

## POSTMORTEM EXAMINATION

Tsosie, Maddison

OMI Case Number: 2023-03069

Year of Birth: 2022

Age: 0 years

Date/Time of Death Pronouncement: 4/28/2023 3:14:00 PM

County Pronounced: San Juan

Law Enforcement: FBI Farmington

Agent: SA Lorraine Hardy

Central Office Deputy Medical Investigator (FDMI): Joshua Trujillo

Type of Examination: Autopsy

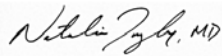
Date of Examination: 4/29/2023

### CAUSE OF DEATH:

Complications of blunt head trauma

### MANNER OF DEATH:

Homicide



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Natalie Taylor M.D.

08/07/2023 11:54:23 AM



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Emily D Helmrich D.O.

08/07/2023 11:54:23 AM

**FINAL PATHOLOGIC DIAGNOSIS:**

- I. Complications of blunt head trauma
  - A. Two separate linear non-displaced skull fractures, left parietal and left occipitoparietal skull
    - 1. Overlying subgaleal hemorrhages
  - B. Acute and organizing subdural hemorrhages
    - 1. Bloody cerebrospinal fluid
  - C. Acute and organizing subarachnoid hemorrhages
  - D. Diffuse axonal injury, traumatic axonal pattern
  - E. Bilateral optic nerve sheath hemorrhages
    - 1. Organizing subdural membrane of the right optic nerve
  - F. Dehydration
    - 1. Dry mucosa membranes and sunken eyes
    - 2. Hypernatremic dehydration with kidney injury, by vitreous fluid analysis
      - a. Sodium (159)
      - b. Chloride (144)
      - c. Urea nitrogen (119)
      - d. Creatinine (1.3)
    - 3. Polarizable crystals, renal collecting ducts
    - 4. Decreased appetite prior to death
  - G. Bilateral distal pulmonary thromboemboli
  - H. Small hemorrhage, left lower palpebral conjunctiva
  - I. Small abrasion, left upper lip
  - J. See separate Neuropathology Report for additional details
- II. Body weight (5.855 kg), 5th percentile

**NARRATIVE SUMMARY AND OPINION:**

Maddison Tsosie was a [REDACTED] girl who, according to reports, was noted to have decreased appetite and a change in sleep patterns (sleeping for shorter periods of time) in the days leading up to her death. [REDACTED]

[REDACTED] Family reported that Maddison had not experienced any recent injuries or falls. [REDACTED]

To determine the cause of this unexpected death in an otherwise healthy baby, an autopsy was performed. External examination showed a normally-developed infant girl who appeared dehydrated. There was a small hemorrhage on her left inner eyelid and a small abrasion on her left upper lip. Internally, there were two separate skull fractures, which were associated with areas of bleeding on the overlying skull surface. There was blood under the membrane that covers the brain (subdural hemorrhage), which also extended into her spinal canal. Focal areas of bleeding were also on the brain surface (subarachnoid hemorrhages). The distal branches of the arteries in the lungs contained blood clots (pulmonary thromboemboli).

Viral testing of the lungs and nasopharynx was negative. Bacterial cultures from multiple body sites grew multiple bacteria consistent with postmortem contamination and/or overgrowth. Notably, no evidence of infection was present on microscopic examination of the tissues.

Analysis of the vitreous eye fluid showed changes consistent with dehydration and acute kidney injury.

Expanded toxicology testing of the blood was negative.

A specialized brain examination performed by a neuropathologist showed diffuse axonal injury (DAI) in a traumatic axonal pattern, which is due to tearing of nerve fibers (axons) from injury. The microscopic appearance of the subdural hemorrhage had features suggestive of different ages, one of which the injury was consistent with occurring 24 hours or less prior to death; the other had an organizing component which was consistent with injury 13-25 days prior to death. The microscopic appearance of the subarachnoid hemorrhage had features suggestive of different ages as well; one of which was four hours or less prior to death, and the other had an organizing component which was consistent with injury 10-14 days prior to death. These injuries could have resulted in symptoms such as changes in sleep patterns and eating habits, headache, nausea, vomiting, fatigue, coma, and/or death.

The available information and examination findings indicate that Maddison died from complications of blunt head trauma. Her reported altered mental status (decreased appetite, change in sleeping patterns, and eventual unresponsiveness) is likely secondary to her injuries and subsequent dehydration. Additionally, pulmonary thromboemboli were present in this case, and can develop secondary to trauma. The presence of two separate skull fractures without explanation, diffuse axonal injury, and blood around the brain at varying ages, indicates that the manner of death is best classified as homicide.

## EXTERNAL EXAMINATION

### **GENERAL**

An autopsy is performed on the body identified as MADDISON TSOSIE at the Office of the Medical Investigator, State of New Mexico, on April 29, 2023, beginning at 0925 hours. The body is that of a well-developed, well-nourished infant female, without dysmorphic features, who appears consistent with the stated age [REDACTED]. Maddison weighs 5.855 kg (at the 5th percentile for age), has a crown-heel length of 64 cm (at the 25th-50th percentile for age), and a head circumference of 41.4 cm (at the 25th percentile for age). An identification band is around the left wrist bearing the decedent's name. The body is received clad in a diaper. A bottle containing apparent herbaceous material in water is also received and saved as evidence. Personal effects are listed in the "Personal Effects" inventory.

### **POSTMORTEM CHANGES**

The body is cool. Rigor mortis is absent. Fixed, red-purple livor mortis extends over the posterior surfaces of the body, except in areas exposed to pressure. The body is without significant decomposition changes. Postmortem changes include: tache noire.

### **EXAMINATION**

#### **General:**

There is dirt under the fingernails and toenails, and in the umbilicus.

#### **Head and Neck:**

The head is normally formed. Scalp hair is black and short. The hair growth pattern is normal. The anterior fontanelle is patent, the posterior fontanelle is closed. The eyes are sunken but are normally formed; the irides are brown. The corneas are translucent. The sclerae are white and the conjunctivae are clear. There is a single small hemorrhage on the left lower palpebral conjunctiva. No other petechial hemorrhages are identified on the sclerae, bulbar conjunctivae, facial skin or oral mucosa. The ears are normally formed and placed, with the appropriate amount of cartilage. The nose and lips are unremarkable. The oral frenula are intact with erythema of the upper frenula. The oral mucosa membranes are dry. The palate is intact and normally arched. There is eruption of the mandibular central incisors, but the mouth is otherwise edentulous, in keeping with appropriate development for age. The neck is symmetrical, without abnormality.

#### **Torso:**

The thorax is well-developed and symmetrical. The abdomen is rounded and soft. The spine is normally formed. The external genitalia are that of an infant female, without injuries. The anus is normally formed and free of lesions.

#### **Extremities:**

The upper and lower extremities are normally formed and symmetrical, without absence of digits. Palmar creases are unremarkable.

### **MARKS, SCARS, and COSMETIC PIERCINGS**

There are no readily apparent scars.

There are no readily apparent cosmetic piercings.

EXTERNAL EXAMINATION

**TATTOOS**

No tattoos are observed.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

## EVIDENCE OF INJURIES

### **BLUNT HEAD TRAUMA**

Externally,

A circular, 0.1 x 0.1 cm abrasion is on the left upper lip at the vermillion border.

Internally,

Subgaleal hemorrhages involve the left parietal and occipital scalp and skull, overlying the fractures.

Linear non-displaced fractures involve the left parietal bone (6.6 cm) and left occipitoparietal bone (4.2 cm) . The left occipitoparietal fracture crosses the lambdoid suture.

There is a thin-film, fluid and non-adherent subdural hemorrhage of the bilateral posterior fossa, and patchy subarachnoid hemorrhage. The subdural hemorrhage extends into the spinal canal, with bloody cerebrospinal fluid during three separate collection attempts at varying locations.

There is bilateral faint perioptic nerve hemorrhage, and faint hemorrhages in the superior periorbital fat.

Please see separate Neuropathology Report for additional details.

# INTERNAL EXAMINATION

## **GENERAL**

The body is that of an appropriately-developed female infant. See "Evidence of Injury" and the separate Neuropathology Report for a description of internal injuries. There are no significant changes of decomposition.

## **BODY CAVITIES**

No adhesions or other abnormal collections of fluid are present in the pleural and peritoneal cavities. All body organs are present in normal and anatomic position, unless otherwise noted. Serous surfaces are smooth, glistening and free of petechiae. The intact diaphragm separates the thoracic and peritoneal cavities.

## **CENTRAL NERVOUS SYSTEM**

See "Evidence of Injury" and the separate neuropathology consultation report for additional details. The dura mater and falx cerebri are intact, and the leptomeninges are thin and translucent. The cerebrospinal fluid is bloody.

## **NECK**

Examination of the soft tissues of the neck, including the strap muscles and large vessels, reveals no abnormalities. The hyoid bone and larynx are intact. The epiglottis is firm, non-swollen and non-erythematous. The tonsils and adenoids are appropriate for age. The tongue is normal.

## **CARDIOVASCULAR SYSTEM**

The heart weighs 27.42 grams; the shape and size of the heart are not unusual with appropriate lateralization features. The pericardial surfaces are smooth, glistening and unremarkable. The pericardial sac is free of significant fluid or adhesions. The coronary arteries arise normally and follow a normal distribution of right dominance.

The coronary arteries arise normally and follow the distribution of a right dominant pattern. The coronary arteries are widely patent. There are no coronary arterial thrombi, plaque hemorrhages or dissections. The coronary ostia are patent and appropriately placed.

The following circumferential valve measurements are obtained: tricuspid valve- 4.4 cm [expected = 4.8 cm, ranging 4.3-5.3 cm]; pulmonic valve- 2.9 cm [expected = 2.9 cm, ranging 2.5-3.3 cm]; mitral valve- 4.1 cm [expected = 4.0 cm, ranging 3.6-4.4 cm]; aortic valve- 2.6 cm [expected = 2.8 cm, ranging 2.5-3.1 cm].

The myocardium is homogeneously dark red-brown, firm and unremarkable; the atrial and ventricular septa are intact. The wall thicknesses are unremarkable. The endocardium is free of fibrosis. The foramen ovale is closed.

The pulmonary artery, the aorta and their major branches arise normally and follow the usual course without thrombotic obstruction or coarctation. The ductus arteriosus is closed. The vena cava, its major tributaries and the pulmonary veins are patent and return to the heart in the usual distribution.

## **PULMONARY SYSTEM**

The right and left lungs weigh 53.99 grams and 49.50 grams, with the normal distribution of lobes and fissures. The upper and lower airways are patent, and the mucosal surfaces are smooth and yellow-tan without erythema. The pleural surfaces are smooth and glistening. The pulmonary parenchyma is alternately light pink and dark red-purple, and the cut surfaces exude slight amounts of blood and frothy fluid. The pulmonary arteries are normally developed and without saddle embolus. Thromboemboli are within the distal artery branches of the lungs.

## INTERNAL EXAMINATION

### **HEPATOBIILIARY SYSTEM**

The liver weighs 217.40 grams and has a normal configuration. The hepatic capsule is smooth, glistening and intact, covering red-brown parenchyma. The central hepatic vasculature is free of thrombus. The gallbladder is normal and the cystic duct is patent. On cut section, the biliary system is not prominent or cystic. The extrahepatic biliary tree is patent.

### **GASTROINTESTINAL SYSTEM**

The esophagus courses to the stomach without fistulae and is lined by gray-white mucosa without lesions. The gastric mucosa is unremarkable with attenuated rugal folds and the lumen contains 2 ml mL of green-brown, mucoid material. The pylorus is widely patent without muscular hypertrophy. The mesentery, small and large bowels have the usual size and position relationship. The appendix is in the right lower quadrant of the abdomen. The small and large bowels are of appropriate caliber without interruption of the luminal continuity. The serosa is smooth and glistening. The small and large intestinal contents are black-green, thick liquid. The pancreas weighs 5.51 g and has normal, tan lobulated parenchyma.

### **GENITOURINARY SYSTEM**

The right and left kidneys and capsules weigh 18.45 grams and 19.89 grams, respectively. The cortical surfaces are smooth and red-brown. The cortices are well-delineated from the medullary pyramids. The calyces, pelves and ureters are free of dilatation. The urinary bladder is empty with a tan and smooth mucosa.

### **REPRODUCTIVE SYSTEM**

The uterus, cervix, vagina, fallopian tubes, and ovaries are without abnormalities.

### **RETICULOENDOTHELIAL SYSTEM**

The spleen weighs 6.69 grams and has a smooth, intact capsule covering red-purple, moderately firm parenchyma. The splenic white pulp is prominent. The regional lymph nodes are unremarkable. The mesenteric lymph nodes are prominent, but not unusual for age. The bone marrow (rib) is red, homogeneous and ample. The 10.71 gram thymus is tan-pink, lobulated and symmetrical without petechiae.

### **ENDOCRINE SYSTEM**

The right adrenal gland weighs 2.80 grams and the left adrenal gland weighs 3.30 grams. The adrenal glands have normal cut surfaces with yellow cortex and gray medulla with the expected corticomedullary ratio. The thyroid gland has appropriate size, position, and consistency. The pituitary gland is unremarkable.

### **MUSCULOSKELETAL SYSTEM**

The axial and appendicular skeletons are unremarkable except in areas of described injury. The musculature is well developed and symmetrical.



## INTERNAL EXAMINATION

### **OTHER EXAMINATIONS**

The following additional examinations were performed: optic nerve examination, forensic neuropathology examination (see separate Neuropathology Report for details), and a radiology consultation (see below for details).

### **RADIOLOGY CONSULTATION:**

Review of a post-autopsy skeletal survey was performed.

Findings: Excluding the skull and anterior chest wall, the skeletal survey is not revealing for any acute, subacute or healed fractures.

Review of a pre-autopsy postmortem computed tomography (PMCT) was performed.

Findings: a left parietal skull fracture and a left occipital fracture. No other skeletal trauma. The PMCT shows subarachnoid hemorrhage and posterior fossa subdural hemorrhage. A small defect in each tibia on the skeletal survey. [REDACTED]

[REDACTED] Diffuse perihilar and  
bronchovascular opacities of the lung. Could be aspiration or pneumonia. [REDACTED]  
[REDACTED]

Consultant:  
Gary Mlady M.D.

## ADDITIONAL STUDIES

### **Computed Tomography**

See "Other examinations" section.

### **Radiography**

See "Other Examinations" section.

### **Magnetic Resonance Imaging**

Postmortem magnetic resonance imaging is not performed.

### **Microscopy**

#### Slide Key

- A1: Thymus, skin, skeletal muscle (psoas), rib
- A2: Small and large intestine, gallbladder, appendix
- A3: Esophagus, stomach, duodenum, pancreas
- A4: Right kidney, adrenal, ovary and fallopian tube
- A5: Left kidney, adrenal, ovary and fallopian tube
- A6: Right lung (upper, middle, lower lobes), right lung pulmonary thromboemboli candidate
- A7: Left lung (upper, lower lobes), liver, spleen
- A8: Neck block, tongue
- A9: Bladder, uterus, vagina, rectum
- A10: Heart, epiglottis

THYROID: No significant histopathologic change. Normal parathyroid tissue is identified.

THYMUS: No significant histopathologic change.

HEART: No significant histopathologic change.

LUNGS: Abundant bacterial colonies without associated inflammation, and scattered intraalveolar flocculent eosinophilic material. The blood vessels reveal thromboemboli with interdigitating areas red blood cells and platelets, fibrin, neutrophils, and fibroblasts.

LIVER: No significant histopathologic change.

GALLBLADDER: Collection of banal cells with voluminous, granular, eosinophilic cytoplasm without infiltration.

TRACHEA: No significant histopathologic change.

PANCREAS: No significant histopathologic change.

SPLEEN: No significant histopathologic change.

KIDNEYS: Scattered polarizable crystals in the collecting ducts.

ADRENAL GLANDS: No significant histopathologic change.

UTERUS/FALLOPIAN TUBES/OVARIES: No significant histopathologic change.

ESOPHAGUS: No significant histopathologic change.

STOMACH: No significant histopathologic change.

INTESTINE: No significant histopathologic change.

LYMPH NODES: No significant histopathologic change.

RIB: No significant histopathologic change.

URINARY BLADDER: No significant histopathologic change.

TONGUE: No significant histopathologic change.

SKELETAL MUSCLE: No significant histopathologic change.

SKIN: No significant histopathologic change.

EPIGLOTTIS: Scattered mixed acute and chronic inflammatory cells in the sub-epithelial mucosa.

## ADDITIONAL STUDIES

### Ancillary Studies

#### VITREOUS FLUID ANALYSIS

Sodium: 159 mmol/L (reference range = 135-150 mmol/L)  
Potassium: >15.0 mmol/L (reference range = <15 mmol/L)  
Chloride: 144 mmol/L (reference range = 105-135 mmol/L)  
Urea nitrogen: 119 mg/dL (reference range = 8-20 mg/dL)  
Creatinine: 1.3 mg/dL (reference range = 0.6-1.3 mg/dL)  
Glucose: 49 mg/dL (reference range = <200 mg/dL)

#### MICROBIOLOGY

##### Bacterial cultures

Heart blood: *Leuconostoc lactis*

Right lung: *Lactococcus lactis* (many), *Enterobacter cloacae* complex (many), *Klebsiella pneumoniae* (moderate),  
*Staphylococcus aureus* (many)

Left lung: *Lactococcus lactis* (many), *Klebsiella pneumoniae* (moderate), *Enterobacter cloacae* complex (moderate),  
*Streptococcus salivarius* group (many)

Cerebrospinal fluid (lumbar): No growth

Cerebrospinal fluid (foramen magnum): *Staphylococcus hominis* (rare), *Leuconostoc lactis* (rare), *Staphylococcus epidermidis*  
(rare)

##### Viral testing

Lung and nasopharyngeal swabs:

Influenza not detected by reverse transcriptase polymerase chain reaction

2019 novel coronavirus not detected by reverse transcriptase polymerase chain reaction.

No other viruses were isolated from the samples.

#### TOXICOLOGY

Toxicology testing was performed and the results are reported separately.

#### METABOLIC SCREEN

No biochemical evidence indicative of an underlying metabolic disorder.