

Case Studies – Challenges in Determining Manner of Death

Jacob Brigham Smith, MD
Associate State Medical Examiner
Iowa Office of the State Medical Examiner

Mind Your Manners

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I have no financial relationships to disclose for this presentation

Objectives

- Use interesting cases to illustrate important points of death investigation, forensic pathology, and cause and manner of death determination

Cause and Manner of Death

- Cause of Death
 - Disease or injury that causes death
 - Underlying disease or injury not mechanism
 - Gunshot Wound of Head – Good COD
 - Exsanguination – Bad COD
 - Atherosclerotic Cardiovascular Disease – Good COD
 - Cardiopulmonary Arrest – Bad COD
 - Very dependent on autopsy findings
- Manner of Death
 - How cause of death came about
 - Very dependent on investigation and scene information

Manners of Death

- Homicide
 - Death at the hands of another
 - Willful action regardless of intent to kill
 - Not equivalent to “murder” or legal definition of homicide
- Suicide
 - Death at one’s own hands
 - Intent to kill or action with a high likelihood of death
- Accident
 - Due to accidental occurrence
- Natural
- Undetermined
 - Not enough information to determine
 - 2 or more equally likely manners

Case 1

- > 72 yo female with multiple medical problems
- > Presented to her PCP with rectal bleeding
- > Colonoscopy
 - > Large polyp snared and removed
 - > In postop her abdomen became distended and she coded and was not able to be resuscitated
 - > Concern that she had a perforated colon

Case 1

- > Should a forensic autopsy be performed?

Case 1

- > No – a hospital autopsy may be helpful but this is not a case for a forensic autopsy
- > A known complication of an appropriate procedure to treat a natural disease – Manner of Death is still natural
- > COD: Complications of Colon Polyp
- > MOD: Natural

Lessons to Learn

- > Just because a person dies in a hospital after a procedure does not mean that a forensic autopsy has to be performed
- > Just because a death is reported to the medical examiner's office does not mean that a forensic autopsy must be performed
- > A known complication of an appropriate procedure to treat a natural disease is a natural death
- > Hospital pathologists can and SHOULD perform autopsies of individuals that die in a hospital
 - > This should not be seen as a conflict of interest, they should be unbiased and impartial and this is their job

Case 2

- > 65 yo Male
- > H/o alcoholism and hypertension
- > Wife (lives in apartment above him) heard a thump and came to investigate
- > Found in doorway of bedroom bleeding from neck with broken wine glass next to him
- > Put sheet on neck but couldn't stop bleeding
- > EMS arrived but he arrested and was unable to be revived

Case 2

- > Irregular stab wound of neck consistent with the broken wine glass
- > No injury to carotid arteries or jugular vein
- > But.....

Case 2

- > COD: Stab Wound of Neck
- > MOD: Accident

Case 3

- > 41 yo male with gunshot wound of head
- > Drinking with a friend in friend's basement
- > Friend had a handgun and they began shooting into a bullet trap
- > Decedent then put the gun to his head and shot himself
- > Friend called 911
- > Found in beanbag chair with can of beer and handgun
- > No known medical or psychiatric history
- > Treated as a suicide

Case 3

- > Autopsy
 - > Contact range gunshot wound on right temporal scalp
 - > Exit gunshot wound behind left ear
 - > No other concerning natural disease or other injuries

Case 3

- > Autopsy
 - > Contact range gunshot wound on right temporal scalp
 - > Exit gunshot wound behind left ear
 - > No other concerning natural disease or other injuries
 - > Consistent with suicide
- > But look at the scene photos....

Case 3

- > Police talk to the friend again
 - > Decedent and friend got into a fight over the gun
 - > Friend pulled the trigger while gun was next to decedent's head
 - > Claims he didn't mean to pull trigger and was trying to stop friend from shooting himself
 - > Put gun and beer in decedent's hand so it looked like a suicide

Case 3

- > COD: Gunshot Wound of Head
- > MOD: Homicide

Case 4

- > 60 yo Female
- > Husband and her were in an argument
- > He says she went into their bedroom and poured lighter fluid on herself and then lit herself on fire
- > He called 911
- > She was taken to a hospital and later declared brain dead

Case 4

- > Autopsy/Hospital Records
 - > Cutaneous burns (38% body surface area)
 - > Mostly of head and upper body in a pouring/splashing pattern
 - > Soot in airways
 - > Erythema and edema of airways
 - > Carboxyhemoglobin level of 28.6%

Case 4

- > Autopsy/Hospital Records
 - > Cutaneous burns (38% body surface area)
 - > Mostly of head and upper body in a pouring/splashing pattern
 - > Soot in airways
 - > Erythema and edema of airways
 - > Carboxyhemoglobin level of 28.6%
- > Police investigation
 - > Fire damage confined to bedroom
 - > History of domestic disputes involving both decedent and husband
 - > Melted cigarette lighter in bedroom
 - > No lighter fluid in bedroom, only lighter fluid was outside another apartment

Case 4

- > COD: Thermal Injuries and Inhalation of Products of Combustion
- > MOD: Undetermined

Case 5

- > 2 month old Male
- > Placed to sleep on an adult bed by an aunt
- > Mother and Grandmother were drinking and then laid down to sleep in the same bed as the infant
- > Mother awoke and found infant unresponsive, face down, and under grandmother

Case 5

- > Autopsy
 - > Blanching lividity on the forehead, right cheek, and around mouth and nose
 - > No evidence of natural disease or trauma
 - > Microbiology testing and toxicology unremarkable

Case 5

- COD: Asphyxia due to Overlay
- MOD: Accident

Case 6

- 18 yo Male
- Found naked in his dorm room with a sheet around his neck and around his bed post
- Pornography was found on his cellphone next to him
- No history of suicidal ideation or past suicide attempts

Case 6

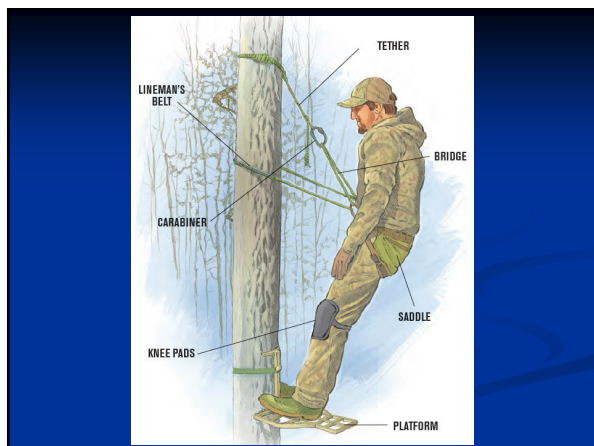
- Autopsy
 - Ligature furrow around neck
 - No evidence of natural disease
 - Toxicology only showed low level of ethanol

Case 6

- COD: Ligature Hanging
- MOD: Accident
- Autoerotic asphyxia

Case 7

- 43 yo male
- Was practicing bow hunting from a saddle tree stand
 - Hammock-like seat with a rope to raise and lower seat



Case 7

- > 43 yo male
- > Was practicing bow hunting from a saddle tree stand
 - > Hammock-like seat with a rope to raise and lower seat
- > Fell out of the seat and was found by another hunter
 - > Suspended 6ft off the ground upside down by the rope around his torso
 - > Initially responsive
 - > Other hunter attempted to get him down but was unable and called 911
 - > Prior to EMS arrival the decedent went unresponsive
 - > Resuscitation was attempted but was unsuccessful

Case 7

- > Autopsy
 - > Congestion of the head, neck, and upper torso
 - > Cardiomegaly
 - > Moderate coronary artery atherosclerosis
 - > Obesity (BMI of 39.5)
 - > Hydrocele of right testis
 - > Toxicology : caffeine

Case 7

- > COD: Positional Asphyxia
- > MOD: Accident

Lessons to Learn

- > Thorough investigation is extremely important
- > Scene photos are extremely important and can make a big difference on proper determination of cause and manner of death
 - > Good scene photos are even better
- > Don't be afraid to ask police and other investigating agencies to go back and ask more questions and do more investigation
- > Determination of cause and manner of death may need to wait until all questions have been answered and information gathered

Case 8

- > 44 yo male
- > Homeless living with a friend
- > When friend went to sleep he was on the floor near an air vent and didn't want to move
- > When friend checked on him a couple of hours later he was unresponsive

Case 8

- > Autopsy
 - > Cardiomegaly (530 grams)
 - > Hepatic steatosis
- > Toxicology
 - > Drugs of abuse and alcohol – negative
 - > Acetone, vitreous: 17 mg/dL
 - > Acetone, blood: 11 mg/dL
- > Vitreous Chemistry
 - > Glucose: 884 mg/dL

Case 8

- > COD: Diabetic Ketoacidosis
- > MOD: Natural

Case 9

- > 51 yo Male
- > Unknown individual went into a hospital and called security to let them know there was a body on fire under the bridge next to the hospital
- > Security investigated and found a homeless man on fire

Case 9

- > Autopsy
 - > Lacerations and abrasions of head
 - > Contusions of head and neck
 - > Basilar and calvarial skull fractures
 - > Epidural and subarachnoid hemorrhages
 - > Cerebral contusions
 - > Fractures of hyoid bone and thyroid cartilage
 - > Thermal injuries involving 85% of body surface area

Case 9

- > Was he burned alive or after he died? How can we tell?
- > No soot or thermal injury of airways
- > Carboxyhemoglobin level of 3.3%

Case 9

- > COD: Blunt Force Injuries of the Head and Neck
- > MOD: Homicide

Case 10

- > 7 yo Female
- > Found unresponsive in bed in the morning
- > Had been swimming the day before
- > She complained of aches and pains and mom gave her either liquid Tylenol or ibuprofen
- > Recently diagnosed with hyperlipidemia

Case 10

- > Autopsy
 - > No evidence of trauma
 - > Mild obesity was only natural disease found
 - > Had a foam cone and frothy fluid in airways
- > Toxicology
 - > Methadone, blood: 0.29 mg/L
 - > EDDP, blood: indicated
 - > Acetaminophen, blood: 1.5 mcg/mL
- > Further Police Investigation
 - > Mom and dad both have methadone prescriptions
 - > Mom recently put methadone in a liquid Tylenol bottle in order to take it with her on a trip
 - > Thought she had thrown the bottle away

Case 10

- > COD: Acute Methadone Intoxication
- > MOD: Accident
- > Accident vs Homicide
 - > Action of giving "Tylenol" was willful
 - > Not acutely aware that "Tylenol" was actually methadone
 - > Therefore it is an accident
 - > Parents plead guilty to negligence resulting in the death of a child

Case 11

- > 28 yo Female
- > H/o bipolar disorder and past suicide attempts
- > Had an argument with her boyfriend after they were drinking
- > Boyfriend then said she went and took a large quantity of Benadryl
- > She became drowsy and he put her to bed
- > In the morning he found her unresponsive

Case 11

- > Autopsy
 - > No evidence of significant natural disease or injury
- > Toxicology
 - > Diphenhydramine, blood: 11600 mcg/L
 - > Dextromethorphan, blood: 25000 mcg/L

Case 11

- > COD: Acute Mixed Drug Intoxication (Diphenhydramine and Dextromethorphan)
- > MOD: Suicide
- > Why suicide?
 - > History indicates a willful ingestion of an excess amount of medication
 - > Postmortem drug levels are extremely high
 - > Past history of suicide attempts

Case 12

- > 59 yo Male
- > Was driving with wife, daughter, and granddaughter
- > Trying to take granddaughter to a medical clinic due to an allergic reaction
- > Granddaughter vomited and he sped up to get to clinic sooner
- > Lost control of vehicle and went onto grass, hit some mailboxes and ran into a cement pillar housing a vacuuming unit at a car wash
- > He was unresponsive and never regained consciousness
- > Everyone else unharmed

Case 12

- Autopsy
 - No external injuries
 - No internal injuries
 - Hypertensive and atherosclerotic cardiovascular disease
 - Pacemaker
 - Obesity and Diabetes
- Further Investigation
 - Wife states that he stopped responding to her right before losing control of the vehicle
 - Pacemaker interrogation – around the time he lost control of the vehicle he had a 10 minute episode of ventricular fibrillation

Case 12

- COD: Ventricular Fibrillation
- Due To: HACVD
- OSC: DM and Obesity
- MOD: Natural

Lessons to Learn

- It is important to autopsy drivers in motor vehicle accidents that die prior to extensive work up in a hospital
- Even cases with seemingly obvious causes of death may not turn out to be what you thought
- Medicine, including forensic pathology, is both a science and an art
- Determination of manner of death is a combination of autopsy findings, investigative information, scene findings, past history, etc

Case 13

- 21 yo Female
- Found unresponsive outside in freezing temperatures wearing this.....

Case 13

- Had been at a rave and then went to a house party
- Was kicked out of the house party because she spilled beer on some marijuana
- Video shows her stumbling around and crawling on the sidewalk before going unresponsive

Case 13

- Autopsy
 - No "classic signs" of hypothermia
 - Abrasions of chin and hands
 - No evidence of significant natural disease
- Toxicology
 - MDMA, blood: 33 mg/L
 - Ethanol, blood: 0.148 g/dL

Case 13

- COD: Hypothermia
- OSC: Acute Mixed Drug Intoxication (MDMA and Ethanol)
- MOD: Accident

Case 14

- 64 yo Male
- Maintenance worker for a food company
- In the winter at the end of each day he would go on the roof to shut off the water supply and drain the pipes in order to prevent freezing
- He didn't come home from work
- The next morning he was found on the roof like this....

Case 14

- Autopsy
 - No "classic signs" of hypothermia
 - Severe atherosclerosis, s/p bypass grafting with patent bypass grafts
 - Hypertensive cardiovascular disease
 - Cardiomegaly (600 grams)
 - Left ventricular hypertrophy
 - Nephrosclerosis
 - Minor abrasions of head
 - Toxicology negative

Case 14

- COD: Atherosclerotic and Hypertensive Cardiovascular Disease
- MOD: Natural

Case 15

- 17 yo male
- Decedent and friends had lifted weight and then went to swim in a local lake
- While swimming decedent grabbed his chest and stated “my chest hurts really bad, I can’t breath”
- Decedent then disappeared under water without a struggle
- Friends were unable to retrieve the decedent and called 911
- Decedent was removed from the water after about 1 hour and was pronounced dead

Case 15

- Autopsy
 - No significant injury
 - No significant natural disease in organs examined
 - Toxicology: caffeine and delta-9 THC
- Neuropathology
 - Normally developed brain
 - Focal hypoxic ischemic neuronal injury – likely due to drowning
- Cardiac Pathology
 - Single focus of active lymphocytic myocarditis involving the atrioventricular node
 - Borderline cardiomegaly with four chamber enlargement and biventricular hypertrophy
 - Patent foramen ovale
- Serology for tissue donation: positive for CMV

Case 15

- > COD: Drowning
- > OSC: Active Lymphocytic Myocarditis Involving the Atrioventricular Node: Borderline Cardiomegaly with Four Chamber Enlargement and Biventricular Hypertrophy
- > MOD: Accident

Lessons to Learn

- > Environment in which a person dies is important
 - > When a natural death occurs in a hostile environment, the environment usually trumps that natural death
 - > Had the person had their natural event in a different environment they may have survived (But for...)
- > Medicine, including forensic pathology, is both a science and an art
- > Determination of manner of death is a combination of autopsy findings, investigative information, scene findings, past history, etc

Case 16

- > 50 yo male
- > Wife left the house at 1800 for a work function when she returned at 0045 she found him unresponsive on the bedroom floor
- > 24 years ago he had been shot in the chest
- > The bullet had passed through his heart and was still in his back

Case 16

- > Autopsy
 - > Evidence of surgical intervention of the heart, including scarring of the left ventricular wall
 - > Dilated cardiomyopathy (670 grams)
 - > Peripheral edema and pulmonary congestion and edema
 - > Projectile recovered from 9th thoracic vertebra
 - > Abrasions and contusion of head

Case 16

- > COD: Complications of Remote Gunshot Wound of Chest
- > MOD: Homicide

Case 17

- > 58 yo female hospitalized for pneumonia and subsequently died
 - > Beaten and raped approximately 2 years prior to her death
 - > Has been comatose since that time
 - > Death not reported by hospital
 - > Reported by funeral home after embalming

Case 17

- > Autopsy revealed:
 - > Chronic (organized) subdural hematoma
 - > Diffuse gliosis and neuronal loss
 - > Acute bilateral bronchopneumonia
 - > Hypertensive cardiovascular disease (410 gram heart, nephrosclerosis)
- > Review of Medical Records (April 2011):
 - > Subdural hemorrhage, subarachnoid hemorrhage, left interventricular hemorrhage, contusions of the left frontal and right temporal lobes, diffuse axonal injury
 - > Multiple rib fractures; Fracture of 2nd lumbar vertebra
 - > Lacerations of liver and spleen; retroperitoneal hematoma

Case 17

- > COD: Complications of Blunt Force Injuries of the Head
- > MOD: Homicide

Case 18

- > 58 yo Male
- > Found on the floor of his bathroom
- > Was assaulted 6 months earlier and recently complained of dizziness
 - > Was hospitalized for 3 days
 - > Thin acute SDH
 - > Fractures of L1-4 transverse processes and retroperitoneal hemorrhage

Case 18

- > Autopsy
 - > No significant acute injuries
 - > Subarachnoid hemorrhage over base of brain

Case 18

- > Autopsy
 - > No significant acute injuries
 - > Subarachnoid hemorrhage over base of brain
 - > Atherosclerotic and hypertensive cardiovascular disease
 - > Atherosclerosis of cerebral arteries
 - > Ruptured cerebral aneurysm of basilar artery

Case 18

- > COD: Ruptured Cerebral Aneurysm
- > OSC: AHCVD
- > MOD: Natural

Lessons to Learn

- When an immediate cause of death can be linked to or is a consequence of a previous injury the manner of death should reflect the manner of the previous injury
- Just because a person suffered a previous injury it does not mean that their death is related to that injury

Case 19

- 57 yo Male
- On his porch when a stranger approached him and asked for a cigarette
- When he refused the man shot him in the lower extremity
- He was alert with minimal bleeding when EMS arrived and transported him to a hospital
- Coded after being administered contrast for a CTA of his lower extremity

Case 19

- Autopsy
 - Penetrating gunshot wound of right thigh, no vascular or boney injury
 - Severe atherosclerosis
 - Occlusion of RCA
 - 75% stenosis of LAD and LCx
 - Remote MI
 - Hypertensive cardiovascular disease
 - Cardiomegaly (690 grams)
 - Left ventricular hypertrophy (2.0 cm)

Case 19

- > COD: Complications of Gunshot Wound of the Right Thigh
- > OSC: AHCVD
- > MOD: Homicide

Lessons to Learn

- > The inciting event leading to the decedent's death dictates the manner of death
- > But for.....
 - > Decedent died from an allergic reaction to contrast But had they not been shot they would not have been administered contrast
 - > Decedent died from transfusion reaction But had they not been in a MVA they would not have need a massive transfusion
 - > Decedent died from a cardiac arrhythmia But had someone not shot at them they may not have had the arrhythmia

Case 20

- > 26 yo Female
- > Driving car with mother in front seat with unrestrained infant on her lap and an unrestrained 3 year old in the back seat
- > Decedent's boyfriend is a security guard and his gun was in a holster in the car
- > Decedent took gun out of the holster and placed it under the front seat
- > Gun slide back to the 3 year old who fired the gun through the drivers seat and hit the decedent

Case 20

- Autopsy
 - Entrance gunshot wound on back
 - Exit gunshot wound on chest
 - Pathway through right lung, IVC, and heart

Case 20

- COD: Gunshot Wound of the Back
- MOD: Accident

Lessons to Learn

- The purpose of firing a gun is to kill something
- Majority of gunshot deaths will be homicide or suicide
- However, need to consider the circumstances and development level of the shooter
- “Do No Harm”

Resource

- "A Guide for Manner of Death Classification" by the National Association of Medical Examiners

GO COUGARS