



**KENTUCKY REGIONAL POISON CENTER**  
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Dear Mr. Melikian:

I understand the final autopsy for Ms. Linda Adanalian has been submitted with the cause of death listed as selenium toxicity. I have previously reviewed the hospital records of Ms Adanalian from May 1999 and February 2000, autopsy results and the post mortem tissue sample results. You may be aware of my opinion that this is a case of acute selenium toxicity. I agree with and support the opinion of Dr. Cyril Wecht, that this case requires a law enforcement investigation. Selenium is an uncommon toxin. Therefore there are a number of issues related to selenium and this case that are not well known outside the expert community. I will address a number of these issues in the following paragraphs.

1. This was an acute event, not a chronic event.

Explanation:

Acute selenium toxicity is characterized by nausea, vomiting, diarrhea and cardiovascular collapse. Chronic selenium toxicity produces a spectrum of symptoms separate and different from acute selenium poisoning. An example of symptoms related to chronic toxicity would be prominent and often complete alopecia (hair loss), transverse ridges on the fingernails progressing to complete finger nail loss, fatigue, sour milk or garlicky odor to the breath, chronic diarrhea and abdominal pain. There was no evidence prior to death or on autopsy of alopecia or changes in fingernails in Ms Adanalian. Please refer to my opinion on the cause of death of Ms Adanalian for further details on this subject

2. The dose required to produce the symptoms experienced by Ms Adanalian was very large. This was not a case of an accidental ingestion of a few "extra" dietary supplements.

Explanation:

Generally speaking selenium supplements come in the 5 to 200 microgram range. To ingest a dose large enough to approach the LD50 in experimental animals Ms Adanalian would have had to ingest in excess of 1,390 of the larger 200 microgram tablets. It is beyond the possible for her to have "accidentally" ingested an extra 1,390 pills.

3. Once accidental ingestion is ruled out, intentional exposure must be considered.

Comment:

Suicide is unlikely as there is no past history of suicide attempts, no psychiatric history suggesting severe depression or attempts at self harm and no reports from family, friends



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or Ms Adanalian's primary care physician suggesting such. Additionally Ms Adanalian's actions on her final day do not fit those of a suicide attempt. I am the Director of a Regional Poison Center that handles more than 4,000 suicide attempts per year. I have personally been involved in managing more than 20,000 cases of suicide attempts by poisoning. When a patient initiates a call for help (in Ms Adanalian's case a call to 911) the suicide attempt victim has made a decision that they now want to live. They, at this point, become forthcoming with details to the healthcare workers (EMTs/paramedics, Emergency room staff, etc) that will help save them, such as the fact they have taken an overdose, what the substance may have been, etc. Yet Ms Adanalian's actions on that last day reflected fear and confusion as to what was happening to her. There was never any suggestion in her history or that of any other person present that an intentional suicide attempt had occurred.

4. Murder or attempted murder by poison is well documented. There are a number of similarities to this case that fit a pattern displayed in previously published cases.

Comment:

Attempted murder by selenium has previously been reported (Ruta DA, et al). One of the similarities with Ms Adanalian's case and the case presented by Dr. Ruta is the multiple episodes of illness associated with symptoms of selenium poisoning. Ms Adanalian's earlier hospitalization of May 1999 presents symptoms consistent with selenium poisoning but with a sub-lethal dose (persistent vomiting and diarrhea, hypotension and persistent weakness). A review of Dr. Chooljian's observation note from the May 1999 hospital admission reveals Ms. Adanalian had her first episode of severe vomiting, diarrhea and weakness about 10 days prior to the hospitalization and that appeared to resolve after a few days. However within several days of the first episode a second episode occurred with symptoms severe enough to cause Dr Chooljian to admit her to the hospital. This would suggest a second dose had been administered after the first had failed to produce death. As with the case presented by Ruta, et al, no specific cause of the illness could be located and the symptoms resolved without specific therapy, essentially because the victim was removed from any further doses of the poison. It is not uncommon for a first time poisoner to be uncertain of the dose necessary to effect a fatal outcome. (Ruta DA, et al, Fernando R). In many cases with first time poisoners, a number of attempts are made, in some cases with repeated hospitalizations of the patient. (Fernando R) This is primarily because the poisoner is unsure what dose is necessary and at the same time is fearful of being discovered by the victim if the poison is noticed by taste or odor or other physical property. (Westveer AE, et al)

5. What selenium species would be used?

Comment:

Selenium toxicity is partially dependent on the chemical state of the selenium. Selenite is more toxic than selenate, which is more toxic than selenide. This definition is based on the oxidation state of the selenium ion: Selenide (-2), selenite (-4) and Selenate (-6). Selenite is readily available as sodium selenite, selenium dioxide and selenious acid; selenate is available as sodium selenate and selenic acid. These are all water-soluble and can be added to food or drinks. The most toxic are the selenites and all are readily available, but selenates are nearly as toxic.

6. Where would you find these?

Comment:

Selenium is not a controlled substance and purchase would not be difficult. Selenium as selenious acid could be easily purchased as a gun blueing solution at any gun store or at many large stores that offer sports sections such as Wal-Mart. Gun blueing solution is used by gun enthusiasts to create the blue sheen on their chrome/steel guns. Additionally selenium is easily available by suppliers of selenium for the health supplement industry. I have located a number of Internet sites that allow purchase of concentrated forms. There is no special license or certification required to make such a purchase. Selenium is used in: veterinary medicine, the pharmaceutical industry, vitamin/mineral supplement manufacture, as a supplement to animal food, glass manufacture (red pigment), anti-dandruff shampoos, a soil additive for selenium deficient areas, ceramic finishes, photocopy drum manufacture, and semi conductor manufacture.

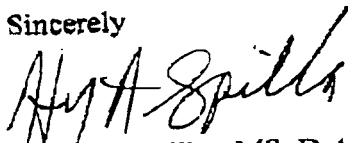
7. How would this be concealed in food? It would not be difficult, if obtained in a concentrated form.

Comment:

The amount of selenium needed to poison Ms Adanalian, if purchased in a concentrated state, would not be great. It would require perhaps 250 to 300 mg of selenium. For instance using the easily available gun blueing solution (9.3% selenious acid) it would require only 2 1/2 to 3 milliliters (half a teaspoon). In fact in the case reported by Ruta, et al, the poisoner (a girlfriend) had purchased gun blueing as the source of selenium. If a more concentrated solution were obtained from a pharmaceutical supply it would require less volume, such as one to two drops. This could easily be concealed in a food or a beverage as most selenite and selenate species are soluble in water. An example might be coffee as was reported in the case by Iwersen-Bergmann, et al. Coffee's somewhat bitter taste provides an excellent medium to cover foreign substances. Coffee, especially if sweetened and/or buffered with sugar and/or cream, would effectively cover the taste of a substance such as selenium, if added in small quantities.

In summary, the evidence indicates Linda Adanalian was administered a fatal dose of selenium, without her knowledge. This case requires a law enforcement investigation. After more than 18 months since her death, it is long overdue. Please let me know if I can be of further assistance in this matter.

Sincerely



Henry A. Spiller, MS, D.ABAT, D.ABFE

References

Ruta DA, Haider S. Attempted murder by selenium poisoning. Brit Med J 1989;299:316-317

Fernando R. Homicidal poisoning with glibenclamide. Med Sci Law 1999;39:354-358

Iwersen-Bergmann S, Schmoldt A. Acute intoxication with aniline: detection of acetaminophen as aniline metabolite. Int J Legal Med 2000;113:171-174

Westveer AE, Trestrail JH 3<sup>rd</sup>, Pinizzotto AJ. Homicidal poisoning in the United States: an analysis of the uniform crime reports from 1980 through 1989. Amer J Forensic Med Pathol 1996;17:282-288