

AFFIDAVIT OF LEIGH HLAVATY, M.D.

I, Leigh Hlavaty, MD, am an adult over the age of 18 and I am competent to testify in a court of law.

QUALIFICATIONS

1. I graduated from the Wayne State University School of Medicine in 1994. I was a resident of Anatomic Pathology at Wayne State University and the [Detroit Medical Center] from July 1994 to June 1997, and served as the Chief Resident of Anatomic Pathology at the same institutions from July 1997 to June 1998. I underwent fellowship training in Forensic Pathology at the Wayne County Medical Examiner's Office from July 1998 to June 1999.
2. I am board certified by the American Board of Pathology in both Forensic Pathology and Anatomic Pathology. I am a member of the National Association of Medical Examiners and the American Academy of Forensic Sciences.
3. I currently am licensed to practice medicine in the States of Michigan and Washington.
4. I have published a number of articles in peer reviewed journals, such as the American Journal of Forensic Medicine and Pathology, focusing on various topics in pathology.
5. I am a Clinical Assistant Professor of Pathology at the University of Michigan and a Clinical Assistant Professor of Pathology at Wayne State University. From 2001-2008, I was an Adjunct Professor and Forensic Pathology Coordinator for Wayne State University Anatomic Pathologist's Assistant Program. I have lectured at the Wayne State University School of Medicine, the University of Michigan and the Wayne County Medical Examiner's Office on forensic pathology issues. I currently serve as Site Supervisor for the forensic pathology fellowship; Coordinator and Supervisor of all pathology residents, emergency medicine residents, and other residents rotating through the Wayne County Medical Examiner's Office; Coordinator and Supervisor of all medical students rotating through the Wayne County Medical Examiner's Office; and Coordinator of Medical Examiner-Emergency Medicine conferences for Detroit Receiving and Henry Ford Hospitals, Sinai-Grace Hospital, and Saint John Hospital.
6. I have served as Deputy Chief Medical Examiner for the Wayne County Medical Examiner's Office in Detroit, Michigan since April 2011. I previously served as an Assistant Medical Examiner at Wayne County Medical Examiner's Office from July 1999 to March 2011.

7. I have over 20 years of experience in anatomic and forensic pathology, and have worked for over 18 years in the Wayne County Medical Examiner's Office. I have performed in excess of 7,000 of autopsies during my career.
8. My responsibilities as Deputy Chief Medical Examiner for the Wayne County include performing postmortem investigations of death, including autopsies and death scene examinations; determining the cause and manner of death; drafting autopsy reports; and providing testimony in state and federal court.
9. I have testified over 400 times in both state and federal court on criminal matters as a witness, typically for the prosecution. I have been qualified in every instance to serve as an expert in both forensic and anatomic pathology, including changes in the body to estimate time of death, such as livor mortis, rigor mortis, and decomposition. I have also testified on pathology issues related to strangulation, including the constellation of findings to identify a strangulation victim.
10. A copy of my curriculum vitae is attached as Exhibit A.

MATERIALS REVIEWED

11. In preparation of this affidavit, I reviewed black and white photographs of the autopsy of Hae Min Lee ("Ms. Lee"), as well as color photographs of her disinterment. I also reviewed the autopsy report and the trial testimony of Dr. Margarita Korell, M.D., the medical examiner that performed the autopsy on Ms. Lee's body.

COMPENSATION

12. I have received no compensation for delivering these opinions, and am charging no fee in connection to this affidavit.

OPINIONS

13. The opinions expressed in this Affidavit are based on my education, training and experience and my review of the materials referred to in paragraph 11. Unless otherwise stated herein, all opinions expressed in this Affidavit are based on my education, training and experience and are held to a reasonable degree of medical, pathologic and scientific probability.

A. Summary of Opinions

14. As explained in more detail below, my primary opinions are: 1) the body of Ms. Lee was in an anterior, face down position for at least eight hours immediately following her death; 2) Ms. Lee was not buried on her right side until at least eight hours following her death; and 3) Ms. Lee was buried at some time at least eight hours after her death but likely not more than 24 hours after her death.

B. Anatomic and Forensic Background

15. Following death, a human body undergoes a number of changes that provide insight into the position of the body following death, how long an individual has been dead, and when an individual was buried.
16. Livor mortis, also known as lividity, is the red-purple discoloration of the skin that occurs following death. This discoloration is caused by the settling of blood in the dependent, or lower, areas of the body. Because the heart is no longer beating and circulating blood, the blood pools within the body and gravity will cause it to settle in the lowest area of the body it can reach. This pooling appears as a red-purple discoloration in the areas where the blood has pooled. For example, lividity will occur in the back (posterior) of the body if the person died while sleeping on their back.
17. Lividity starts to become visible within two to four hours after death, and becomes most visible eight to twelve hours after death. Due to the breakdown of the blood within the blood vessels in the body, if a body remains immobile for eight to twelve hours immediately after death, lividity will become "fixed," meaning that the lividity pattern will not shift and resettle even if the body is moved into a new body position. For example, if lividity fixes while a body is lying on its back, it will not shift and resettle if the body is turned onto its stomach.
18. If a body is shifted after the lividity pattern has begun to fix but before it is fully fixed, then it may show a "mixed" pattern of lividity, with lividity present on different parts of the body. For example, if a person died sleeping on their back and remained in that position as lividity began to fix and then was turned on their right side before lividity became fully fixed, one would expect to see a mixed pattern of lividity with some lividity present on the posterior (back) and some on the right side.
19. Lividity can be environmentally and temperature dependent, and therefore can be accelerated by warm temperatures or slowed by cool temperatures. The guideline

of eight to twelve hours for lividity to fix is based on temperate conditions, which typically means room temperature between 60 and 80 degrees Fahrenheit.

20. Rigor mortis is the stiffening of the body's muscles after death. This chemical process occurs after death because the body is no longer making the adenosine triphosphate (ATP) needed to make to break down the actin-myosin complexes within muscle cells. Rigor mortis becomes evident two to four hours after death, starting in the smaller muscle groups, like the jaw, and spreading to larger groups, such as the arms and legs.
21. It typically takes eight to twelve hours for rigor mortis to become fully developed, at which time the body is completely stiff. Rigor mortis remains fully developed for eight to twelve hours, and then gradually dissipates over the following eight to twelve hours when the body becomes flaccid again. It disappears in the same order in which it appears. Like with livor mortis, rigor mortis is temperature conditional and warm temperatures can accelerate the process and cold temperatures can delay the process.
22. Decomposition follows after the fixing of livor mortis and the disappearance of rigor mortis and occurs when the body begins to break itself down, typically from the inside. Enzymes digest cell membranes and then the cells begin to break down. Bacteria also begins to release from the gastrointestinal tract.
23. Skin slippage is one sign of decomposition. Skin slippage is the sloughing of the superficial layers of the skin off the body, typically beginning around two to three days following death in temperate conditions. Skin slippage usually starts with formation with what appears to be blisters on the body. Then, when the roof of the blister ruptures, the skin then sloughs off the body.
24. When a victim is strangled, the head becomes congested and fills with blood because the pressure on the neck prevents the blood from draining from the head. This generally causes the head of strangulation victims to decompose at a slightly faster rate than the rest of the body.
25. Burying a body delays decomposition and the changes that occur in a body following death. Generally, for purposes of decomposition, one week exposed to air is equal to eight weeks buried in dirt. Exposure to air and warmer temperatures generally speeds the rate of decomposition; burial in dirt cools the body and prevents exposure, delaying decomposition. Further, burial also can shield the body from insects; the presence of insects can often speed up the decomposition process.

C. Ms. Lee's Body Was in an Anterior (Face Down Position) While Lividity Fixed, Which Occurred No Less Than Eight Hours Immediately Following Her Death.

26. The Maryland Office of the Chief Medical Examiner's Post-Mortem Report on Ms. Lee's body indicates the presence of fixed anterior lividity ("Lividity was present and fixed on the anterior surface of the body...") ("... livor mortis was prominently seen on the anterior-upper chest and face."). The medical examiner who testified at Mr. Syed's trial, Dr. Korell, testified under oath that Ms. Lee's body showed fixed frontal lividity. Specifically, she stated, "The only thing I can say is that she had frontal livor, and that means in the front. I don't know where she was before she was buried." Tr. 78:16-18. Neither the post-mortem report nor Dr. Korell's testimony refers to the presence of any other lividity in Ms. Lee's body.
27. I have reviewed the black and white post-mortem photographs of Ms. Lee's body. Because of the poor quality of these photographs, I was not able to independently determine the lividity patterns on Ms. Lee but saw no finding inconsistent with the post-mortem report and Medical Examiner's sworn testimony that fixed frontal lividity was present in Ms. Lee's body.
28. I also have reviewed color photographs of the disinterment of Ms. Lee's body. In one photograph, there is faint lividity on the front of the body's left flank, which is consistent with fixed anterior lividity as the flank is the side of the torso and would be expected to show some pink in the front half if the body had anterior lividity. In another photograph, the body is on its right side with a view of the chest and abdomen. In this photograph, the lividity is of equal intensity on both sides of the chest. Collectively, these photographs are not inconsistent with the full frontal lividity that was described in the autopsy report and testified to by Dr. Korell at trial.
29. To result in fixed frontal lividity, Ms. Lee's body would have had to have laid face down in temperate location from the time lividity began to fix to the time lividity became fully fixed (at least eight to twelve hours following death) because it takes lividity eight to twelve hours to fix in such conditions.
30. If Ms. Lee's body was left in a location with cooler than temperate ambient temperatures following her death, it would take more than eight to twelve hours for lividity to become fixed.
31. Therefore, based on a reasonable degree of medical, pathologic and scientific probability, the body of Ms. Lee was in an anterior (face down) position from

approximately 2-4 hours following her death until at least eight hours immediately following her death, and possibly longer, resulting in fixed anterior lividity.

D. Ms. Lee Was Not Buried On Her Right Side For At Least Eight Hours Following Her Death.

32. I understand that Ms. Lee's body was found buried on its right side. This is reflected in the Post-Mortem Report ("The body was on her right side."), as well as photographs of the burial site.
33. The anterior fixed lividity pattern seen in Ms. Lee's body is not consistent with the body being buried on its right side within eight hours following her death. If she was buried on her right side within eight hours following her death, one would expect not see fixed anterior lividity. If Ms. Lee's body was on its right side as lividity began to fix, one would expect to see some right-sided lividity. If Ms. Lee's body had been placed on its right side before lividity fixed and remained in that position until lividity fixed, right-sided lividity would be present. Thus, if Ms. Lee's body had been buried on its right side within eight hours of death, there would be right-sided lividity present. Neither the post-mortem report nor Dr. Korell's testimony refers to the presence of lividity on either side of Ms. Lee's body.
34. I reviewed the post-mortem photographs to determine whether there was any variation in the shading of grey from left half of the body to the right half and there was not. I saw no evidence in these photographs of right-sided lividity. The photographs of the disinterment of Ms. Lee's body likewise do not show a lividity pattern fitting with a right-sided burial position within eight hours of death. The intensity of the lividity is equal on both sides of Ms. Lee's chest and support the anterior fixed lividity pattern. If Ms. Lee's body had right-sided lividity, then one would expect the left flank would be completely pale, which it is not in these photographs.
35. The lividity pattern observed with Ms. Lee's body is not consistent with a right-sided burial position within eight hours of her death, as lividity was fixed in the front of her body and not its right side. Consequently, she could not have been buried on her right side until more than eight hours following her death.
36. Therefore, based on a reasonable degree of medical, pathologic and scientific probability, Ms. Lee's body was not buried on its right side for at least eight hours following her death.

E. Ms. Lee's Body Likely Was Buried Eight to Twenty-Four Hours Following Her Death.

37. Based on my observation of the post-mortem photographs, as well as the autopsy report, skin slippage was present. This means that Ms. Lee's body had begun to decompose at the time it was found. The amount and distribution of skin slippage on the body in this case is what you would expect for a body buried in a shallow grave for about three to four weeks and then disinterred and examined.
38. The autopsy report provided that "rigor was broken to an equal degree in all extremities." The stiffness in Ms. Lee's body was likely from the cold, because her body had undergone changes as a result of decomposition, such as the skin slippage. Skin slippage and decomposition are evidence that the rigor mortis has already passed, and therefore, any stiffening of the body was due to cold temperatures.
39. According to the autopsy report, there were no decomposition changes noted to any of the internal organs. Specifically, the autopsy report noted that Ms. Lee's brain appeared normal and had good demarcation between grey and white matter structures. Typically, in a strangulation victim, the head decomposes at a rate faster than the rest of the body. According to the autopsy report, Ms. Lee's brain did not show any decomposition changes. If Ms. Lee had been buried more than twenty-four hours following her death, then there likely would have been more significant decomposition of the brain and internal organs than was present.
40. At the time Ms. Lee's body was found, it had begun to undergo changes that occur as part of decomposition, such as skin slippage. However, the levels of decomposition present indicate her body did not remain exposed to air for an extended period following her death.
41. Therefore, based on a reasonable degree of medical, pathologic and scientific probability, Ms. Lee's body likely buried within 24 hours of her death.

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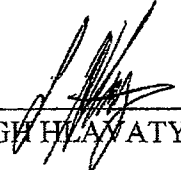
I solemnly affirm under the penalties of perjury that the contents of the foregoing affidavit are true and correct to the best of my knowledge, information and belief.

subscribed and sworn before me, this 14
day of October, 2016, a Notary Public
in and for Wayne County,
Michigan.


(Signature)

NOTARY PUBLIC

My Commission expires FEB 22, 2020


LEIGH H. W. A. T. Y., M.D.