Autopsy, Biopsies, Drug Abuse and Toxicology:

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Objectives

- Understand the differences between medical examiner/coroner autopsies and privately arranged medical autopsies.
- Understand the utility/limitations of the autopsy in evaluating tissue suitability.
- Understand where autopsy may be necessary (if tissue donation is still being considered).
- See examples of some common areas of discrepancy in autopsy reports and suggestions on how to deal with them.
- Be aware of some “red flags” which may be found in any autopsy report that signal extra scrutiny.
- Understand how biopsy findings (OPO, procurement, processing), if performed, can affect donor suitability.
- Understand how toxicological testing, if performed, can affect donor suitability.

Autopsy

- External and internal physical examination (usually by a pathologist) after death.
- May include only internal dissection (gross only).
- May include microscopic examinations of tissue.
- May include toxicological examinations (blood, urine, vitreous, bile, liver, etc.). (Generally forensic cases: ME/Coroner).
- May include outside consultant exams (cardiac pathology, neuropathology).

Forensic Pathology Mission

- Be certain death did/did not come about by violent means.
- Determine cause and manner of death.
- Not necessarily concerned with incidental co-morbidities that may affect suitability.
Forensic Autopsy Manners

- Natural
- Accident
- Suicide
- Homicide
- Undetermined

Forensic Autopsy

- Either released by ME/coroner or never reported.
- Consent required
- Typically natural, but sometimes trauma deaths that have been released from autopsy requirement by the coroner/ME.
- Often include higher sampling of tissues for microscopy, but not necessarily.
- Generally do not include toxicology
- Most qualified docs to do these tend to be forensic trained pathologists. The autopsy is becoming a “lost art” as even anatomic pathologists are commonly avoiding them due to other activities, poor reimbursement by hospitals and perceived lack of need.

Private Autopsy

- Performed as statutory responsibility
- No consent needed
- Generally because trauma involved, suspected, or the underlying natural cause is not known
- Mission focused on cause/manner
- Incidental lesions may not be clarified if not deemed important
- It is important to educate you M.E./coroners to you are interested in knowing
- Toxicology is frequently ordered
- Results may be appended for later. Keep in mind.

Coroner and Medical Examiner

- Coroner elected
- Less training
- Lay person, sometimes a physician, depending on state requirement. Many states require only GED.
- Medical Examiner appointed
- MD or DO in all
- FL must be pathologist
- Often get referrals from coroners

Florida Tissue Regs and the Autopsy

- AHCA (Agency for Health Care Administration) Statute 59a. 1.005 (37) Autopsy. A gross external and, if applicable, internal examination of any area of the donor altered by the retrieval shall be performed and dictated or otherwise recorded by the procuring person(s) at the time of the removal of tissues from the cadaveric donor. A written report of these findings shall be immediately prepared and delivered to the person(s) responsible for the autopsy of the donor. The report shall contain a notation of normal conditions as well as all itemization of all abnormal pathological findings found during the gross examination of the donor. Whenever a full medical autopsy of the donor will not subsequently be performed by a medical examiner, the tissue bank shall obtain a full medical autopsy by other means. The tissue bank shall affix a copy of the autopsy report to the donor record. The medical director or designee may exercise a waiver of an autopsy on a case-by-case basis and shall justify and document that waiver in the donor’s medical record.
Autopsy Benefits

- More information to base eligibility. “The more we look, the more we find”
- Lingering questions sometimes put to rest
- It is a benefit to the families.
- Can sometimes allow chance for donation on cases which might otherwise be deferred
  - Pneumonia “suggested” or listed in differential
  - Tumor suggested but not clarified
  - Sepsis “questioned” somewhere in a note
  - “Explained Dementia” (FDA requires micros of brain)
- Donors with cancer histories can be better evaluated. I now accept any history of cancer if disease free > 5 yrs + required autopsy. Requiring the autopsy on these donors makes the “disease free” determination easier

Autopsy Pitfalls/Limitations

- Look and you may find. Banks that don’t solicit these will be blind to those findings. The reassuring good news is that it doesn’t seem to matter for most conditions.
- The “complete” autopsy is a misnomer. All are partial and (hopefully) directed to some extent. Are they looking at what you are interested in? (cancer: nodes, bone marrow, when cancers found)
- It is another document to obtain and usually is the rate limiting step for release and processing.
- Potential for discrepancies (weight, med hx, etc.), other conflicts with med/soc
- ME report issues: High risk lesions may be suggested but no follow-up microscopics done, because it won’t affect their cause/manner of death and not in their budget/mission.
- Private autopsies can each cost up to several thousand dollars
- Physiologic derangements (sepsis, chemical imbalances, drug effects) can not be seen with naked eyes (gross exam) or in the microscope

Literature on Occult Disease Detection on Tissue Donors by Autopsy

- Otero, et al 1998
  - 54 donors after screening
  - 5/54 (9%) had previously undetected, potentially transmissible diseases.
  - They included hepatocarcinoma, lymphocytic lymphoma, medullary thyroid carcinoma, probable hemorrhagic viral gastritis, hepatitis (Hep B surface antigen positive in liver with “ground glass hepatocytes” by immunohistochemical staining)


- 15/79 (19%) ruled out based on autopsy alone
  - 1 with glioblastoma (thought to be HTN stroke), severe osteoporosis was actually the reason for discard
  - 1 with pyelonephritis, probable sepsis, (intrahepatic cholestasis) (not actual pic)
  - 1 with histology of active hepatitis (also serology hep Bsag +). (not actual pic)
  - 1 with acute purulent pericarditis, bronchopneumonia (with aspiration evident). (not actual pic)
  - History of “pre-cancerous” bladder polyp removed 2 years before and 8 weeks ago, s/p intravesicular BCG for 6 weeks, chronic ethanolism. Autopsy revealed prostatic BCG effect but no residual neoplasm.
15/79 (19%) ruled out based on autopsy alone

- 1 with chronic active hepatitis histology (HCV Ab+, HCV NAT-) (not actual pic)
- 1 with systemic eosinophilic granulomata dies from acute duodenal ulcer bleed. Medical director personal judgement as this is not addressed by AATB, FDA, FL (bone involvement) (not actual pic)
- 1 with pulmonary polarizable crystals (worrisome for talc and previous IV drug abuse) with portal and lobular chronic liver inflammation and focal hepatocyte dropout (serology, NAT negative. (not actual pic)

15/79 (19%) ruled out based on autopsy alone

- 1 with histology of active hepatitis (HCV Ab+, HCV NAT+) as well as 2mm papillary carcinoma of thyroid (no mets or lymph node involvement).
- History of remote cocaine, marijuana and unknown IV drugs 15-20 years ago. (50 y/o). Did fit criteria at that time.
- Found unresponsive, previous MI, stroke, HTN, coronary stents, smoker. Autopsy did bear out cause: Acute MI with occluded left anterior descending, right coronary artery stents. No track mark scars, acute injection sites or other sequelae of IV drug use identified at procurement or by me.
- Double gloved finger cut by ilium resection margin. Washed out wound instantly and expressed blood. Multiple followup HCV ab, NAT all negative.
- New eligibility criteria: No IV drug abuse history accepted.
- How's that for selfish???
15/79 (19%) ruled out based on autopsy alone

- 1 with rheumatoid arthritis (FDA, AATB) noted at autopsy, rheumatoid nodules on elbows. Histology confirms.
  - Mild bilateral ulnar deviation of 2nd through 5th digits at metacarpophalangeal joints
  - Bilateral, proximal dorsal forearm, subcutaneous rheumatoid nodules
  - Rheumatoid factor sent out: 630.2 IU/mL (0.0 – 13.9 IU/mL)
  - No history of rheumatoid of course.
  - Cause of death = Atherosclerotic and hypertensive heart disease and COPD.

- 1 with multiple sclerosis (FL 59a exclusion) identified microscopically at autopsy.
  - Routine thoracic spinal cord section which was grossly normal.
  - Cause of death due to Atherosclerotic and hypertensive heart disease
  - No neurological/musculoskeletal symptoms.

- 1 with single perianal condyloma (FDA, AATB) and flat penile condyloma
  - Married, history of inhaled marijuana and cocaine 10 years before.
  - In jail for 6 years until 1996
  - Missed by procurement staff. Noted on repeat external exam before autopsy

The “Necessary” Autopsy in a Tissue Donor

- Clinical “suggestion” of terminal infection (actually diagnosed up front should be a rule out)
- Fevers, elevated WBC, lung infiltrates (aren’t always pneumonia) are nonspecific, common in trauma, sequelae of heart attacks, strokes, etc. but often RAISE the issue of a serious infection or the potential for sepsis
- Clinical suggestion of underlying malignancy (certain malignancies diagnosed up front or by history = rule out)
- Medically explained dementia (strokes, trauma, tumors, etc.) still need postmortem microscopic examination
- You work in Florida

M.E. Autopsy Received: QA issues

- Demographic checks (Name, age, race, times)
- Body weight issues: Measured ME weight vs. what the tissue bank was reported.
  - Is it pre or post-procurement?
    - If came for tissue before any ME intervention, no issue
    - If came from ME, probably pre-procurement and should be used
    - If lower that what we had, I adjust the plasma dilution algorithm (if performed)
    - If heavier, I still make note as it’s “more room to grow” for fluids

Case

- 52 year old man reportedly 200 pounds (90.9 kg), in a MVA, received 3250 mL of saline and colloid in the last hour, with suspected internal hemorrhage.
  - Calculated PV = 90.9/0.25 = 3636 mL = OK
  - Calculated BV = 90.9/0.15 = 6060 mL = OK
- Autopsy takes 4 months from ME, because toxicology is backed up at state lab (was positive for opiates; was prescribed codeine/acetominophen, but he is a driver). Actual measured ME weight before procurement = 175 pounds (79.5 kg)
  - Calculated PV = 79.5/0.25 = 3180 mL
  - Calculated BV = 79.5/0.15 = 5300 mL
- Moral: Always doublecheck that ME weight is either the same or more that what you have been reported. Even if more, it may be a good idea to adjust the algorithm “for more room”, as further fluid admin data could filter in.
Autopsy Received: QA issues

- Tattoos, piercings, surgical scar discrepancies
- Severe internal trauma not appreciable externally
  - Pelvic fractures, abdominal visceral injuries, etc.
- Internal discrepancies:
  - Ex: Micro indicated to be sampled on gross exam, but no description, etc.
  - Ex: Testes mentioned on a female or vice versa
  - “Template” issues
  - Need to request amendments/clarifications

Autopsy Reports

- Usually the last component needed for medical sign off on tissue release
- Can take months, usually because of toxicology/high workloads
- Is the report you’ve received complete?
  - Complete gross examination (missing pages?)
  - Toxicology
  - Microscopic examination
- Toxicology is a relevant medical record

Hypothetical Delayed Toxicology: Gunshot Wound of Head Suicide

- Autopsy report arrives 2 months after death. QA (myself in our office) reviews the file. Toxicology is not in file, but this is not appreciated as missing.
- All infectious disease testing, cultures, med/soc, and autopsy findings are deemed acceptable by the medical director and case medically released for distribution

6 months later……

- Toxicology report arrives indicating morphine in the peripheral blood and 6-monoacetylmorphine in the urine.
- Medical social history by next of kin re-examined and indicates no known illicit drug use
- Physical assessment re-examined indicates no evidence of recent or old injection sites
- What to do?
Suggestions

- Have historian re-contacted. Indicate what we now know. Ask if they have any knowledge of such use as well as route of administration, including further clarification of no other high risk drugs that they may have used, but not currently
- Assuming they now acknowledge such use, what does this say about their credibility?
- Assuming they still don’t know, what does that say about their credibility?
- I suggest requesting the name of a better historian in addition to re-contacting the primary historian
- The goal is to find someone who does know

M.E. Autopsy Received: QA issues

- Nodule or mass identified anywhere on gross exam but not clarified by microscopic
  - Unless you can get a section submitted by that doc or released for a consultant might have to consider worse case scenarios
  - Lung nodule = cancer, sarcoid
  - Unexplained enlarged or atypical lymph node = cancer, infection, sarcoid (explained = anthracotic node in a a smoker)

Autopsy Received: Other Issues

- Infectious disease issues
- Malignancy issues
- Cause of death not identified

Case

- 33/W/F presented 10/17 for preterm labor. Fetal distress noted on 10/29 and taken for C-section. 10/30 suddenly collapsed while talking to family. No chest pain or headache. No previous complaints, fever, etc. but for usual post-op issues. Receiving meds (labetolol 200 mg BID for pregnancy related HTN, lortab (hydrocodone) for pain.
- Heart rate 4-50, PEA noted, resuce for 33 minutes, pronounced
Case

- Coroner declines case
- Differential (generally natural, but clearly unexpected, unclear cause)
  - Pulmonary embolism
  - Amniotic fluid embolism
  - Hypertensive complication
  - Infectious complication unlikely (given her terminal presentation of sudden collapse, bradycardia, hypotension)
- Overdose (young female, was on Lortab, but also unlikely given circumstances of above)

Procurement Culture Data

- I routinely review all procurement cultures before processing (Micro lab director)
- Right and left ilia, right femur swab cultures grew Klebsiella pneumoniae. All others clean
- Chart was already in and reviewed. No clinical indication of infection. Enterics, not unexpected in proximal hip area as contaminants, but the fact that they are all growing the same organism makes me a little more concerned about a bacteremia.
- Appropriate zones, subsequent sequenced areas discarded (we do not sterilize, all aseptic).
- Others free of cross contamination move on, however, HOLD placed for processing pending autopsy.

Private autopsy findings

- Privately contracted pathologist does the autopsy
- No appreciable cause of death
  - Heart weight only 300 grams (not enlarged as you might expect for a significant hypertension)
  - No pulmonary embolism (thrombus or amniotic fluid)
  - Tox was requested as the pathologist was an ME and understood the tissue bank need to find cause, despite non-concern on the part of lay coroner (why is she dead?)
  - Appropriate level of hydrocodone found which was prescribed.
- Uterus exam from autopsy: "Hemorrhagic and acutely inflamed decidua"
- Signed out as "cardiac dysrythmia, etiology undetermined"
- Any other info helpful?? Postpartum….

Placental Exam Data:

- Report from hospital on placenta revealed "acute chorioamnionitis and funisitis". Funisitis from the Latin "cord inflammation". Funisitis is the result of neutrophils migrating out of the fetal circulation towards the bacterially infected amniotic fluid. Chorioamnionitis is inflammation of the placental chorion and amnion.
- This is likely why mom had early presentation for delivery and fetal distress in the first place.
My Concerns

- I called and spoke to our contracted pathologist. He had not gotten our culture info.
- The Klebsiella in our procurement cultures might reasonably reflect the infectious etiology of her chorioamnionitis/deciduitis. Has been a reported cause of chorioamnionitis.
- Other still worrisome explanation is that a local pelvic infection, even if not causative of death, might have seeded the ilia, right femur.
- MS tissues to discard. Concern for potential contamination/bacteremia/true infectious cause of death.

References:

Case

- 42 year old previously healthy 190 pound black male.
- History of sudden shortness of breath after a week of “flu-like” symptoms.
- Why the PE in a healthy 42 yr old? → he had a 2 hour daily commute to his office. Can lead to venostasis and deep leg vein thrombi.
- Message: Flu-"like" symptoms without any reasonable cause = Flu!!!

Pulmonary Embolism

Case: Autopsy scenario

- 57 year old man with high blood pressure, previous bypass graft, found dead in chair.
- Next of kin spoke to them that evening before found.
- Autopsy arranged privately
- Small cell carcinoma of left lung identified. On hold from the beginning due to notification of lung mass.

Case: No autopsy scenario

- Same guy.
- No private autopsy arranged (either family denied or was not requested for)
- Tissues released (still have small cell of lung that we don’t know about)
- It is reassuring that despite the fact that cancer is being overlooked without autopsies, there are no reports of MS/CV tissue transmission of cancer after millions of transplants.
Case

- 34 year old male with apparent self-inflicted GSW to head.
- Serologies, Procurement cultures clean → Processing occurs.
- Autopsy received. Incidental finding of multiple amorphous pulmonary crystalline granulomata. Oxycodone in therapeutic levels in the blood. (his of treatment of chronic back pain).
- Ready to medically release?

Case: IV drug abuse identified by histology

- These findings are diagnostic for injection of pill matrix (pill crushing)
- No history of IV use by historian = Discard
- If the historian DID indicate IV drug abuse 7 years ago, and your SOP allows for the > 5 years per allowable FDA, AATB criteria, this might be OK.
- What if the lung crystals are intravascular as well (in capillaries)?

Autopsy report

- Lung: Multiple scattered perivascular polarizable large amorphous crystalline granulomata
- Diagnostic for methylcellulose (pill matrix) from injecting crushed pills. Diagnostic for IV drug abuse.

Case: IV drug abuse identified by histology

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Biopsies

- Antemortem or historical
  - Hospital biopsy for suspicion of cancer, infection
  - Indication of recent biopsy in med/soc (obtain results)
- Postmortem
  - OPO biopsies: Typical liver, kidney, sometimes lung
  - Procurement phase issues (condyloma, questionable melanocytic, other cancerous lesions)
  - Processing phase: Foreign materials, discolored bone, tumors, inflammatory lesions, ischemic lesions

Histology Reviews I’ve Had

- Questionable Liver inflammation (majority of my reviews)
  - Most turn out as described to be nonspecific portal inflammation or steatohepatitis, some are worse than described.
- Cancers: Brain, prostate, hepatocellular cancer, transitional cell of the ureter, are but some examples this year
- Sarcoidosis/tuberculosis/fungal issues
- Single case of liver cirrhosis on micro per FP that was inconsistent with the normal gross description by the FP. Was actually fatty liver, he secondarily reviewed, agreed and no slide mix-up confirmed.
- Sometimes description is worrisome, but before making judgment, especially to “keep case”, recuts requested to see for myself

Contact Dermatitis

- Look for pattern of distribution, shape
- Can be caused by clothing, jewelry, other items in contact with skin
- Adhesive patches
- Biopsy
- M.E. confirmed that donor had been wearing a cervical collar on initial external exam prior to transport to tissue bank.

Papulovesicular rash at base of neck
Cause? Suitable?
**Hepatic inflammation**

- Lobular hepatic inflammation and necrosis (worrisome for viral etiology): this is **not** what you see with alcoholism alone
- Keep in mind, a reasonable cause may be suggested: hepatotoxic meds (statins), but be careful……I generally find these troubling.

**Genital condylomata**

**Tattoos Ink deposition in lymph nodes**

**Giant Cell Tumor of Tendon Sheath**
Green-black bone: Minocycline Effects

- Frequently noted in thyroid tissue, the so-called “black thyroid”
- Brown to green-black pigmentation of bone tissue (allegedly due to iron deposition),
- A similar antibiotic tetracycline, can also stain bone a yellow color. I see this often on internal exam of the skull.
- Either scenario is OK in terms of risk, the problem arises in terms of placement of the discolored bone
- Less commonly the skin can occur as well

The Vascular Biopsy

- We don’t want late surprises
- Obtain liver, kidney, etc. biopsy results on vascular/tissue donors
- Don’t want to miss a hepatitis/malignancy/other important lesion

The Cardiac Pathology Report: Another “Biopsy”

- Myocarditis
  - Scattered lymphocytes do not make for myocarditis, must see actual myocyte necrosis with invading lymphocytes. Most cardiac pathologists are careful not to overcall this.
  - When faced with a description of myocardial lymphocytes/questionable myocyte injury, must take into account co-morbidity in the heart such as: healing infarcts, underlying coronary artery disease, previous surgery, chronic ischemic changes, valvular disease with atherosclerosis, degenerative calcifications, etc.
- Endocarditis
- Cancer (rare)
  - Sarcomas/Lymphomas/leukemias

Cardiac Path Report

- Want to read about this two months after you’ve released the case?
- Chagas Disease
**Hemangioma and Lipomas**

**Bone Infarcts, healed**

**Retained Suture**

**TOXICOLOGY**

- Relevant medical record, if known to be performed at autopsy
- Check for toxicology data in medical chart (admission testing)
### Forensic Autopsy Reports

**Forensic autopsy reports which should typically include toxicology**

- Drug intoxication as cause of death
- Undetermined cause or manner
- “SIDS” (diagnosis of exclusion)
- Homicides
- Suicides
- Most accidents
- Some offices do routine toxicology on all autopsied cases.

### Forensic Toxicology

- Was toxicology or ordered or wasn’t it?
- If toxicology isn’t included in the forensic autopsy report you receive, look for documentation of disposition of the sample in report as some pathologists make notation of this
  - “Blood sent to a certain lab”. Request report.
  - “Blood retained or saved” = Not run. No action needed.
  - No indication one way or the other. Have this clarified.

### Drug Abuse and Donor Eligibility

- Persons who have injected drugs for a non-medical reason in the preceding five years, including intravenous, intramuscular, and subcutaneous injections are to be rejected by all
- I reject donors with any history of injectable drug abuse
- Surprise positive toxicology for cocaine, methamphetamine, opiates, especially when historians are unaware and route cannot be determined. Favor re-contact, search for better historian, attempt to obtain primary care records...if no knowledge of IV admin after all reasonable attempts, might accept...not cut and dry.
- Some data indicates increased risk of HIV, hepatitis in inhalation, smoked cocaine use (? Related to co-morbid sexual practices vs. direct inoculations.

### Injectable Drugs

- Heroin
- Fentanyl, morphine
- Pill crushing (oxycodone, various)
  - Can affect time release safety factor
  - Pill matrix will cause emboli to lungs
- Cocaine (less typical route)
- Steroids (intramuscular) if not given by physician
Injectable drug use signs

- Track marks scars – chronic
- Acute (red, purulent, swollen) and chronic phlebitis (scarring, induration, distal edema) of injection sites
- Acute: Terminal non-medically explained punctures
- If OK by ME can cut into questionable area to look for actual sub-Q hemorrhage and biopsy. If no ME, biopsy away. Look for crystals and granulomatous changes.
- Pulmonary perivascular crystalline granulomas (adulterant talc, pill matrix), sometimes with pulmonary hypertension changes. Recent use identified when crystals are intravascular.
- Right sided acute bacterial endocarditis (usually Staph aureus.)
- Puncture sites can be stealthy: webbing of toes, penile veins, umbilicus, etc.

Drug Abuse and Donor Eligibility

- Persons who have injected drugs for a non-medical reason in the preceding five years, including intravenous, intramuscular, and subcutaneous injections are to be rejected by all
- LifeLink currently reject donors with any history of injectable drug abuse
- How to handle cocaine, methamphetamine use discovered by postmortem toxicology, especially when historian is unaware and therefore route cannot be determined. Physical assessment should be carefully scrutinized again, review photos.

Heroin

- Can be injected, snorted or smoked.
- Presence of morphine and 6-MAM (6-monoacetylmorphine) diagnostic heroin use.
- Different parts of the country have different favored routes of administration (IV, snort), but it is becoming popular again
- Potential increased risk of other high risk activities such as prostitution, unsafe sex practices

Methadone

- Used to be thought of only for opiate withdrawal treatment: “methadone clinics”
- Now it is a common pain control medication for back pain, etc.
- Methadone deaths on the rise, mainly in oral users without IV drug user histories
- If you can verify the likely source by historian and lack of injectable drug use, it can be OK.
**Cocaine**

- A huge “incidental” finding in many forensic cases which must be dealt with
  - In the cases of apparent naturals, many times this can become the cause or a contributor of death, especially apparent cardiovascular deaths.
  - If your bank or specific HCTP has a rule-out for cocaine by any route, you’re done. Hopefully you haven’t already released.
  - If known IV route under five years = rule out for all.
  - No socioeconomic group is spared from cocaine use.

**Cocaine Statistics**

- According to the United Nations Office on Drugs and Crime 2006 World Drug Report, the United States has the world’s greatest rate of cocaine consumption by people aged 15 to 64, 2.8%.
- Cocaine is commonly used in middle to upper class communities. It is also popular amongst college students, not just to aid in studying, but also as a party drug. Its users span over different ages, races, and professions.
- 1 out of 4 Americans between the age of 26 and 34 have used cocaine in their lifetime.
- Adults age 26 and older have the highest rate of current cocaine use, compared to other age groups. Source: National Survey on Drug Use and Health - SAMHSA web site.

**Methamphetamine**

- Can be produced in home laboratories using pseudoephedrine or ephedrine, the active ingredients in some over-the-counter cold meds.
- As with most drugs, the local availability increases the risk of use.
- Rural environments are where meth labs flourish. In the Midwest, where meth accounts for nearly 90% of all drug cases, and nowhere is it more prevalent than in Oklahoma.

1. www.drug-statistics.com
**Methamphetamine: Immediate Effects**

- Euphoria
- Increased energy and attentiveness
- Excessive sweating
- Loss of appetite, insomnia, tremor, jaw-clenching
- Agitation, compulsive fascination with repetitive tasks
- Talkativeness, irritability, panic attacks
- Increased libido, sexual risk taking
- Picking at skin

**Methamphetamine: Chronic Effects**

- Weight loss
- Withdrawal-related depression
- Rapid tooth decay ("meth mouth")
- Cutaneous ulcers, abrasions, from nervous "picking" at skin

**MDMA (Ecstasy)**

- MDMA also falls under many other broad categories of substances, including amphetamines and hallucinogenics.
- The drug has a tendency to produce euphoria, an increased sense of intimacy with others, and loss of inhibition. It is commonly associated with the rave party culture.
- Sexual risk issues need to be considered

**Case**

- Cause of death: Gunshot wound of chest
- Manner: Homicide
**Toxicology (blood)**
- Cocaine EIA (screen): Positive
- Cocaine panel: Positive for parent cocaine, and two metabolites (recent use)
- Opiates screen negative

**Scene**
- Copper colored “brillo-like” pieces of material
- Bent spoon
- Hypodermic insulin syringes (no history of diabetes, no roommates that we know of)

**Medical/Social History Review**
- “Did the deceased ever use illicit, non-prescribed drug or other substances, i.e. cocaine, marijuana, steroids, or inhalants?
- Answer: “experimented with marijuana many years ago, not now”

**Thoughts?**
- Does he live alone?
- Are the medical problems we don’t know about?
- About the paraphernalia
  - Brillo: Can be used as screen or filter for crack cocaine use
  - Bent spoon: Possibly for heating drug to put in IV solution (ex: heroin).
  - Insulin syringes: IV drug abuse?
    - No history of insulin use or housemate
Resolution

- IV drug abuse suggested by scene description
- Also, recent cocaine abuse is documented (autopsy toxicology), therefore, reliability of the medical social history is put into question
- Resolution: Tissues unfortunately must be discarded

Reliability of Second Party Medical/Social Histories

- How well do they really know them? (husband, wife, mom, dad, cousin, friend)
- Some behaviors are, right or wrong, kept secret from even the closest next of kin
- Sexual history
- Illicit drug history
- Always ask for the name of a friend who may have more insight, if further questions come up
- Good physical assessment for cutaneous evidence of IV drug use, STD’s
- Next, a complete autopsy for internal signs

Other Forensic Ancillary Data to Consider

- M.E. scene exam
  - Evidence of illicit drug abuse paraphernalia
  - Time of death issues
  - Not routinely obtained when requesting “autopsy report”. It is a different document, but can be very helpful.
  - Hospital deaths do not typically have M.E. personnel scene exams as body is no longer at scene.
- Police report
  - Evidence of high risk behavior. Potential last known alive clarifications

Toxicology Moral

- It is Relevant medical record.
- Likely to have been ordered on the majority of M.E. casework.
- If not included and unsure if ordered -> verify
Suggestions on Surprise Illicit Tox

- Have historian re-contacted. Indicate what we now know. Ask if they have any knowledge of such use as well as route of administration, including further clarification of no other high risk drugs that they may have used, but not currently
  - Assuming they now acknowledge such use, what does this say about their credibility?
  - Assuming they still don’t know, what does that say about their credibility?
- I suggest requesting the name of a better historian in addition to re-contacting the primary historian
- The goal is to find someone who does know

Are these autopsy findings on gross/micro risk free for later toxicology surprises?

- Ruptured myocardial infarct with coronary thrombus
- Ruptured berry aneurysm
- Intraoral gunshot wound of head
- Decapitation due to pedestrian versus train accident
- Focal bronchopneumonia in a 50 year old with COPD:

Case: How tissue banks can help the ME?

- 35 year old woman dies in her 38th week of pregnancy. No remarkable med/soc issues.
- ME autopsy performed. Three weeks out, results still pending (tox, etc…..micros, gross reveal no overt cause)
- Procurement cultures: Near 100% growth of Pasteurella multocida. (common dog bite vector) Called forensic pathologist, called NOK who corrected the med/soc. They HAD been bitten by a dog in the preceding week or two.
- Cause of death: Pasteurella sepsis.
- Tissue Disposition: Discarded (sepsis)
- Moral: Communicate out date with them as well.
- Other cases I’ve called after noting significant procurement culture growth (Klebsiella peritonitis, Strep Pneumoniae, Staph aureus)

Case 5: How Tissue Banks can help the M.E.

- 53 year old woman, 250 lbs, recent traveler from Detroit to Florida, collapses after arriving. ME takes case (no previous history or doc to sign) and allows MS/heart valve tissue procurement prior to autopsy.
- Procurement identify nothing in the heart or pulmonary trunk
- Clots are noted in the legs while dissection (recommend saving those for the ME to examine)
- ME does autopsy: Massive bilateral PE’s. Your clot in the leg saves the day. ME does not have to re-open the legs. Tissue bank is the hero of the ME.
**Case: How tissue banks can help the M.E.**

- 45 year old man is in a 2 vehicle head on MVA. Dead at the scene.
- You procurement staff routinely obtain subclavian blood.
- The ME does the autopsy and finds 500 ml of blood in the left chest cavity. Is this an antemortem reaction to trauma or artifact of subclavian stick?
- Pearl: Unless you ME/coroner wants you to do a subclavian stick (?), utilize the femoral veins. If there is no ME. involvement, the subclavian access is fine. Less artifact is always preferred by forensic pathologists.

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**Case**

- 43 year old man dies after hanging himself.
- Autopsy comes in after only 2 days. 😊
- The report indicates that “the uterus, fallopian tubes and ovaries are unremarkable”. 😅
- Have the M.E. contacted for “clarification”
- Keep in mind that some people use templates, which can result in errors. Although they seem trivial, certainly humorous, they indicate less a discrepancy, potential a serious ID discrepancy.

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**Requesting clarifications from M.E./private autopsy pathologist**

- It is sometimes awkward to request an amended report, but a serious discrepancy raises ID issues, validity issues should be followed up.
- Example: Missing microscopic description when indicated to have been taken in the protocol but missing from the microscopic description section.
- Seen this a few times on reports. Bone marrow can take longer to process (decalcified) and might inadvertently be missing from the autopsy report as those slides came separately for review.
- Typically an oversight like this occurs because the index of suspicion for finding a lesion is low. But you can have surprises when random samples have been taken.

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**Possible Adjuncts with the Forensic Autopsy (other relevant records)**

- Toxicology (very likely): Need to look at this.
- Scene report
- Police report
- M.E. investigative narrative
Scene and Toxicology Report Value

- Cause of death: Gunshot wound of chest
- Manner: Homicide

Toxicology (blood)

- Cocaine EIA (screen): Positive
- Cocaine panel: Positive for parent cocaine, and two metabolites (recent use).
- Opiates screen negative

Medical/Social History Review

- “Did the deceased ever use illicit, non-prescribed drug or other substances, i.e. cocaine, marijuana, steroids, or inhalants?
- Answer: “experimented with marijuana many years ago, not now”

Scene

- Copper colored “brillo-like” pieces of material
- Bent spoon
- Hypodermic insulin syringes (no history of diabetes, no roommates that we know of)
Thoughts?

- Does he live alone?
- Are the medical problems we don’t know about?
- About the paraphernalia
  - Brillo: Can be used as screen or filter for crack cocaine use;
  - Bent spoon: Possibly for heating drug to put in IV solution (ex: heroin).
  - Insulin syringes: IV drug abuse?

Resolution

- IV drug abuse suggested by scene description
- Also, recent cocaine abuse is documented (autopsy toxicology), therefore, reliability of the medical social history is also put into question
- Resolution: Tissues must be discarded

Thanks for Listening!!

Questions and Answers