Office of the Medical Examiner
1360 Indian Lake Road
Daytona Beach, FL 32124-1001

MEDICAL EXAMINER REPORT

Name	**Brogan, April Dyan**	Case Number	**15-07-247**
Date of Death (Found)	May 1, 2015	County of Death	Volusia
Date of Exam	May 4, 2015	Time of Exam	1010 Hours

I. Moderate Pulmonary Congestion
   A. Pulmonary hyperinflation
   B. Mild pulmonary anthracosis
   C. Frothy white foam overlying mucosal surface of upper airway

II. Moderate Hepatic Congestion

III. Moderate Cerebral Edema

Cause of Death:	Opiate Withdrawal Syndrome
Other Significant Condition(s):	Bronchial Asthma
Manner of Death:	Natural

Timothy J. Gallagher, M. D. 7/28/2015
Associate Medical Examiner Date

XC: State Attorney's Office
Volusia County Sheriff's Office

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REPORT OF POSTMORTEM EXAMINATION

OFFICIALS PRESENT AT EXAMINATION

None.

EXTERNAL EXAMINATION

The body is that of a 64-inch, 125-pound adult white female who appears the reported age of 28 years. The Body Mass Index is 21 kilograms per meter squared. The scalp hair is brown and up to 19 inches in length. The irides are blue, the sclerae are congested and the conjunctivae are light pink to gray. The bridge of the nose is midline. The nasal septum is intact.

The lips are slender and symmetrical. The oral mucosal frenula are intact. The tongue is atraumatic. The dentition is natural and in fair repair. The neck is symmetrical and has no lymphadenopathy or injury. The trachea is midline. The external auditory canals have no fluid drainage. The earlobes have multiple cosmetic piercings.

The chest is symmetrical and has no scars. The upper extremities are symmetrical and have no edema or injury. The fingernails are trimmed short and are unclean. The abdomen is flat and has no masses or hernias. The periumbilical region has multiple cosmetic piercings.

The musculature of the legs is well formed and symmetrical. The legs have no edema or significant injury. The toenails are trimmed short and are clean; they are painted with a pink polish. The external genitalia are those of an adult female. The anus is atraumatic.

Red-purple postmortem lividity is most prominent on the posterior torso especially on the shoulders, lower back and in the proximal lower extremities.

White plastic bands around the right and left ankles have the inscription "15-07-247" and "Brogan, April".

TATTOOS AND OTHER IDENTIFYING MARKS

Tattoos

- Shamrock and butterfly with inscription "BLH" – upper posterior torso
- 2 women sitting down – posterior lower torso
- Shamrock with inscription "Kiss me I'm Irish" – left lower abdominal region
- Stars – left lateral leg

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EVIDENCE OF RECENT MEDICAL TREATMENT

There are four electrocardiographic pads distributed on the anterior chest and lower abdomen. There is a defibrillator pad on the right upper chest and a second defibrillator pad on the left lower chest. An intravenous catheter is in the left lateral neck. There is a combi tube appropriately placed in the oropharynx; the distal tip rests within the esophagus.

EVIDENCE OF INJURY

Injuries of Torso

There is a 2 x 1 inch contusion on the right gluteal region.

Injuries of Extremities

There is a 2 x 1 inch contusion on the right anterior thigh. There is a 1¼ x ½ inch contusion on left anterior thigh. There is a 1 x ½ inch contusion on the left anterior thigh. There is a 1 x ¾ inch contusion on the left medial malleolar region.

EVIDENCE OF ORGAN AND/OR TISSUE DONATION

None.

INTERNAL EXAMINATION: **The following excludes any previously described injuries.**

BODY CAVITIES

The anterior chest wall and abdominal wall have no abnormalities. The subcutaneous fat of the anterior abdominal wall is 1.5 centimeters thick.

CARDIOVASCULAR SYSTEM

The intact pericardial sac contains approximately 25 milliliters of pale yellow serous fluid. The 290-gram heart has a smooth epicardial surface. The four cardiac chambers are free of mural thrombi and thromboemboli. The fossa ovalis is closed. The tricuspid, mitral, aortic and pulmonary valves have no deformities or vegetation; they are pliable and translucent. The red-brown myocardium has no fibrosis, necrosis, softening or induration. The mural endocardium is thin, smooth and translucent. The ostia of the left main and right coronary arteries are patent and arise normally from the aortic root. The left anterior descending, left circumflex and right coronary arteries are widely patent. The left ventricle

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is 1.2 centimeters thick. The interventricular septum is 1.0 centimeters thick and the right ventricle is 0.4 centimeters thick. No atherosclerosis is within the aorta.

RESPIRATORY SYSTEM

The right lung weighs 400 grams and the left lung weighs 350 grams. The lungs are hyperinflated. The medial borders of the right and left lungs overlap the anterior pericardium. The pleural surfaces are purple-red with a small amount of black pigmentation. The pulmonary parenchyma is dark red and has moderate congestion. The lungs are free of neoplasm, granulomata and infarcts. The tracheobronchial tree has delicate frothy white foam overlying a gray-tan mucosal surface and is free of excessive fluid, mucus and foreign objects. The pulmonary arteries are distributed radially and adequately and the branches are free of thromboemboli. The hilar lymph nodes are normal.

HEPATOBILIARY SYSTEM

The 1690-gram liver has a thin, smooth and intact capsule. The homogeneous red-brown hepatic parenchyma is congested and has no nodularity or masses. The portal tract structures are intact and have no abnormalities. The vessels of the porta hepatis are normal and the biliary tree is patent. The gallbladder contains 0.25 milliliters of thin, green-yellow bile.

UROGENITAL SYSTEM

The 180-gram right kidney and 200-gram left kidney have smooth red-purple cortical surfaces. The cut surfaces of the kidneys, renal calyces, pelves and ureters have no abnormalities. The corticomedullary junctions are distinct. The renal arteries are patent. The ureters are patent and enter into the bladder at the usual place at the trigone. The urinary bladder is lined by tan mucosa and contains no urine.

HEAD AND NECK

The tongue is atraumatic. The strap muscles of the neck are soft, red-brown and free of hemorrhage. The larynx is free of foreign objects and contains a small amount of thin gray-pink mucoid material. The hyoid bone and thyroid cartilage are intact.

GASTROINTESTINAL SYSTEM

The esophagus, stomach and duodenum have no ulcers, varices or masses. The stomach contains approximately 250 milliliters of tan-gray, semi-solid food material. The small bowel, vermiform appendix, colon and rectum have no abnormalities on their serosal surface.

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HEMOLYMPHATIC SYSTEM

The 280-gram spleen has a wrinkled and intact capsule. The purple-red splenic parenchyma has small follicles of normal white pulp. The body has no peripheral or central lymphadenopathy.

ENDOCRINE SYSTEM

The pituitary gland is normal within the sella turcica. The brown-red thyroid gland has no nodularity. The pale, yellow lobulated pancreas has no ecchymosis, cystic structures, masses or calcifications. The adrenal glands have yellow-orange cortices with distinct brown medullae. The 6.5 x 4.0 centimeter uterus is tan-pink, soft and has no masses. The cervix has no lesions.

The ovaries have a tan parenchyma and have no masses or cysts.

MUSCULOSKELETAL SYSTEM

The intact thoracolumbar spine has no abnormalities. The clavicles and ribs have no calluses. The sternum is intact. The long bones of the extremities have no fractures.

CENTRAL NERVOUS SYSTEM

The temporalis muscles are normal. The calvarium is intact. The epidural and subdural spaces are free of hemorrhage. The dura matter is intact. The 1410-gram brain is symmetric and covered by smooth translucent leptomeninges. The gyri are moderately widened and the sulci are narrowed. The gray matter is unremarkable and is clearly delineated from the white matter. The ventricles are not dilated and have a normal choroid plexus. The basal ganglia, thalamus, hippocampus, amygdala, substantia nigra and mammillary bodies are symmetric and normally formed. The cerebellum has a normal folia and dentate nucleus. The pons and medulla are free of internal and external abnormalities. The vessels of the circle of Willis are patent and free of atherosclerosis and other abnormalities.

MICROSCOPIC EXAMINATION: Two slides examined on May 21, 2015.

HEART: Myocyte hypertrophy, myocardial fiber disarray, increased perivascular fibrosis.

LUNGS: Vascular congestion, atelectasis, edema, refractile crystalline foreign material, focal pigmented macrophage accumulation in alveoli and interstitium, focal anthracotic pigment accumulation, thickening of bronchiolar basement membrane, increased mucus deposition, chronic mixed inflammatory infiltrates with increased eosinophilia.

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LIVER: Sinusoidal congestion, mild micro- and macrovesicular steatosis, increased periportal chronic inflammation.

KIDNEY: Vascular congestion.

BRAIN: Changes of global ischemia.

TOXICOLOGY

URINE DRUG SCREEN: Performed by District Seven Medical Examiner's Office

AMPHETAMINE	Negative
BARBITURATES	Negative
BENZODIAZEPINES	Negative
BUPRENORPHINE	Negative
COCAINE	**Positive**
M-AMP	Negative
MDMA	Negative
METHADONE	Negative
MORPHINE	Negative
OPIATES	Negative
OXYCODONE	Negative
PCP	Negative
PROPOXPHYENE	Negative
THC	Negative

Also see the separate comprehensive report from NMS Laboratories.

TG/trm

End of Report

NMS LABS

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Robert A. Middleberg, PhD, F-ABFT, DABCC-TC, Laboratory Director

CONFIDENTIAL

Supplemental Report

Report Issued 07/17/2015 12:00
Last Report Issued 05/19/2015 10:00

To: **10277**
Volusia County Medical Examiner Office
Attn: Teri Hanans
1360 Indian Lake Road
Daytona Beach, FL 32124

Patient Name Brogan, April
Patient ID 15-07-247
Chain 35173
Age 28 Y **DOB** 10/30/1986
Gender Female
Workorder 1513336?

Positive Findings:

Compound	Result	Units	Matrix Source
Diazepam	**100**	**ng/mL**	**001 - Peripheral Blood**
Nordiazepam	**100**	**ng/mL**	**001 - Peripheral Blood**
Norfentanyl	**0.88**	**ng/mL**	**001 - Peripheral Blood**
Creatinine (Vitreous Fluid)	**0.51**	**mg/dL**	**003 - Vitreous Fluid**
Sodium (Vitreous Fluid)	**130**	**mmol/L**	**003 - Vitreous Fluid**
Potassium (Vitreous Fluid)	**18**	**mmol/L**	**003 - Vitreous Fluid**
Chloride (Vitreous Fluid)	**117**	**mmol/L**	**003 - Vitreous Fluid**
Urea Nitrogen (Vitreous Fluid)	**14**	**mg/dL**	**003 - Vitreous Fluid**

See Detailed Findings section for additional information

Testing Requested:

Analysis Code	Description
1919FL	Electrolytes and Glucose Panel (Vitreous), Fluid (Forensic)
8052B	Postmortem Toxicology - Expanded, Blood (Forensic)

Tests Not Performed:

Part or all of the requested testing was unable to be performed. Refer to the **Analysis Summary and Reporting Limits** section for details.

Specimens Received:

ID	Tube/Container	Volume/ Mass	Collection Date/Time	Matrix Source	Miscellaneous Information
001	Gray Top Tube	8 mL	05/04/2015 10:10	Peripheral Blood	
002	Gray Top Tube	8 mL	05/04/2015 10:10	Peripheral Blood	
003	White Vial	2 mL	Not Given	Vitreous Fluid	

All sample volumes/weights are approximations.

Specimens received on 07/16/2015, 05/07/2015.

ORIG. TO TG
COPY TO KO
DATE 7.20.15 v.15

Detailed Findings:

Analysis and Comments	Result	Units	Rpt. Limit	Specimen Source	Analysis By
Diazepam	100	ng/mL	20	001 - Peripheral Blood	LC-MS/MS
Nordiazepam	100	ng/mL	20	001 - Peripheral Blood	LC-MS/MS
Norfentanyl	0.88	ng/mL	0.20	001 - Peripheral Blood	LC-MS/MS
Creatinine (Vitreous Fluid)	0.51	mg/dL	0.050	003 - Vitreous Fluid	Colorimetry
Sodium (Vitreous Fluid)	130	mmol/L	80	003 - Vitreous Fluid	Chemistry Analyzer
Potassium (Vitreous Fluid)	18	mmol/L	1.0	003 - Vitreous Fluid	Chemistry Analyzer
Chloride (Vitreous Fluid)	117	mmol/L	70	003 - Vitreous Fluid	Chemistry Analyzer
Glucose (Vitreous Fluid)	None Detected	mg/dL	35	003 - Vitreous Fluid	Chemistry Analyzer
Urea Nitrogen (Vitreous Fluid)	14	mg/dL	3.0	003 - Vitreous Fluid	Chemistry Analyzer

Other than the above findings, examination of the specimen(s) submitted did not reveal any positive findings of toxicological significance by procedures outlined in the accompanying Analysis Summary.

Reference Comments:

1. Chloride (Vitreous Fluid) - Vitreous Fluid:

   Normal: 105 - 135 mmol/L

2. Creatinine (Vitreous Fluid) - Vitreous Fluid:

   Normal: 0.6 - 1.3 mg/dL

3. Diazepam (Valium®) - Peripheral Blood:

   Diazepam is a benzodiazepine used primarily for its sedative anxiolytic or muscle relaxing effects. It is a U.S. DEA Schedule IV listed central nervous system depressant, and patients using this medication are warned accordingly, especially concerning motor functions. It is habituating, and frequently abused. It is metabolized to several pharmacologically active compounds: nordiazepam, oxazepam and temazepam. In order to evaluate the effects of this compound, concentrations of these metabolites must also be considered.

   The reported diazepam concentration in a chronic steady-state regimen of 5 mg twice daily ranges from 100 - 400 ng/mL with nordiazepam being in the range of 130 - 500 ng/mL. Oxazepam and temazepam may be present in low concentrations.

   Toxic effects may be produced by blood concentrations in excess of 1500 ng/mL; fatalities produced by diazepam alone are rare, but may occur at blood concentrations greater than 5000 ng/mL. Alcohol greatly enhances the activity of the benzodiazepines.

4. Glucose (Vitreous Fluid) - Vitreous Fluid:

   Normal: <200 mg/dL

   Postmortem vitreous glucose concentrations >200 mg/dL are associated with hyperglycemia.

   Since postmortem vitreous glucose concentrations decline rapidly after death both in vivo and in vitro, care should be taken in the interpretation of results. Stability of vitreous glucose for up to 30 days has been noted by NMS Labs when specimens are maintained frozen (-20°C).

Reference Comments:

5. Nordiazepam (Chlordiazepoxide Metabolite) - Peripheral Blood:

   Nordiazepam is a pharmacologically active metabolite of several benzodiazepines, including diazepam (Valium®) and chlordiazepoxide (Librium®). The action of this compound is based on its central nervous system depressant activity. Nordiazepam has a very long elimination half-life and may be identified long after the parent drug has been completely eliminated from the circulation.

   Psychiatric patients taking chronic diazepam doses ranging from 2 to 55 mg daily had steady state plasma concentrations of nordiazepam averaging 390 ng/mL (range 26 to 1600 ng/mL). Chronic therapy with a daily oral dose of 22.5 mg clorazepate produced reported steady-state plasma concentrations of nordiazepam of 660 +/- 140 ng/mL. The active metabolites oxazepam and temazepam may be present in low concentrations. The blood to plasma ratio of nordiazepam is 0.6.

   A fatal case was reported with a nordiazepam blood concentration of 5500 ng/mL along with 0.180 g/dL ethanol and 7000 ng/mL chlordiazepoxide. Alcohol greatly enhances the activity of the benzodiazepines.

6. Norfentanyl (Fentanyl Metabolite) - Peripheral Blood:

   Norfentanyl is the primary inactive metabolite of the synthetic narcotic analgesic fentanyl.

7. Potassium (Vitreous Fluid) - Vitreous Fluid:

   Normal: <15 mmol/L
   Quantitative results for Potassium will be affected if performed on gray top tubes since these collection tubes contain potassium oxalate.

8. Sodium (Vitreous Fluid) - Vitreous Fluid:

   Normal: 135 - 150 mmol/L
   Quantitative results for sodium will be affected if performed on gray top tubes since these collection tubes contain sodium fluoride.

9. Urea Nitrogen (Vitreous Fluid) - Vitreous Fluid:

   Normal: 8 - 20 mg/dL

Sample Comments:

001 Physician/Pathologist Name: Dr. GallagherK.OrozcoP. Feller

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded two (2) years from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.

Workorder 15133367 was electronically signed on 07/17/2015 11:09 by:

Susan B. Crookham

Susan Crookham,
Certifying Scientist

Analysis Summary and Reporting Limits:

All of the following tests were performed for this case. For each test, the compounds listed were included in the scope. The Reporting Limit listed for each compound represents the lowest concentration of the compound that will be reported as being positive. If the compound is listed as None Detected, it is not present above the Reporting Limit. Please refer to the Positive Findings section of the report for those compounds that were identified as being present.

Acode 1919FL - Electrolytes and Glucose Panel (Vitreous), Fluid (Forensic) - Vitreous Fluid

-Analysis by Chemistry Analyzer for:

Analysis Summary and Reporting Limits:

Compound	Rpt. Limit	Compound	Rpt. Limit
Chloride (Vitreous Fluid)	70 mmol/L	Sodium (Vitreous Fluid)	80 mmol/L
Glucose (Vitreous Fluid)	35 mg/dL	Urea Nitrogen (Vitreous Fluid)	3.0 mg/dL
Potassium (Vitreous Fluid)	1.0 mmol/L		

-Analysis by Colorimetry (C) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Creatinine (Vitreous Fluid)	0.050 mg/dL		

Acode 50012B - Benzodiazepines Confirmation, Blood (Forensic) - Peripheral Blood

-Analysis by High Performance Liquid Chromatography/ TandemMass Spectrometry (LC-MS/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
7-Amino Clonazepam	5.0 ng/mL	Flurazepam	2.0 ng/mL
Alpha-Hydroxyalprazolam	5.0 ng/mL	Hydroxyethylflurazepam	N/A
Alprazolam	5.0 ng/mL	Hydroxytriazolam	5.0 ng/mL
Chlordiazepoxide	N/A	Lorazepam	5.0 ng/mL
Clobazam	20 ng/mL	Midazolam	5.0 ng/mL
Clonazepam	2.0 ng/mL	Nordiazepam	20 ng/mL
Desalkylflurazepam	N/A	Oxazepam	20 ng/mL
Diazepam	20 ng/mL	Temazepam	20 ng/mL
Estazolam	5.0 ng/mL	Triazolam	N/A

Not Reported: Chlordiazepoxide: Analysis canceled; although included in the confirmation test panel, the analyte was not positive by a chromatographic-based screening technique.
Not Reported: Triazolam: Analysis canceled; although included in the confirmation test panel, the analyte was not positive by a chromatographic-based screening technique.
Not Reported: Hydroxyethylflurazepam: Analysis canceled; although included in the confirmation test panel, the analyte was not positive by a chromatographic-based screening technique.
Not Reported: Desalkylflurazepam: Analysis canceled; although included in the confirmation test panel, the analyte was not positive by a chromatographic-based screening technique.

Acode 52142B - Fentanyl and Metabolite Confirmation, Blood (Forensic) - Peripheral Blood

-Analysis by High Performance Liquid Chromatography/ TandemMass Spectrometry (LC-MS/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Fentanyl	N/A	Norfentanyl	0.20 ng/mL

Not Reported: Fentanyl: Analysis canceled; although included in the confirmation test panel, the analyte was not positive by a chromatographic-based screening technique.

Acode 8052B - Postmortem Toxicology - Expanded, Blood (Forensic) - Peripheral Blood

-Analysis by Enzyme-Linked Immunosorbent Assay (ELISA) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Barbiturates	0.040 mcg/mL	Salicylates	120 mcg/mL
Cannabinoids	10 ng/mL		

-Analysis by Headspace Gas Chromatography (GC) for:

Analysis Summary and Reporting Limits:

Compound	Rpt. Limit	Compound	Rpt. Limit
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	5.0 mg/dL

-Analysis by High Performance Liquid Chromatography/
Time ofFlight-Mass Spectrometry (LC/TOF-MS) for: The following is a general list of compound classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified compound class are included. Some specific analytes outside these classes are also included. For a detailed list of all analytes and reporting limits, please contact NMS Labs.
Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotic Agents, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hypnosedatives, Hypoglycemics, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents, Opiates and Opioids.