Diagnostically Difficult Forensic Cases: Logistics, Ethics, and Case Examples


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Financial Disclosure

I have nothing to disclose

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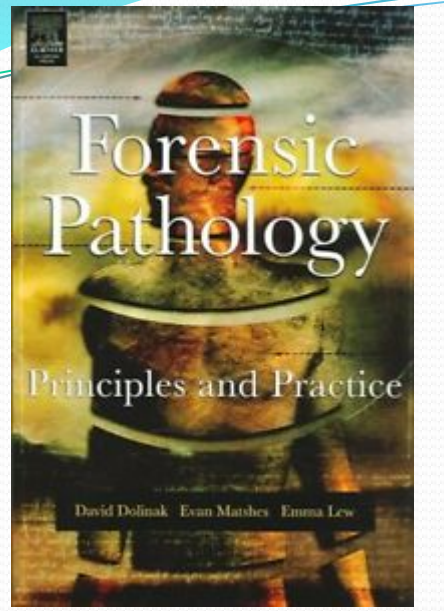
“You’re a pretty good physician but a not-so-great business person.”
~ Vanessa J. Oliver

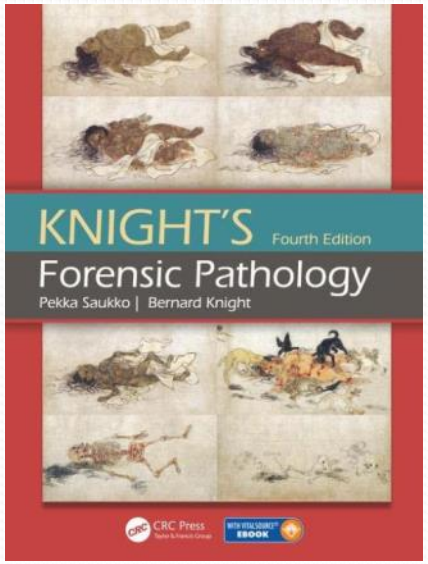


Wetli notes that forensic pathologists know that answers are not always satisfactory, easy, or readily acceptable to those asking important questions surrounding a death. He goes on to state:
"[T]here are times when the most honest thing to say is "I don't know,' in lieu of creating a specious theory of death not supported by historical, pathological, or scientific evidence."
~ Wetli CV. Foreword. In: Dolinak D, Matshes EW, Lew EO. *Forensic Pathology: Principles and Practice*. Boston, MA: Elsevier; 2005.

Dolinak: "Conjecture is not evidence. Presumption is not proof."

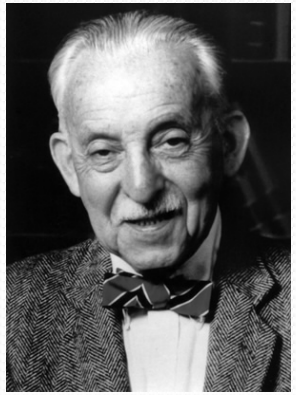
Saukko and Knight: "over-interpretation […] regrettably still leads to instances of miscarriage of justice."
"All too often, dogmatic opinions are derived from an unsound factual base, learned from lectures or textbooks that repeat previous dogma with little sense of critical evaluation."

~ Saukko P, Knight B. *Knights Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.



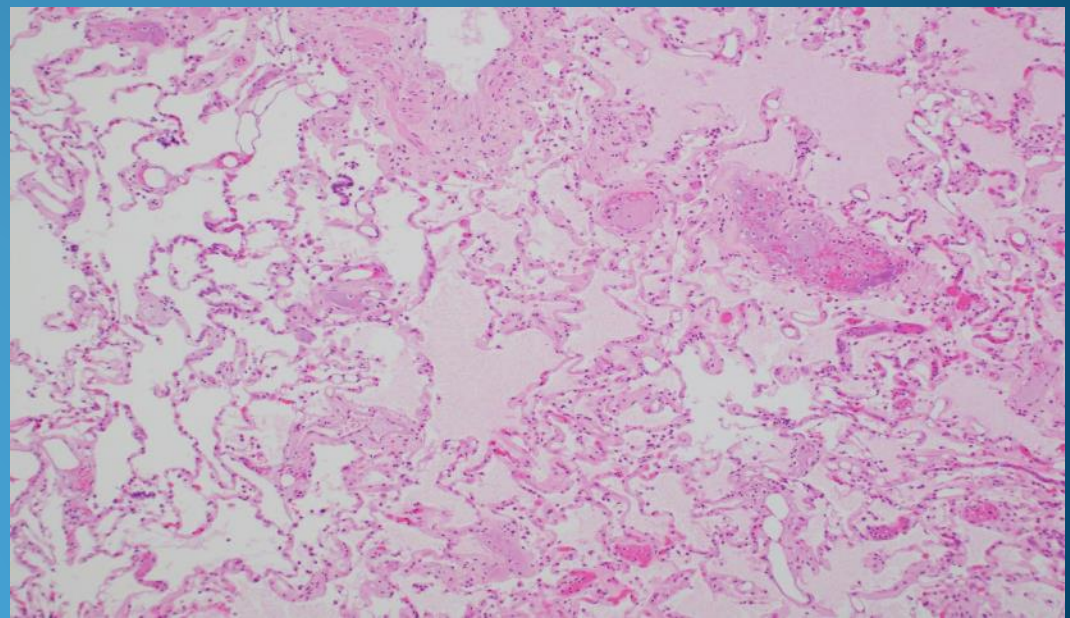
Some key features of sound medical testimony

- **Scientific validity**
  - Facts objectively noted
  - Recorded accurately
  - Analyzed
  - Opinions solidly derived from these data with admission of uncertainties
- **Personal impartiality**
  - FP/ME usually called by the prosecution
  - Fair and dispassionate
  - Don’t become a “persecuting witness”
  - Must not be prosecution-minded or defense-minded
  - Not testifying “for” either party
  - Goal is to present unbiased and disinterested observations & interpretations to assist the trier of fact – ***not*** to “win” or “lose” a case

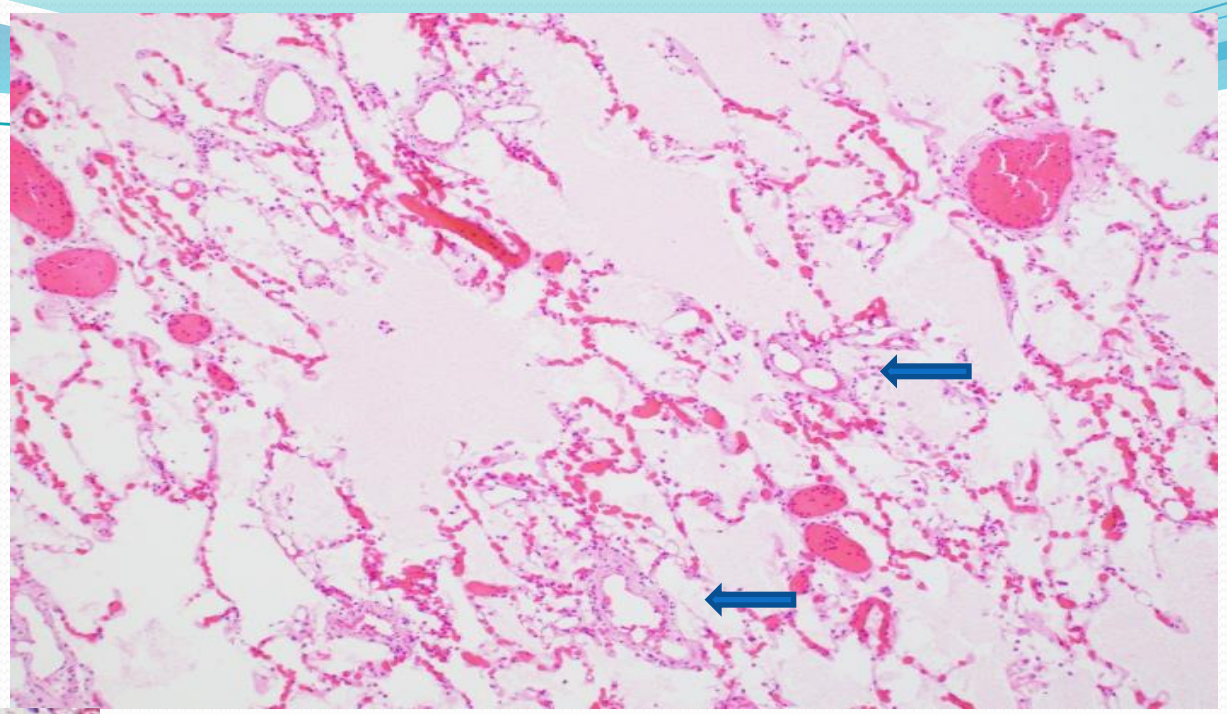


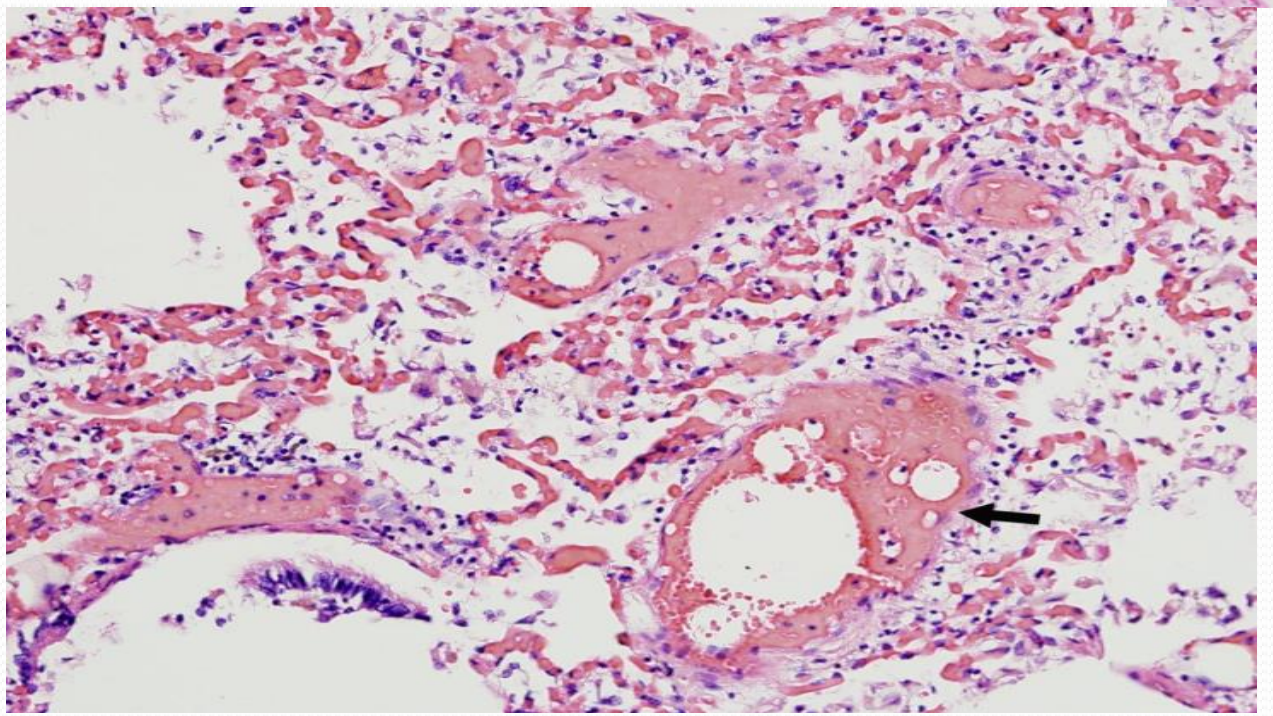
The case of the pulmonary vascular « bubbles »

- Middle-aged patient
- Sepsis due to UTI
- Acute pulmonary hypertension with cor pulmonale – ddx PE, DAD, sepsis
- Bubble study echo with death shortly thereafter
- Autopsy pathologist: death due to acute cor pulmonale due to acute PAH due to sepsis "and *possibly* a form of gas embolism from the agitated saline injection."
- Burden of evidence for medical opinion, for civil action
- Deposition: autopsy pathologist: more likely than not, bubbles are air

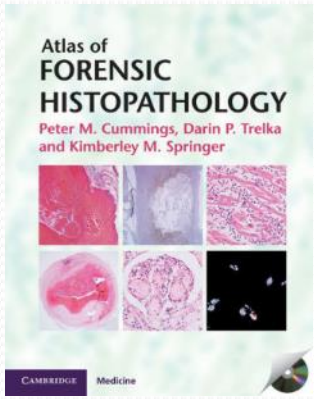


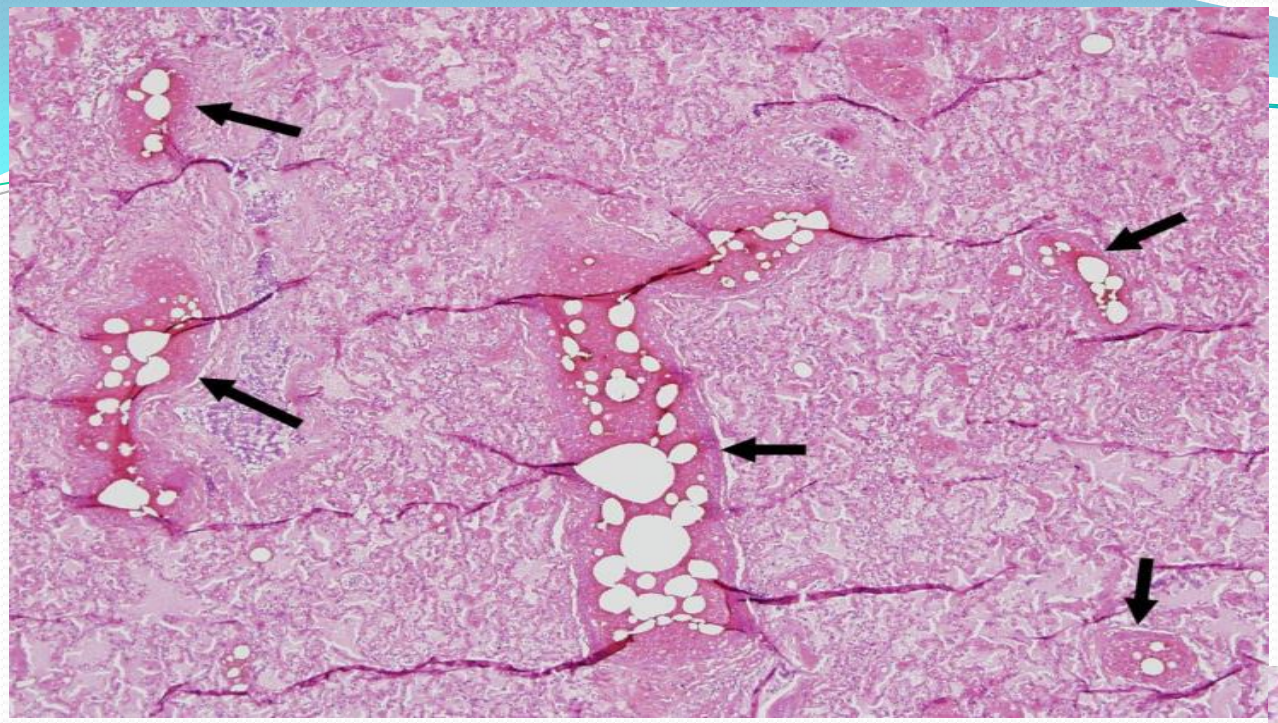
Right: lung from patient's autopsy, 100x, emboli (blue arrows)



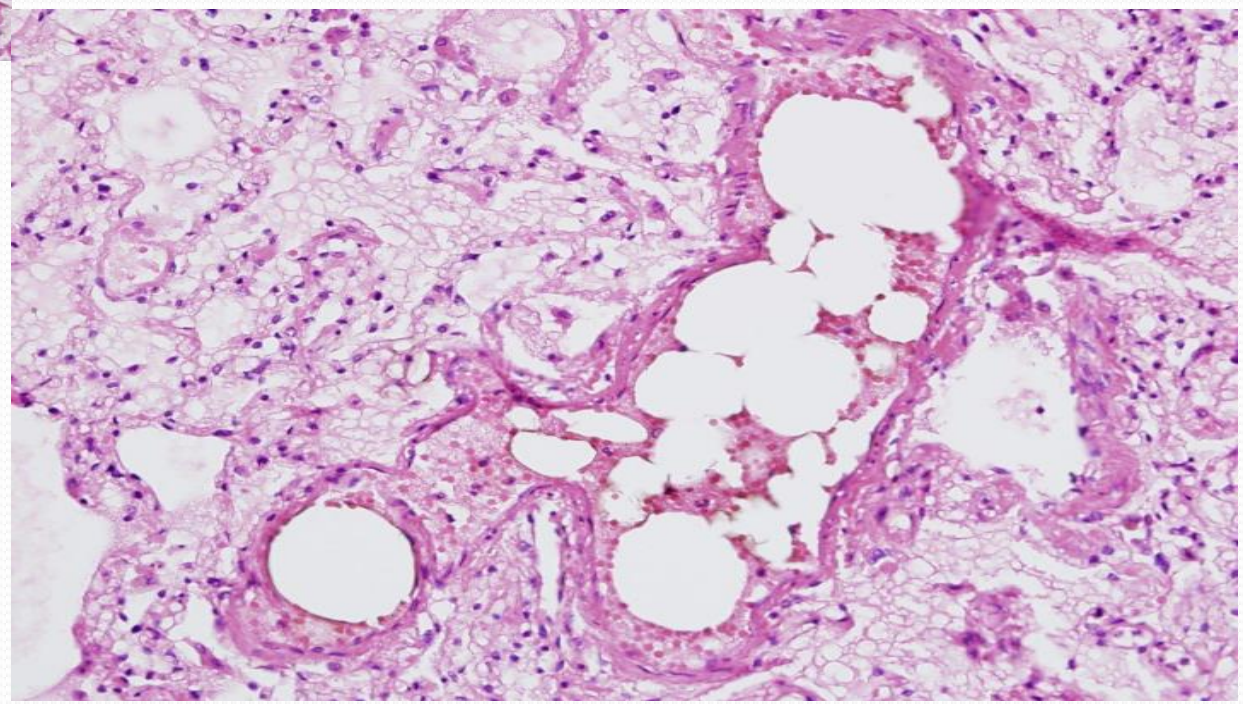


Left: figure 3.9, *Atlas of Forensic Histopathology*, Cummings et al, 2011. "Fat Emboli. There are cleared-out spaces within the blood vessel. What you are seeing is not the fat, but a space left behind as the fat is removed by tissue processing (arrow)."



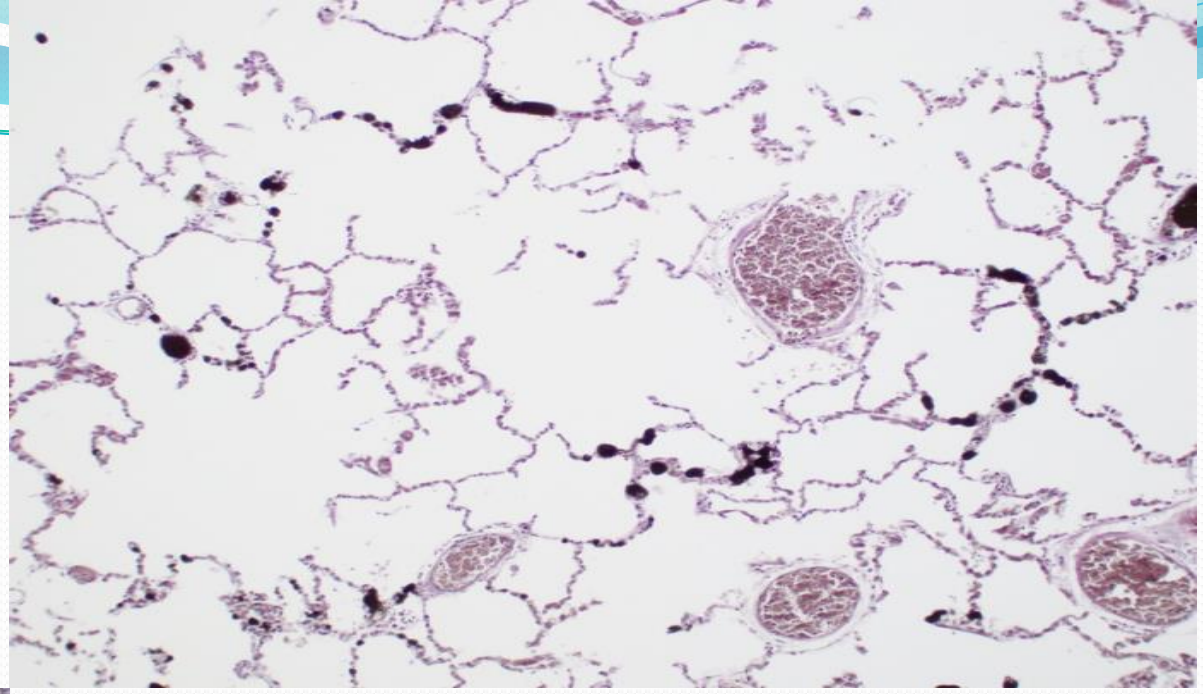


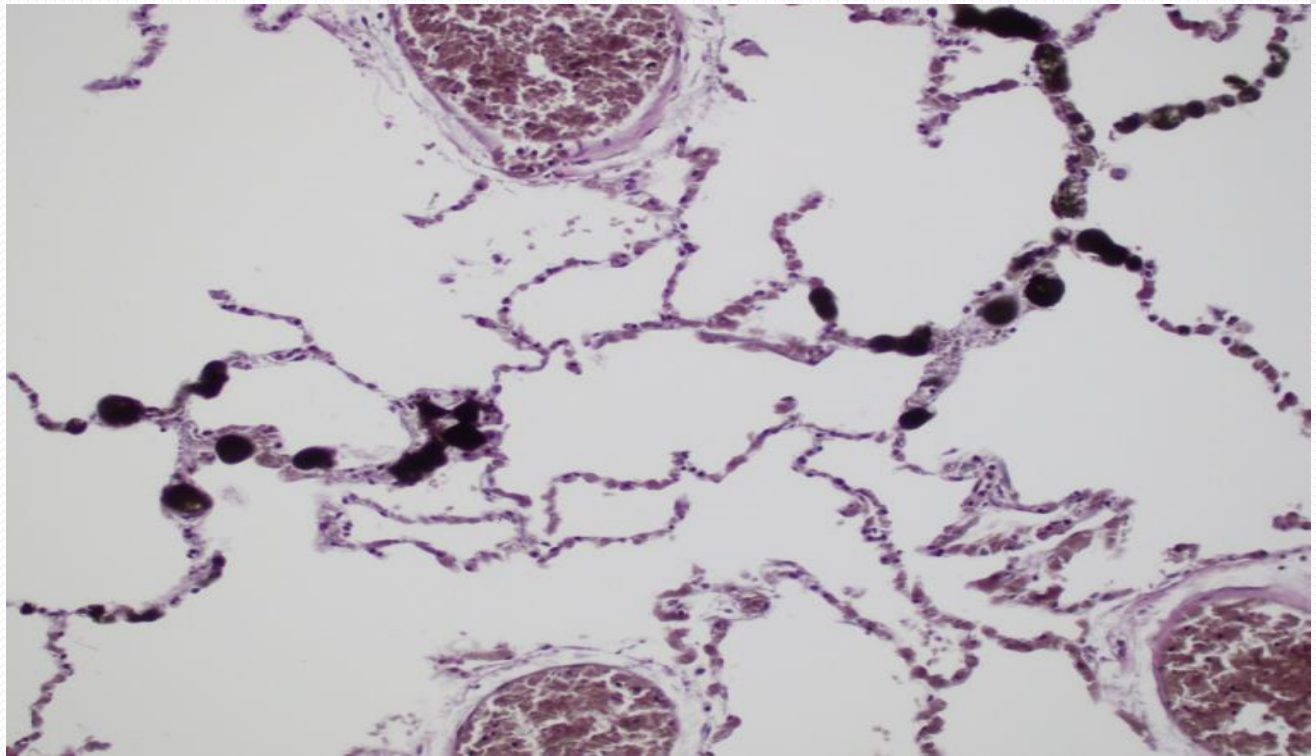
Left: figure 3.8A, *Atlas of Forensic Histopathology*, Cummings et al, 2011. “Fat emboli in pulmonary vasculature. Lung section with atelectasis and alveolar edema fluid. Note the empty spaces within the pulmonary vasculature (arrows).”



Right: figure 3.9B, *Atlas of Forensic Histopathology*, Cummings et al, 2011. “Erythrocytes peripheralized by mature adipocytes, the cytoplasmic contents of which have been subsequently lost during tissue processing, resulting in empty space. Formalin-fixed tissues can be used for osmium tetroxide staining of lipids in fat emboli.”

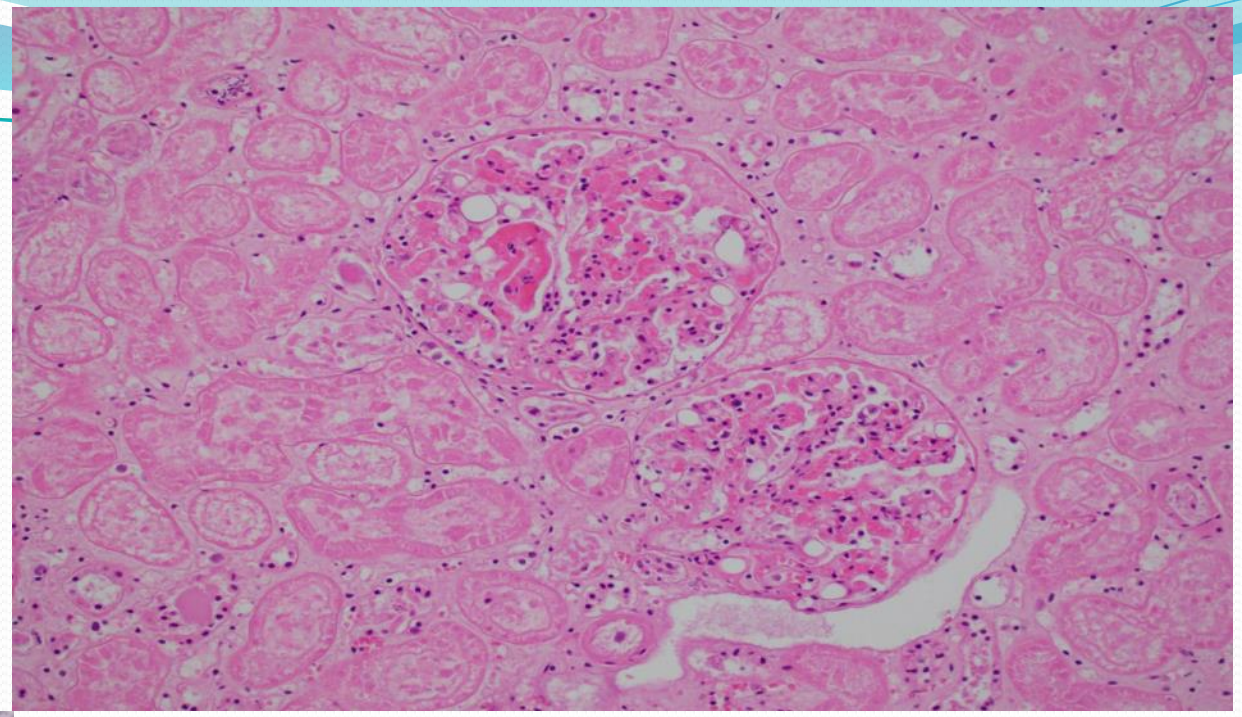
Right: lung from patient's autopsy, osmium slide 3, 100x, fat emboli (intravascular black spots)

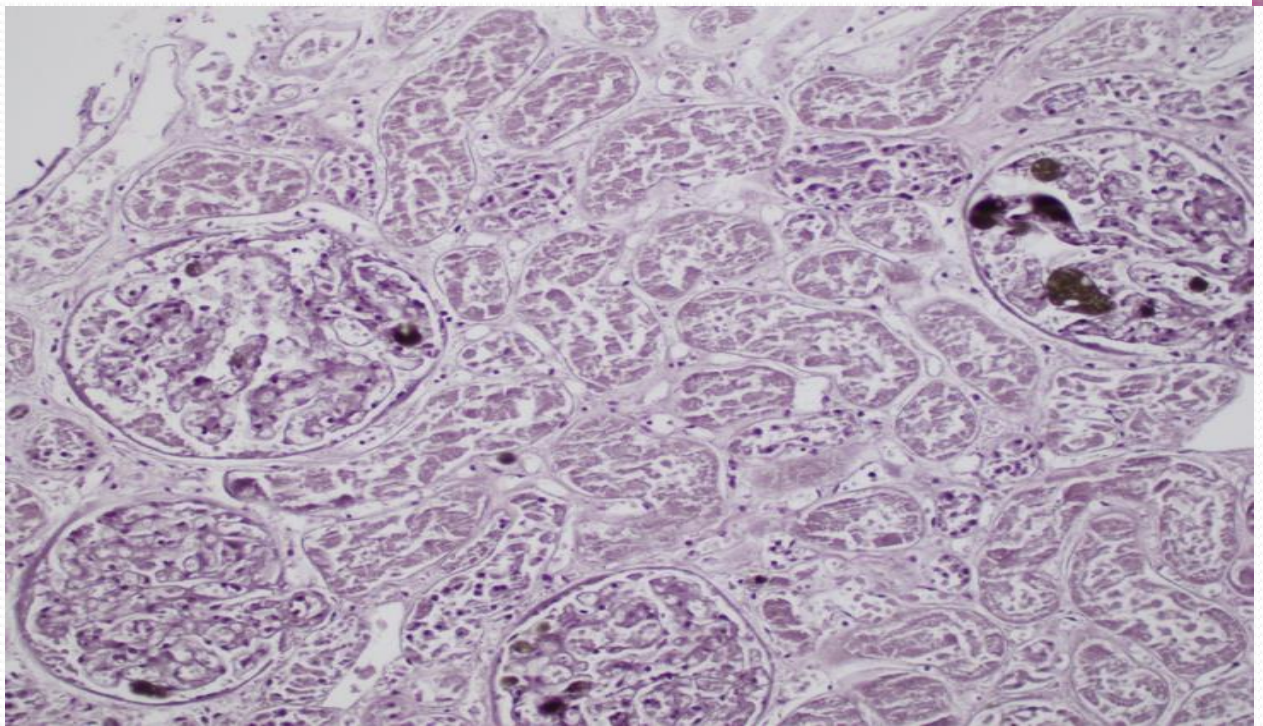




Left: lung from patient's autopsy, osmium slide 3, 200x, fat emboli (intravascular black spots)

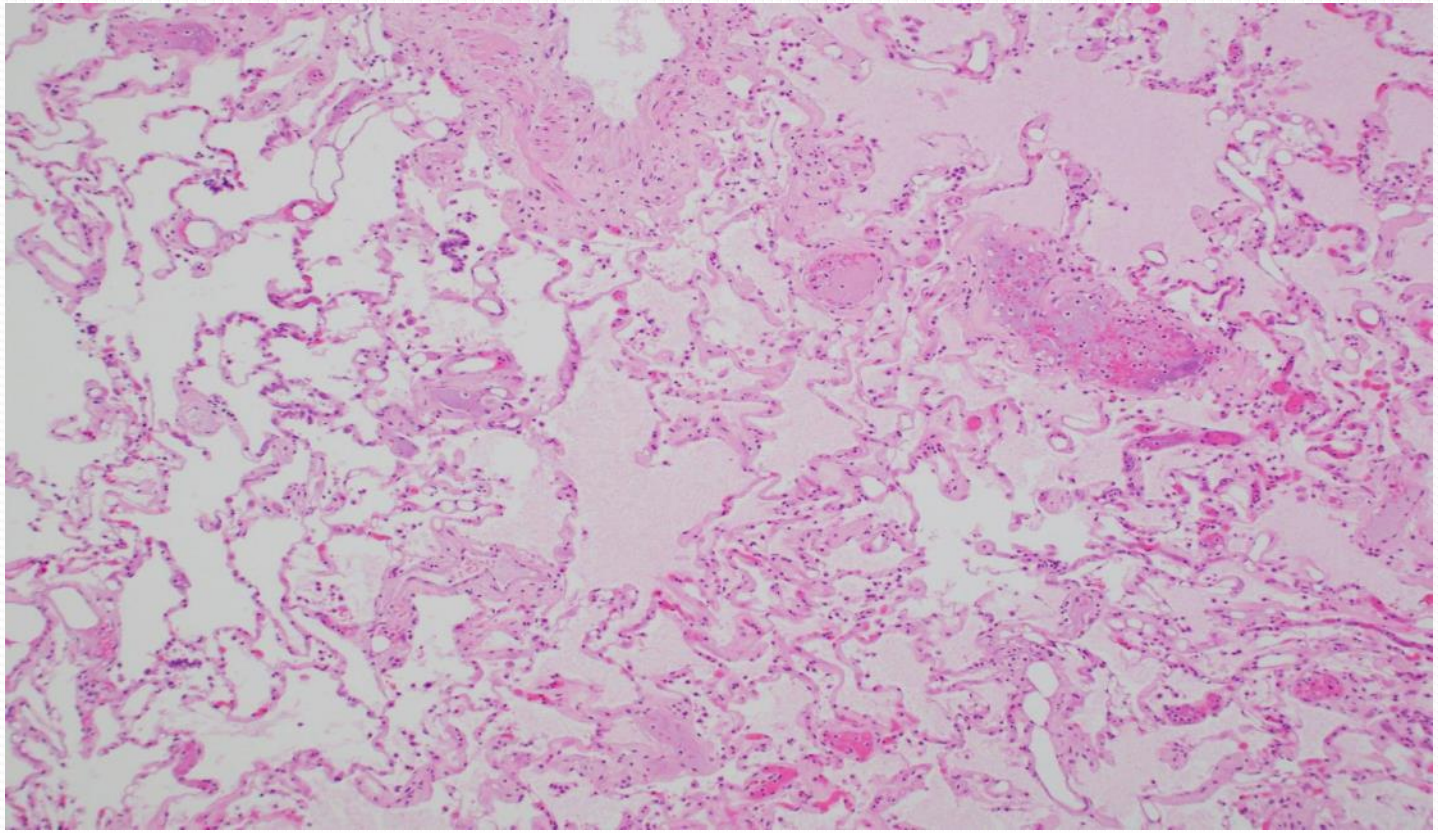
Right: kidney from patient's autopsy, H & E, 200x, fat emboli (intraglomerular vascular cleared areas)

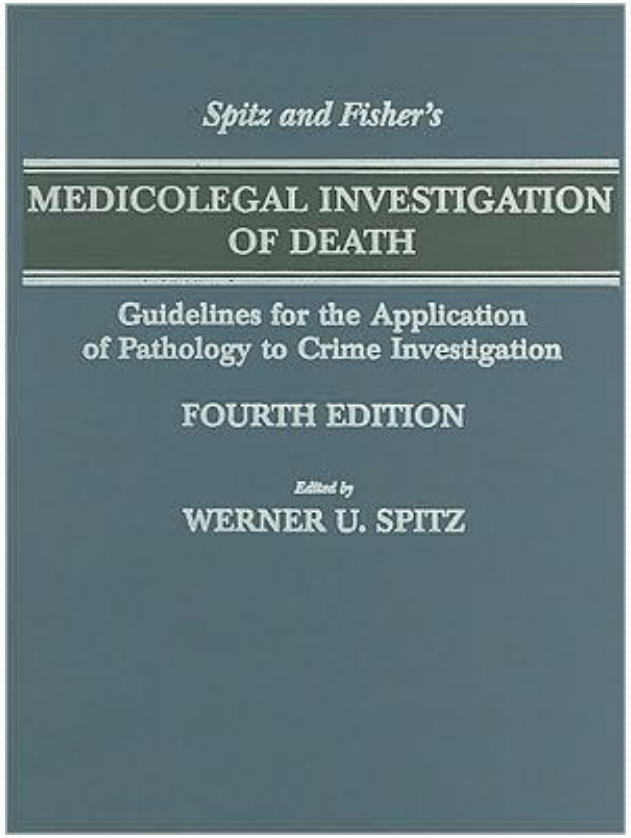




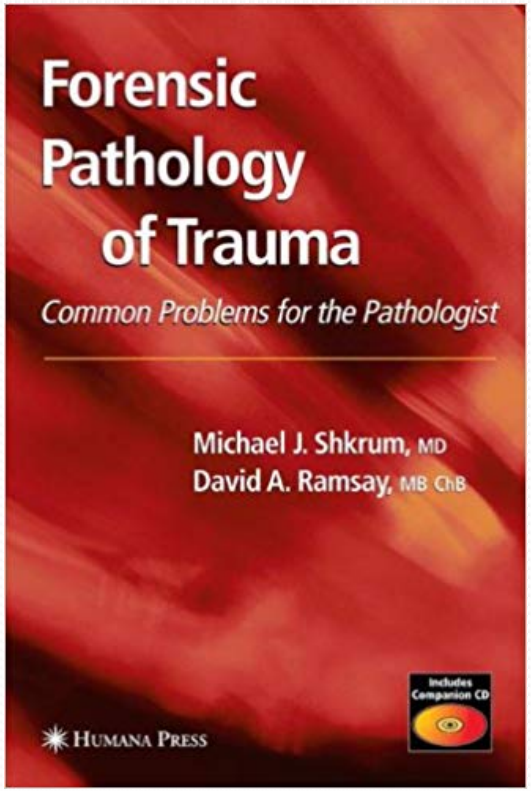
Left: kidney from patient's autopsy, osmium slide 4, 200x, fat emboli (intraglomerular vascular black spots)

"Cardiopulmonary resuscitation is probably the most common cause of pulmonary fat embolism seen at autopsy […] In hematoxylin-eosin-stained paraffin sections fat embolism may still be recognized as small hollow intravascular spaces from which the fat has been dissolved by xylene. *These are especially prominent in the alveolar capillaries of the lungs and the renal glomeruli* [emphasis mine]." ~ Spitz WU, Spitz DJ. *Spitz & Fisher's Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation, 4th ed*. Springfield, IL: Charles C Thomas; 2006.

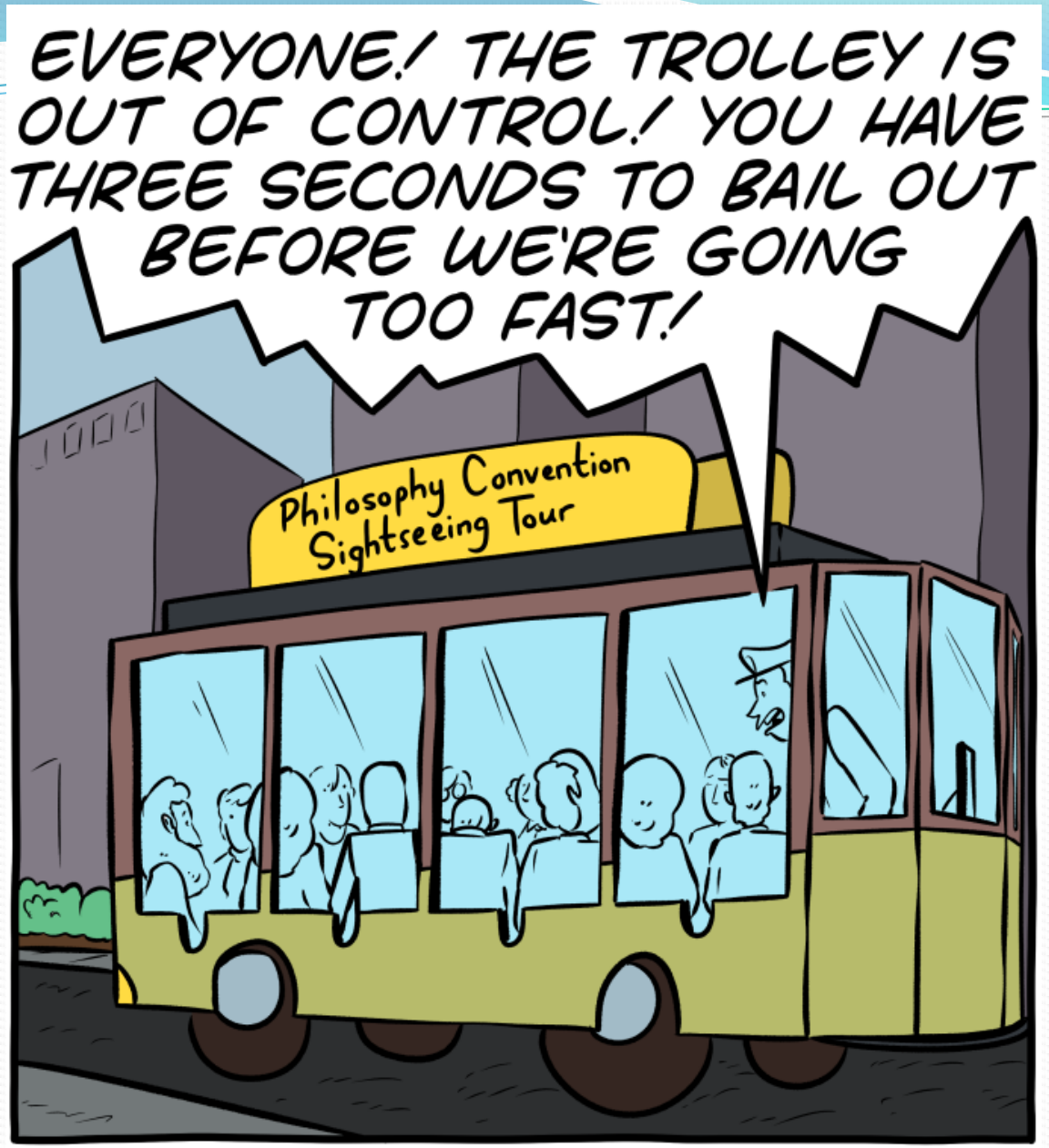




“Fat embolism occurs in up to 80% of unsuccessfully resuscitated individuals.” ~ *Forensic Pathology of Trauma: Common Problems for the Pathologist*. Totowa, NJ: Humana Press; 2007.



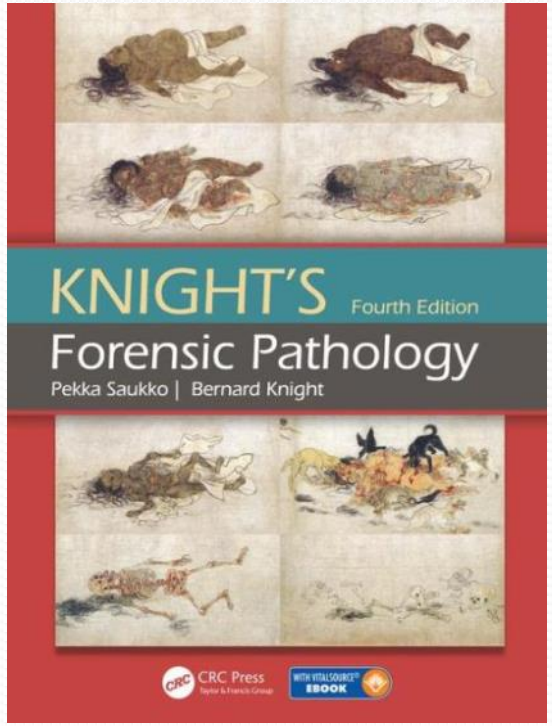
“Eighty-eight percent of nontrauma patients and 86% of trauma patients who received CPR had PFE.” ~ Eriksson EA, Pellegrini DC, Vanderkolk WE, Minshall CT, Fakhry SM, Cohle SD. Incidence of pulmonary fat embolism at autopsy: an undiagnosed epidemic. *J Trauma*. 1011; 71: 312-315.



By the time we realized it wasn't
a thought experiment, it was too late.

"Overinterpretation must be avoided, as in all fields of forensic medicine, and 'Sherlock Holmesian' opinions […] must be suitably restrained if both justice and the credibility of [the] pathologist are to be preserved."

~ Saukko P, Knight B. *Knights Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.



il presunto assassino italiano

- Mr Forti picks up Mr Pike at the Miami Airport; Mr Pike found dead of multiple GSW on beach next day
- Autopsy: “the stomach contains 150 cc of pale tan fluid containing partially digested semi-solid food including apparent orange fruit like meal.”

Medical Examiner Testimony

3. I have conducted a microscopic examination and analysis of food contents discovered within Mr. Pike's stomach and a sample of food served on the flight taken by Anthony Dale Pike from Spain to Miami on February 15, 1998. The food contained in Mr. Pike's stomach is consistent with the food served on the flight.

4. Based upon the amount of food that has been digested an estimate of the time of death would be approximately 2 - 4 hours after the last meal.

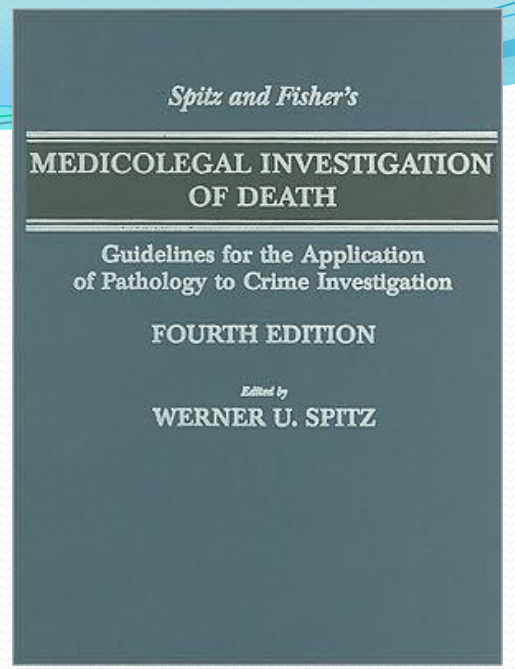
5. The time of death would be consistent with having occurred between 6::00 p.m. and 7:16 p.m. on February 15, 1998.

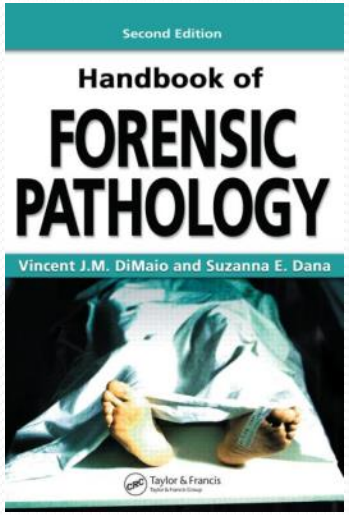
“A myth has haunted forensic medicine for a century. It may be stated as follows: When solid food has been swallowed, digestion and stomach emptying occur at a constant and predicable rate.” Jaffe’s entire abstract:

The inspection of the contents of the stomach must be part of every postmortem examination because it may provide qualitative information concerning the nature of the last meal and the presence of abnormal constituents. Using it as a guide to the time of death, however, is theoretically unsound and presents many practical difficulties, although it may have limited applicability in some exceptional instances. ***Generally, using stomach contents as a guide to the time of death involves an unacceptable degree of imprecision and is thus liable to mislead the investigator and the court***.”

Jaffe FA. Stomach contents and the time of death: reexamination of a persistent question. *Am J Forensic Med Pathol*. 1989; 10(1): 37-41.

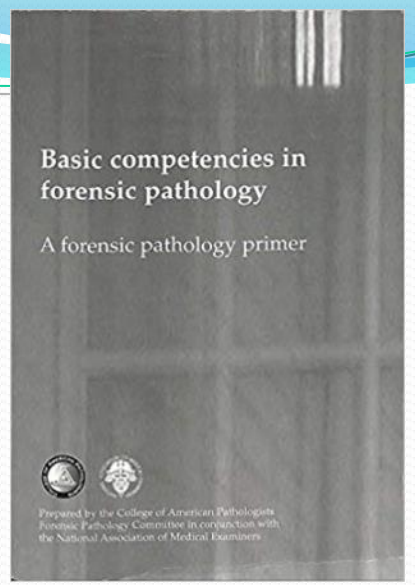
Perper: “Gastric emptying is **affected by many factors**, with delaying of emptying often due to miscellaneous entities such as starch foods, fatty foods, alcohol, many drugs, and emotional stress such as fear or excitement.” In: Spitz & Fisher’s.

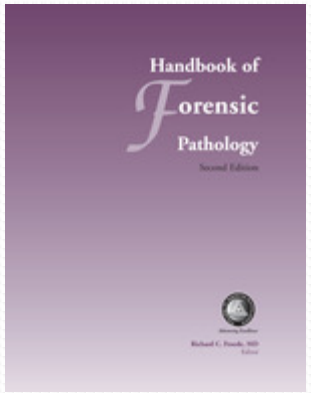




Di Maio and Dana: “Gastric emptying time has **great variations** from meal to meal, from person to person, and from day to day in the same person.” They also note that a factor to consider in the rate of gastric emptying is stress, as *gastric emptying can fully cease in an individual under stressful conditions* [emphasis mine]. DiMaio VJM, Dana SE. *Handbook of Forensic Pathology*, 2nd ed. Boca Raton, FL: CRC; 2007.

"The rate of gastric emptying after a known last meal is ***unpredictable***." Cina SJ. Postmortem changes and identification of remains. In: Prahlow JA, ed. *Basic Competencies in Forensic Pathology: A Forensic Pathology Primer*. Northfield, IL: College of American Pathologists; 2006.

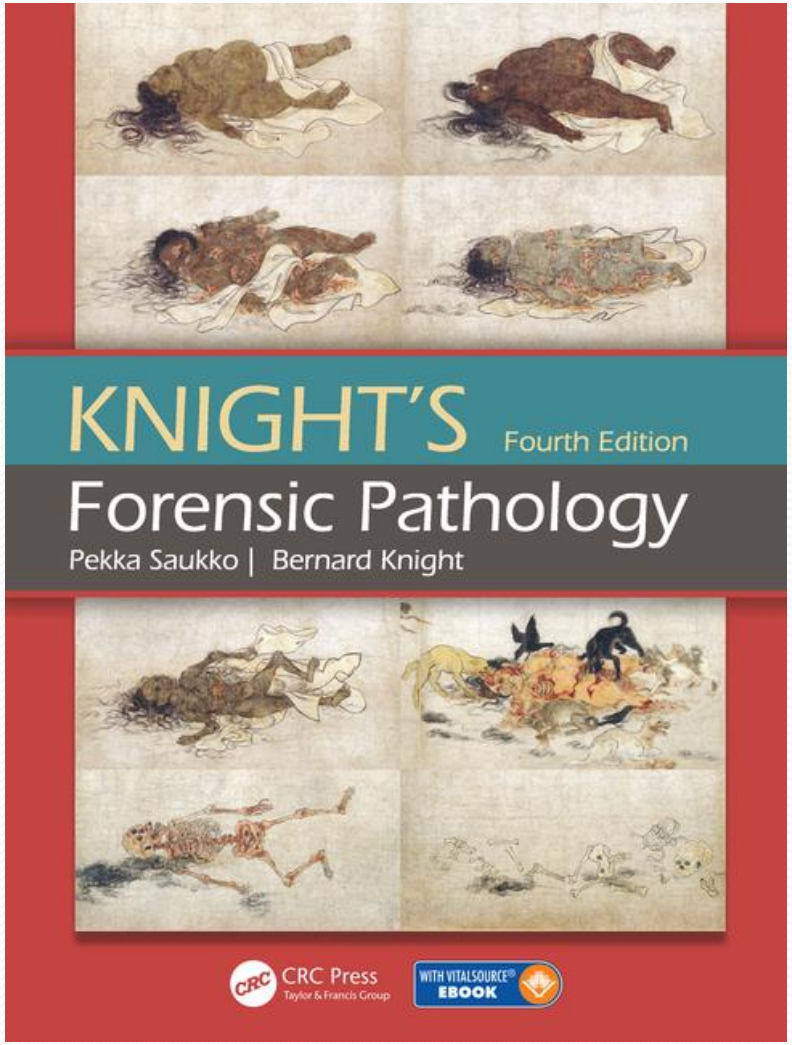




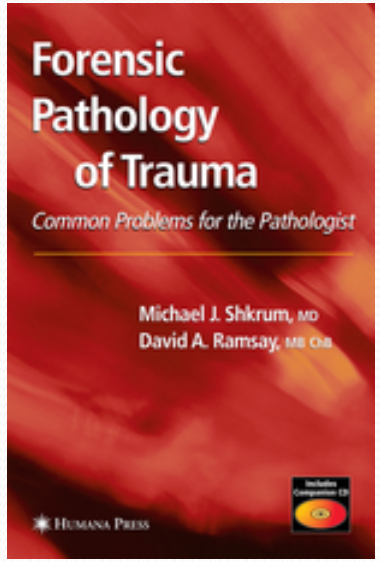
Nashelsky and McFeeley: "Many factors confound and change gastric emptying time, including stress, exercise, disease, and the composition of the meal […]. Estimation of time of death based on stomach contents is ***strongly discouraged***." In: Froede RC, Davis GJ, Prahlow JA, Randall BB, Reay DT, Weedn VW, eds. *Handbook of Forensic Pathology*, 2nd ed. Northfield, IL: College of American Pathologists; 2003.

Saukko and Knight note that “There is now almost a consensus that with extremely circumscribed exceptions, the method [of timing gastric emptying] is ***too uncertain to have much validity***.”

They indicate that the original hypothesis of gastric emptying time was a belief that food spent a fairly uniform time in the stomach before being released to the duodenum and that the original assumptions of emptying of an “average” meal was some 2 -3 hours, but that was a ***test meal of gruel***, hardly a representative sample of a modern, mixed diet. The subjects of experimental work were ***healthy volunteers and presumably free from stress during the experiments***. They cite examples of great variations on potential gastric emptying times, such as Modi giving 4 – 6 hours for a meat and vegetable meal and 6 – 7 hours for starchy meal. They note that fatty substances can markedly delay gastric emptying time, as can alcohol or stress.



Shkrum and Ramsay note that gastric emptying ***varies in the same individual and between individuals under similar circumstances eating the same meal*** and that emptying is delayed by many factors, including emotional upset, alcohol, and other drugs. They warn that stomach contents "*are rarely useful in estimating the time of death because of the many variables involved* [emphasis mine]."




"I'm not a magician, Spock,
just an old country doctor."

A good deed, followed by punishment

Ms Ogle, 51, best friend and caretaker of Ms Betty Rice, 78

Ms Rice died 11/09/2009

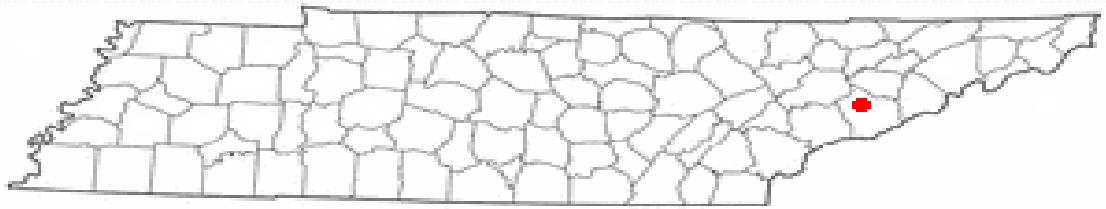
Exhumed 3 months later after complaints from relatives

Embalmed, decomposing body autopsied 02/09/2010

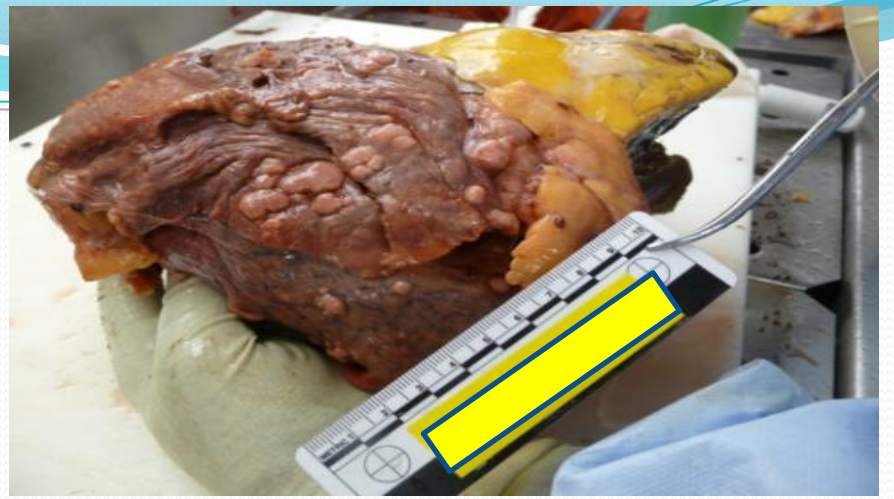
Charles Poole, Esq

Sevier County, Tennessee

- County seat of Sevier County, pop 14,807
- Named for Col John Sevier, Revolutionary War veteran
- Home of Dolly Parton



Autopsy Findings



- Diffuse carcinomatosis – metastatic small cell
  - Multiple lymph nodes
  - Pleural effusion
  - Skull, liver, adrenal vertebral body, diaphragm metastases
  - “right lung completely obliterated by carcinomatous nodules”
  - Bronchopneumonia, left lung, acute, with marked edema in all left lung sections
- Severe H & ASCVD with cardiomegaly, up to 90% coronary stenoses

Liver Toxicologic Findings

- Methanol 300 mg/100g
- Alprazolam 32 ng/g
- Morphine – total 1600 ng/g
- Cyclobenzaprine 110 ng/g
- Promethazine 1100 ng/g

Medical Examiner COD Statement:

The main cause of death of Betty Rice is morphine, promethazine, alprazolam, and cyclobenzaprine intoxication. Metastatic cancer of lung and arteriosclerotic cardiovascular disease are considered to be significant conditions contributing to her death.

: how would ASCVD, HCVD, and DM contribute to a drug intoxication death?

Following burial, multiple [estranged] family members, mainly nieces, came forward suspicious of the fact that they were not notified of her death as well as the fact that the decedent's will was allegedly altered the day before her death.

Moritz: Mistake of confusing the objective with the subjective sections of the protocol
It is as surprising as it is distressing to note how frequently pathologists include statements of opinion and interpretation in the part of the protocol that is supposed to be objective and factual. The purpose of a protocol is twofold. One is to record a sufficiently detailed, factual, and noninterpretive description of the observed conditions, in order that a competent reader may form his own opinions in regard to the significance of the changes described. The other is to interpret the significance of the changes that were observed and described.

Moritz AR. Classical mistakes in forensic pathology. *Am J Clin Pathol*. 1956; 26: 1383. Reprinted Am J Forensic Med Pathol. 1981; 2(4): 299-308.

Alan Moritz and Frances Glessner Lee, working on the Nutshell Studies.

Some issues at hand

- No evidence or literature correlating PM liver in an embalmed, decomposing body with premortem blood concentration
- Postmortem redistribution
- Medical Examiner at McDaniel hearing: “Toxicology trumps anatomic findings”

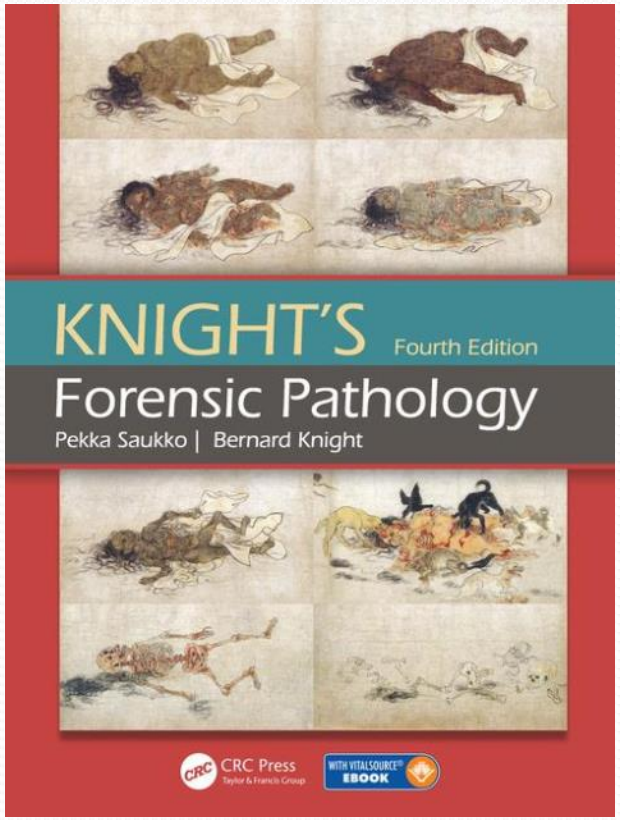
“For example, a ruptured myocardial infarct or coronary artery thrombus is a compelling finding and would trump the opioid intoxication diagnosis.” ~ Gill JR, Stajic M. Classical mistakes in forensic toxicology made by forensic pathologists. *Acad Forensic Pathol*. 2012; 2(3): 228-234.

Some issues at hand

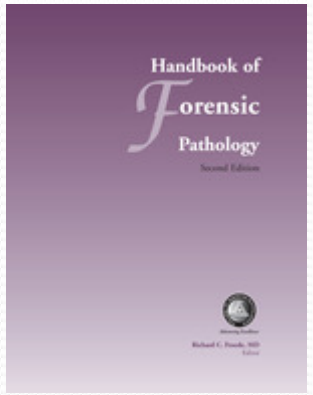
- Drugs found in Ms Rice's PM tissue were prescribed
- Ms Rice had been taking opiates before death and would have had tolerance to some degree
- The day before her death, Ms Rice was documented by hospice nurses as being capable of ADL, ***including taking her own medications***

"While many drug related deaths are straightforward, many cases require careful thought with information not available for some time until after the autopsy. ***Taking a postmortem concentration and determining that it is the cause of death without consideration of historical and scene information and other postmortem data may lead to an incorrect conclusion on cause and manner of death***." ~ Parai JL, Milroy C. The autopsy and toxicologic deaths. *Acad Forensic Pathol*. 2012; 2(3): 222-227.

"[…] the analysis [of the presence and quantity of drugs] is not the final arbiter of the cause of death, although it is a highly important component of the whole range of investigation. The pathologist has the duty to correlate and interpret all known facts. [S]He ***must fit the circumstances***, the presence of natural disease, trauma and other toxic substances with the laboratory findings, to arrive at the most reasonable cause of death." ~ Saukko P, Knight B. *Knights Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.



Polklis: “Modern analytical methods and instrumentation now make it feasible to detect drugs or poisons in a wide variety of unusual specimens collected from decomposed, exhumed, embalmed, and incinerated bodies as well as skeletal remains. ***In such cases, it is often difficult or impossible to draw conclusions as to the pharmacological or toxicological effects of detected drugs upon the decedent at the time of death*** [emphasis mine].



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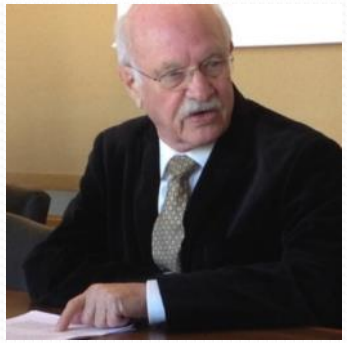
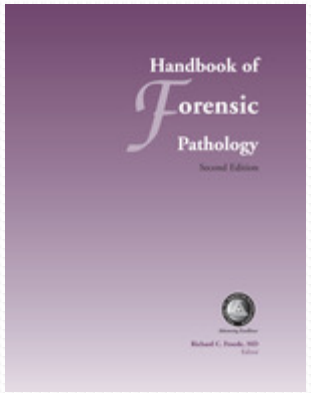




Karch: “**The idea that the cause of death could be determined by simply consulting a reference table is not valid**. Postmortem drug concentrations are only of value when the results are combined with evidence obtained by thoroughly examining the death scene, reviewing the deceased’s history, and examining the body. The final diagnosis depends on appropriately weighing all these factors.”

In: Froede RC, Davis GJ, Prahlow JA, Randall BB, Reay DT, Weedn VW, eds. *Handbook of Forensic Pathology*, 2nd ed. Northfield, IL: College of American Pathologists; 2003.

"There's no way scientifically, to calculate a level of drugs in an organ, what her level might have been during life," said Dr. Gregory Davis, a Professor of Pathology from the University of Kentucky. "The only thing we can say is the 4 drugs she was prescribed during life, she had in her when she died."
The judge says the case wasn't worth going to the jury. he made a ruling of not guilty after hearing all the testimony this week.
"This court must, I feel duty compels me, to direct a verdict of not guilty of this defendant on all charges," Judge Rex Ogle told the court.

While presiding over the murder trial of Elizabeth Ogle, charged with killing Betty Rice in 2010 while caring for the ailing Rice, Judge Ogle heard the state's case, then the testimony a series of medical experts for the defense that shot down much of what the state's evidence purported to show. It would have been easy for the judge to send the case to the jury and hope those 12 people agreed with his own assessment that Elizabeth Ogle (no relation to the judge) was innocent.

The politically wise thing to do was let the jury have it. Instead, the judge did direct a verdict of innocent for the defendant, ending her two-plus years of hell.

That took some guts.

Sometimes doing what is right takes courage. Judge Ogle saw a woman on trial for a crime he knew she didn't commit, and he acted within the power of his office to put a stop to it, even though such a move might not be a popular thing to do.

The Mountain Press.com

Sevier County's Daily Newspaper

Elizabeth Ogle was able to walk out of the Sevier County jail a free woman, she was jumping for joy, feeling the grass, and reaching for the trees, things she's not been able to enjoy in more than 2 years.
"It's been very depressing, very sad, scary," said Elizabeth Ogle. "I will take nothing for granted anymore. That's like walking over here, feeling of the grass, touching the trees, I haven't seen grass and trees in 27 months and one day."

May all your Christmas wishes come true.

Have a Merry Christmas and a Happy New Year.

Elizabeth Ogle

Thanks so much for testifying for me in my trial. You helped to save my life and I will forever be greatful. Because of what you did for me, these cookies were made with happiness and love!

Some errors in judgment

Am J Forensic Med Pathol
December 1981 (orig 1956)
Alan R. Moritz, MD
Classical mistakes in forensic pathology*

Mistake of substituting intuition for scientifically defensible interpretation

This brings me to one of the most dangerous mistakes in forensic pathology, and one that is particularly prevalent among experienced forensic pathologists who, for one reason or another, acquire a propensity for what might be called "categorical intuitive deduction." This *Sherlock Holmes type of expert* may see certain bruises in the skin of the neck and conclude without doubt that they were produced by the thumb and forefinger of the right hand of the stranger. He may see an excoriation of the anus and maintain unequivocally and without benefit of other elements of scientific proof that the assailant was a sodomist. He ignores the essential component for proof of the correctness of any such scientific deduction, namely, the nonoccurrence of such lesions or changes in control cases.

Am Journal Forensic Med Pathol December 1981 (original *Am J Clin Pathol* 1956)
Alan R. Moritz, M.D.
Classical mistakes in forensic pathology*

It is difficult to estimate how much harm is done by these people. I know of a man who was hanged largely on the weight of such uncritical evidence. The ordinary hospital pathologist is not accustomed to being so continuously unchallenged as to permit him to acquire a full-blown God complex of the kind that I am discussing. The hospital pathologist must be able to defend his interpretations against clinicians who also have a certain amount of information about the facts in issue. It is only the full-time forensic pathologist who is likely to become accustomed to having his opinions go virtually unchallenged. **The stakes are too high to play hunches in forensic pathology**.

the conundrum of live birth versus stillbirth

Alabama v Bridget Lee

Pickens County, Alabama

History

- 32 y.o. gives birth 11/06 between 12:30 and 17:00
  - Concealed pregnancy, no prenatal care
- Alleges febrile illness that day and spontaneous vaginal delivery of dead infant
- Alleges fear of social consequences; therefore, hides birth from family/friends
- 11/11: 5 days later, friend calls police, and Ms Lee allows search of her SUV, where body of Baby Boy Lee is found

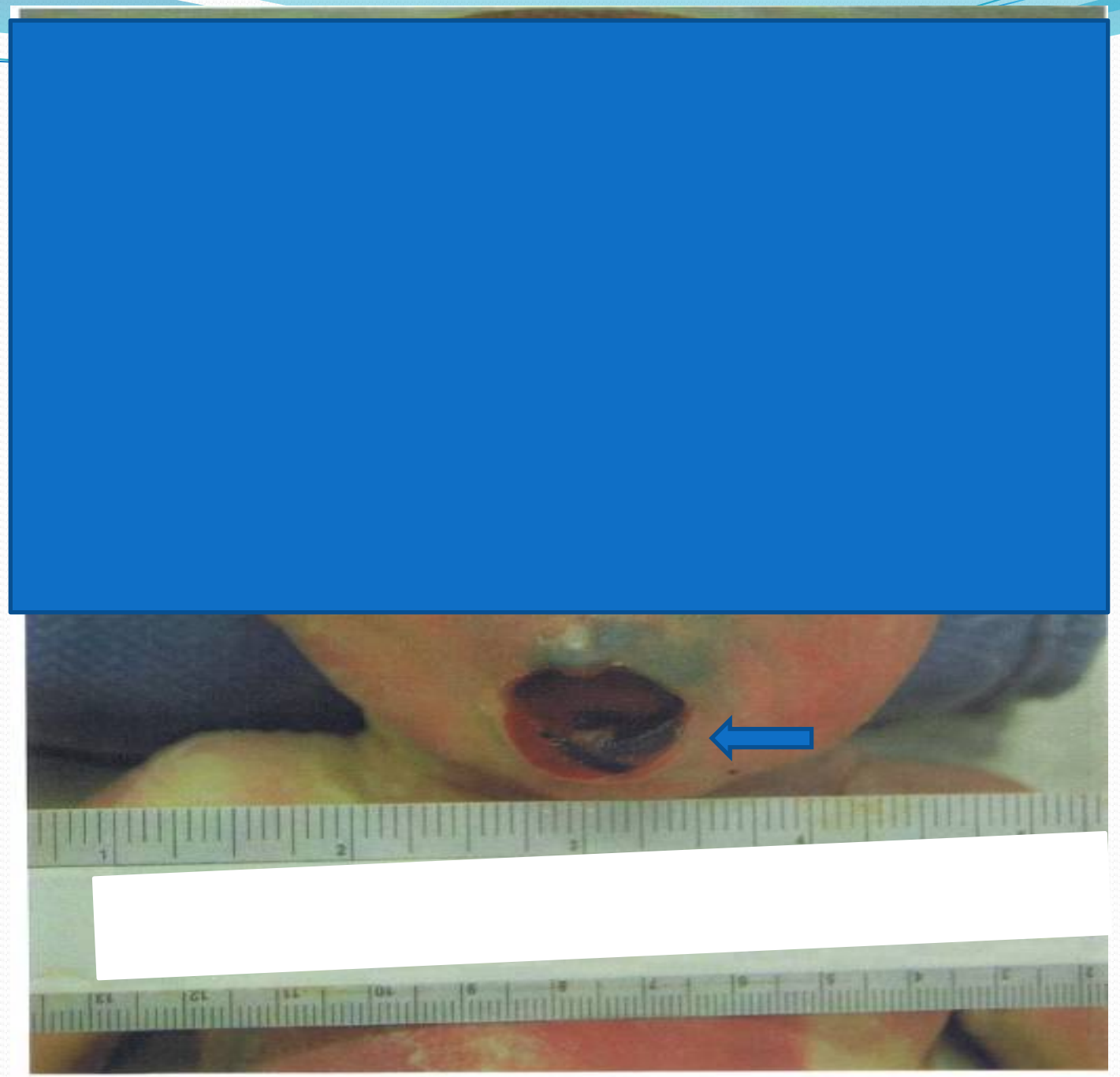
Initial Autopsy Findings

Autopsy performed 11/12, six days after delivery, with findings of:

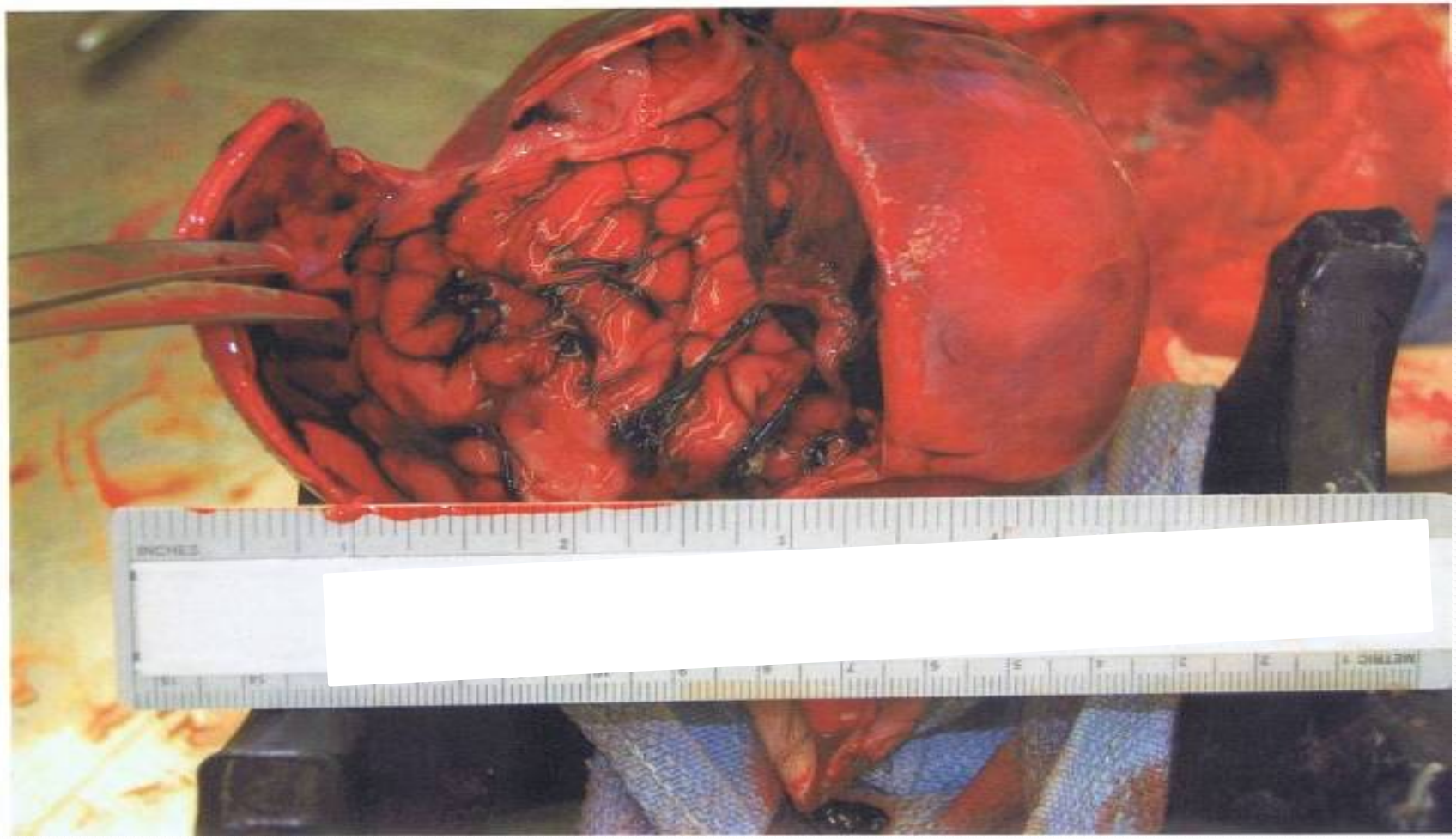
I. Asphyxiation due to Suffocation
   A. Subgaleal hemorrhage, frontal scalp
   B. Contusion of lip
II. Subdural Hemorrhage
III. Gestational Age consistent with ~35 weeks
IV. Chorioamnionitis of Placenta

Opinion: This newborn male infant died from asphyxiation due to suffocation. Autopsy reveals that he was born alive and breathing. The manner of death is Homicide.

Contusion of lip described (arrow); however, no evidence of a lip contusion – common decomposition drying artifact – note green decomposition artifact as well



What is described as a “Thin layer of fresh subdural blood covering the convexities of the brain” is actually diffuse subarachnoid staining due to decomposition with decomposing blood vessels filled with postmortem clot



Assertion of Live Birth

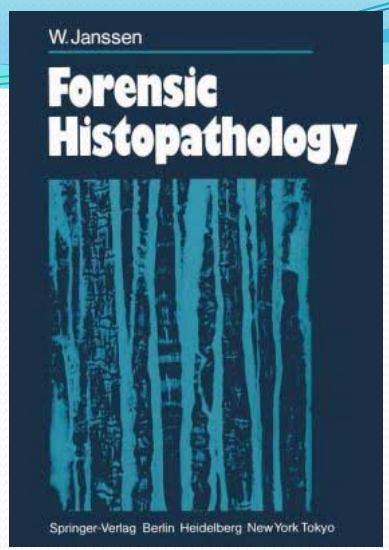
No evidence offered

- "Pulmonary parenchyma was salmon-pink and expanded, exuding slight amounts of blood and frothy fluid; no focal lesions were noted." **[common in decomposition]**

Postmortem handling has also been incriminated for the entry of air into fetal lungs. Apparently respired alveoli have been found in lung sections for a dead infant taken from the uterus of a dead mother

Saukko & Knight. *Knight's Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.

Assertion of Live Birth



Even in unborn children taken dead from the uterus of the dead mother, partial infiltration of air into the lungs could be detected (Meixner 1926). The cause of this partial aeration was explained by postmortem entry of air into the lungs as a result of manipulations to the corpse of the child during autopsy. […] According to the present level of knowledge and possibilities for examination, ventilation [aeration] of the lungs alone cannot be taken as certain indication of a live birth. **Under various circumstances, lungs originally aerated can become devoid of air: conversely, the lungs of stillborn neonates can appear aerated. […]** ***The influence of autolysis and putrefaction can lead to the disappearance of air or regeneration of gas within the pulmonary tissue***.

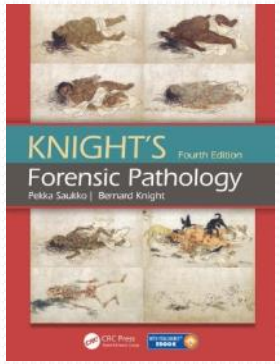
Janssen. *Forensic Histology*. 1984, Springer-Verlag, Berlin, pp 201-203

Assertion of Live Birth

"Float test" described on p 3: ("both the right and left lungs floated when completely submerged in water, the right greater than the left") – this test has been known to have ***no*** sensitivity or specificity for over 100 years

From Saukko and Knight:

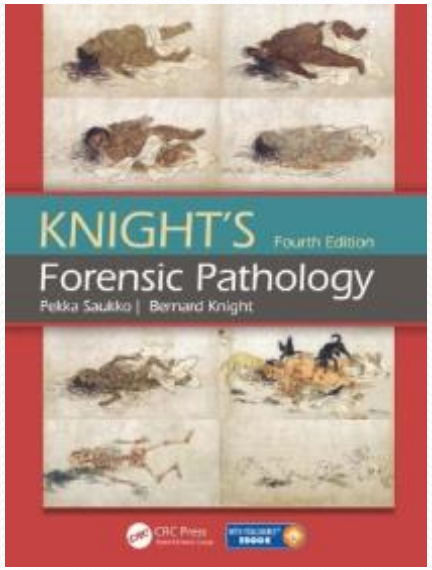
***There are too many recorded instances when control tests have shown that stillborn lungs may float and the lungs from undoubtedly live-born infants have sunk, to allow it to be used in testimony in a criminal trial*. Even one such failure negates the whole history of the test and the authors are saddened to contemplate the number of innocent women who were sent to the gallows in previous centuries on the testimony of doctors who had an uncritical faith in this crude technique. As this is such an important issue and one that is still contested today, the words of the late Professor Polson may be recalled from his notable textbook [Polson C, Gee D, Knight B. 1985. *Essentials of Forensic Medicine, 3rd ed*. Pergamon Press, London]:**



The test was suspect even in 1900 and requires not detailed discussion, because it is now known to have no value. The lungs of the live-born, even those who have been known to live for days, may sink [Dilworth 1900; Randolph 1901] and those which float are not necessarily those of live-born infants…. It is therefore pointless to apply the hydrostatic test, which will impair the material for other and more important investigations.

From Saukko and Knight:

“The complicated instructions offered in many textbooks concerning cutting the lung into lobes and then in to piece, squeezing them with knife blades and even pressing them underfoot on the mortuary floor before floating them, all smatter of black magic and are a complete waste of time. Worse, they can simulate a *false sense of scientific validity* [emphasis mine] and even to an eventual miscarriage of justice.”



Int J Legal Med (2013) 127:447–451
DOI 10.1007/s00414-012-0727-1

ORIGINAL ARTICLE

Is the lung floating test a valuable tool or obsolete? A prospective autopsy study

Anna-Lena Große Ostendorf · Markus A. Rothschild · Annette M. Müller · Sibylle Banaschak

Received: 25 February 2012 / Accepted: 12 June 2012 / Published online: 26 June 2012

Abstract The lung floating test is still an obligatory measure to distinguish whether a newborn was born dead or alive. In order to verify the reliability of the floating test, a new clinical trial should examine the results of current cases and thus expose, if the test is still contemporary. Following the question, if the test is appropriate for the nowadays birth collective, 208 lungs of newborns were tested with the floating test. The test showed the expected correct result in 204 cases. However, it indicated a false negative result in four cases, in which the lungs sank, although prior life had been reported by medical staff. Overall, the study was able to prove that the results of the floating test are reliable in 98 %. Further, there was not a single false-positive result (lungs of a stillborn swim). Nevertheless, the test demonstrates that a negative test result cannot be taken as proof for a newborn never to have breathed at all.

Keywords Lung floating test · Neonates · Stillborn · Newborn

Introduction

The lung floating test (also known as hydrostatic test, floatation test, lung test, or docimasia), normally undertaken during the medicolegal autopsy of newborns and possibly

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A. M. Müller
Department of Paediatric Pathology, University of Bonn,
52137 Bonn, Germany

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performance of the lung floating test.

Out of the 208 children, 194 were born dead under clinical conditions. Four more died within a few hours after birth, and the remaining ten passed away from age 2 days up to 10 months. The autopsy was undertaken regularly between 1 and 14 days after the death of the children, showing

INVITED REVIEW

Neonatal Deaths, Infanticide, and the Hydrostatic (Floatation) Test: Historical Perspectives

Chris Milroy MD LLB FRCPath FRCPC FFFLM

ABSTRACT: The hydrostatic test, or floatation test, has historically been used to determine whether a newborn infant has breathed. It is performed by placing the lungs, still attached to the heart, in water and seeing whether they float. The test can then be repeated with the lungs separated and on individual pieces of dissected lung. The test has been described in great detail by some authors and has also been subject to significant criticism for at least 250 years. This paper reviews the history of the test and the challenges that have been made to its validity in forensic pathology texts from the 18th to the 21st century.

KEYWORDS: Forensic pathology, Child abuse, Fetal death, Infanticide

INTRODUCTION

There is no department of medicine requiring greater attention from student and general practitioners than a complete knowledge of jurisprudence, for it must be obvious, that nothing is more important to the community than efficient and correct testimony from a medical witness. Many innocent creatures have been sacrificed in consequence of a wrong impression made upon the mind of jurors, frequently unable to judge of those circumstances often involved in doubt and uncertainty.

— William Henry Cox. Preface to the 1837 third edition of "Observations on the uncertainty of the signs of murder in new-born infants."(1)

The diagnosis of whether a newborn baby has been born alive is well recognized to be a problem for the forensic pathologist performing the autopsy on an abandoned newborn child or one born precipitously without medical attention. Two questions are typically posed by the law; 1) was the child born alive, and 2) did the child achieve a separate existence. The two questions are not the same. A child may breath but not achieve a separate existence from the mother.

Proof of a separate existence cannot normally be determined by the pathologist. Food in the stomach or a vital reaction in the umbilical stump are proof, though these cases are not typical because the usual cases that are examined are newborn children and not infants who have survived for any significant period of time.

The main area of analysis in forensic pathology is whether it is possible to prove that breathing has occurred. In their 2004 textbook, Knight and Saukko state that *"this issue has probably provoked more discussion, in the printed words and controversy than any other topic in Forensic Medicine"*(2).

Historically, the diagnosis of proof of live birth has relied on the flotation or hydrostatic test. The test has also been called the docimasia pulmonaris, docimasia meaning test in Greek. The premise is simple—if there has been respiration, the thoracic pluck and individual lungs will float. However as Knight and Saukko state, *"there are too many recorded instances when control tests have shown that stillborn lungs may float and the lungs of undoubtedly live-born infants have sunk to allow it to be used in a criminal trial. Even one such failure negates the whole history of the test and the authors are saddened to contemplate the number of innocent woman who were sent to the gallows in previous centuries on the testimony of doctors who had uncritical faith in this crude technique"* (2).

The use of the hydrostatic test has been attributed to different practitioners by various authors.

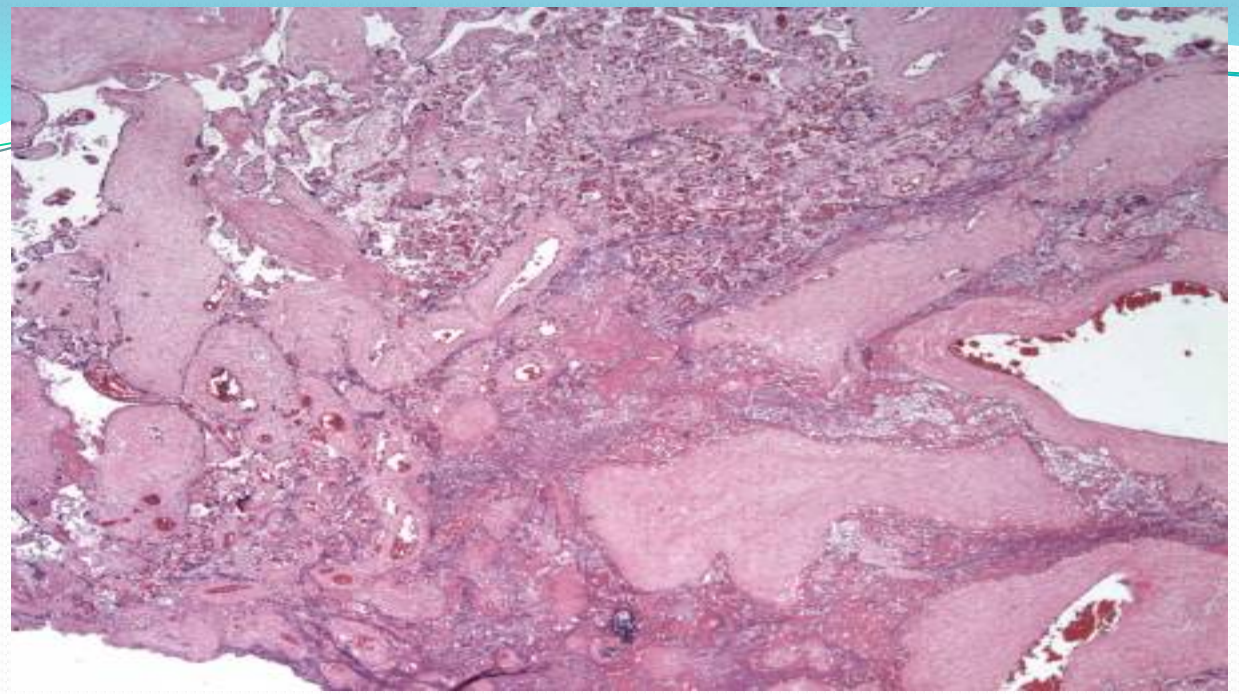
From: CHRISTOPHER MILROY
To: Davis, Gregory J
Subject: Re: from Greg Davis
Date: Friday, August 29, 2014 5:33:32 PM

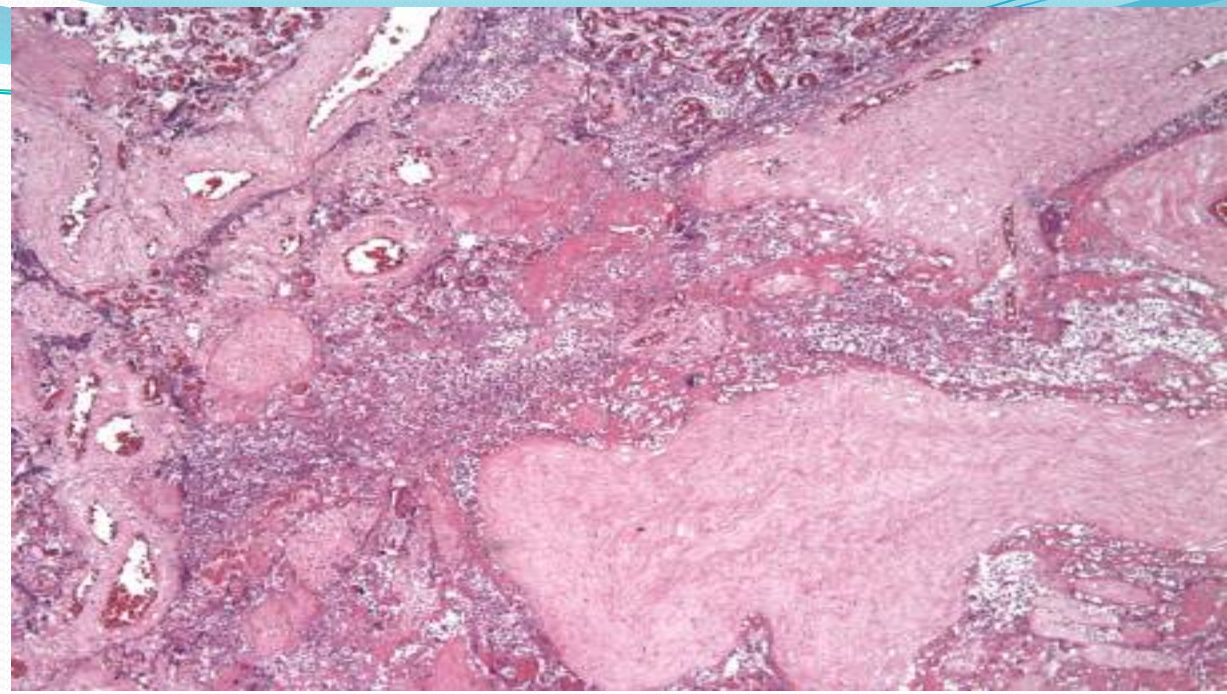
I agree. They actually had 194 still births. So in fact their test group was actually quite small. So they had 14 live births with 4 false negatives ! - not 98% accurate. They were also not looking at the unattended births. They had 10 cases from 2 - 10 months of age !!
Chris

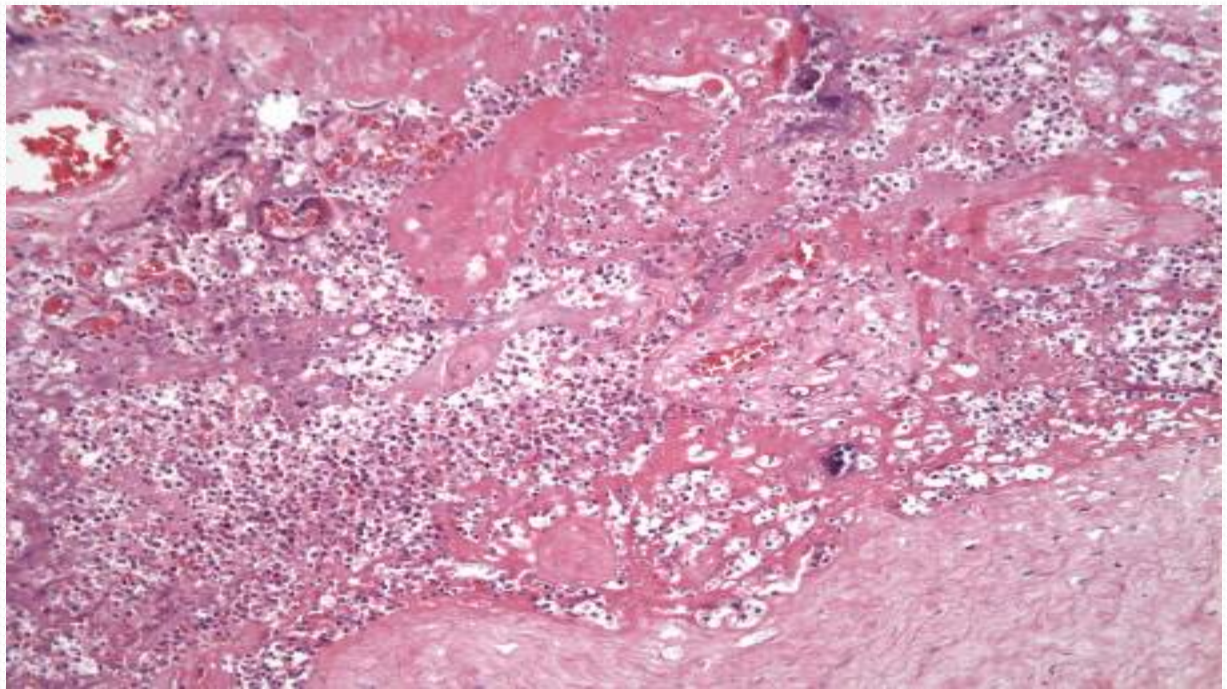
----Original message----
From : gjdavis@uky.edu
Date : 29/08/2014 - 19:51 (BST)
To : c.milroy@btinternet.com
Subject : from Greg Davis

Chris, what do you think of this article? I think their conclusions are rather disturbing and, from the first sentence, an idée fixe for them?

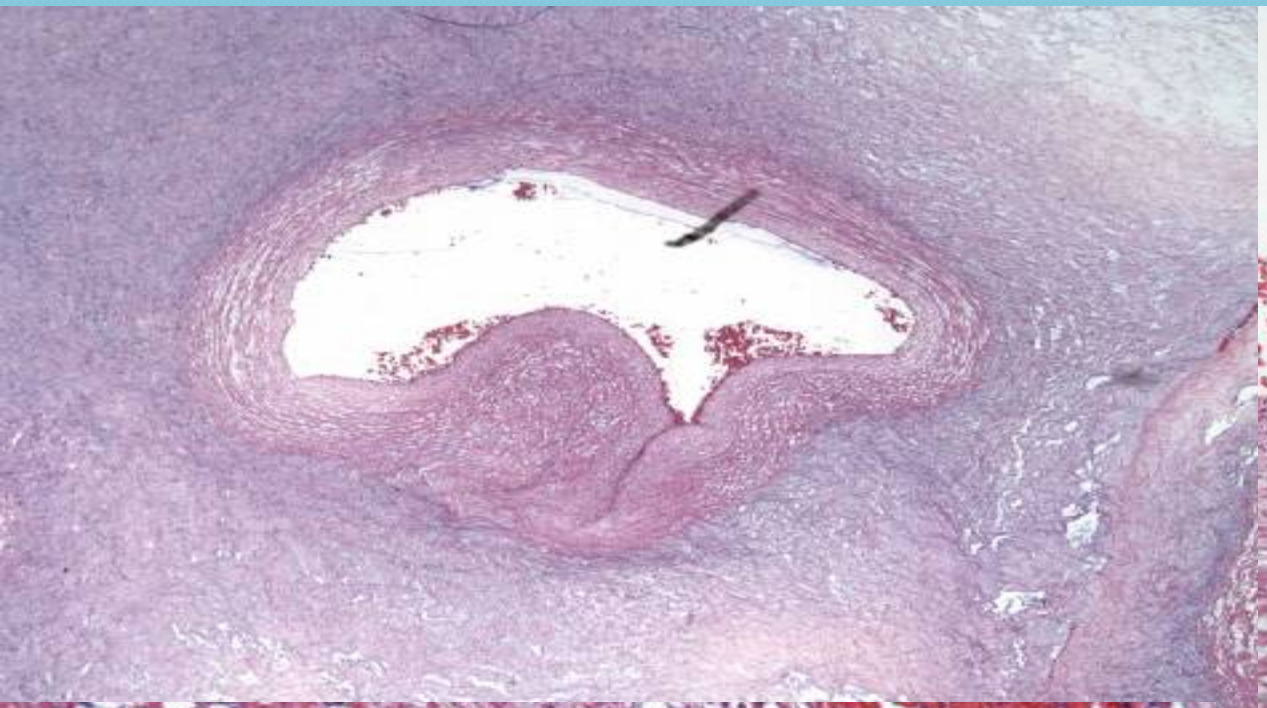
Greg

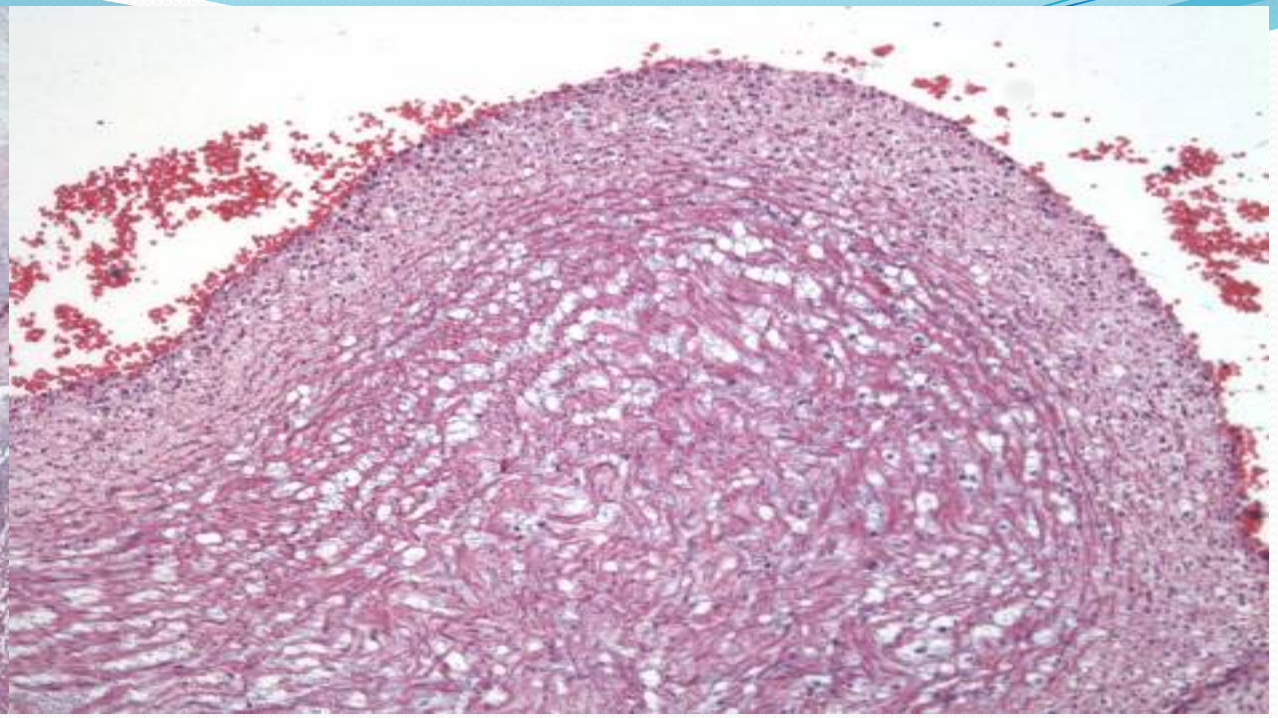


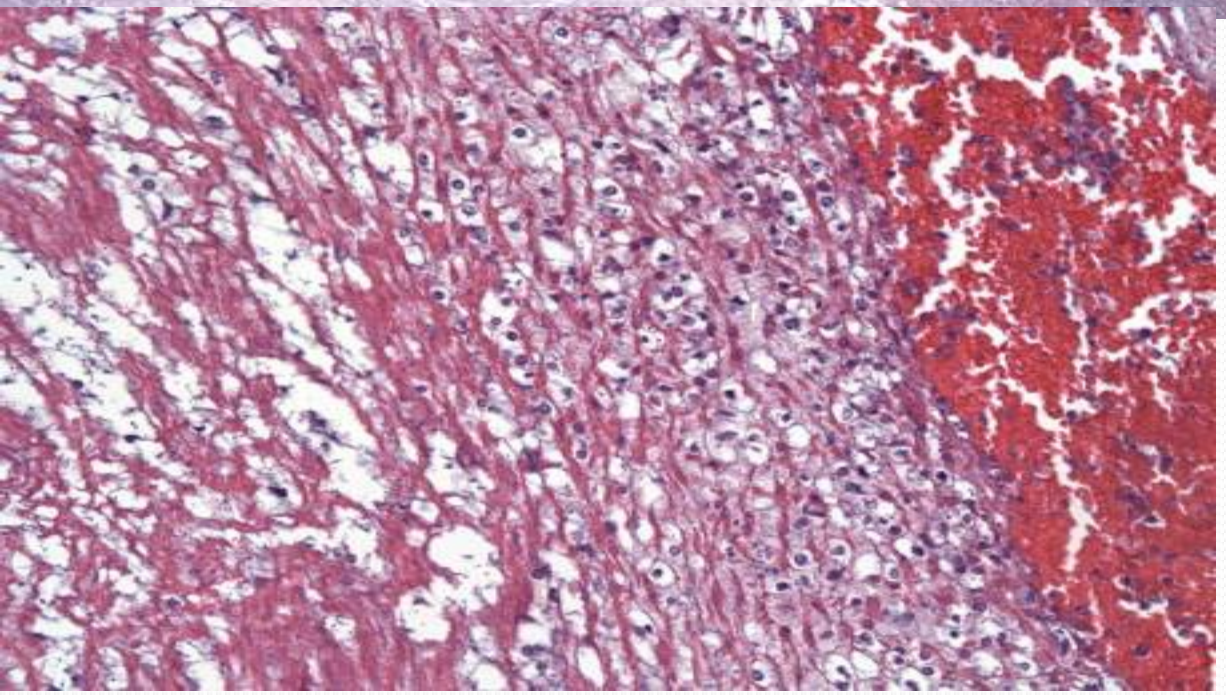




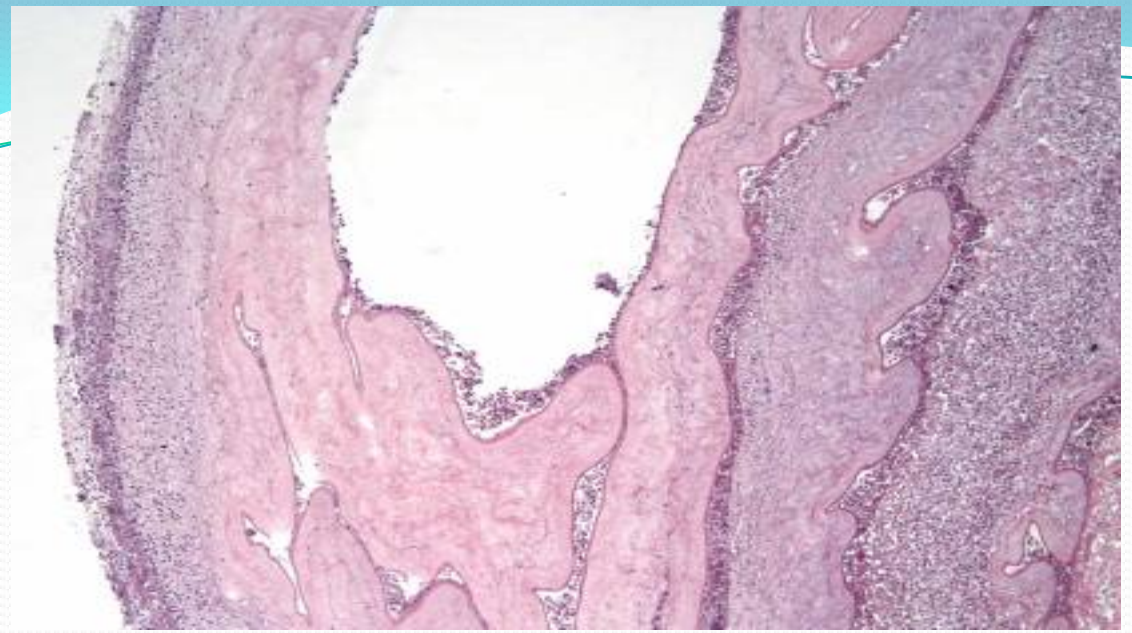
Acute chorioamnionitis: noted on front page of initial report but not described microscopically or in “Opinion”

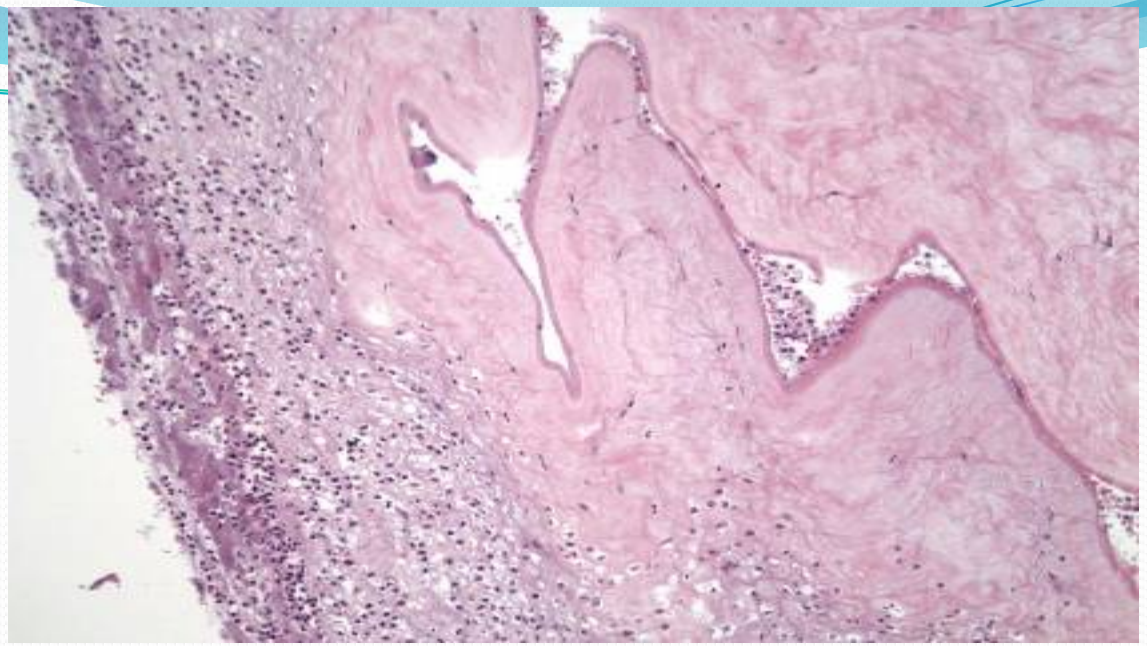


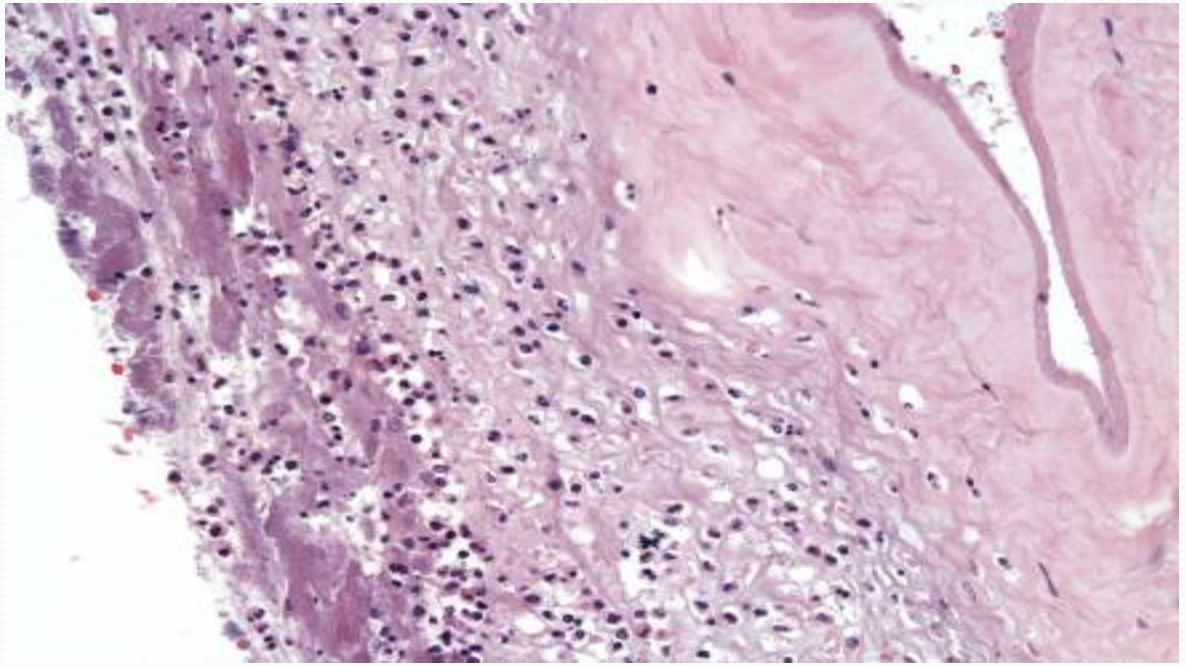




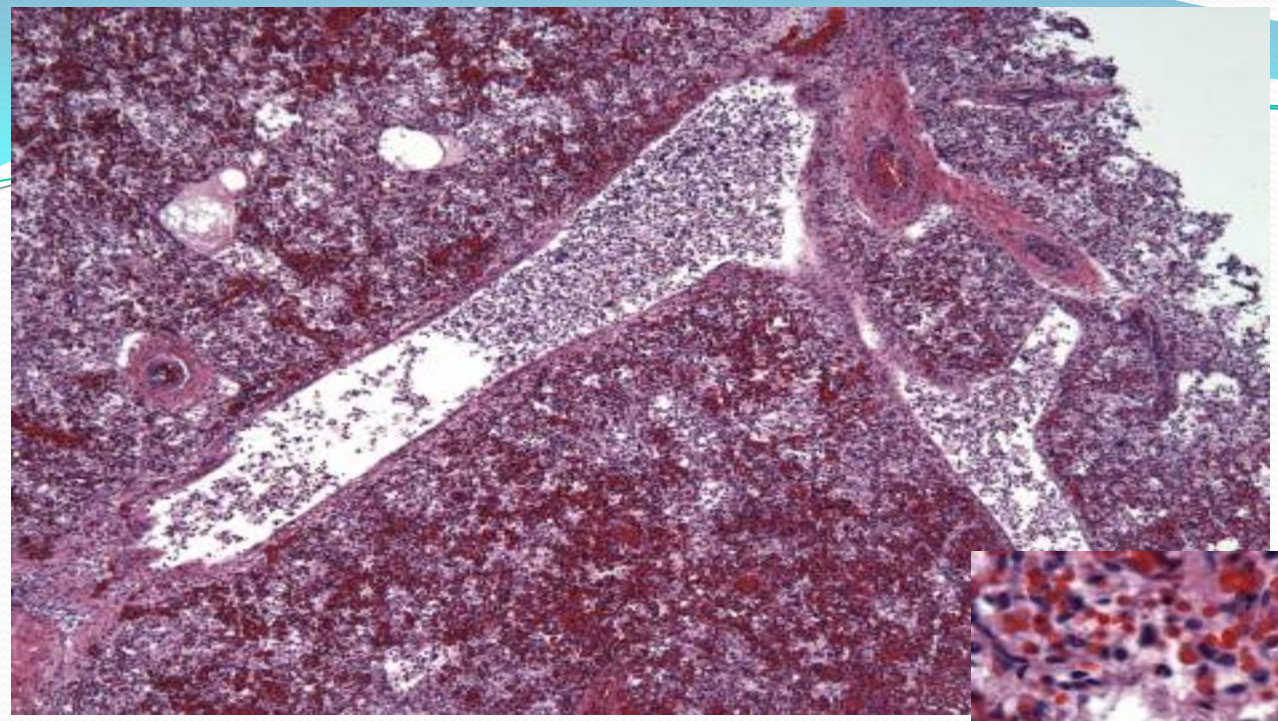
Acute funisitis not mentioned in initial report



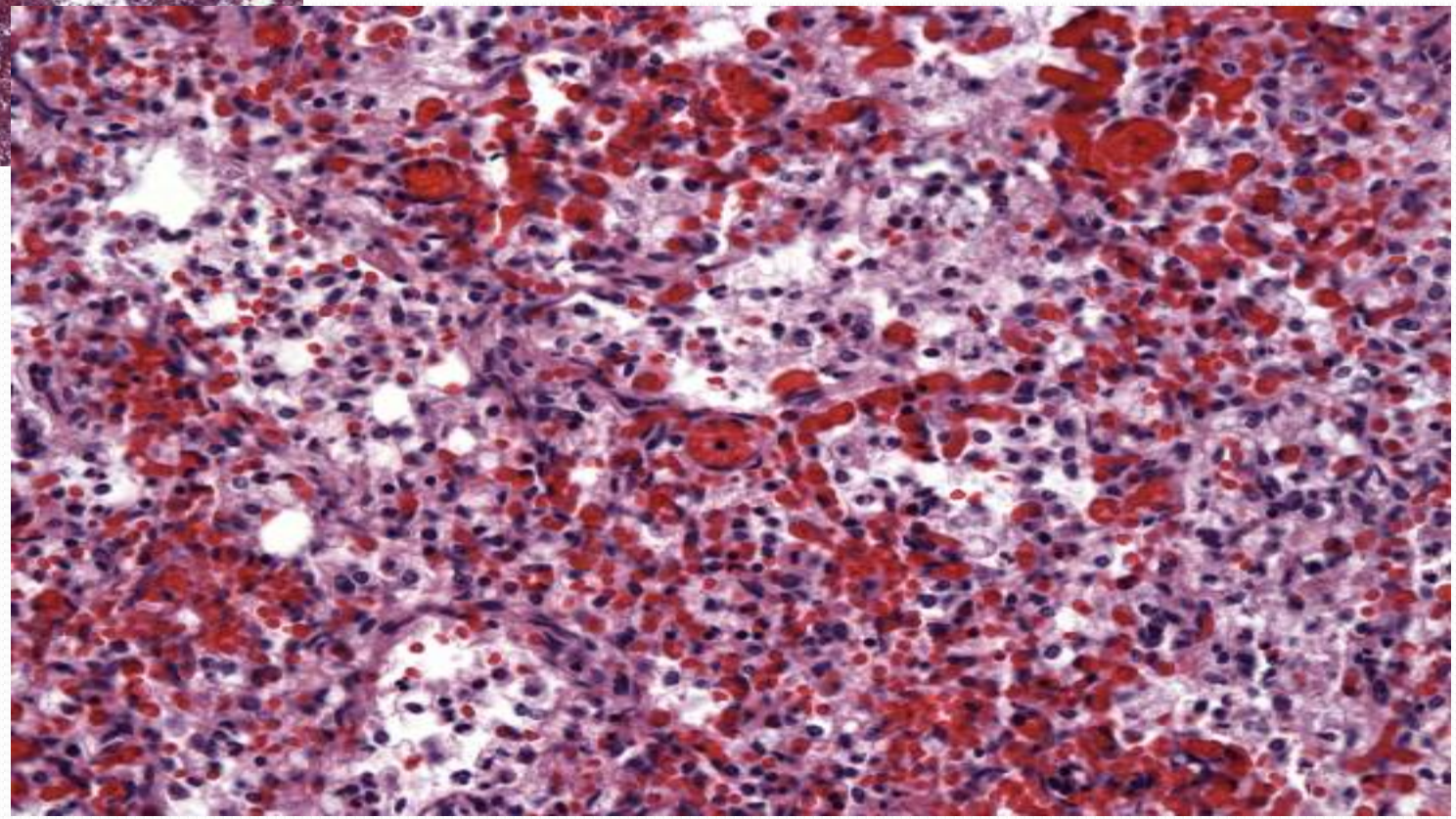




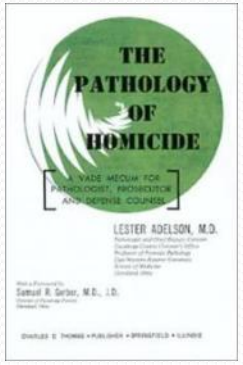
Membranes not described or alluded to in initial report



Lungs initially described as “congestion”; note congenital pneumonia



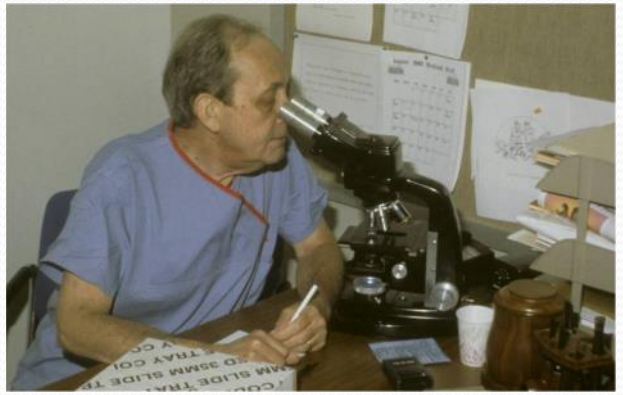
Complete gross autopsy and painstaking microscopic studies do not always give satisfactory answers as to cause or mechanism of death in many stillbirths and neonatal deaths which occurred with competent medical attention. Even more insurmountable can be the problems faced by the pathologist who examines a child whose antenatal, intranatal, and neonatal courses were not witnessed by any person willing or able to tell what transpired.



Adelson L. *The Pathology of Homicide: A Vade Mecum for the Pathologist, Prosecutor and Defense Counsel.* 1974, C.C. Thomas, Springfield, IL, p 628

The one thing a forensic pathologist can always say with 100% certainty is, "I don't know."

- L.C. McCloud, MD



Sequence of Events

- March 7, 2009: consultation letter to defense counsel
- March 2009: DA requests review by Alabama Chief ME and colleagues
- March 25, 2009: Alabama Chief ME and three additional MEs amend report: Cause of death: “Pneumonia”, Manner “Natural”
- April 9, 2009: all charges dropped

Of concern: quote in comment of amended autopsy report: “The lung floatation [sic] test performed is invalid due to the presence of postmortem decomposition

ACR352 ALABAMA JUDICIAL INFORMATION SYSTEM CASE: CC 2007 000079.00
OPER: KAS CASE ACTION SUMMARY
PAGE: 1 CIRCUIT CRIMINAL RUN DATE: 04/20/2007

IN THE CIRCUIT COURT OF PICKENS JUDGE: JWM

STATE OF ALABAMA VS LEE BRIDGET C
390 GARDNER SAPPS RD
CARROLLTON, AL 35447 0000

CASE: CC 2007 000079.00

DOB: 07/03/1974 SEX: F RACE: W HT: 5 08 WT: 135 HR: BLN EYES: BLU
SSN: 422293382 ALIAS NAMES:

CHARGE01: MURDER CAPITAL-UNDER CODE01: CM15 LIT: MURDER CAPITAL TYP: F J: 001
OFFENSE DATE: 11/06/2006 AGENCY/OFFICER: 054015A RAY LEW

DATE WAR/CAP ISS: DATE ARRESTED: 11/15/2006
DATE INDICTED: 04/11/2007 DATE FILED: 04/20/2007
DATE RELEASED: DATE HEARING:
BOND AMOUNT: $.00 SURETIES:

DATE 1: 05/08/2007 DESC: ARRG TIME: 0900 A
DATE 2: DESC: TIME: 0000

TRACKING NOS: DC 2006 001066 00 / /

DEF/ATY: STANDRIDGE JAMES O TYPE: A TYPE:
P O BOX 2507
TUSCALOOSA AL 35403

PROSECUTOR: MCCOOL JAMES CHRISTOPHER

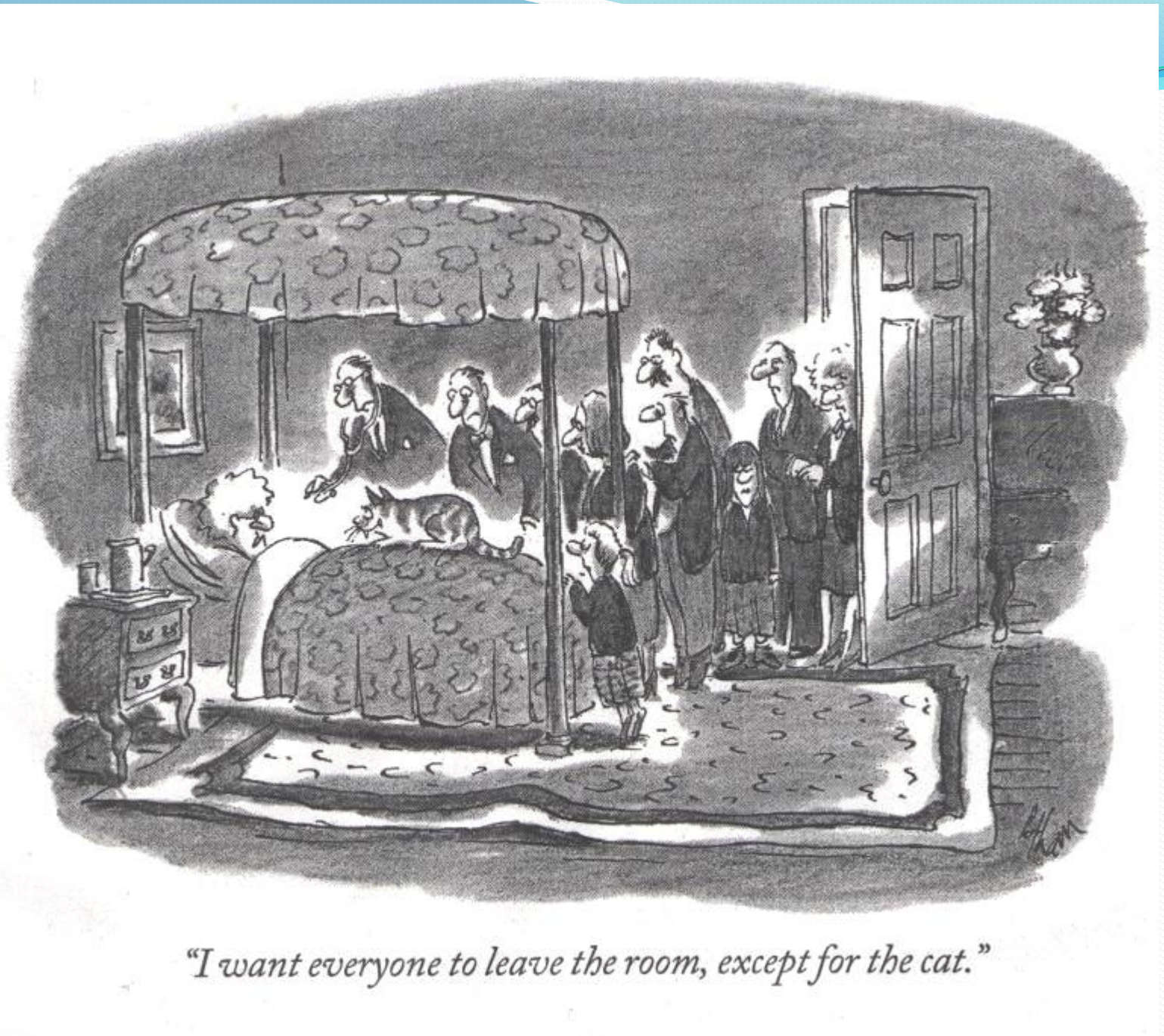
OTH CSE: DC2006001066OO CHK/TICKET NO: GRAND JURY:
COURT REPORTER: SID NO: 000000000
DEF STATUS: JAIL DEMAND: OPER: KAS

TRANS DATE	ACTIONS, JUDGEMENTS, AND NOTES		OPE
04/20/2007	ASSIGNED TO: (JWM) JAMES W. MOORE, JR	(AR01)	KAS
04/20/2007	FILED ON: 04/20/2007	(AR01)	KAS
04/20/2007	DEFENDANT ARRESTED ON: 11/15/2006	(AR01)	KAS
04/20/2007	INITIAL STATUS SET TO: "J" - JAIL	(AR01)	KAS
04/20/2007	DEFENDANT INDICTED ON: 04/11/2007	(AR01)	KAS
04/20/2007	ATTORNEY FOR DEFENDANT: STANDRIDGE JAMES O	(AR01)	KAS
04/20/2007	CHARGE 01: MURDER CAPITAL-UNDER/#CNTS: 001	(AR01)	KAS
04/20/2007	SET FOR: ARRAIGNMENT ON 05/08/2007 AT 0900A	(AR10)	KAS
8/16/07	Upon the Stipulation of The State and Defendant the Motion to set Bond is grant'd. Bond is set at $200,000.00 Security Bond, Further House Arrest with Electronic monitoring by Com Corr, Cost to be paid by Defendant. Defendant is ord'd to House arrest at 299 Rolling Hills Drive Carrollton AL and is allow'd to leave the premises only For Doctors Appointments, Court Appearances and Meetings with Counsel.		
4/9/09	Upon the Endorse, the Court Dismisses this Action, the Defendant and Bondsman are Discharged. Cost Waived.		

AP Photo - Bridget Lee stands in her home in Carrollton, Ala., on Wednesday, April 8, 2009. The small-town mother of two was charged with an unspeakable crime: killing the newborn baby she admitted conceiving during an extramarital affair. Now, in a stunning turn, Lee is free and on the verge of walking away completely vindicated, cleared of a crime that state forensics officials say never even occurred.

Some Takeaways

- Float test worse than useless
- Lung histology problematic at best – fully expanded alveoli can be seen in stillbirth
- Beware of “vital reaction in the umbilical stump” – funisitis?
- Gas in stomach
- Food in stomach



"I want everyone to leave the room, except for the cat."

ipse dixit

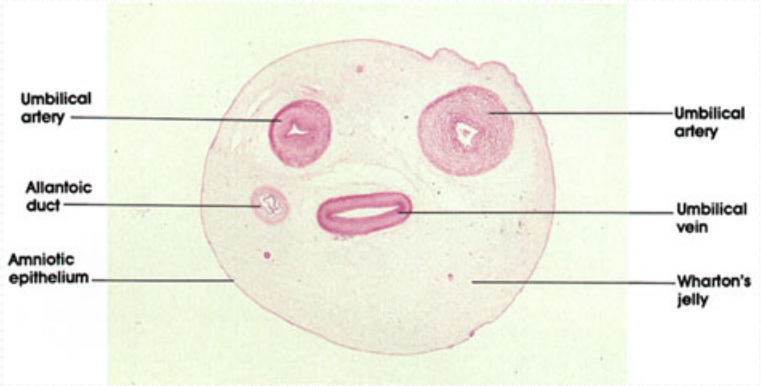
- 24 y.o. claims she did not know she was pregnant
- Cramps, precipitous delivery in toilet
- ME opines that Baby Boy X died of asphyxia during the early postpartum period
- Further states in narrative that the neonate was the product of a “concealed” full-term pregnancy. ME writes in her “Narrative” that:

Unfortunately, the description of the events by the mother was inconsistent and sometimes contradictory. In spite of the mother’s account that the umbilical cord ripped when she tried to pull the neonate from the toilet, ***the cut ends of the cord clearly indicated the use of a sharp instrument***. Furthermore, abundance of air bubbles in the pulmonary edema fluid as well as presence of air bubbles in the hemorrhagic fluid of the stomach indicated that the neonate was neither delivered directly into the toilet water nor immediately submerged into the toilet water before having taken his first breath. Available medical records and initial investigation did not indicate resuscitation of the neonate. Although drowning is a plausible cause of this asphyxial death, it is evident that the neonate was able to breathe on his own before being submerged in the toilet water, consistent with neonaticide.

ME claims “the cut ends of the cord clearly indicated the use of a sharp instrument”…however:

Morris and Hunt (1966) conducted experiments on cords and determined that they could easily be broken by hand traction. A broken cord can show a clean transverse termination, but it is usually ragged. If cut by a sharp instrument such as knife or scissors the cut may be clean, but may also be ragged if the instrument is blunt.

Morris JD, Hunt AC. Breaking strength of the umbilical cord. *J Forensic Sc*i. 1966; 11(1): 43-49.



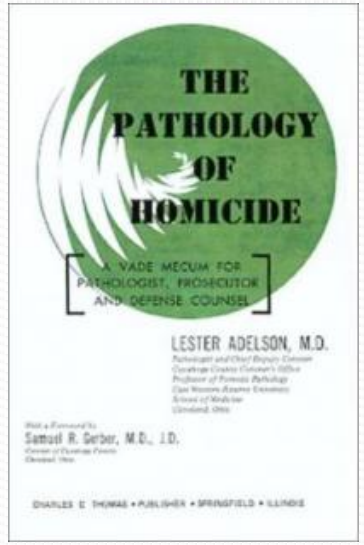
ME states that “Furthermore, abundance of air bubbles in the pulmonary edema fluid as well as presence of air bubbles in the hemorrhagic fluid of the stomach indicated that the neonate was neither delivered directly into the toilet water nor immediately submerged into the toilet water before having taken his first breath.”

ME diagnoses asphyxia, citing “almost fully inflated lungs, bilateral,” “frothy pulmonary edema in trachea, bilateral bronchi, and bronchial branches,” “positive float test,” “near completely expanded lung parenchyma, right greater than left, radiologic and histologic,” and “blood stained fluid gastric content with air bubbles.”

However…

“Gas can be present in the stomach of a nonputrefied neonate as a consequence of aerophagia incident to labored respiratory efforts as the infant was in transit through the birth canal.” ~ Adelson

“There can be no quarrel with Simpson who states that the microscopic appearance of the lungs, formerly accepted as being diagnostic of extra-uterine respiration, can offer great difficulty to the “honest pathologist.” The lungs of many stillborn children, delivered at or near full term, show evidence of space formation in their air sacs.” ~ Adelson, 1974

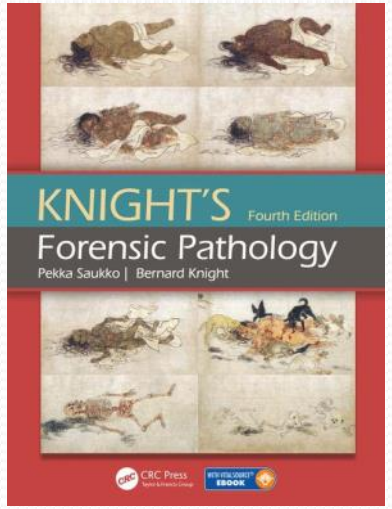


“Postmortem handling has also been incriminated for the entry of air into fetal lungs. Apparently respired alveoli have been found in lung sections for a dead infant taken from the uterus of a dead mother.”

“An undoubted still birth may reveal quite extensive alveolar expansion, whilst a baby that unequivocally lived for some time may show totally collapsed air sacs.”

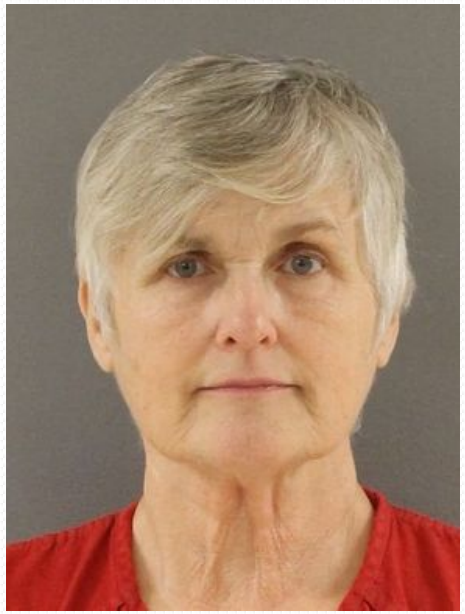
“Any doubts must be resolved in the direction of no breathing and, even in doubtful instances when the pathologist decides – on balance – that respiration has occurred, [s]he should convey his [her] uncertainty in the body of his [her] report.”

~ Saukko & Knight



the “black widow”

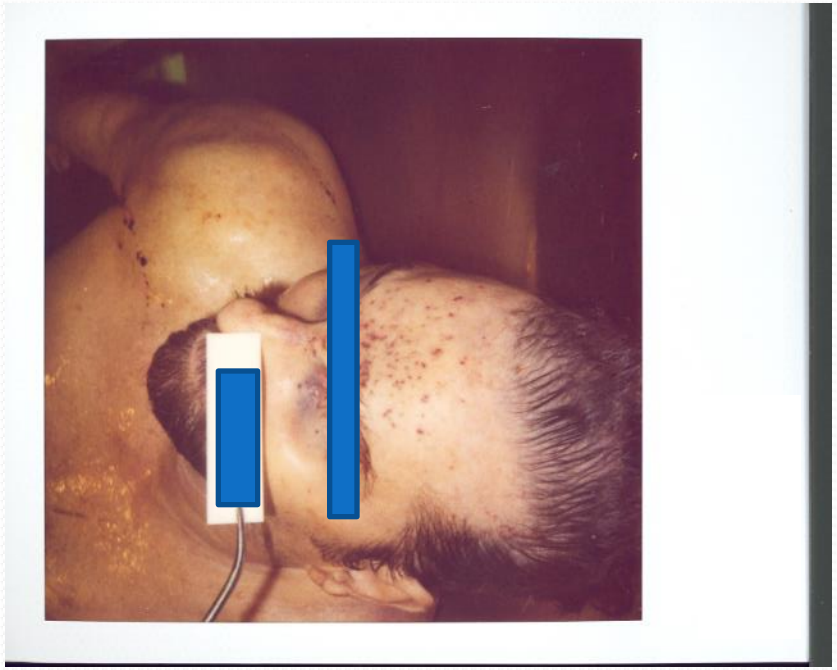
- 57 year old male dead of a single, close range gunshot wound
- History of depression, possible early dementia
- Local ME signs out manner of death as “homicide” within approximately one day of death
- Mistrial, retrial with conviction, then 3rd trial due to judicial misconduct



Medical Examiner Testimony

Caveat re “consistent with”

- ME offers within the “narrative” portion on page one of autopsy report the opinion that “Scene investigation and wound features, particularly the extent of gunpowder stippling, are inconsistent with self-inflicted gunshot wound. The manner of death is homicide.”
- In fact, the findings are “consistent with” a self-inflicted gunshot wound, just as they are “consistent with” a wound inflicted by another individual. There are no distinctive features of the decedent’s wound that are pathognomonic (diagnostic) of infliction by another.



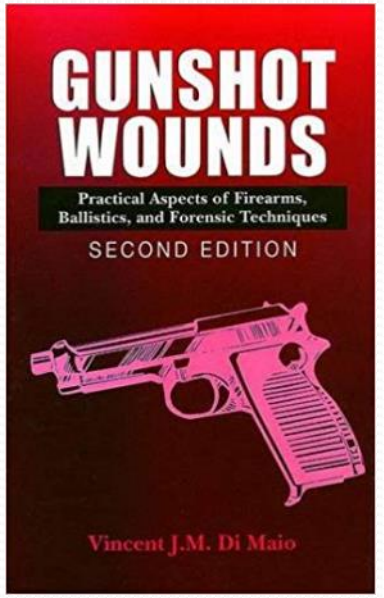
Medical Examiner Testimony

- “So suicide versus homicide scenario is that forehead wound in a suicide is extremely rare. What’s even more rare is that it's not a contact. It's going to be a distant [sic] wound, and also what's particular in this particular case is that Mr Leath was actually blind in his left eye. So anything that is in his left vision, he would not be able to see. So if he's aiming, let's say-- potentially, let's say, hypothetically, he would be aiming above his left eye, he wouldn't be really able to see that gun or that muzzle.”

- Elsewhere, in final report, same ME characterized wound as “close range.”

- no scientific basis upon which to base statement that a “forehead wound in a suicide is extremely rare.” In one study by Di Maio, the head was the site of suicidal handgun wounds in 83.5% of male decedents and 72% of female decedents; the actual site on the head is not identified. The forehead as a site for a suicidal entrance wound, while less common than the side of the head, is by no means “rare” or “extremely rare.”

"While most suicidal gunshot wounds are contact wounds, a small (1 to 3%) but significant number are of intermediate range." Di Maio then displays a figure, (14.1) of a known suicide victim with a spread of gunpowder stippling similar to Mr Leath's. ~ Suicide by firearms. In: DiMaio VJM. *Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques*, 3rd ed. Boca Raton, FL: CRC Press; 2016.



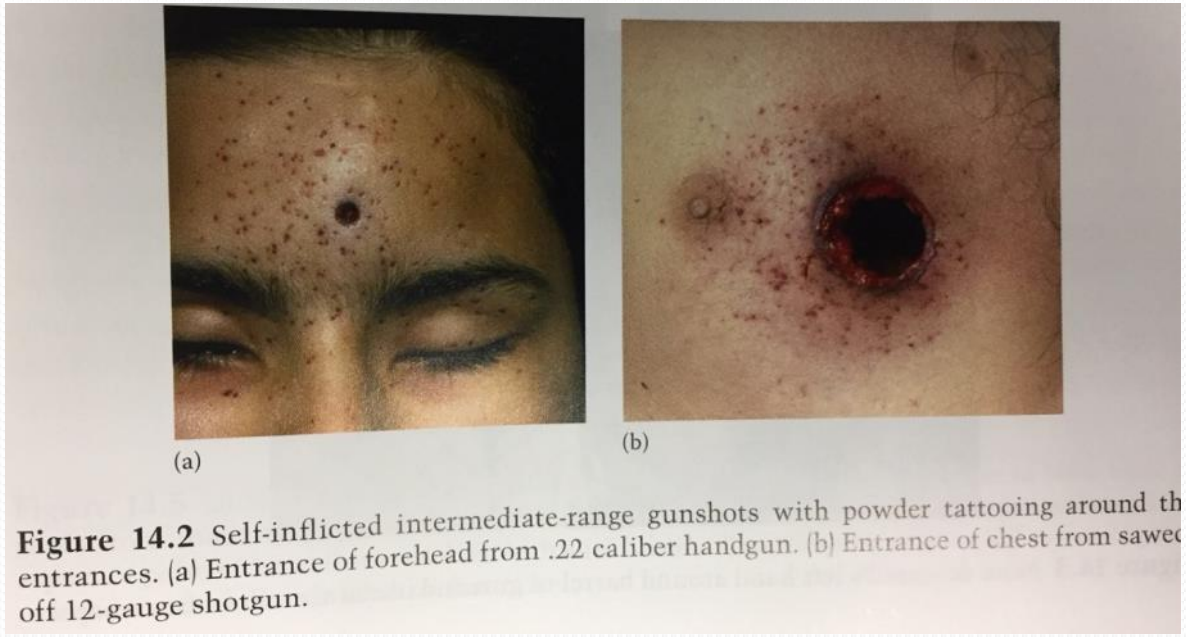
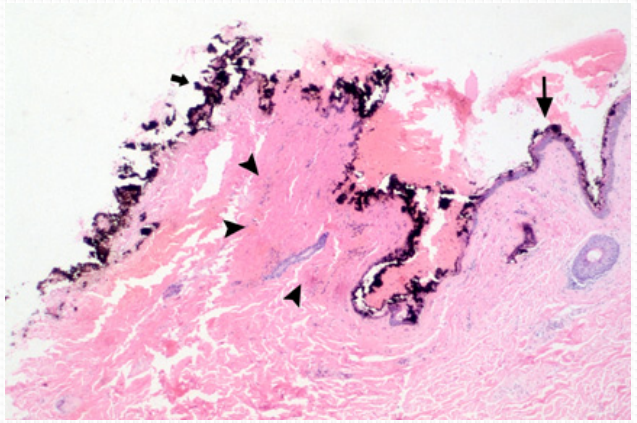
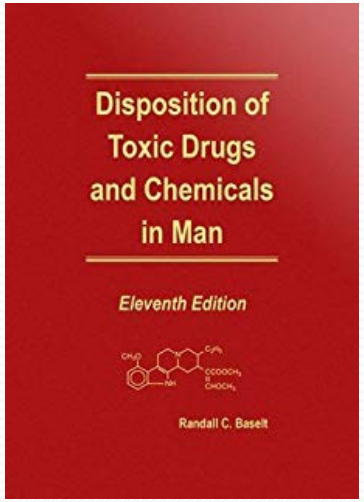


Figure 14.2 Self-inflicted intermediate-range gunshots with powder tattooing around th entrances. (a) Entrance of forehead from .22 caliber handgun. (b) Entrance of chest from sawe off 12-gauge shotgun.



Medical Examiner Testimony

- ME appears to place great import in testimony that Mr Leath's blood concentration of doxepin, 0.16 mcg/mL, is above the "therapeutic range and is approaching toxic levels," citing Baselt as source.
- According to The International Association of Forensic Toxicologists (TIAFT) , the therapeutic range is a *plasma* concentration of 0.02 mcg/mL – 0.15 mcg/mL.
- According to Baselt, the source ME refers to as "actually one of the most widely used toxicology textbooks" and in previous testimony as "our toxicology bible," the blood:plasma ratio of doxepin is 1.2 to 1.3. Therefore, a *blood* doxepin concentration of 0.16 mcg/mL is equivalent to a *plasma* doxepin concentration of 0.12 mcg/mL to 0.13 mcg/mL, within the therapeutic range.



Medical Examiner Testimony

- ME also appears to ignore the phenomenon of ***postmortem redistribution***. Again according to Baselt, one study showed that heart/femoral blood concentration ratios in 8 cases averaged 3.1 and ranged from 0.8 – 7.6, while another showed an average redistribution of 5.5 with a range of 1.0 – 20. Utilizing such averages, decedent's blood doxepin concentration at death could easily have been 0.03 mcg/mL – 0.05 mcg/mL, at the lower end of the therapeutic range.
- It is not possible from the autopsy or the scene investigation materials to identify whether decedent voluntarily or unknowingly ingested meperidine, doxepin, and promethazine, the three drugs identified in his blood. It is equally not possible to know his patterns of ingestion including length of time of ingestion, potential reasons for ingesting the drugs, and potential tolerance to the sedating effects of these drugs. ME's implication that he was sedated or unconscious at the time he sustained his gunshot wound was *speculation*.

Medical Examiner Testimony

- ME erroneously states in testimony that, “No, it [normeperidine, the primary metabolite of meperidine] ***never*** [emphasis mine] occurs with one time administration of Demerol.
- Firstly, “never say ‘never’; never say ‘always’” is a forensic aphorism for good reason.
- Secondly: ME is incorrect:

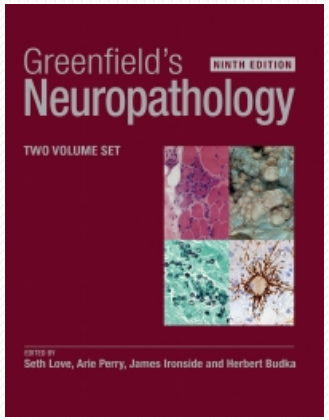
  - “Oral meperidine was absorbed rapidly by all subjects and reached maximum plasma concentrations of 0.5 to 1.5 hr after drug. ***After reach subject’s first does of meperidine, normeperidine was detected in the plasma by the time of the first blood sample*** [emphasis mine] (15 min after intravenous and 30 min after oral drug).”

    - Pond SM, Tong T, Benowitz NL, Jacob P, Rigod J. Presystemic metabolism of meperidine to normeperidine in normal and cirrhotic subjects. *Clin Pharmacol Ther*. 1981: 183-188.

Medical Examiner Testimony

- Discussion at trial as to whether decedent may have been obtunded or demented to a degree by Alzheimer Disease, and ME stated that, in her opinion, he did not suffer from dementia. The absence of anatomic evidence of dementia is not indicative that decedent was not suffering from clinical dementia in any form. As all pathologists know, myriad diseases in addition to Alzheimer Disease can result in states of delirium and dementia. Lowe et al describe 43 separate causes of dementia, including “dementia lacking distinctive histology.”

Lowe J, Mirra SS, Hyman BT, Dickson DW. Ageing and dementia.
In: Love S, Louis DN, Ellison DW, eds, *Greenfield’s Neuropathology*, 8th ed, vol 1.
London: Hodder Arnold; 2008.



May 10, 2017: Directed verdict for the defense

According to repeated nationwide surveys,

More Doctors Smoke CAMELS than any other cigarette!

Doctors in every branch of medicine were asked, "What cigarette do you smoke?" The brand named most was Camel!

You'll enjoy Camels for the same reasons so many doctors enjoy them. Camels have cool, cool *mildness*, pack after pack, and a *flavor* unmatched by any other cigarette.

Make this sensible test: Smoke only Camels for 30 days and see how well Camels please your taste, how well they suit *your* throat as your steady smoke. You'll see how enjoyable a cigarette can be!

THE DOCTORS' CHOICE IS AMERICA'S CHOICE!

MAUREEN O'HARA says: "I pick Camels. They agree with my throat and taste wonderful!"

DICK HAYMES states: "I get more pleasure from Camels than from any other brand!"

RALPH BELLAMY reports: "Camels suit my taste and throat. I've smoked 'em for years!"

For 30 days, test Camels in your "T-Zone" (T for Throat, T for Taste).

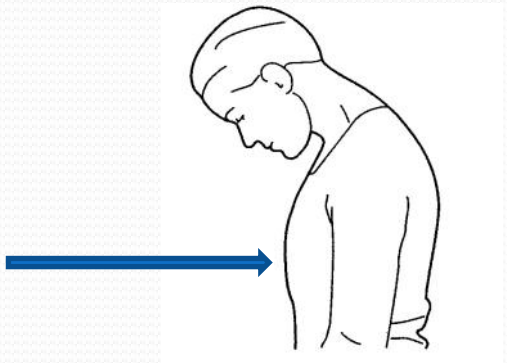
the Colorado deer hunter expert

- 10/03/2016: Wilma Mason shoots gun-wielding Tony Ferrara on her property
- Postmortem tox: blood methamphetamine 397 ng/mL, amphetamine 54 ng/mL
- No charges initially
- Intermediate range rifle wound of chest
- Path front to back, slightly to right, slightly down
- > 5 months later charged with murder due to Sheriff's Deputy's affidavit: angle of fire did not support Ms Mason's statement

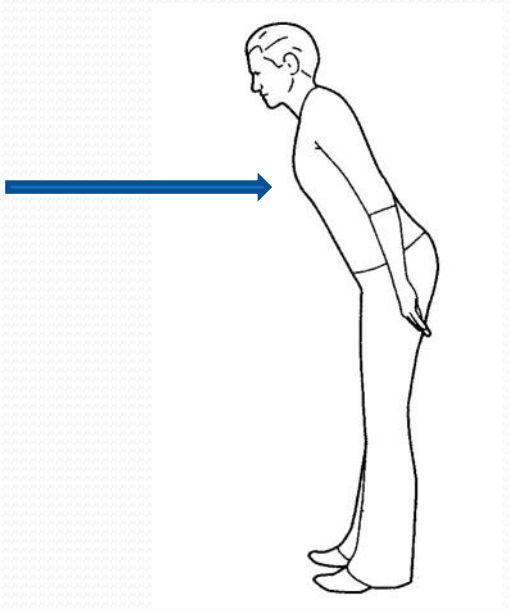
In item 46 of the Affidavit and Application for Arrest Warrant, Cpl Hoffman states, "This [the autopsy findings] is inconsistent with Wilma stating she was holding the rifle at an upward angle at her hip when the shot was fired." In item 47, he states, "Drivers license records show Anthony Ferrera [sic] was 5 feet 11 inches tall, and Wilma Mason is 5 feet 4 inches tall *which would indicate Anthony was either falling or kneeling when he was shot* [emphasis mine]." Cpl Hoffman goes on to indicate, "Manner of death was ruled a homicide as injury was consistent with being caused by another person and it was noted there was stippling from gun powder on and around the entrance wound indicating it was a close proximity wound."

the Colorado deer hunter expert

- No scientific basis for opinion
- No way of knowing if Mr Ferrara were “either falling or kneeling when he was shot”

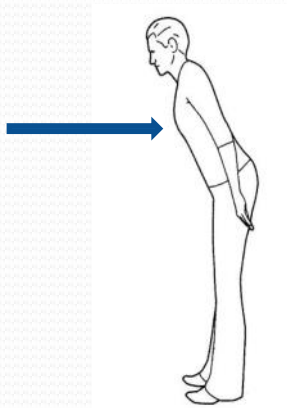


versus



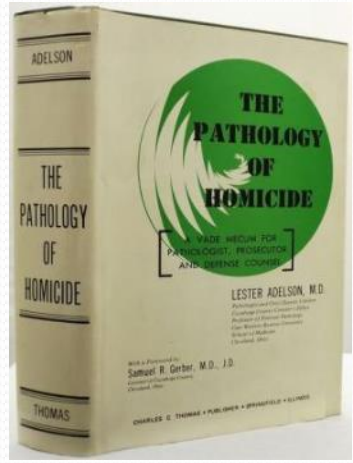
the Colorado deer hunter expert

- No scientific basis for opinion
- No way of knowing if Mr Ferrara were “either falling or kneeling when he was shot”



“When the bullet path in the body has been explored from origin to terminus, one can not reach a valid conclusion about the positions of gun and victim without taking into consideration the fact that the victim could have been in any one of several positions at the time he was struck. For example, one may find that a bullet which entered the anterior chest wall forty-nine inches above the left heel exited from the right posterior thorax forty-two inches above the right heel. (Both legs were symmetrical.) These two figures alone do not establish that the gun was fired from an elevated position. ***A bullet fired parallel to the floor on which assailant and victim were standing would take the same course in the thorax if the victim were bending forward when he was struck***.”

~ Adelson L. Homicide by firearms. In: Adelson L. *The Pathology of Homicide: A Vade Mecum for Pathologist, Prosecutor and Defense Counsel*. Springfield, IL: Charles C. Thomas; 1974: 265.

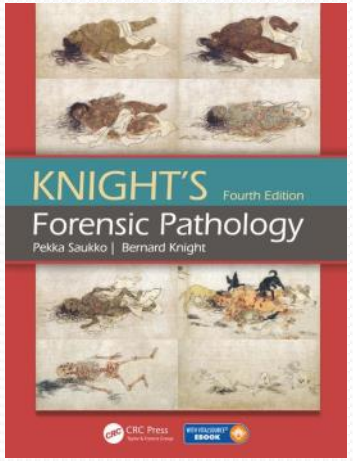


the Colorado deer hunter expert

- Path consistent with Mr Ferrara bending forward in threatening manner

"The posture of the victim's body at the instant of impact must be taken into account. It is too often assumed, especially by lawyers, that all persons are injured – in whatever fashion – while standing in the 'anatomical position' [erect, eyes, palms, and feet forward]. Nothing is further from the truth, as people, especially in conditions of fight, fright or flight, may be moving or dodging in a variety of postures, which change by the second. For example, in one of the author's (BK) cases, a female accidentally shot by a police officer had the anterior entrance wound much higher than the exit in her back. This did not mean that she was shot from above, *but that she was leaning forward when the bullet hit her* [emphasis mine]."

~ Saukko P, Knight B. Gunshot and explosion deaths. In: Saukko P, Knight B. *Knight's Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016:260.

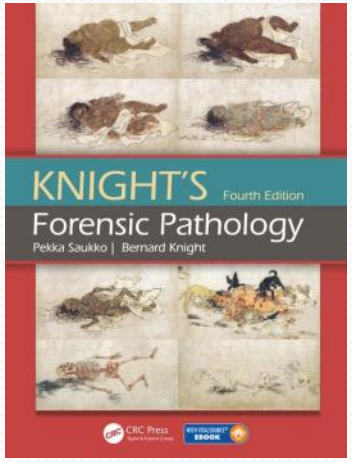


the Colorado deer hunter expert

Charges dismissed

Although he is not a forensic pathologist or trained death investigator, Cpl Hoffman committed one of the classical mistakes in forensic pathology, that of substituting intuition for scientifically defensible interpretation. As Saukko and Knight warn in the preface to the third edition of *Knight's Forensic Pathology*: "over-interpretation […] regrettably still leads to instances of miscarriage of justice."

~ Saukko P, Knight B. Gunshot and explosion deaths. In: Saukko P, Knight B. *Knight's Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.




DANGER
HIGH VOLTAGE
DANGER
DANGER
NOT ONLY WILL
THIS KILL YOU
IT WILL HURT
THE WHOLE TIME
YOU'RE DYING

the competition of the CODs

- 09/24/2017: Tanner Burgess shoots Michael Kehoe in right thigh and testicle
- Mr Kehoe is treated and discharged home
- Dies at home 13 days after receiving GSW
- ME: death due to “complications of gunshot wound of the leg [sic] and scrotum.”
- No offered mechanism of death, including:
- No hemorrhage
- No infection
- No pulmonary emboli*
- No pneumonia*

*The latter two linked to inactivity / inanition caused by recuperation)

the competition of the CODs

- ME did not consider competing causes of death
- Femoral blood procured at autopsy:
  - Blood oxycodone concentration 42 ng/mL – TIAFT "therapeutic range"
  - Blood cyclobenzaprine concentration 170 ng/mL – **over 4.7 times upper limit of "therapeutic"**
  - Baselt notes toxicity: hypotension, coma, cardiac dysrhythmia
  - Permitted *ex parte* discussion with ME: "it doesn't seem to be enough to explain death" – no explanation for such an assertion, even after discussion of synergistic effects with oxycodone
- Decedent 73" tall, 278 lbs, BMI 36.7 kg/m^2, heart **540 gm**
- Schoen & Mitchell and others: cardiac hypertrophy & cardiomegaly are independent risk factors for SCD

Schoen FJ, Mitchell RN. The heart. In: Kumar V, Abbas AK, Aster JC, eds. *Robbins and Cotran Pathologic Basis of Disease*, 9th ed. Philadelphia: Elsevier; 2015.

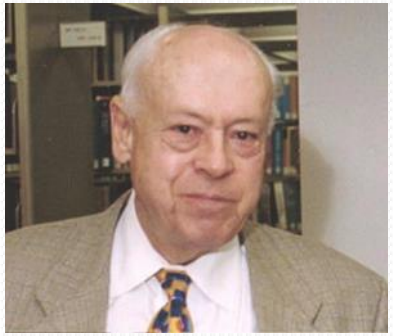
https://www.uptodate.com/contents/left-ventricular-hypertrophy-and-arrhythmia

the competition of the CODs

"One might argue that Mr Kehoe's recent injury precipitated a cardiac dysrhythmia due to his underlying unhealthy cardiac status. While such a proposed scenario of "homicide by heart attack," i.e., a sudden death due to underlying cardiac disease with an arrhythmia precipitated by physical and / or emotional stress precipitated by the criminal act of another, is within the realm of possibility, it is problematic. It is generally accepted within the forensic pathology community that the collapse and sudden death, in most cases, must occur during the emotional response period, even if the criminal act had passed."

Davis JH. Can sudden cardiac death be murder? *J Forensic Sci*. 1978; 23(2): 384-387.

Turner SA, Barnard JJ, Spotswood SD, Prahlow JA. "Homicide by heart attack" revisited*. *J Forensic Sci*. 2004; 49(3): 598-600.



the competition of the CODs

“A reasonable cause and manner of death statement in Mr Kehoe’s case would be:

No anatomic or toxicologic findings clearly explaining death are identified at autopsy. Findings are consistent with but not diagnostic of acute drug intoxication with oxycodone and cyclobenzaprine. Potential sudden cardiac death due to underlying cardiac hypertrophy with marked cardiomegaly cannot be ruled out. The significance of and possible contribution to death from the gunshot wound is uncertain. The manner of death is undetermined.”

Such investigative and diagnostic uncertainty, while frustrating, are also common in real-world death investigation and forensic medicine and pathology. Uncertainty, while intellectually unsatisfying, is also appropriate in the case of Mr Kehoe’s death, acknowledging the limits of the science and art of the practice of medicine in general and forensic pathology and toxicology and medicolegal death investigation in particular.

the competition of the CODs

"Such investigative and diagnostic uncertainty, while frustrating, are also common in real-world death investigation and forensic medicine and pathology. Uncertainty, while intellectually unsatisfying, is also appropriate in the case of Mr Kehoe's death, acknowledging the limits of the science and art of the practice of medicine in general and forensic pathology and toxicology and medicolegal death investigation in particular."

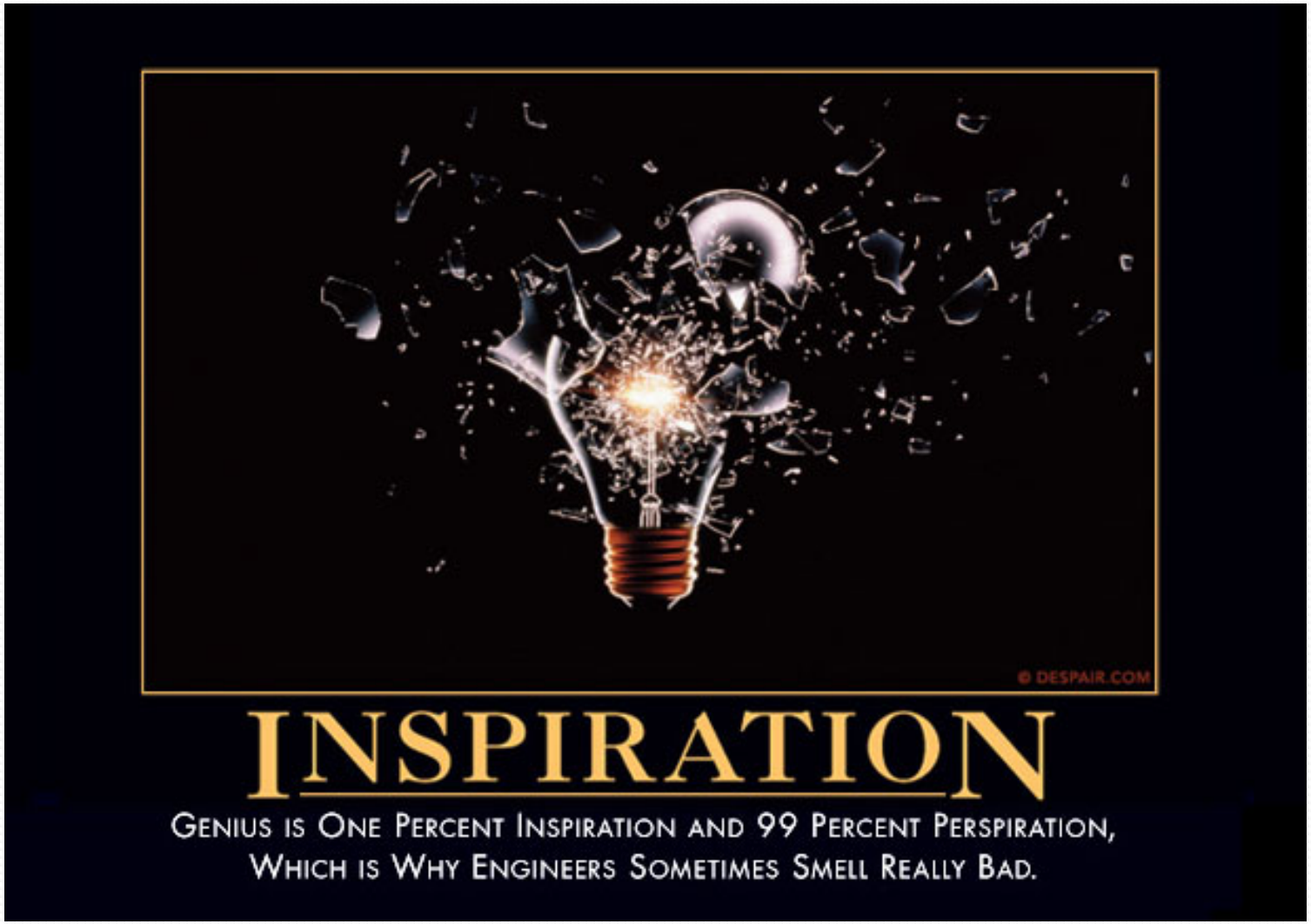
[apropos of such cases]: "Minimally, cross examination should explore the foundations of the opinion by suggesting a competing causal explanation for death and questioning the adequacy of the evidence-base for the expert's opinion." Pollanen MS. On the strength of evidence in forensic pathology. *Forensic Sci Med Pathol*. 2016; 12: 95-97.

Charge amended to assault, as no proof GSW caused or contributed to death.

Post hoc ergo propter hoc fallacy – "after this therefore because of this" – confusing sequence with consequence

https://www.youtube.com/watch?v=HL_vHDjG5Wk

Seldom, for the purpose of manner-of-death classification, is “beyond a reasonable doubt” required as the burden of proof. In many cases, “reasonable probability” will suffice, but in other instances such as suicide, case law or prudence may require a “preponderance” of evidence – or in homicide – “clear and convincing evidence” may be required or recommended. ~ Hanzlick R, Hunsaker JC III, Davis GJ. A guide for manner of death classification. February 2002. National Association of Medical Examiners, wwwthename.org


© DESPAIR.COM
INSPIRATION
GENIUS IS ONE PERCENT INSPIRATION AND 99 PERCENT PERSPIRATION,
WHICH IS WHY ENGINEERS SOMETIMES SMELL REALLY BAD.

the judge who knew too much

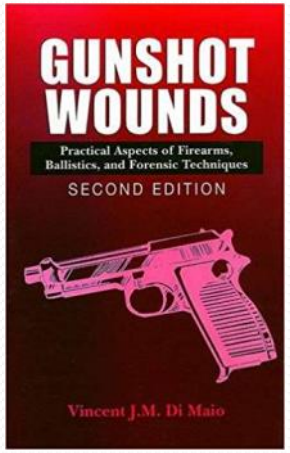
- Mr Charles Burkes, robbery victim, shot by assailant with .38 caliber revolver
- 19 year old convicted based on eyewitness testimony of 6’ 200# shooter (Mr DeMarlo Berry 5’8” 140#)
- Imprisoned 23 years
- Steven Jackson, 6’ 235# confessed to murder years later
- Judge refuses to accept confession, saying that Mr Burkes could not have walked ~ 20’ from site of shooting at safe to point of collapse with no blood spatter except at point of collapse

the judge who knew too much

“Mr Burkes’s fatal gunshot wound is consistent with causing little to no external bleeding until he came to rest some distance from sustaining the injury. Given the path of the projectile as described in Dr Green’s autopsy report being from back to front, downward, and to the right, striking the aorta and pulmonary artery, such an injury can cause all initial exsanguination (blood loss) to be internal.

Di Maio states, “In some cases there may be no blood because the bleeding was internal […].”

Di Maio VJM. Gunshot Wounds: *Practical Aspects of Firearms, Ballistics, and Forensic Techniques*, 2nd ed. Boca Raton, FL: CRC; 1998: 253-254.

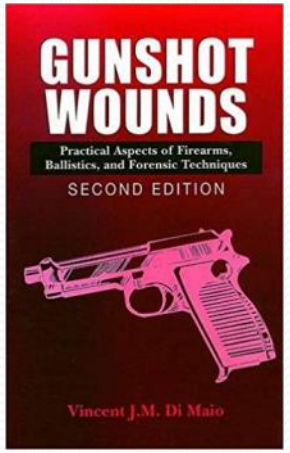


the judge who knew too much

Di Maio also states, “Minimal bleeding around an entrance site usually involves small-caliber weapons and locations on the body that are clothed and/or elevated, i.e., not in dependant areas where bleeding or leakage of blood would occur secondary to gravity.” Mr Burkes was shot in a clothed, non-dependant area of his body, the posterior left shoulder, and that entrance wound was his only external gunshot injury. Whether in an initial squatting or kneeling position, gravity would tend to keep all bleeding internal in such a scenario, consistent with Mr Jackson’s statement that “[…] I shot him in the back as he was still squatted down and facing the safe.”

Not unusual for no blood spatter to be in the area of the initial gunshot, given the relatively low muzzle velocity of a .38 handgun, the area of the body affected, and Mr Burkes’s clothing in the area of the entrance wound.

Di Maio VJM. Gunshot Wounds: *Practical Aspects of Firearms, Ballistics, and Forensic Techniques*, 2nd ed. Boca Raton, FL: CRC; 1998.



the judge who knew too much

As Dr Green's autopsy report shows that the bullet did not strike Mr Burkes's spinal cord or brainstem area, he would not have been immediately incapacitated and would have been able to move independently for some distance before blood loss caused unconsciousness and death.

Not unusual for ME cases to note gunshot victims to 1) not externally bleed, at least initially, and 2) be able to move for some distance before collapsing.

Spitz notes that "Gunshot wounds of the heart and lung are often associated with extended activity until blood loss causes shock, followed by death. Many fatally injured attempt to reach help. Some crawl, run, or use the phone." Di Maio states, "An individual may sustain a fatal gunshot wound and yet engage in physical activity. Experienced forensic pathologists not uncommonly encounter cases in which an individual, after incurring a fatal gunshot wound of the heart, is able to walk or run hundreds of yards and engage in strenuous physical activity prior to collapse and death."

Spitz WU, Spitz DJ. *Spitz and Fisher's Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation*, 4th ed. Springfield, IL: CC Thomas; 2006: 694.

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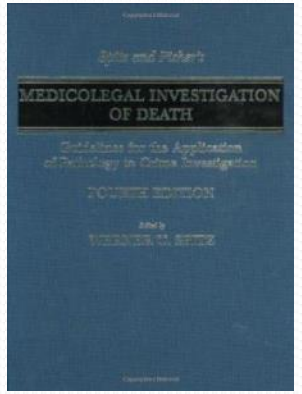
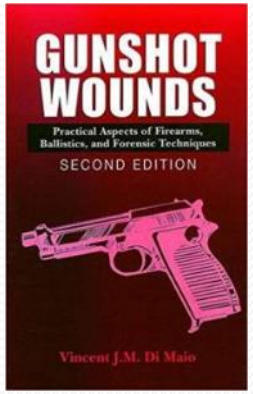
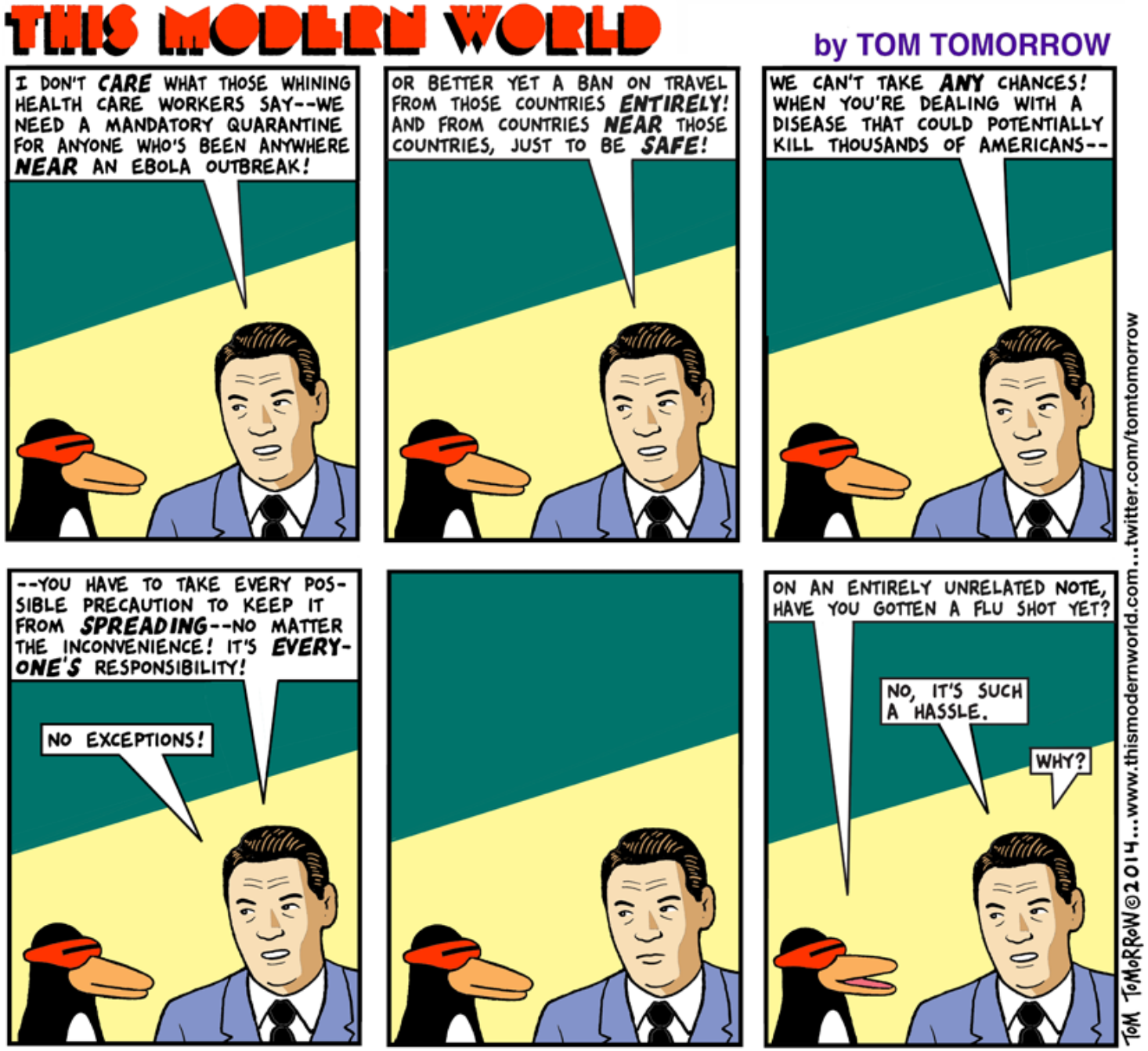




Utah lawyers, Rocky Mountain Innocence Center help exonerate man convicted of 1994 murder: Rocky Mountain Innocence Center took case nearly 20 years after he was sentenced to two life terms in prison.

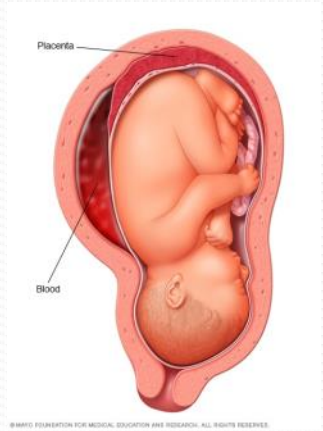
~ Pamela Manson, 07/18/2017

The Salt Lake Tribune


THIS MODERN WORLD
by TOM TOMORROW
I DON'T CARE WHAT THOSE WHINING HEALTH CARE WORKERS SAY--WE NEED A MANDATORY QUARANTINE FOR ANYONE WHO'S BEEN ANYWHERE NEAR AN EBOLA OUTBREAK!
OR BETTER YET A BAN ON TRAVEL FROM THOSE COUNTRIES ENTIRELY! AND FROM COUNTRIES NEAR THOSE COUNTRIES, JUST TO BE SAFE!
WE CAN'T TAKE ANY CHANCES! WHEN YOU'RE DEALING WITH A DISEASE THAT COULD POTENTIALLY KILL THOUSANDS OF AMERICANS--
--YOU HAVE TO TAKE EVERY POSSIBLE PRECAUTION TO KEEP IT FROM SPREADING--NO MATTER THE INCONVENIENCE! IT'S EVERYONE'S RESPONSIBILITY!
NO EXCEPTIONS!
ON AN ENTIRELY UNRELATED NOTE, HAVE YOU GOTTEN A FLU SHOT YET?
NO, IT'S SUCH A HASSLE.
WHY?
TOM TOMORROW©2014...www.thismodernworld.com...twitter.com/tomtomorrow

association is not causation

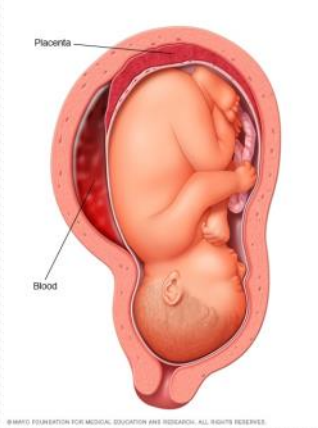
- Mid-30s patient has vaginal birth at home after contractions – not aware if baby breathed
- No prenatal care; didn't know she was pregnant till a week before
- PMH sig for previous c-sxn due to chorioamnionitis
- BP on admission 146/106
- Autopsy: abruptio placenta "ruptured placenta" [sic]
- Flattened ears, but "no congenital abnormalities or anomalies" – "***No x-rays are performed***"
  - Also: no specimens procured for testing for inborn errors of metabolism (metabolic disorders)
- "no signs of infection to fetus or placenta; however, "***No postmortem cultures are taken***"
- **COD per ME**: "Prematurity due to abruptio placenta. Contributing: Acute methamphetamine, clonazepam, and diphenhydramine intoxication"
- Defendant charged with feticide and involuntary manslaughter



association is not causation

- No scientific way to offer opinion that infant died of prematurity due to abruption
  - Partial or complete separation of placenta before delivery, 1% – 2% of pregnancies
- No scientific way to offer opinion that combined drug intoxication contributed to death
- ME ignored valid competing causes of death
- ME stated blood clot on placenta is “evidence of abruption”; however, normal placentas often have adherent blood clot
- OB-GYN makes no note of abruption
- ACOG: whether or not methamphetamine use increases risk of preterm birth or abruption is ***unclear***

Methamphetamine abuse in women of reproductive age. Committee Opinion, Committee on Health Care for Underserved Women, American College of Obstetricians and Gynecologists. Committee Opinion 479, March 2011, reaffirmed 2017.



association is not causation

Shah et al: screening of 34,833 mom-infant pairs – ***no findings*** that meth use was associated with, much had a causal relationship to, placental abruption.

- Shah R, Diaz SD, Arria A, et al. Prenatal methamphetamine exposure and short-term maternal and infant medical outcomes. *Am J Perinatol*. 2012; 29(5): 391-400.

Wright et al studied the pregnancies and infants of 144 mothers using methamphetamine. They found that there was ***no difference*** in the incidence of preterm delivery or abruption between the methamphetamine-exposed newborns and those not exposed to methamphetamine.

- Wright TE, Schuetter R, Tellei J, Sauvage L. Methamphetamines and pregnancy outcomes. *J Addiction Med*. 2015; 9(2): 111-117.

association is not causation

The forensic pathologist interprets the toxicology results in the setting of the entire death investigation. This review focuses on potential errors by the forensic pathologist with regard to toxicology analysis encountered with death investigation. These include mistakes of determining the cause of death based solely on the drug concentration and failure to consider the postmortem nature of the specimen when interpreting results. The forensic toxicologist does analytical toxicology; i.e., determining what drug(s) is/are present and in what concentration. The forensic pathologist does interpretive toxicology, which requires consideration of the decedent's medical history, the circumstances surrounding death, the environment of the death, the autopsy findings, and the results of the analytical toxicology. Forensic pathologists must communicate with the forensic toxicologists, ***understand their limitations***, and collect proper specimens.

- Gill JR, Stajic M. Classical mistakes in forensic toxicology made by forensic pathologists. *Acad Forensic Pathol*. 2012; 2(3): 228-234.

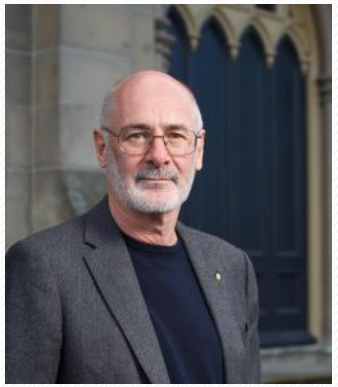
association is not causation

- No testing for metabolic disorders
- Routine testing in unexpected newborn deaths (since 1990s in every ME office with which I've been associated)
- Metabolic disorders may manifest as sudden, unexpected death in the perinatal period.

  - Gilbert-Barness E, Steffensen TS, Johnson DR. Pediatric metabolic diseases. In: Collins KA, Byard RW, eds. *Forensic Pathology of Infancy and Childhood*. New York, NY: Springer; 2014: 995.
  - Vernon HJ. Inborn errors of metabolism: advances in diagnosis and therapy. *JAMA Pediatr*. 2015:169(8):778-782.

- Extended testing is not difficult and is relatively inexpensive; a metabolic screen can be performed on dried blood on filter paper, easily prepared at the time of autopsy by placing drops of fresh blood onto filter paper.

  - Dolinak , 331, 336.



association is not causation

- No testing for infectious disease ("**no postmortem cultures are taken**")
- p 2: "no signs of infection to fetus or placenta"
- Mother had high WBC (13.7K) and high absolute neutrophil count (11.5K)
- Mother had PMH of preterm c-sxn 11 mos earlier for chorioamnionitis
- GBS infection in pregnant women common and can lead to fetal death / pregnancy loss
    - https://www.uptodate.com/contents/group-b-streptococcal-infection-in-pregnant-women
- Again, routine testing in unexpected newborn deaths (since 1990s in every ME office with which I've been associated)
- Infectious disease may manifest as sudden, unexpected death in the perinatal period.
- Medical axiom: "if you don't look for it, you won't find it"

association is not causation

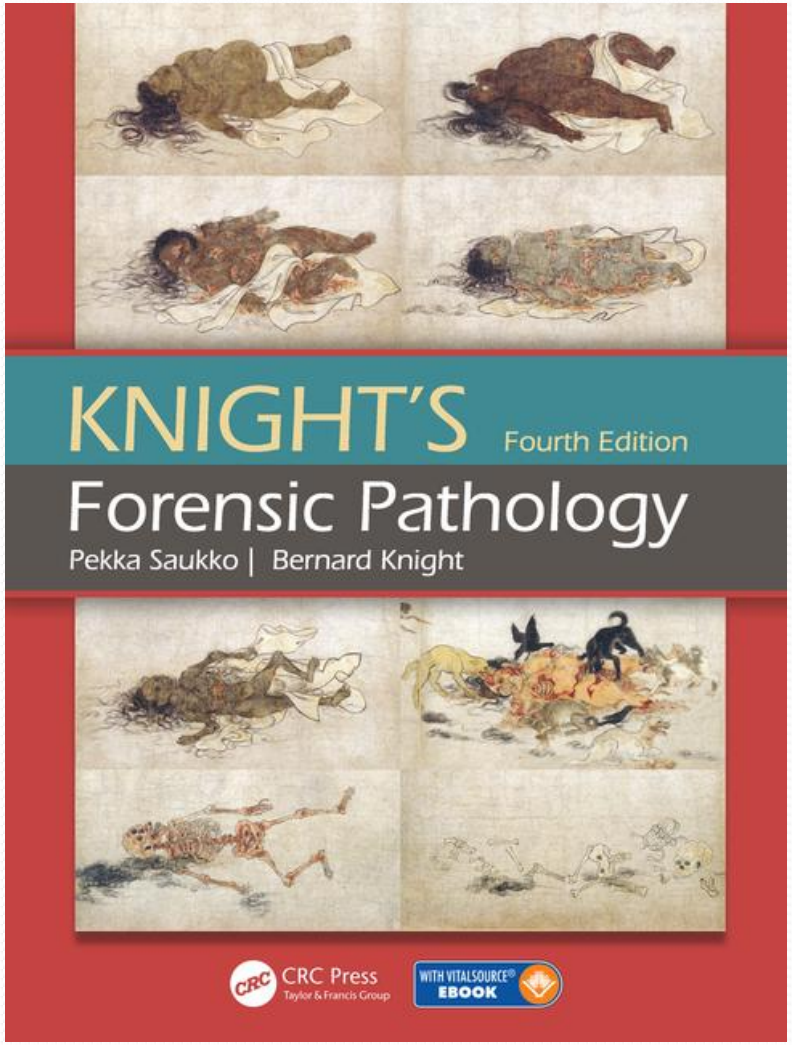
Reasonable COD statement in this case:

No anatomic or toxicologic findings clearly explaining death of this preterm fetus are identified at autopsy. Findings are consistent with but not diagnostic of placental abruption. Inborn errors of metabolism and infectious disease have not been ruled out, and the significance of the methamphetamine, fentanyl, clonazepam, and diphenhydramine identified is unclear. The manner of death is undetermined.

Charges of feticide and involuntary manslaughter subsequently dropped

"To be dogmatic about a single cause [of death] where the grounds for such a decision are tenuous does not help anyone and can lead to unfortunate consequences."

Saukko P, Knight B. *Knights Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.



a cause v ***the*** cause

Middle-aged decedent with history of:

- CAD with angina pectoris and palpitations
- Abnormal stress test
- Dyslipidemia
- Cigarette use
- Extreme obesity 5’1” 240 lbs BMI 45.5 kg/m^2
- Chronic and current use of opioid analgesics for fibromyalgia, sacroiliitis, inflammatory polyarthropathy, and L-S spondylosis
- LKA 10/14
- Found dead by apartment maintenance 10/16; coroner noted purge, skin slip
- Autopsy 10/20, four days after body found
  - Pathologist describes heart wt 400 gm
  - 90% stenosis RCA, 50% stenosis LAD and LCA
  - Hepatic steatosis
  - ***No microscopy performed***

a cause v ***the*** cause

Toxicology report of blood procured from ***heart*** by coroner:

- Oxycodone 587 ng/mL (10 – 200)
- Oxymorphone 84 ng/mL (1 – 5)
- 7-aminoclonazepam 12.2 ng/mL
- Cyclobenzaprine 195 ng/mL (3 – 36)
- Gabapentin 4.9 ng/mL (2 – 20)
- Metoprolol 243 ng/mL (30 – 350)
- Amlodipine 289 ng/mL
- Caffeine present

a cause v *the* cause

Cause of death statement by Medical Examiner

Cause of death: Acute oxycodone, cyclobenzaprine, and gabapentin intoxication

Contributing: Atherosclerotic and Hypertensive cardiovascular disease and Diabetes Mellitus

Manner of Death: Accident

: how would ASCVD, HCVD, and DM contribute to a drug intoxication death?

Of note: coroner disagreed with MOD, stating “undetermined”

a cause v ***the*** cause

The forensic pathologist interprets the toxicology results in the setting of the entire death investigation. This review focuses on potential errors by the forensic pathologist with regard to toxicology analysis encountered with death investigation. *These include mistakes of determining the cause of death based solely on the drug concentration and failure to consider the postmortem nature of the specimen when interpreting results*. The forensic toxicologist does analytical toxicology; i.e., determining what drug(s) is/are present and in what concentration. *The forensic pathologist does interpretive toxicology, which requires consideration of the decedent's medical history, the circumstances surrounding death, the environment of the death, the autopsy findings, and the results of the analytical toxicology*. Forensic pathologists must communicate with the forensic toxicologists, understand their limitations, *and collect proper specimens*.

Gill JR, Stajic M. Classical mistakes in forensic toxicology made by forensic toxicologists. *Acad Forensic Pathol*. 2012; 2(3): 228-234.

a cause v ***the*** cause

ME makes error of determining COD based solely on drug concentrations, failing to consider:

postmortem nature of specimen
site from which coroner procured blood

Postmortem redistribution results in changes in drug concentrations at various anatomic sites after death, ***especially in heart blood***

Two years before this case, NAME and ACMT recommended procurement of blood from ilio-femoral vessels to lessen the impact of PMR

Davis GG, National Association of Medical Examiners and American College of Medical Toxicology Expert Panel on Evaluation and Reporting Opioid Deaths. Recommendations for the investigation, diagnosis, and certification of deaths related to opioid drugs. *Acad Forensic Pathol*. 2013; 3(1): 62-76.

aFP

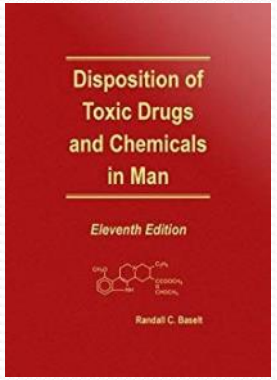
a cause v *the* cause

Baselt: oxycodone heart/femoral postmortem concentration ratios can be up to 4.6

H/F postmortem concentration ratio for cyclobenzaprine has been reported to be up to 5.3.

Oxymorphone, not mentioned in ME's report, is a drug in its own right as well as a metabolite of oxycodone, and it is known to show marked redistribution with heart/femoral postmortem concentration ratios up to 8.

Gabapentin appears to not show PMR, consistent with decedent's blood gabapentin concentration being relatively low in relation to the artifactually elevated concentrations of oxycodone, oxymorphone, and cyclobenzaprine.



Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*, 11th ed. Seal Beach, CA: Biomedical Communications; 2017.

a cause v ***the*** cause

ME does not take into account the decedent's PMH that may explain death as well as circumstances surrounding death that may decrease her long hx of ingesting opioids, increasing likelihood of tolerance

Med records show long term and current use of opioids

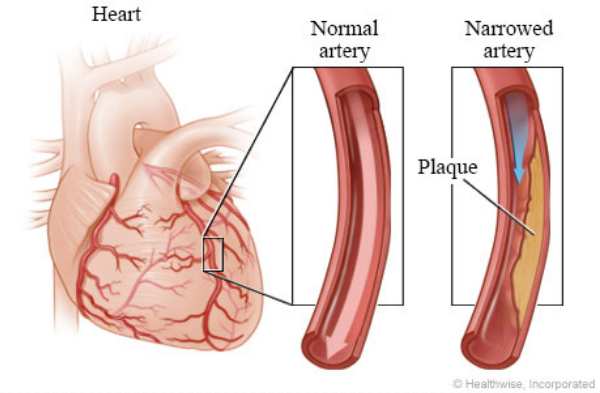
Gill and Stajic: studies of drug fatalities often fail to take into account habituation/tolerance to the effects of the drug, noting that "**[m]ost experienced forensic pathologists have seen people die from mechanical violence (e.g., gunshot wound) with blood cocaine concentrations ten times greater than others whose deaths were clearly attributable to cocaine intoxication**."

Gill and Stajic: "But determination of the role of medications or drugs of abuse in the cause of death is more complex. ***This is particularly true when the decedent has advanced underlying disease that is capable of explaining the death***."

a cause v *the* cause

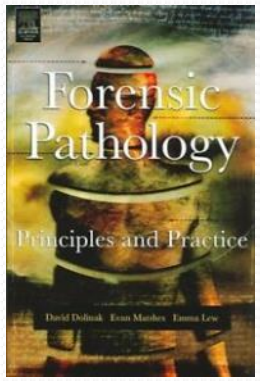
RCA > 90% stenosis

> 75% stenosis of coronary can explain sudden death, and finding of decedent on toilet more commonly seen in sudden cardiac death 2° to ASCVD, HCVD, DM than in drug-related deaths



Dowling, G. Sudden natural death. In: Dolinak D, Matshes EW, Lew EO, eds. *Forensic Pathology: Principles and Practice*. Boston, MA: Elsevier Academic Press; 2005:73.

Davis GJ. Sudden natural death in adults. In: Prahlow JA, ed. *Basic Competencies in Forensic Pathology: A Forensic Pathology Primer*. Northfield, IL: College of American Pathologists; 2016:45.



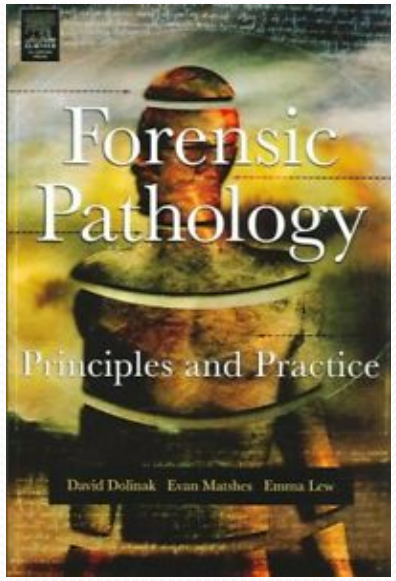
a cause v ***the*** cause

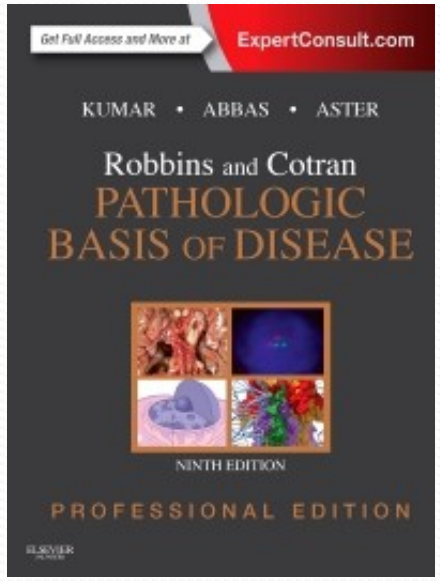
In spite of hx of DM, ME did ***not*** test vitreous for glucose

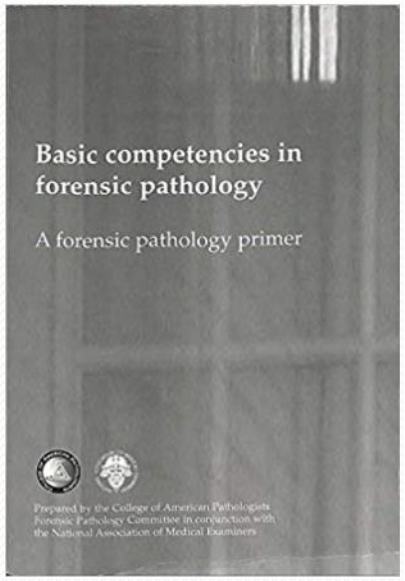
Cardiovascular complications e.g. SCD common in longstanding DM

Not only CAD, but microangiopathy in DM; however, ME elected ***not*** to take microscopy

Dolinak, 110.
Kumar, 1119.
Kumar, 1120.
Prahlow, 51.





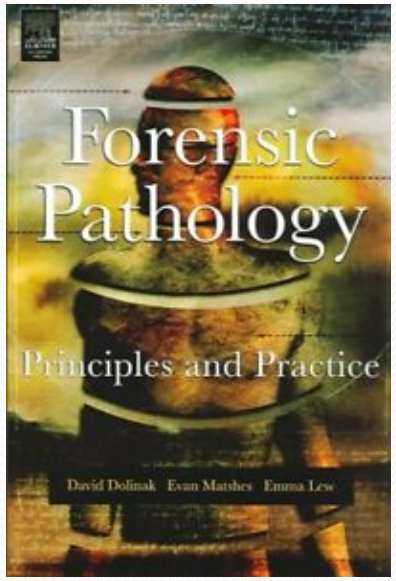


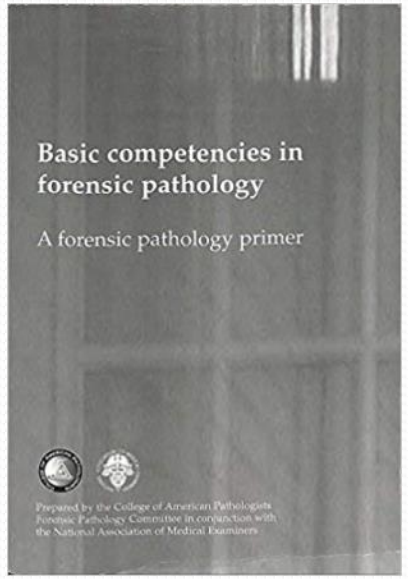
a cause v *the* cause

Decedent had long h/o HCVD

HTN alone [“the silent killer”], even w/o added burden of ASCVD, DM, extreme obesity, and cigarette smoking, may result in SCD

Dolinak, 76.
Prahlow, 51.





a cause v *the* cause

Decedent had long h/o tobacco (cigarette) use, the most preventable cause of human death

Tobacco use risk for ASCVD & COPD

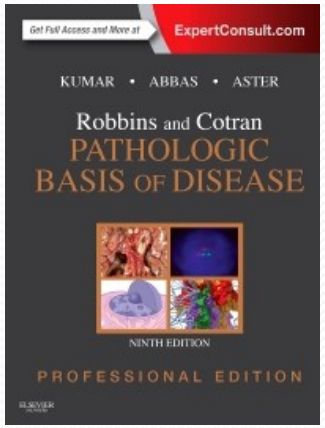
Decedent “smoked 4-5 cigarettes / day” in attempt to quit smoking

No “safe” # of cigarettes – smoking even 1/day carries risk of CAD much greater than expected, about half that of people who smoke 20/day

Kumar, 417.

Ibid.

Hackshaw A, Morris JK, Boniface S, Tang J-L, Milenković D. Low cigarette consumption and risk of coronary heart disease and stroke: meta-analysis of 141 cohort studies in 55 study reports. *BMJ*. 2018; 360: j5855.



a cause v ***the*** cause

For the reasons noted above, including but not limited to:

- nature of the postmortem blood specimen
- postmortem redistribution
- habituation / tolerance decedent would have had to opioid medications given her long term consumption
- multiple comorbidities from which decedent was suffering at the time of her death (including but not limited to atherosclerotic cardiovascular disease, hypertensive cardiovascular disease, diabetes mellitus, cigarette use, extreme obesity, dyslipidemia, and fatty liver that are valid competing causes of death)

the ME ***cannot*** state to a reasonable degree of medical probability that decedent's death was due to drug intoxication.

a cause v *the* cause

A valid competing cause of death:

“Sudden cardiac death due to atherosclerotic, hypertensive, and diabetic cardiovascular disease complicated by extreme obesity and tobacco use. The significance of the postmortem drugs identified and their concentrations is unclear.”

McCloud’s dictum

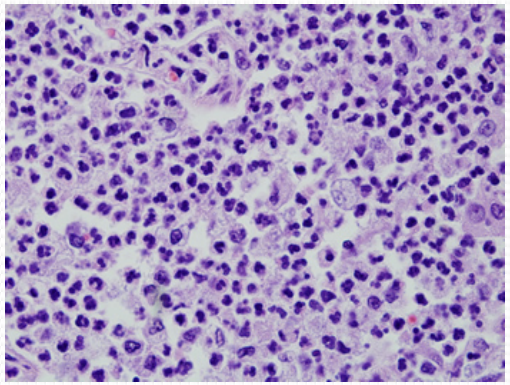
Intellectual honesty v intellectual failure

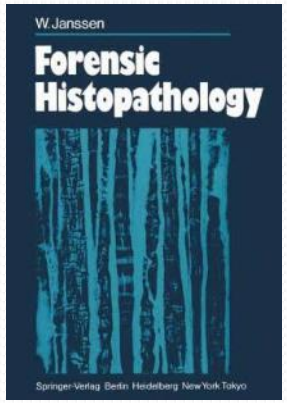
Colorado Timing

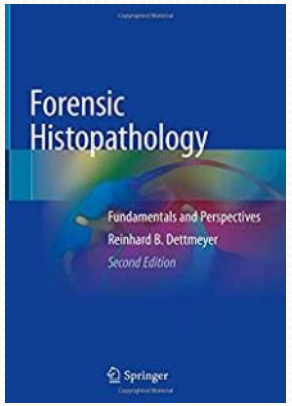
- 34 y.o. intoxicated woman has group sex with multiple intoxicated men
- Mr Yazzie leaves while other men remain
- Many hours later, decedent found dead
- COD: Blood loss from lacerations of vagina and vulva due to blunt force penetration of vagina
- Mr Yazzie charged with murder, as ME stated in addendum to autopsy report:
  - “some injuries were inflicted more than 4 hrs prior to death and others to a maximum of ~ 8 hrs taking into account the likely slowing of body processes [no citation]” Also: “It us my further opinion that penile/vaginal sex alone cannot explain these findings”
- ME: “Most sources agree that the infiltration of injured tissue by white cells called neutrophils cannot be reliably demonstrated earlier than four hours after injury, and a range of four to six hours is sometimes stated.” – no citation for “most sources

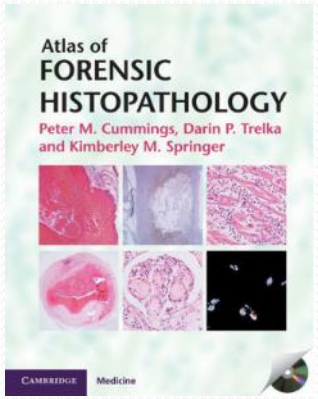
Colorado Timing

- ME: “Most sources agree that the infiltration of injured tissue by white cells called neutrophils cannot be reliably demonstrated earlier than four hours after injury, and a range of four to six hours is sometimes stated.” – no citation for “most sources”
- Janssen, 1984: “In humans, polymorphonuclear leukocytes have been histologically determined in the marginal areas of laparotomy wounds at the earliest after 20 min”
- Janssen: “At 2 – 4 hrs, mononuclear cells & phagocytosis present” [none in this case]
- Dettmeyer: cellular reactions after 30 minutes, though “neutrophil infiltration can start earlier”
- Cummings: “Caveat: neutrophilic infiltrates have been reported to appear within 20 – 30 minutes”









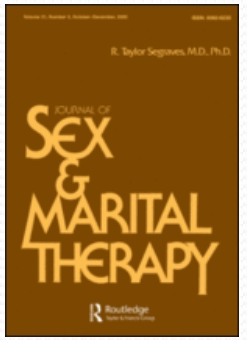
Colorado Timing

- ME: “the wound healing process, like all physiologic processes, would be delayed or shifted to the longer intervals by the dying process […] [s]hould take soldier cells [PMNs] longer to appear in the more recent injuries. No literature support. Just common sense.”
- ME: “penile/vaginal sex alone cannot explain these findings [vaginal injuries]” […] rough penile / vaginal sex “does not tear genitalia”
- But…
- Astrup et al found frequent genital lesions in 34% , including laceration, abrasion, and contusion/hematoma in consensual sex

Astrup BS, Ravn P, Lauritsen J, Thomsen JL. Nature, frequency and duration of genital lesions after consensual sexual intercourse – implications for legal proceedings. *Forensic Sci Int*. 2012; 219: 50-56.

Colorado Timing

- "There is a general expectation that sexual assault will result in physical injury at a rate higher than that of consensual sexual activities. Review of the literature does not support this concept."
    - Song SH, Fernandes JR. Comparison of injury patters in consensual and nonconsensual sex: is it possible to determine if consent was given? *Acad Forensic Pathol*. 2017; 7(4): 619-631.
- Jeng C-J, Wang L-R. Vaginal laceration and hemorrhagic shock during consensual intercourse. *J Sex Marital Ther*. 2007; 33: 249-253. [three cases in Taiwan]



Colorado Timing

- Decedent's BAC 0.368 g/100mL
- Testimony of prosecution expert, a toxicology lab director (not a physician):
- "I previously opined that [the decedent] was under the influence of ethyl alcohol to a degree that caused her to experience severely impaired consciousness and an inability to adequately assess the situation. This is still my professional opinion to a reasonable degree of scientific certainty. My professional opinions are based on current scientific research generally accepted in the forensic toxicology community, on my training and experience, and on the information provided to me regarding this case."
- NO scientific basis for statement above
- In fact, med, tox, and general forensic literature would indicate that expert should not offer such

Colorado Timing

- Not possible to predict individual behavior based on a BAC (or any other drug concentration)

This chart is not valid, never was, and we'll chat about why

BLOOD-ALCOHOL CONCENTRATION, %W/V	STAGE OF ALCOHOLIC INFLUENCE	CLINICAL SIGNS/SYMPTOMS
0.01-0.05	Sobriety	No apparent influence Behavior nearly normal by ordinary observation Slight changes detectable by special tests
0.03-0.12	Euphoria	Mild euphoria, sociability, talkativeness Increased self-confidence; decreased inhibitions Diminution of attention, judgment, and control Loss of efficiency in finer performance tests
0.09-0.25	Excitement	Emotional instability; decreased inhibitions Loss of critical judgment Impairment of memory and comprehension Decreased sensitory response; increased reaction time Some muscular incoordination
0.18-0.30	Confusion	Disorientation, mental confusion; dizziness Exaggerated emotional states (fear, anger, grief, etc.) Disturbance of sensation (diplopia, etc.) and of perception of color, form, motion, dimensions Decreased pain sense Impaired balance; muscular incoordination; staggering gait, slurred speech
0.27-0.40	Stupor	Apathy; general inertia, approaching paralysis Markedly decreased response to stimuli Marked muscular incoordination; inability to stand or walk Vomiting; incontinence of urine and feces Impaired consciousness; sleep or stupor
		Complete unconsciousness; coma; anesthesia

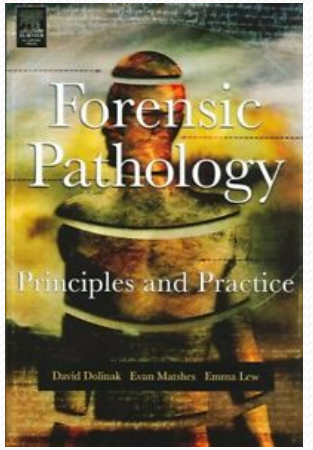
Colorado Timing

- Not possible to predict individual behavior based on a BAC (or any other drug concentration)
- You will see CNS depression with a high BAC:
  - Euphoria
  - Decreased inhibitions
  - Decreased attention span
  - Decreased concentration
  - Slowed reaction time
  - Decreased judgment
  - Paradoxically increased
  - BUT: cannot predict external manifestations of behavior

Colorado Timing

- Decedent known to have alcohol use disorder (alcoholism)

- Dolinak: Deaths due to the toxic effects of acute overingestion of ethanol are due to severe respiratory and central nervous system depression and usually involve blood ethanol levels of 0.35 percent or higher. This number should only be used as a guide, however, because *one must be reminded that a tolerant chronic alcoholic may appear to act normal or only slightly impaired at a blood ethanol level of 0.30 to 0.40 percent* [emphasis mine], and a novice, nontolerant individual may die from a blood ethanol level as low as 0.20 to 0.30 percent or lower.

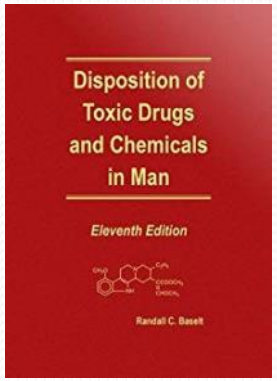


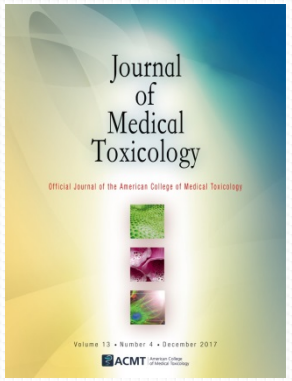
Colorado Timing

- Inexplicably, tox expert stated:
- “Even while intoxicated, in general I would expect a person who is in close proximity and interacting with [the decedent] should have been able to perceive that she was heavily intoxicated and unable to make sound decisions or consciously express her willingness to act.”
- No scientific basis for such an assertion – also an expert on human cognition? And individuals’ perception of others’ intoxication?
- Well…

Colorado Timing

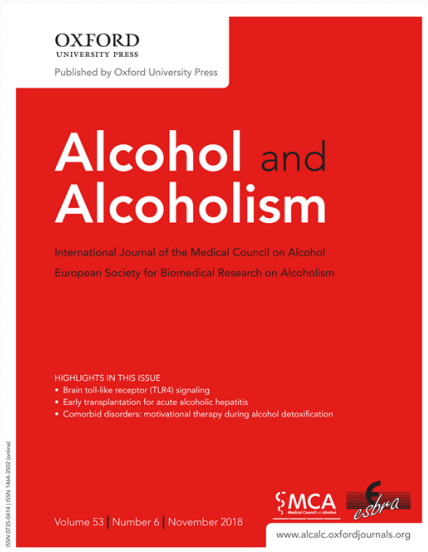
- Baselt: describes BAC of 0.53 in a 45 yo driver
- 23 yo woman gave caregivers medical history with BAC of 0.52
- 16 adults showed only “mild to moderate CNS depression with BACs 0.52 – 0.78
- Roberts and Dollard (ER): case of an alcohol tolerant man with a BAC of 0.515 appeared:
  - Neurologically intact
  - Cognitively normal
  - No objective signs of intoxication by repeated evals by experienced ER physicians

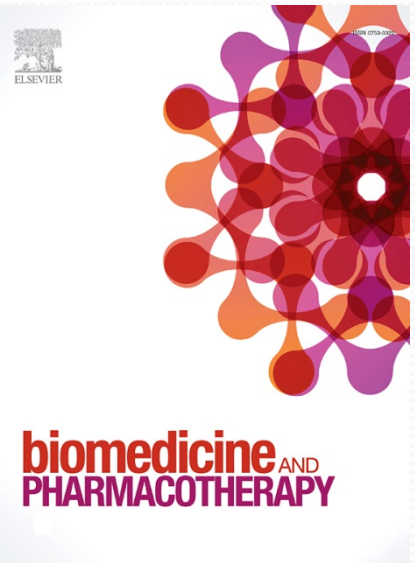




Colorado Timing

- Redmond: BAC of 0.894 in a patient who was conscious, responsive, able to give adequate history
- Redmond & Cartlidge: of 235 patients admitted to university hospital detox unit:
  - 22 were talking and alert, and all had BACs > 0.50

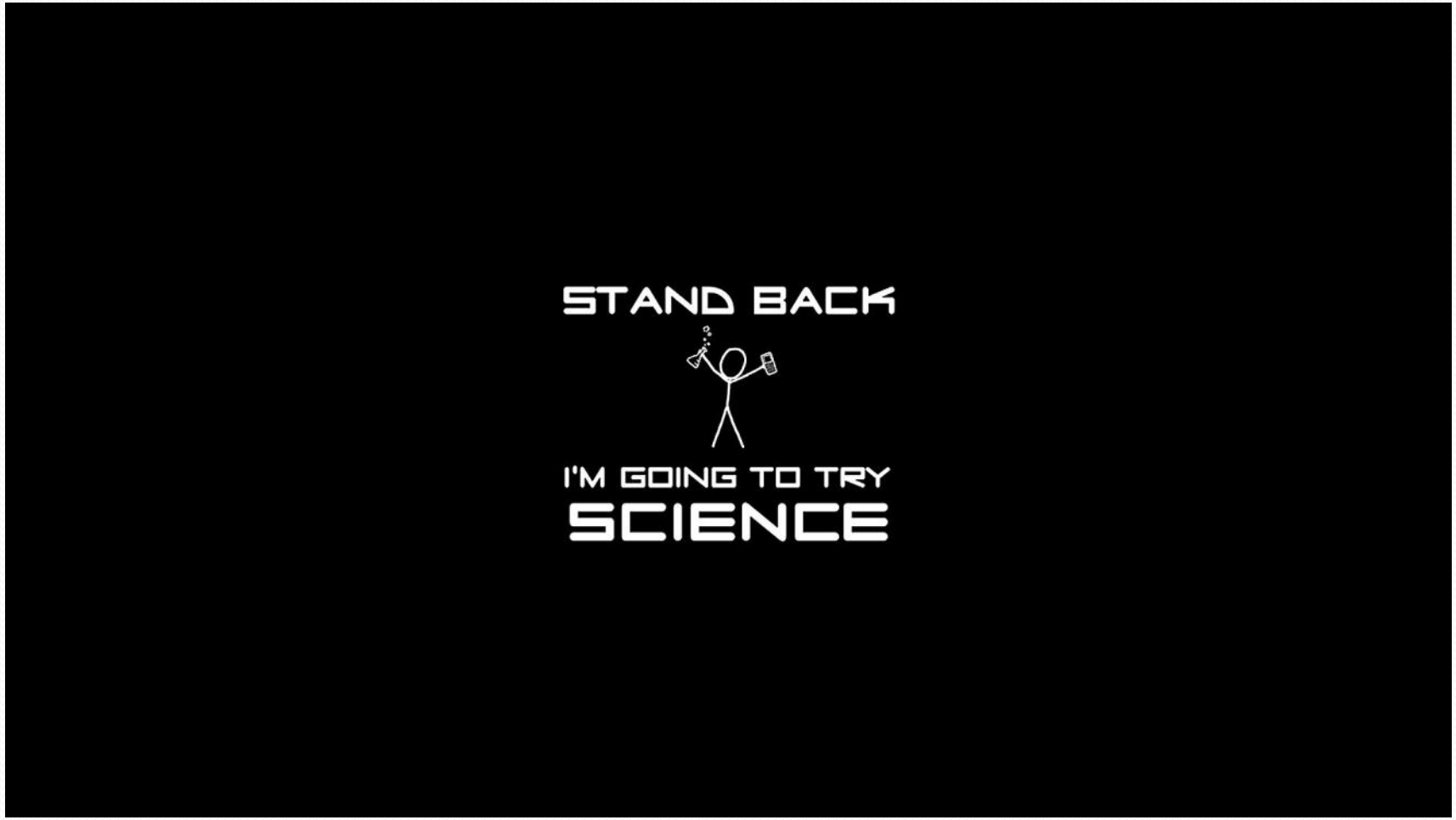


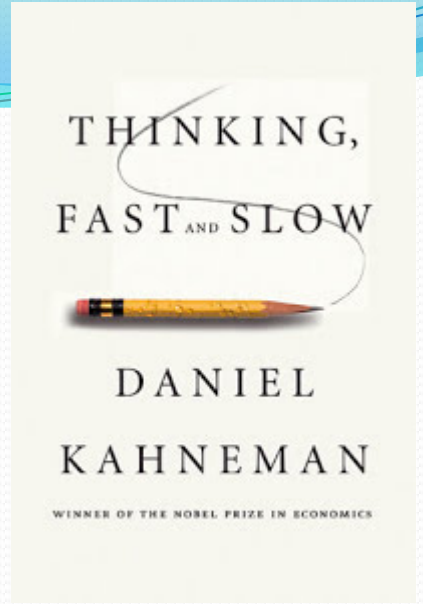


Colorado Timing

- In summary:
  - No medical/scientific basis for allegation that:
    - Decedent had “severely impaired consciousness”
    - Decedent had “inability to ‘adequately assess the situation’”
    - “Even while intoxicated, in general I would expect a person who is in close proximity and interacting with [the decedent] should have been able to perceive that she was heavily intoxicated […]”

Some Closing Thoughts

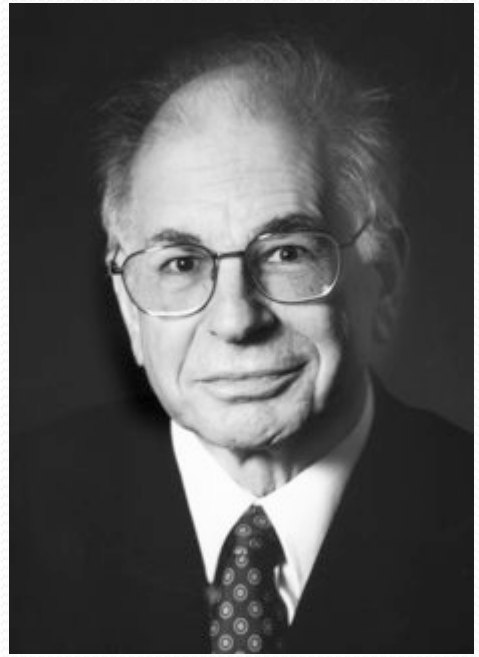




"Acquisition of skills requires a regular environment, an adequate opportunity to practice, and rapid and unequivocal feedback about the correctness of thoughts and actions."

"Experts who acknowledge the full extent of their ignorance may expect to be replaced by more confident competitors, who are better able to gain the trust of clients. An unbiased appreciation of uncertainty is a cornerstone of rationality, but it is not what people and organizations want."

~ Daniel Kahneman, PhD, Nobel Laureate, Princeton Professor of Psychology and Public Affairs, Emeritus

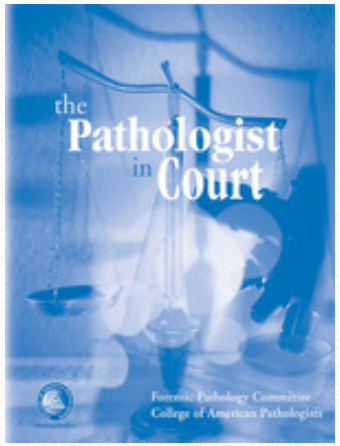


“Uncertainty is not, in this context, an admission of intellectual failure. It is an admission of intellectual honesty”

« Le doute n'est pas une état bien agréable, mais l'assurance est un état ridicule. »
“Doubt is not a comfortable position, but certainty is an absurd one.” ~ Voltaire. Letter to Frederick William, Prince of Prussia (28 November 1770). English. In: Tallentyre SG, ed, *Voltaire in His Letters*. New York, NY: G.P. Putnam's Sons; 1919: 232.

Among things of which to beware:

- Losing objectivity
- Overconfidence
- Becoming an advocate



Reay DT, Davis GJ, Biedrzycki LM, et al, eds. Forensic Pathology Committee, College of American Pathologists. The Pathologist in Court. Northfield, IL: College of American Pathologists; 2003.

"If the law has made you [the physician] a witness, remain a [wo]man of science; you have no victim to avenge, no guilty person to convict, and no innocent person to save. You must bear testimony within the limits of science."
~ Paul Camille Hippolyte Brouardel, MD

Confirmation Bias

Confirmation Bias: A fallacy of logos, the common tendency to notice, search out, select and share evidence that confirms one's own standpoint and beliefs, as opposed to contrary evidence. […] In contemporary times Confirmation Bias is most often seen in the tendency of various audiences to "curate their political environments, subsisting on one-sided information diets and [even] selecting into politically homogeneous neighborhoods" (Neblo et al, 2017, *Science*). Confirmation Bias (also, Homophily) means that people tend to seek out and follow solely those media outlets that confirm their common ideological and cultural biases, sometimes to an degree that leads a the false (implicit or even explicit) conclusion that "everyone" agrees with that bias and that anyone who doesn't is "crazy," "looney," evil or even "radicalized." See also, "Half Truth," and "Defensiveness."

~ http://utminers.utep.edu/omwilliamson/ENGL1311/fallacies.htm

Other common fallacies of logic

Anchoring Bias (also, Attention Bias, Availability Bias): A fallacy of logos stemming from the natural tendency to give undue attention and importance to information that is immediately available at hand, particularly the first or last information received, and to minimize or ignore broader data or wider evidence that clearly exists but is not as easily remembered or accessed, e.g., "We know from experience that this doesn't work," when "experience" means the most recent local attempt, ignoring overwhelming experience from other places and times where it *has* worked and *does* work.

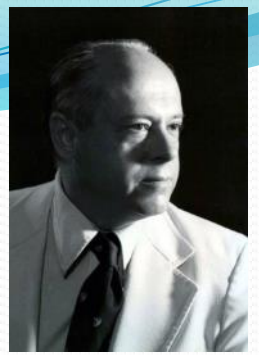
Ipse dixit

Post hoc ergo propter hoc

~ http://utminers.utep.edu/omwilliamson/ENGL1311/fallacies.htm

Some Takeaways

- Nordby JJ. Can we believe what we see, if we see what we believe? ***J Forensic Sci*** 1992;37(4):1115-1124.
  - The eye sees, but the conscious observation is shaped by the experience and expectations of the observer
- The pathologist may fall into the trap of rote thinking and rote methodology – autopsy lacks correlation with circumstances
- Some pathologists may possess a lack of concern for their actions and are too eager to opine inflicted injury / homicide based solely on autopsy patterns



Some Takeaways

- Science v Art of Medicine
- Misinterpretation of the intent of the phrase "**it's a homicide till proven otherwise**"
- Errors in interpretation may be from lack of cognitive ability and/or lack of proper autopsy training
- Problem of unquestioned acceptance of publications that repeat untested concepts, e.g. "automatism"
- Position papers should not be relied upon as scientific source – simply a consensus of "like believers"
  - Reviews and position papers may be useful as a reference literature start, but only a start
- Non-critical acceptance of publications may demonstrate suboptimal cognition

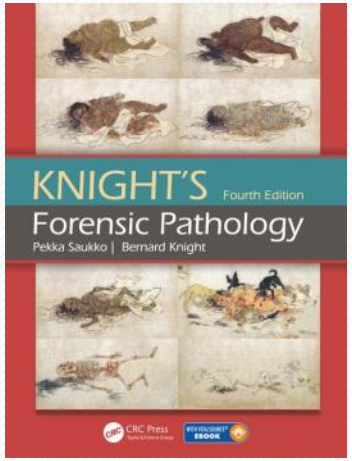
Some Takeaways

As the pathologist increases in experience and maturity, he or she is more ready to concede [when] he cannot find a cause of death, and this is far more satisfactory [than speculation]. In forensic work, this is not “abrogating responsibilities,” but being objective, sensible and just.”

Of course OK to discuss differential diagnosis, but:

“[T]o be dogmatic about a single cause where the grounds for such a decision are tenuous does not help anyone and can lead to unfortunate consequences.”

~ Saukko P, Knight B. *Knight’s Forensic Pathology*, 4th ed. Boca Raton, FL: CRC Press; 2016.

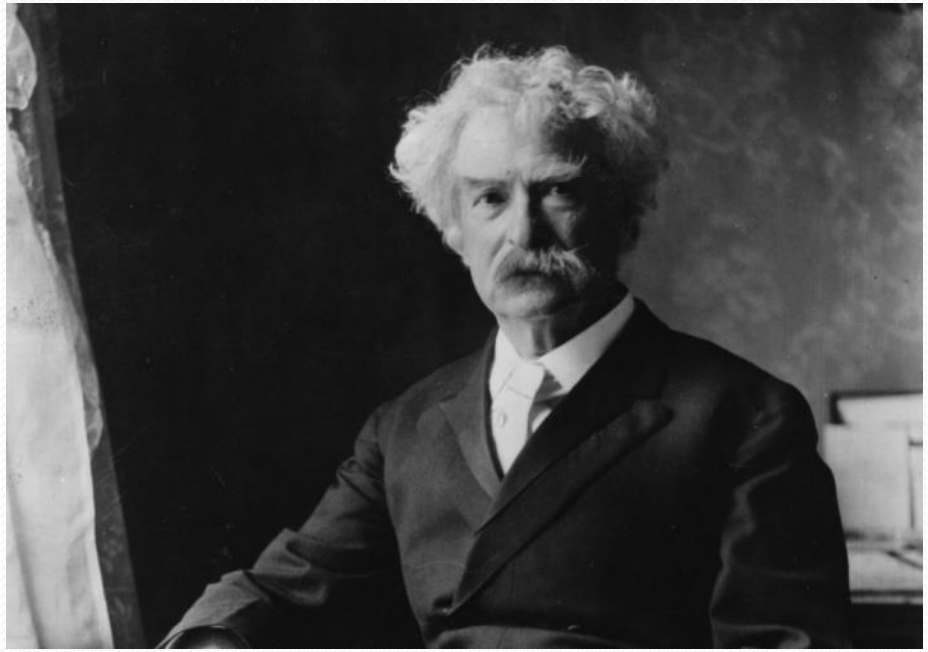


Some Takeaways

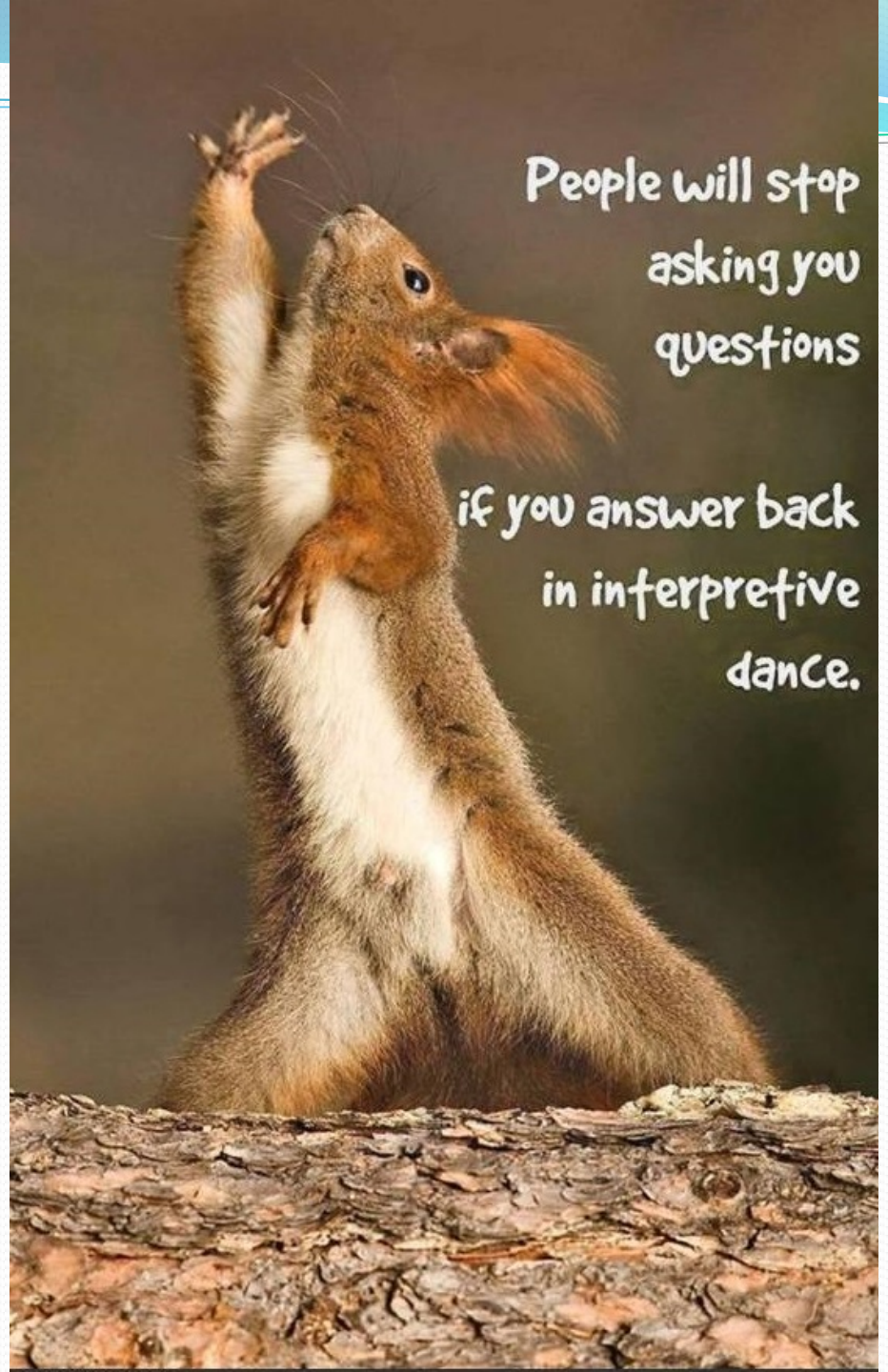
- Beware of emotional issues – paraphrasing Haidt: “The emotional tail wags the rational dog.”
- Do your due diligence
- Core competence
- “Maintain your enthusiasm; always be truthful.” ~ GR Nichols, MD
- Remember Dr McCloud’s aphorisms re 100% certainty & re speech
- One must be dispassionate with equanimity, without agenda
- If not “change your mind,” be open to “thinking again” ~ after Kahneman

“It ain’t what you don’t know that gets you into trouble. It’s what you know for certain that just ain’t true.”

~ Mark Twain (Samuel Clemens), attributed



Thank you!


People will stop
asking you
questions
if you answer back
in interpretive
dance.