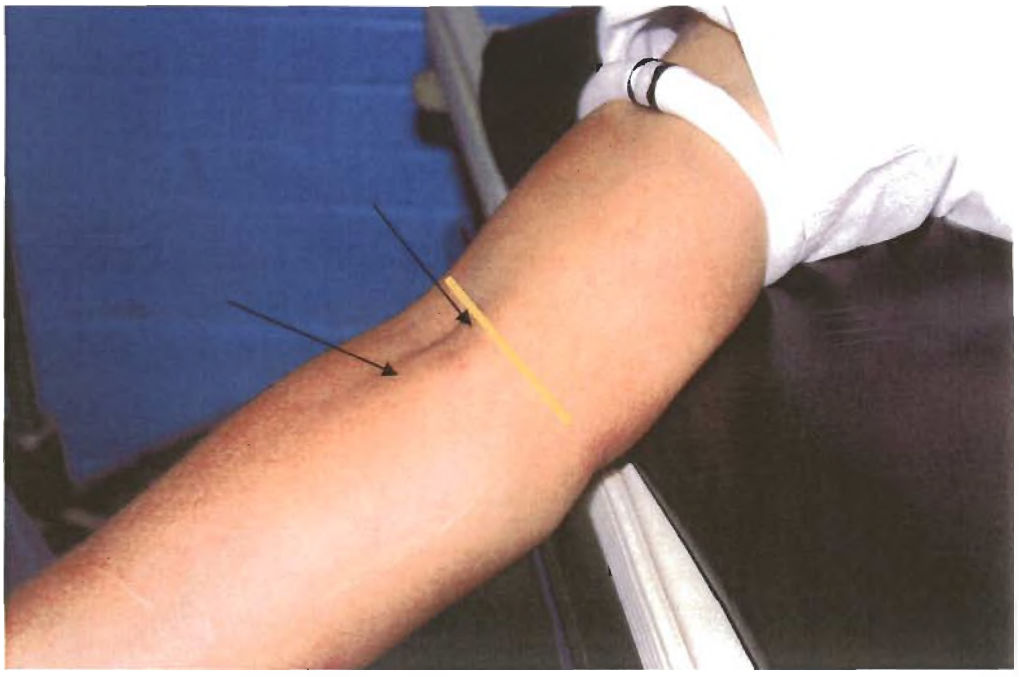


Photo G

The dark arrows point to the basilic vein.

Ultrasound 4

The dark arrow points to the basilic vein. This vein is readily cannulated by anyone trained/certified to start basic intravenous lines, even more easily than the saphenous veins listed above, and is one of the veins commonly used when blood is drawn for laboratory tests or for blood donation.

The next area examined was the right side of the neck, specifically the area known as the anterior cervical triangle (see Glossary). In this area lie the internal and external jugular veins. In the supine position Mr. Nelson's

external jugular vein was readily visible (see Photo H), and easily seen with ultrasound (see Ultrasound 5).

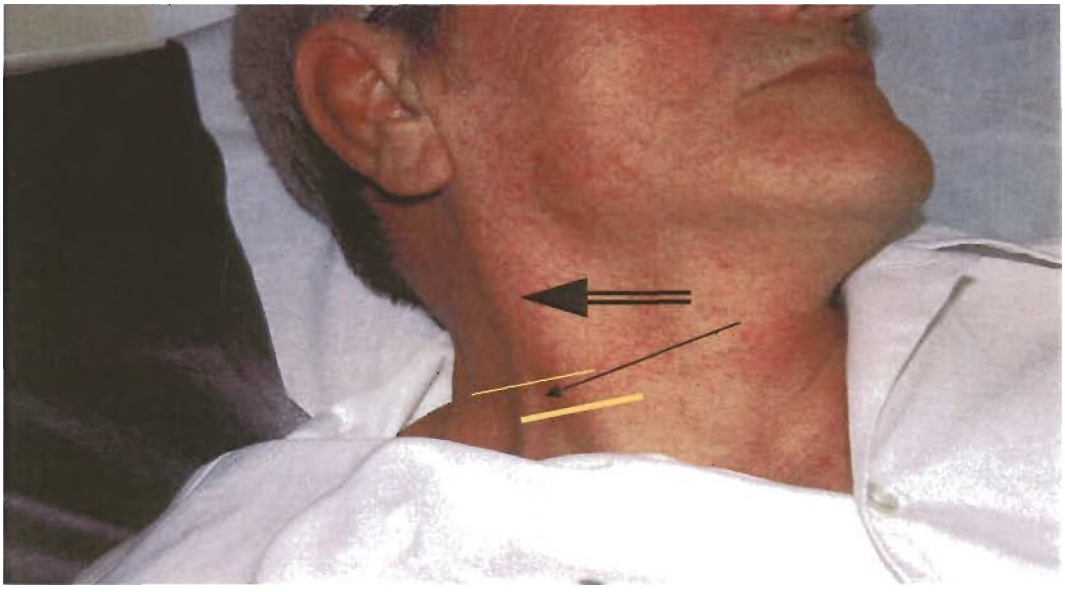


Photo H

Once again, the thin dark arrow points to the external jugular vein. The upper yellow line is where the ultrasound probe was placed to examine the external jugular vein, and the heavier lower yellow line indicates probe placement for examination of the right internal jugular vein. The large double black arrow points to the sternocleidomastoid muscle (see below).

This vein (the external jugular) is easy to see, and yet moderately difficult to cannulate unless the operator has had some experience in cannulating it specifically, as it is very easy to go through the vein instead of into it. Mostly one finds MDs and military combat medics accessing this vein, but some EMT/paramedics may have had experience with it. Nurses usually do not use veins in the neck.

Ultrasound 5

The dark arrow points to the right external jugular vein.

The largest vein in the neck is the internal jugular. It courses through the neck deep to the sternocleidomastoid muscle (indicated by the large black double arrow in Photo H; see Glossary) and generally shallow and lateral to the carotid artery. See Ultrasound 6. The single arrow points to the right internal jugular vein, and the double arrow to the right carotid artery.

Ultrasound 6

The internal jugular vein is generally restricted to access by physicians, some advanced nurse practitioners (such as CRNAs) and perhaps some PAs (physicians' assistants) who have had specialized training in central venous

line placement (see Glossary). Once one has performed some 40-50 of these procedures they become quite straightforward. This vein is generally used for major resuscitative infusions (large volume, rapid administration), for monitoring of central venous pressure, or as an access for pacemaker wires or Swann-Ganz catheters commonly used during heart surgery. The catheters needed to access this vein are of necessity longer and larger in diameter than most peripheral intravenous catheters. Because of the size of catheter usually placed, a local anesthetic is commonly injected at the insertion site. Entering the central venous circulation is inherently more dangerous than peripheral vein cannulation, as the surrounding structures are more vital and less accessible if damaged (carotid artery, lungs, thoracic duct, etc). Mr. Nelson's internal jugular veins are large and (with the above limitations in mind) would not be terribly challenging to cannulate.

The last part of the exam involved the left internal and external jugular veins. See Photo I, and Ultrasounds 7 and 8.

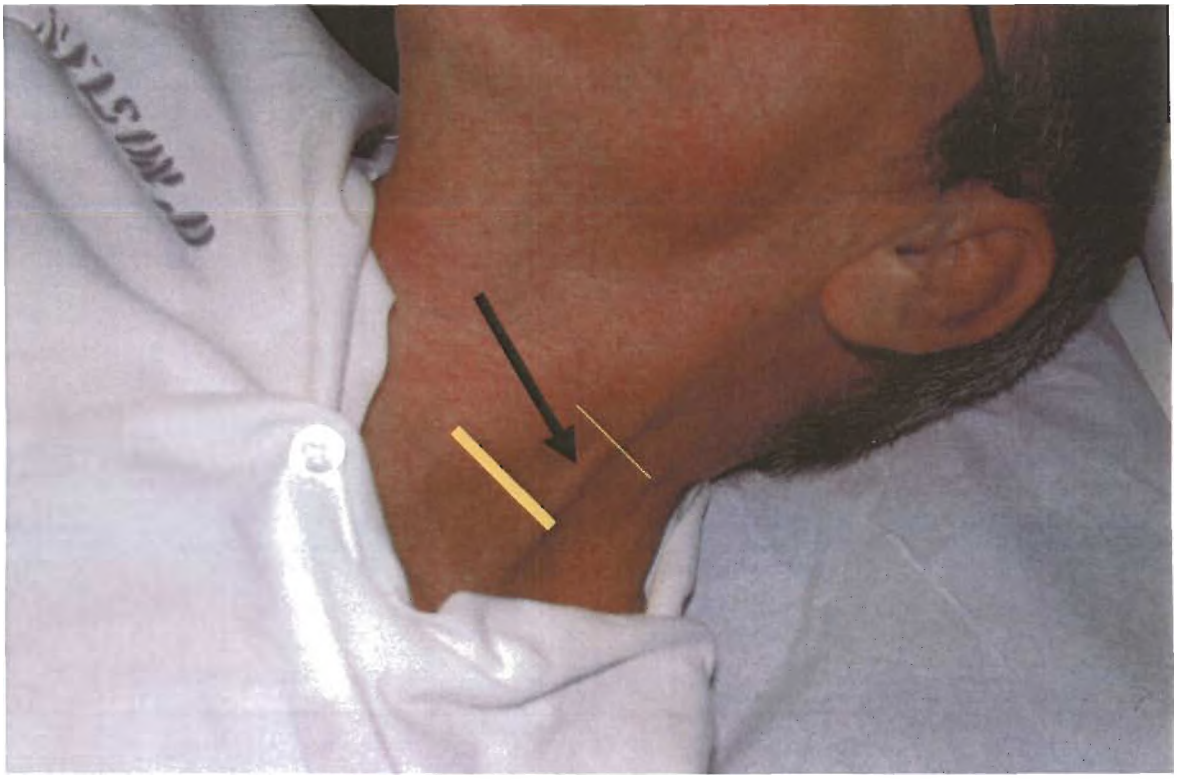


Photo I

The dark arrow points to the left external jugular vein. The thin yellow line is the site of the ultrasound probe for the external jugular examination, and the heavier yellow line that for the internal jugular. The same constraints and considerations as mentioned above apply for this side as well.

Ultrasound 7

The arrow points to the left external jugular vein.

Ultrasound 8

The upper arrow points to the left internal jugular vein, and the lower double arrow to the left carotid artery.

It is not generally possible to image the subclavian veins with ultrasound, and this was not attempted.

In summary, Mr. Nelson has readily accessible peripheral veins in the following regions. They are listed in order of ease of access and therefore preference.

1. Right basilic vein in right antecubital fossa (a peripheral vein; see Glossary). This vein is easily cannulated by most persons with basic intravenous skills (i.e. emergency medical technicians/paramedics who are so certified, military combat medics, nurses, CRNAs (certified registered nurse anesthetists), PAs (physician's assistants) and physicians).
2. Right saphenous vein at the right medial malleolus (a peripheral vein). This vein is easily cannulated by most persons with basic intravenous skills.
3. Left saphenous vein at the left medial malleolus (a peripheral vein). This vein is easily cannulated by most persons with basic intravenous skills.
4. Right external jugular vein, just posterior to the midpoint of the sternocleidomastoid muscle (a peripheral vein). Cannulating this vein is a little harder, and requires a bit more experience.
5. Left external jugular vein, just posterior to the midpoint of the sternocleidomastoid muscle (a peripheral vein). Same as for right external jugular.

In addition to the peripheral veins listed above, the internal jugular veins (central veins) are also accessible, but gaining such access requires an advanced-level practitioner (CRNA, MD, PA). However, given the accessibility of the peripheral veins listed above, it is my medical opinion that cannulation of central veins will not be necessary to obtain venous access on David Larry Nelson.

GLOSSARY

(listed in order of text appearance)

IV of sufficient size: intravenous catheters are sized in gauges, with larger numbers representing smaller diameters. Although the Warden did not know the size IV generally placed for lethal injection, I would suspect that it would be 18ga (ideal in terms of ability to inject the volume required in the time allotted, as well as not being as uncomfortable as a larger 16 or 14ga catheter) or possibly a 20ga (not as much flow). Anything smaller would be essentially worthless.

Palmar and Volar: the palmar surface of the arm is that which is contiguous with the palm of the hand; the volar surface represents the back of the hand.

Most experienced IV personnel like to use the volar surface of the hand or forearm.

Antecubital Fossa: that part of the arm at the elbow where, with the palm up, the skin creases when the elbow is bent.

Ultrasonic examination: carried out using a state of the art Sonosite MicroMaxx ultrasound machine equipped with a linear vascular probe. It is becoming standard of care to use this device when performing central venous access, as it increases the level of safety considerably. This device emits sound waves into the tissues and then constructs a cross sectional image based upon the sound as it is reflected back. In the images in this document the surface of the skin is at the top of each image. On the right margin there is a depth scale which allows one to know the exact depth and size of a given structure. Typically, veins are seen in cross section as dark circles while the surrounding tissues are lighter.

Venous Stasis: poor circulation of the blood as it is returned to the heart from the legs. This is usually manifested by varicose veins, which are segmental enlargements of the veins in the leg caused by failure of the venous valve system, due to the increase of hydrostatic (fluid) pressure in the leg when a person is upright. This fluid pressure amounts to a sizeable figure, commonly 180 cm of water, or about one-half atmosphere pressure. This considerable load is dealt with via the pumping action of the leg muscles coupled with valves that do not permit reverse flow. Varicosities are most commonly hereditary, and may cause pain and localized swelling. In later stages of the disease, fluid leaks out of the vessels and ulcers form as the skin breaks down. Mr. Nelson has the varicose veins (varicosities) and early skin changes.

Varicosities: varicose veins. See above **Venous Stasis**.

Cannulation: refers to the act of inserting a plastic catheter into a vein or other structure. Also commonly referred to as "starting an IV." The technique requires locating the vein, usually by placing a tourniquet on the extremity between the heart and the desired site of placement and locating the vein by visual and palpatory methods. A catheter-over-needle device is then inserted into the vein through the skin; when blood returns through the needle the catheter is slid into the vein over the needle. The needle is then removed, leaving a plastic flexible pathway into the vein (also known as percutaneous placement). Neck veins (internal and external jugular) and subclavian veins do not allow the use of tourniquets; the patient is usually supine, in a head-down position on a stretcher to allow gravity to assist in blood pooling and dilation of the these veins.

Lumen: the space inside the vein where blood is carried.

Anterior cervical triangle: an area in the neck bordered by the sternal and clavicular heads of the sternocleidomastoid muscle, and the upper border of the clavicle. This is readily demonstrated by turning the head to one side and then attempting to turn it the other way while holding the chin and resisting the movement.

Sternocleidomastoid muscle: The prominent strap muscle of the neck which attaches to the mastoid process (the bump on the skull immediately behind the ear) and to both the top of the sternum (breastbone) and the clavicle (collarbone) approximately an inch lateral to the sternal insertion.

Central venous access: in this document is the same as ***percutaneous*** (literally means through the skin) central venous access, and refers to the act of inserting a catheter-over-needle device into a central vein (see below). This may be achieved in three commonly used places: the internal jugular vein, the femoral vein, or the subclavian vein. The subclavian route has the greatest associated discomfort and risk, that being pneumothorax or puncturing of the lung. The femoral route is questionably the most difficult, as it is buried deep in the groin and its landmarks are not as reliable. The internal jugular is probably the easiest, as it is usually not more than a centimeter or two deep, with fairly reliable landmarks. Its main complication is cannulation of the carotid artery.

A note about "peripheral" and "central" veins is in order at this point. A ***peripheral*** vein is one in the extremities or neck which is separated from the great veins (inferior or superior vena cavae) leading to the heart by two or more divisions. Peripheral veins are frequently visually identified or palpable. In this particular instance, the external jugular would be considered a peripheral vein, since it is easily visualized, palpable, and empties into the subclavian veins on each side, which then empty into the superior vena cava via a short trunk named the brachiocephalic vein. The vena cava leads directly to the heart.

A ***central*** vein leads (via no more than one other named structure, usually a short trunk) to the vena cava (either inferior or superior), which then empties directly into the heart (right atrium).