

Background Information Pertaining to the Forensic Investigation into the Death of Anna Nicole Smith

Joshua Perper, MD, LLB, MSc
Chief Medical Examiner
Broward County, Florida

March 2007



Initial Information

- Anna Nicole Smith found unresponsive at Seminole Hard Rock Hotel and Casino
- Possible “stomach flu” for several days
- Body transported to Memorial Regional Hospital
- Pronounced dead and Medical Examiner’s Office notified at 2:49 PM February 8, 2007

Medical Examiner Jurisdiction

- Dictated by Florida Statute
- 406.11 The medical examiner of the district in which the death occurred . . . shall determine the cause of death . . . when any person dies:
 - ✓ suddenly, when in apparent good health
 - ✓ in suspicious or unusual circumstances
 - ✓ unattended by a practicing physician

Medical Examiner's Office

Immediate Response

- Dispatched Dr. Gertrude Juste, Associate Medical Examiner, to the scenes (hotel and hospital)
- Many prescription drugs recovered in hotel room; no illegal drugs
- Dr. Juste accompanied body from hospital to morgue
- Activated high-profile security precautions with Broward Sheriff's Office
- Developed autopsy checklist

Patient Received at M.E. Facility

- Brought in at 4:59 PM under routine protocol in manner preserving dignity of the deceased
- Assembled Forensic Team
- Initial documentation started
- Brief external examination
 - ✓ No evidence of blunt force, sharp force, gunshot wound, or asphyxiation
 - ✓ Samples taken for microbiology, toxicology, serology, DNA, trace evidence

Forensic Team

Dr. Joshua Perper

Chief Medical Examiner

Dr. Stephen Cina

Deputy Chief Medical Examiner

Dr. Gertrude Juste

Associate Medical Examiner

Dr. Reinhard Motte

Associate Medical Examiner

Dr. Harold Schueler

Chief Toxicologist

Edwina Johnson

Chief Investigator

Wendy Crane

Investigator

AUTOPSY CREW

Dean Reynolds

Chief Autopsy Room Technician

Irma Moten

Autopsy Room Technician

Joe Anderson

Visual Imaging Technician

James Fleurimond

Visual Imaging Technician

Evening of February 8, 2007

- Body and tissue samples secured in locked area of morgue
- Autopsy scheduled for next morning approximately 9:30 AM
- Final autopsy checklist developed and reviewed

Autopsy: February 9, 2007

- Forensic Team present
- Prosecutors:
Dr. Joshua Perper and Dr. Gertrude Juste
- Autopsy commenced at 10:36 AM,
ended 6 hours later

Autopsy: February 9, 2007 (Cont'd)

- Extensive sampling of tissues and body fluids for toxicological analysis
- Additional samples for DNA
- Cultures of organs and internal body fluids for evidence of infection
- Detailed examination of body cavities and all organs
- Samples taken for microscopic evaluation

Initial Autopsy Findings

- Gross examination*
 - Subtle, mild discoloration of heart muscle
 - Possible changes to intestinal lining
 - Congestion with mild enlargement of liver
 - Small amount of bloody fluid in the stomach (commonly seen in terminal shock)
 - Non-specific edema (water logging) of lungs

* Changes visible to the naked eye

Microscopic Findings

- Heart: minimal, focal heart muscle scarring; likely clinically insignificant
- Lungs: mild terminal aspiration; patchy edema
- Mild chronic duodenitis (minimal intestinal inflammation)
- Slightly increased number of acute inflammatory cells in spleen (consistent with infection)
- Chronic inflammation of thyroid gland (Hashimoto thyroiditis)

Volunteering Medical Consultants

Dr. Stephen Nelson, neuropathologist and Chief Medical Examiner, Polk County, Florida

Dr. Michael Bell, cardiopathologist and Chief Medical Examiner, Palm Beach County, Florida

Dr. Azorides Morales, cardiopathologist and Chairman of Department of Pathology, University of Miami

Dr. Gordon Dickinson, infectious disease specialist, Professor and Chief of Department of Infectious Diseases, University of Miami

Dr. Margaret Gorenssek, infectious disease specialist, Chief of Department of Infectious Diseases, Cleveland Clinic, Florida

Dr. Michael Bayerl, hematopathology, Assistant Professor, Department of Pathology, Milton S. Hershey Medical Center, Pennsylvania

Evaluation by Consultants

- Two cardiopathologists examined the heart in detail
 - No significant gross or microscopic abnormalities other than minimal focal scarring in one of many slides (deemed clinically insignificant; found in many normal hearts if extensively sampled) and a tiny focus of chronic inflammation on one slide of many
- Neuropathologist examined the brain and found no obvious lesions to explain death

Some of the Conditions Excluded by Autopsy and Tests

- Pneumonia
- Pulmonary thromboembolism
- Asthma
- Coronary artery disease
Heart problems
- Stroke
- Cancer
- Large amounts of pills
in the stomach
- Cirrhosis, fatty liver, hepatitis
- Leukemia
- Kidney infection
- Renal changes compatible
with diabetes or lupus
- Pregnancy
- Internal bleeding

Investigation into Circumstances of Death

- 12 individuals interviewed
(friends, physicians, witnesses)
- Bottles of medication from U.S.A. and Bahamas examined
- Dr. Gertrude Juste and investigator Wendy Crane traveled to Bahamas to conduct additional interviews & review medical records
- Review of Seminole Police Investigation file
- Forensic examination of two of Miss Smith's laptop computers
- Developed detailed timeline leading up to death

Social and Medical History

- Information obtained from witnesses and public sources:
 - ✓ Chronic pain
 - ✓ Long term prescription drug use
 - ✓ Questionable “seizure” history (possibly related to medications)
 - ✓ Fluctuating weight
 - ✓ Stressors: public scrutiny, protracted lawsuits

More Recent Events

- Prescription drug use, including Methadone, during recent pregnancy
- Birth of daughter, Dannielynn, September 2006
- Death of son, Daniel, 3 days later—emotionally devastating, depression
- Near drowning episode in October 2006 associated with probable drug intoxication resulting in pneumonia

The Last Few Months

- Continued use of multiple prescription drugs
- Continued injections of various “longevity medicines” and diet medications, including Vitamin B12, Growth Hormone, Topamax, and immunoglobulins
- Suicidal comments in short-term after son’s death
- Mood variable but improving
- Additional stressors: Paternity suit, suit regarding ownership of residence in Bahamas, inheritance suit re: husband’s estate

The Final Week

- New stressor: Lawsuit filed against TrimSpa
- Ongoing paternity, estate, and residential lawsuits
- While in Bahamas, had injections into buttocks of B12, Human Growth Hormone, or immunoglobulins
- Planned trip from Bahamas to Fort Lauderdale on Monday, February 5, 2007

Timeline: Monday, Feb 5, Morning

- Prior to flight from Bahamas to U.S. felt well with no complaints for the 3 days prior to flight
- 11:00 AM had dance lesson in preparation for music video and participation in TrimSpa celebration in Bahamas
- Planned to shop for furniture in Miami for her Bahamas home
- Stated intention to marry Howard K. Stern on February 28, 2007 (per statement of Dr. Eroshevich, psychiatrist and friend)
- Prior to flight injected left buttock with either vitamin B12, human growth hormone, or immunoglobulins (longevity/immune protective medications)

Timeline: Monday, Feb 5, Early Evening

- Flew from Bahamas to Ft. Lauderdale with Howard K. Stern and Dr. Eroshevich (psychiatrist and friend)
- Due to pilot's error, plane landed in Miami at 5:30 PM
- During flight very upbeat and outgoing, however complained of pain in left buttock when seated
- Complained of cold and severe chills in limo ride to Seminole Hard Rock Hotel; checked in at 7:30 PM
- Upon arrival to room, temperature of 105 degrees; refused to go to hospital or let friends call 911
- Placed in ice bath, temperature dropped to 97 degrees

Timeline: Monday, Feb 5, Late Evening

- Administered
 - TamiFlu
 - Cipro (ciprofloxacin), 1000 mg, an antibiotic
 - Fluids
- Fell asleep at 10:00 PM after a dose of chloral hydrate (sleeping medication)
 - Recommended dose is 1 to 2 teaspoons prior to bed
 - Her routine dose was 2 tablespoons taken as needed (though she sometimes drank directly from the bottle)

Timeline: Tuesday, Feb 6

- Next morning, companions noted a “pungent odor” emanating from Anna Nicole, apparently sweat soaking the sheets
- Little if any urine production
- Temperature 100 degrees
- Given a bath and oral hydration; pungent odor faded
- Appeared to be doing OK but no appetite; watching TV
- Felt well in early afternoon; took chloral hydrate and slept for 2 hours

Timeline: Tuesday, Feb 6, Evening

- Watched TV with Howard K. Stern and Dr. Eroshevich until 11:00 PM
- Took another dose of chloral hydrate (sleeping medication)
- Asked for and received (unknown if she took them):
 - Soma
(muscle relaxant for painful musculoskeletal conditions)
 - Klonopin
(anti-seizure and anti-anxiety drug)
 - Valium
(anti-anxiety drug)
 - Topamax
(anti-seizure; tranquilizer; used in weight reduction)

Timeline: Wednesday, Feb 7

- Awake in bed and watching TV at 11:00 AM
- Ate breakfast (egg white omelette with spinach)
- Found naked and confused sitting in dry bathtub in afternoon
- Ordered and ate 2 crabcakes and shrimp for dinner
- Became very upset when her friend/physician Dr. Eroshevich left town that evening

Timeline: Wednesday, Feb 7, Late Evening

- Complained of not feeling well and took a bath
- Seen on couch at 10:00 PM watching TV in the living room of the suite
- Howard K. Stern was in the bedroom in the suite

Timeline: Thursday, Feb 8

- Took chloral hydrate before falling asleep in early morning
- No longer on couch at 4:00 AM
- About 9:00 AM - may have been seen moving in her bed by Maurice Brighthaupt (“Big Mo”)-friend/bodyguard/medic
- According to Howard K. Stern, he slept in bed with Miss Smith. When he woke up some time around 9-10:00 AM, she was awake. She did not complain of pain but felt very weak and asked Mr. Stern to help her to the bathroom and back to bed. Mr. Stern took a shower and left to attend to the purchase of a boat by Anna. Mr. Stern stated that he did not give Anna any medication and did not see Anna taking any medication
- At about 12:00 PM, Anna was seen “sleeping” by the wife of Big Mo, a registered nurse, who was asked to watch Anna by him
- About 1:00 PM the nurse called Big Mo to have him call 911 when Anna was found unresponsive
- The nurse initiated CPR

Timeline: Thursday, Feb 8

- 1:38 PM – Big Mo returned to room and continued CPR
- 1:40 PM - Seminole EMS called
- 1:46 PM - EMS arrived in hotel room, administered CPR and ACLS protocol (including medications such as atropine), and transported to hospital
- 2:43 PM - EMS arrived at Memorial Regional Hospital
- 2:49 PM - pronounced dead

Medical Examiner Timeline: Thursday, Feb 8

- Body transported to Medical Examiner's Office at 4:59 PM
- External examination and collecting of blood and body fluid samples for:
 - ✓ bacteriological and viral cultures
 - ✓ cerebrospinal fluid bacteriological cultures
 - ✓ intestinal bacteriological and viral cultures
 - ✓ DNA sampling
 - ✓ Serum for toxicology and chemistries

Timeline: Friday, Feb 9

- Autopsy performed at 10:36 AM
- Tissues and body fluids taken for microscopic examination and further toxicological, bacteriological, serological, and DNA analyses
- Initial assumptions (three choices):
 - ✓ Natural death
 - ✓ Drug/medication related death
 - ✓ Combination of natural and drug related death
- Following interviews of witnesses (Dr. Eroshevich and Mr. Stern) we learned of the history of buttock pain and plans were made to re-examine and dissect this part of the body (not a routine procedure)

Initial Toxicology Findings

- Received 2/9/07
- Urine drug screen: positive for benzodiazepines (anti-anxiety/anti-depressant medications)
- Blood and ocular (eye fluid) ethanol: negative
- Vitreous (eye fluid) glucose/electrolytes: non-specific chloride elevation; no evidence of hyperglycemia; inconsequential postmortem potassium elevation

Body Re-Examined 2/12/07

- Incisions made into buttocks and thighs
- Abscesses noted within scar tissue in left buttock
- Extensive scarring of both buttocks
- Linear hemorrhages from skin to abscesses
- Microscopy: abscess, foreign material, and scarring in buttocks
- Cultures from abscesses grew bacteria: *Pseudomonas luteola* and *Acinetobacter baumannii*

Additional Toxicology

- Received week of 2/12/07
- Blood drug screen **positive** for:
 - ✓ Topiramate (Topamax; anti-seizure, weight control)
 - ✓ Multiple benzodiazepines, including Valium (anti-anxiety), Klonopin (anticonvulsant) and Ativan (anti-anxiety)
 - ✓ Meprobamate (anti-anxiety)
 - ✓ Methocarbamol (muscle relaxant)
 - ✓ Guaifenesin (phlegm expectorant)
 - ✓ Diphenhydramine (anti-histamine)
- **All of the above were at therapeutic levels**

Additional Toxicology

- Drugs **NOT** present in the blood:
 - ✓ Methadone
 - ✓ cocaine
 - ✓ amphetamines (“speed”)
 - ✓ THC (marijuana)
 - ✓ barbiturates (sleeping pills)
 - ✓ morphine and other opiates
 - ✓ other illicit drugs
 - ✓ cyanide
 - ✓ carbon monoxide
 - ✓ succinylcholine (paralytic drug)
- All findings confirmed at independent referral labs

Rare Causes of Death Excluded

- Radiation poisoning
(excluded by Geiger counter testing)
- Ricin and Anthrax poisoning
(excluded by absence of microscopic changes)
- Thallium poisoning
(excluded by symptoms, toxicology,
& microscopic findings)

Evaluation for Sepsis

- Bacteria were isolated from buttocks abscesses (described above)
- These abscess bacteria were not present in blood, probably due to partial sensitivity to the antibiotic Cipro
- Terminal inhalation of oral cavity bacteria into lungs (but no vomit in airways or lungs)
- Blood, cerebrospinal fluid, urine cultures: no pathogenic organisms; mild growth of contaminants
- Elevated levels of interleukins 6 and 8 (pro-inflammatory agents) that indicate an acute inflammatory response, possibly infection
- No endotoxins detected

Additional Test Results Received

- Heavy metals: negative
- Insulin and C-peptide: within normal limits
- Cipro (ciprofloxacin) antibiotic level: therapeutic
- Human Growth Hormone: non-contributory
- Serum anti-nuclear antibodies: mildly elevated but double stranded DNA was negative
- Liver function tests: postmortem artifactual elevation of liver enzymes

Stool Cultures

- Negative for *Salmonella*, *Shigella*, *Campylobacter*, virulent *E. Coli* species
- Initial viral studies isolated *Norwalk* virus by screening assay
- A specific *Norwalk* virus could not be confirmed by PCR studies at referral lab or CDC

Possible Causes of Death as of 2/19/07

- Sepsis due to deep soft tissue abscesses due to multiple cutaneous injections
- Viral enteritis
- Likely manner of death: Natural
- No significant contribution by therapeutic levels of medications
- Additional laboratory tests (microbiological, toxicological) still pending

Additional Test Results Received

- Immunoglobulins, complement C3, and serology: no evidence of immunodeficiency
- Special stains of spleen showed aberrant staining of B-lymphocytes (may be seen in some autoimmune states)
- **Chloral hydrate blood level: markedly elevated (toxic to lethal level)**

Chloral Hydrate

- Sedative/hypnotic drug used as sleeping medication
- Available as an elixir (liquid), capsules, suppositories
- Normal liquid dosage: 1-2 teaspoons before bed
- Total daily dosage should not exceed 2 grams (4 teaspoons)
- Side effects: confusion, hallucinations, diarrhea, nausea, stomach pain, and vomiting

Chloral Hydrate Toxicity

- Symptoms include extreme weakness, confusion, seizures, extreme drowsiness, low body temperature, staggering, changes in heart rate, and breathing problems
- Toxic blood levels: 20 to 240mg/L
- Fatalities reported at blood levels of: > 29mg/L
- Anna Nicole Smith's blood level: 75mg/L
- May interact with diphenhydramine, anti-anxiety drugs, sedatives, tranquilizers, alcohol, narcotic pain relievers

Probable Cause of Death as of 3/2/07

- Acute combined drug intoxication (chloral hydrate and therapeutic levels of other drugs)
- Contributory:
 - Bacterial infection (abscesses)
 - Mild viral enteritis (intestinal infection)
- Manner of death: ?
- Additional confirmatory testing and consultants reports pending

Week of March 5-9, 2007

- Additional test results received:
Non-contributory
- Consultants' findings discussed:
No surprises
- Interviews with involved parties concluded
- All data synthesized

Weeks of March 10-23

- Follow-up on additional evidence with potential impact on manner of death
- Forensic examination of two computers confirmed intense grieving over Daniel's death but showed that her mood had improved, she was generally enjoying life, and that she was planning on having another child
- Investigation completed
- Final reports generated

Final Cause of Death

- **PRIMARY:**
Acute combined drug intoxication due to
 - ingestion of multiple prescription medications
- **CONTRIBUTORY:**
Bacterial infection (abscesses), Mild viral enteritis, “Flu”
- **HOW INJURY OCCURRED:**
Ingested excessive chloral hydrate in combination with therapeutic levels of other medications

Manner of Death

- Determined by correlation of autopsy findings, adjunctive studies, and circumstances leading to death
- Alternatives:
 - Homicide
 - Suicide
 - Accident
 - Natural
 - Undetermined

Determining Manner of Death in Cases of Drug Intoxication

- Personality traits
- Recent behavior
- Long term behavior including suicide attempts
- Habits of drug use & abuse
- Levels, types, and lethality of drugs in blood
- Ratio of parent drugs to breakdown products, (*i.e.*, taking one massive dose or a little too much over time)
- Presence of pills or liquids in stomach
- Evidence of another individual administering drugs to a person (*e.g.*, forced ingestion, assisted suicide)

Personality Traits of Anna Nicole Smith

- Strong personality
- Endured many difficult life experiences
- Solid business woman
- Could be domineering
- Tendency toward histrionic, attention-getting behavior
- Drug-seeking behavior and long history of prescription drug use including over self-medication
- Obsession with Marilyn Monroe (which was waning somewhat)

Possible Future Plans of Anna Nicole Smith

- Considering having another baby
- Considering marriage in late February 2007
- Planning new business ventures
- Trip to Dubai in March

The Argument for Accident

The Argument for Accident

In most cases of suicide, the victim ingests a large amount of a drug to ensure death. In this case, the toxic blood level of chloral hydrate could be fatal in and of itself but not necessarily so. However, it is definitely lethal in combination with other drugs which were present at therapeutic levels.

The Argument for Accident

In many cases of prescription drug overdose, multiple drug levels are significantly elevated.

In this case, all drugs except chloral hydrate were at therapeutic levels.

The Argument for Accident

Reports of suicidal ideation were not substantiated after mid-October 2006.

Religious upbringing and ideology prohibit suicide.

The Argument for Accident

A near drowning episode in a pool several months prior to death appears to have followed an accidental drug overdose rather than a suicidal act.

Indeed, she thanked the individual who had resuscitated her rather than being angry at him.

The Argument for Accident

Miss Smith had a long history of prescription drug use and over-self medicating. She may have drank a little too much chloral hydrate to alleviate symptoms which were secondary to infection.

The Argument for Accident

Miss Smith was likely not aware of the risks of using multiple drugs while in a physically vulnerable state consequent to her infections.

The Argument for Accident

Miss Smith had just had a baby and, by some accounts, was often in good spirits. There was no evidence of depression on the way to Florida from the Bahamas or during her stay in Fort Lauderdale.

The Argument for Accident

There was no suicide note (though these are absent in many suicides).

No statements expressing suicidal intent after mid-October 2006 were uncovered.

Suicidal ideation was absent in emails posted after mid-October 2006.

The investigation suggests she was making definitive plans for her immediate future.

The Argument for Accident

Anna Nicole Smith was a very strong woman. Having survived the death of her son, it seems unlikely that she would choose to end her life because of her current legal problems.

The Argument for Suicide

The Argument for Suicide

Most close friends state that Miss Smith was devastated by the death of her son, Daniel, in September 2006.

She exhibited many symptoms of clinical depression.

The Argument for Suicide

Though it is unclear, Miss Smith may have threatened to kill herself after Daniel's death, and possibly even attempted to do so by drowning in October 2006 (though this was more likely an accident).

The Argument for Suicide

Her depression over the loss of her son occurred shortly after the delivery of her infant daughter by Caesarean section.

This is a very critical time in which many women are predisposed to endogenous depression, so-called postpartum depression.

The Argument for Suicide

Several months prior to her death, Miss Smith bought 4 plots in a Bahamian cemetery and had possibly commissioned a dress for her funeral.

The Argument for Suicide

There were several additional significant life stressors in play at the time of her death. She was involved in 4 lawsuits, the last of which was filed a week prior to her death.

The Argument for Suicide

By report, Miss Smith did not appear to be intoxicated when she was last seen alive. This suggests that she took a significant dose of chloral hydrate within a few hours of her death.

The Argument for Suicide

The ratio of chloral hydrate metabolites in the blood suggests ingestion of a significant quantity of the parent drug in the hours prior to death (though not minutes before death).

The Argument for Suicide

Miss Smith suffered from soft tissue abscesses and viral enteritis at the time of death. Some of the chemical mediators produced by the body in response to infection are also elevated in depression.

The Argument for Suicide

Miss Smith suffered from chronic pain and Hashimoto thyroiditis (chronic inflammation of the thyroid), both of which are associated with depression.

The Argument for Suicide

Miss Smith had stated a while ago that she wished to die in the same fashion as her idol, Marilyn Monroe, who died by suicide.

Of note, Marilyn Monroe employed chloral hydrate (in combination with a barbiturate) in her highly publicized death.

The Argument Against Homicide

The Argument Against Homicide

Given the level of the chloral hydrate in Miss Smith's blood, someone would have had to either force-feed her or have her voluntarily ingest a large amount of liquid chloral hydrate under duress.

The Argument Against Homicide

Given the therapeutic levels of the other drugs in her system, Miss Smith may have been somewhat impaired but should have been capable of resisting attempts at forced feeding.

The Argument Against Homicide

There was no oral trauma to suggest forced feeding.

The Argument Against Homicide

Chloral hydrate has a very unpleasant, harsh taste which should be easily detectable if an attempt was made to “slip it” into a beverage.

The Argument Against Homicide

There were no other significant injuries.

The Argument Against Homicide

There is no evidence at present to suggest that another individual provided Miss Smith with drugs to actively assist her in taking her own life.

The Argument Against Homicide

One could speculate that Miss Smith was cognitively impaired due to her infections and use of benzodiazepines and that this rendered her susceptible to homicidal poisoning. However this would represent mere speculation that is not supported by the evidence gathered during this investigation.

The Argument Against Homicide

A police investigation was completed and found no evidence of foul play.

The Manner of Death

- Compelling arguments can be made for Accident
- Suicide is less likely
- Homicide is not supported by the police investigation or our findings
- Natural is not an option since death was caused by drug intoxication, not a natural disease process

Undetermined Manner of Death?

- The classification “Undetermined” is used when the information pointing to one manner of death is no more compelling than one or more other competing manners of death in thorough consideration of all available information.

Hazlick *et al.* A Guide for Manner of Death Classification,
1st Edition, National Association of Medical Examiners

**The Manner of Death in this case is
ACCIDENT.**

**The evidence for Accident is more
convincing than all other options
(including suicide and homicide).**

Conclusion

PRIMARY CAUSE OF DEATH:

Acute Combined Drug Intoxication (primarily chloral hydrate with other prescription medications) due to ingestion of multiple prescription medications

CONTRIBUTORY TO DEATH:

Bacterial Infection (Abscesses), mild viral enteritis, “Flu”

MANNER OF DEATH:

Accident

HOW INJURY OCCURRED:

Ingested excessive chloral hydrate while taking multiple prescription medications