



## Case Report

# Failure to Autopsy: The Otto Warmbier Case

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## Abstract

Coroner and medical examiner offices are charged with the medicolegal investigation of deaths to determine the cause and manner of death. We describe the recent high-profile case of Otto Warmbier, who tragically died shortly after his return in a coma from North Korea and in which the coroner failed to conduct a complete autopsy, and failed to satisfy the needs of the local, national, and international communities.

Medico legal death investigation offices, including both medical examiner and coroner offices, have a legal responsibility and duty to investigate deaths in the public interest for public safety and public health purposes. Although, they serve the families of the deceased as they can, their *raison d'être* and priority is service to the greater public good. Thus, they may conduct investigations and even autopsies over the objections of the next-of-kin. Full investigations include a complete forensic autopsy. The utilitarian public interest should, within the constraints of the office resources, drive the decision of whether to autopsy or not. Failure to autopsy can sometimes constitute a breach of faith that the public entrusts in these offices. Empirically, this seems to be a greater problem in coroner jurisdictions than in medical examiner offices. Specifically, we believe the recent case of Otto Warmbier is such a case.

## Case Report

Based on news reports this tragic story began in 2015 when Otto Warmbier, a 21-year-old college third year student at the University of Virginia, decided to go on a 5-day New Year's sightseeing adventure tour of North Korea [1,2]. While in his Pyongyang hotel, he attempted to take a propaganda poster ("Let's arm ourselves strongly with Kim Jong-Il's patriotism!" in Korean) from a staff-only area at 1:57 on the morning of New Year's Day, but it was too large to carry away [3-5]. This act was caught on video camera. As the tour group was to depart from the Pyongyang International Airport on January 2, 2016, Otto was detained and arrested. In a scripted February 29, 2016 news conference, Warmbier confessed to the "very severe and preplanned crime" of attempting to steal the poster [6]. At his trial in March 2016, he was found guilty of "hostile acts against the state" and sentenced to 15 years of imprisonment and hard labor [7].

During his imprisonment, Otto Warmbier was held in *communicado*, and reportedly slipped into a coma shortly after his sentencing in March 2016, approximately one month after detainment. More than a year passed before the North Korean officials disclosed his dire condition to the U.S. State Department on June 6, 2017. The North Korean officials further stated that Warmbier had contracted food-borne botulism shortly after his sentencing, and had fallen into a coma after taking a sleeping pill [8]. After diplomatic efforts to secure his release, Secretary of State Rex Tillerson announced his release on June 12<sup>th</sup>, three weeks after the notice to the State Department and 17 months after his detainment. The next day, June 13, 2017, he was flown by air ambulance to the University of Cincinnati Medical Center (UCMC) [9].

The UCMC doctors reported that he was stable but had contractures of his extremities and was in a state of unresponsive wakefulness or persistent vegetative state, in which the brain stem continues to function, but without conscious brain function [10-12]. Brain scans revealed Warmbier had suffered extensive loss of brain tissue throughout his brain, consistent with a cardiopulmonary event that caused global anoxia, although they stated that they did not know what caused the cardiac arrest. North Korean medical records and magnetic resonance imaging (MRI) brain scans sent with Warmbier documented extensive brain injury dating back to at least April, 2016 [13]. The UCMC doctors declared that they could find no evidence of active botulism and that radiologic imaging failed to locate evidence of acute or healing fractures or other evidence of trauma (specifically noting that there was no injury of the neck). On June 19, 2017, six days after being returned to the U.S., he was pronounced dead in the hospital at 2:20 am.

Reactions to his death were strong [14]. Senator John McCain called it murder. Senator Ben Cardin said, "Otto is dead because of Kim Jong-Il's repressive, murderous regime." Defense Secretary James Mattis said that his death after such a minor infraction, "goes beyond any kind of understanding of law and order, of humanity, of responsibility towards any human being" [12]. North Korean officials responded that their treatment of him was "humanitarian" despite his being a criminal and enemy of the state, that his death was a mystery, and that their country was a victim of a smear campaign [15].

The Hamilton County Coroner's Office in Ohio took possession of the body from the hospital. Otto Warmbier's family asked Dr. Lakshmi Sammarco, a neuroradiologist and the elected coroner, not to perform a complete autopsy, but rather merely to conduct an external inspection of the body [3,16-18]. The family did not offer a reason for their objection [19,20]. The office announced that the cause and manner of death were "pending", while waiting for medical records, images, air ambulance records, and interviews with the medical team that treated Warmbier. Otto Warmbier was buried on June 22, 2017 [21].

An external examination was conducted on June 19, 2017 at 5:20 PM at the Hamilton County Morgue. The final autopsy report was released 4 months after the death on September 28, 2017 [22]. The key features of the examination are shown in table 1.

On September 27, 2017, the Coroner's Office held a press conference and announced that they had concluded their investigation and publicly released their report [22]. The coroner certified the cause of death as "Complications of chronic anoxic/ischemic encephalopathy due to unknown insult more than a year prior to death" and the manner of death as "Undetermined". Dr. Sammarco responded to questioning that he died after arrival to the U.S. because his feeding tube was removed and ventral feedings were stopped. She also responded to questioning that Warmbier had not been tortured and that, in fact, he had been well cared for as evidenced by the good condition of the skin and lack of decubitus ulcers, given his contractures. The report also declared that there were "Two partially pigmented scars of the left lower leg and foot with multiple additional small scars" and then describes in more detail scars of the neck and lower extremities. Afterwards, Warmbier's father said that his son had been tortured and President Trump tweeted that Warmbier "was tortured beyond belief by North Korea".

## Discussion

In commenting on the Warmbier case, Dr. Brian Peterson, President of the National Association of Medical Examiners, stated, "A complete autopsy with a neuropathological examination could reveal numerous causes for brain injury" [4] and Dr. Cyril Wecht declared "it's a terrible mistake not to perform an autopsy" and then, "If you have something that could be anything other than a Natural death, you're obligated to do an autopsy" [4]. In our opinion, the autopsy should have been performed for the following six reasons:

**The national and international interests demanded it**



**Table 1:** Excerpts from the Coroner’s Report on Otto Warmbier.

General	The body is that of a well-developed, well-nourished adult man that weighs 160.5 pounds. The body measures 74.5 inches in length. The body mass index is 20.33 kg/m <sup>2</sup> . The body appears compatible with the stated age of 22 years. The nose shows no remarkable alteration. The lips and gums show a 4 mm nodule extending above the skin at the mucocutaneous margin of the right lower lip medial to a more lateral area of slight tissue retraction with central small pale scar. The teeth are natural and in good repair. The neck is supple, without masses, and the larynx is in the midline. The thorax is well-developed and symmetrical. The breasts are normally developed and symmetrical without palpable masses. The abdomen is relatively flat. The upper and lower extremities are symmetrical without absence of digits, but there are flexion contractures of the mid-arms, hands and wrists and extension contractures of the legs and feet and the feet also extend medially.
Identifying Marks and Scars:	There is a small pale scar of the midline dorsal presacral area. There are multiple very small scars of the dorsal chest. There is a round scar just above the sternal notch with mild retraction, consistent with a tracheostomy scar. There are two punctate pale scars overlying the right internal jugular area. There is a small purple scar involving the lower right prepatellar skin and another small purple scar just distal and lateral to the area of the right patella. There is a row of roughly parallel striae distensae over laying the right inguinal crease and proximal right femoral area. There is a small pigmented scar of the ventromedial right med lower leg. There is a large pigmented scar involving the skin of the junction of the left foot and ankle ventrolaterally. There is a large 4.3 x 1.6 inch irregular pigmented scar with paler areas involving the right foot. There is a slightly pigmented transverse somewhat oval scar involving the ventral proximal left upper arm.
External Evidence of Injury	<p>Head and Neck: There are puncture eschars, venous distention, and yellow remnants of pink contusions involving the skin overlying the left internal jugular area of the neck.</p> <p>Torso: In addition to the puncture with fading contusions of the right lower abdomen, there is a small fading contusion of the lower lumbar midline.</p> <p>Upper and Lower Extremities: There are two small contusions of the dorsal right mid arm. There are small contusions proximal to the olecranon process in the distal left upper arm. There is a small contusion just lateral to the left patellar skin. There are two small contusions involving the lateral surface of the right thumb. There are three small contusions involving the lateral surface of the left thumb.</p>
Diagnosis:	<ol style="list-style-type: none"> <li>1. Chronic anoxic/ischemic encephalopathy             <ol style="list-style-type: none"> <li>A. Flexion contractures of the upper extremities</li> <li>B. Extension contractures of the lower extremities</li> </ol> </li> <li>2 Two partially pigmented scars of the left lower leg and foot with multiple additional small cutaneous scars.</li> </ol>
Cause of Death:	Complications of chronic anoxic/ischemic encephalopathy due to unknown insult more than a year prior to death.
Manner of Death:	Undetermined

The relationship between the United States and the Republic of North Korea at the time was tense. In fact, many considered that North Korea was the single most important issue facing the administration. North Korea had conducted several nuclear tests and fired several missiles. Furthermore, the public rhetoric between Prime Minister Kim Jong Il and President Donald Trump was increasingly tense and bombastic. Given the international ramifications, the fullest investigation was warranted.

**Mystery surrounded the death and there was no obvious explanation evident**

In this case, a young healthy person was taken custody by North Korea, but was returned comatose and died shortly thereafter. What happened during this time is unknown due to the communication blackout. Although Warmbier clearly suffered extensive brain damage, there was no reason apparent from an external examination or from the medical records that would explain the reason for the brain damage. At the press conference of September 27<sup>th</sup>, Dr. Sammarco commented: “One of the frustrating things is the lack of information about what happened to him in North Korea... All we can do is to theorize, and we hate to theorize without science backing us up...” Further investigation was needed.

**The history given to explain the death was suspicious**

The rationale given by North Korean diplomats for Warmbier’s condition was



that he had succumbed to botulism and sleeping pills. While botulism could have caused diaphragmatic paralysis and resultant cerebral anoxic damage, there is no other clinical information to support such a diagnosis that has been given. While an overdose of sleeping pills could have caused respiratory depression and resultant cerebral anoxic damage, this would require taking several pills-although it is possible that he hoarded pills and attempted a suicidal overdose. So the given reasons may be plausible, but appear somewhat dubious. It seems odd that two independent explanations are given and both conditions would be difficult to prove or disprove a year later. Communications from the North Koreans was notoriously unreliable and here they would have a motive to cover-up for any ill deeds, if such were the case. Given the possibility of an unreliable history, further investigation was warranted.

### **This was a case of possible homicide**

It is clearly possible and was suspected by many that the North Koreans did something to Warmbier that resulted in his condition and ultimate demise, justifying a determination of homicide. An accidental or natural manner is also possible. The Coroner's Office seems to recognize the possibility of homicide, when they declared the manner of death to be undetermined. Murder investigations demand autopsies.

### **Suspicious and possible evidence of torture existed**

Speculation abounded that Warmbier was tortured by the North Koreans, including by the parents and President Trump. American missionary Kenneth Bae, a former captive of North Korea, reported that torture was common among those imprisoned [23]. It is conceivable that cerebral anoxia could be caused from gagging, perhaps from overly aggressive water-boarding, or even from a pulmonary thromboembolus resulting from being strapped to a chair for a prolonged period of time. Furthermore, the finding of scars (particularly the 4.3x1.6 inch scar of the right foot dorsum), although not considered to be from torture by the coroner's office, should have triggered a suspicion of such and an autopsy should have been conducted to further explore the possibility. Torture is sometimes performed in a way to specifically avoid external injury, but may still show internal injury upon dissection. Any evidence of torture, whether resulting in death or not, would have been of great interest to the family, the U.S., and the international community as a human rights violation [24].

International law firmly establishes a right to be free of torture. The Universal Declaration of Human Rights; the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (UNCAT), and the International Covenant on Civil and Political Rights; all expressly outlaw it. The Democratic People's Republic of Korea is a signatory of only the last. North Korea is also a signatory to the 1949 Geneva Convention and the 1977 Additional Protocols I and II, which includes the Common Article III that bars torture, cruel, inhumane, and degrading treatment during wartime. It is of note that the U.S. Constitution bars cruel and unusual punishment. The Istanbul Protocol [25] is a United Nations manual on the documentation of torture in the living and the Minnesota Protocol (updated in 2016) [26] is a United Nations manual on investigations of unlawful deaths that includes a section on autopsy; guidance on forensic autopsies is given Forensic Autopsy: Manual for Forensic Pathologists, UN Office of Drugs and Crime, October 2015. The assumption is that an autopsy should be performed. The Minnesota Protocol clearly states that a forensic investigation including a complete autopsy is legally warranted in cases of death that may have been caused by acts or omission of the State, deaths that occurred when a person was detained by the State, or deaths that occurred where the State may have failed to meet its obligation to protect life [26]. The Protocol also states that the state (Ohio) has a duty to investigate any suspicious death, deaths where reasonable allegations of a potentially unlawful death, or even where it is not alleged or suspected that the State caused the death or unlawfully failed to prevent it [26]. The Protocol outlines the state's legal obligations

and standards relating to the forensic investigation. They include the standard autopsy protocol that includes an External and Internal Examination. A key provision of the investigation is that the investigators must be independent of undue influence, allow to perform their functions without intimidation, hindrance, harassment, or improper influence [26].

While, forensic pathologist in the U.S. rarely encounter “true” cases of torture they need to understand and interrupt features of torture [24]. Autopsies are the only scientific way to provide the cause of death among detainees, death in custody, political prisoners, and, POWs and ascertain the truth behind how injuries associated with acts of torture [24,27-30]. Many methods of torture present with minimal external signs therefore requiring a unique and even more detailed internal examination than a forensic pathology typically conducts [24]. For example injuries to the head and the anterior/posterior regions of the torso are common. However, these types of injuries result on limited or minimal bruising externally therefore, musculocutaneous dissection of these areas is required [24]. A common form of torture is blunt injuries to the soles of the feet, referred to as falanga. Externally this method of torture is normal externally only by dissection of the foot would reveal subcutaneous and subplantar fascial hemorrhage. Injuries to the musculocutaneous system involve the back, buttocks, thigh, and leg also shown minor external signs. Another common type of torture, that of suspension (reverse hanging), can only be confirmed by a dissection of the shoulder joint. Histological examination is an important element of the forensic investigation and injury evaluation. This evaluation will provide timing of the injury and indication of infections [24]. Besides the obligation of the coroner to determine the cause and manner of death the results of the investigation has ramification if international criminal prosecution charges are procured [24].

### **The rationale for not conducting the autopsy was insufficient**

In her press conference of September 27<sup>th</sup>, Dr. Sammarco stated: “We felt nothing of significance was going to be gained from an autopsy and we honored the family’s wishes.” The conclusion that nothing would be gained is speculative. She, nor anyone else, knows if an autopsy would have revealed any new findings. It is clear that she thought that a new revelation from the autopsy would be unlikely after a year’s time, and perhaps it was, but this should not be left to speculation-the significance of the case demanded that we know and the only way to know is to perform the autopsy. She relied on the MRI scans of the head and neck to diagnose anoxic encephalopathy, no trauma to the neck, and no healing or healed fractures of any bones. As a neuroradiologist, she has expertise in reading the MRI scans and would normally rely on her interpretation for clinical patient care. However, MRI scans can be misinterpreted [31] and it is not uncommon for an autopsy to reveal pathology not seen by radiology, even advanced imaging techniques [32]. There was no need to rely on them here, where an autopsy could have been definitive in this regard. Even the more sensitive CT scan is not a substitute to a complete autopsy. A 2007 study examining the correlation between the autopsy and CT as it related to sensitivity, specificity, and positive predictive values reported sensitivity ranging from 0-75% and overall an inadequate forensic tool for the detection of traumatic injuries (32). Additional studies on post-mortem imaging reported that the cause of death is frequently missed using CT and MRI as a method of cause of the diagnosis or in trauma cases [33,34]. At this point post-mortem imaging is not a substitution for the physical autopsy [35].

Finally, she commented that she honored the wishes of the family not to autopsy their son. The public interest, not the private interest of the family, should control the decision here, where the public interest is very strong. Families often initially, while their grieving is fresh, express their desire that an autopsy not be performed, only to later wish an autopsy had been done to answer their questions [36-40].



An autopsy may have disclosed a specific etiology to explain a natural death, such as myocardial infarction, arrhythmogenic right ventricular cardiomyopathy, or pulmonary blebs which could have resulted in a spontaneous pneumothorax. Furthermore, traumatic injury, not seen externally would also be important and should have been ruled out to the maximal extent possible. Ultimately, such findings would bear on the manner of death—a ruling of homicide would have had international repercussions and an undetermined manner, as is the case here, seems unsatisfactory.

In a number of high profile cases, such as that of Mary Jo Kopechne (traveling with Senator Edward Kennedy) [41,42], Lester Jordan (father of Michael Jordan) [43], and Supreme Court Justice Antonin Scalia [44,45], the failure to perform an autopsy resulted in significant speculation at best and failure to accurately ascertain the cause of death and the manner of death at worst. In the case of Kopechne, a lay Pennsylvania judge was moved by the family's desire not to disturb her burial, after Massachusetts medical examiners learned of the death and pressed for an exhumation and autopsy; the latter two cases were decisions of a coroner and a justice-of-peace acting as a coroner.

Coroners appear to be more likely to capitulate to families' desires not to do an autopsy than medical examiners. Autopsy rates for coroner jurisdictions are generally lower than for medical examiner offices. Most coroners are elected and are more sensitive to the desires of their citizen constituents. As mentioned above, families will commonly not want an autopsy initially; but later will regret not having the answers, peace of mind, and closure that an autopsy can provide. Because coroners often serve smaller counties, there are repercussions to their decisions and actions within their communities, beyond non-reelection. On the other hand, medical examiner offices, headed by appointed forensic pathologists, see their jobs as providing scientifically and medically accurate determinations of causes and manners of death. Thus, medicolegal death investigation is more likely to be politicized in coroner jurisdictions than in Medical Examiner Offices.

In Ohio, the coroner is elected every four years and, unlike in most states must be a physician, however, the coroner is not required to be a forensic pathologist—but instead can be any licensed physician regardless of their knowledge of medicolegal death investigation. In this case, Dr. Sammarco was appointed by the Hamilton County Democratic Party's Central Committee in 2012 [46], after the previous coroner died unexpectedly in office, and then later elected to coroner in 2013 without any previous experience in medicolegal death investigation [47].

Coroners may feel that they need to find a balance between the feelings of the next-of-kin and the roles and duties of the coroner's office, but this is a misguided premise. Those charged with the responsibility of determining the cause and manner of death have a duty not only to the decedent and the family of the decedent, but also to the community they serve to conduct a complete and thorough investigation. The coroner or medical examiner must speak for the dead. The postmortem examination represents the final examination of the body to determine the true cause of death. Their duty to ascertain the cause and manner of death is paramount and should supersede other considerations. Those medicolegal death investigation authorities failing to execute their duties may result in murders going undetected, leave questions unanswered, and fuel rumors and conspiracy theories. The Otto Warmbier case is unfortunately among the latest examples of failure to fully execute the duty to ascertain the cause and manner of death of individuals dying under their jurisdiction.

In summary this case exemplifies not only the main weaknesses of the Coroner's system but also illustrates that even within a Medical Examiner's office with their legal authority they can fail to perform their responsibility to conduct a complete and thorough postmortem examination. In this case the medical examiner capitulated to



the wishes of the next-of-kin resulting in failure to ascertain the true cause and manner of death, put to rest rumors and conspiracies, and to provide forensic data about a possible torture of an American citizen.

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