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LETHAL POISONING FROM OLEANDER

Introduction

Oleander (*Nerium oleander*), an evergreen shrub or small tree in the Dogbane family Apocynaceae, is widely cultivated as ornamental shrubs or hedges, but it's one of the most poisonous plants known, because of the presence of cardioactive glycosides in every part of the plant whose chemical structure is similar to those of digoxin. Despite its toxicity, Oleander has been used in the past for manufacturing herbal medicaments for the treatment of many different diseases (leprosy, malaria, ringworm, venereal infections).

Poisoning from Oleander are not common but a variety of cases are described in world literature, most of all referring to accidental ingestion, but in some instances concerning suicidal or homicidal purposes.

Case report

In December 2004, the bodies of two young people, one male and one female, were found in a pine forest near Cecina (Tuscany).

They were lying as asleep on the floor of a forester's storehouse, dressed with shabby clothes, very light for wintery season (Fig. 1,2). They had neither documents of identification nor money and there was no food near the bodies, but only a half-fully bottle of water.

The preliminary examination of the two cadavers showed no signs of traumatic injuries and there was no evidence of the previous presence of other persons on the scene; from the thanatologic data it was supposed that the death had occurred about two-three days before the discovery.

At autopsy the most important element was represented by the condition of extreme malnutrition and physical debilitation of both of them: the man was 171 cm high and weighed 37,5 Kg, the woman was 170 cm high and weighed 38 Kg (Fig. 3,4).

The autopsy confirmed the absence of traumatic injuries and didn't reveal significant disease. Vegetal remains, (leaf-like and fibres) were found in the stomach of both the

cadavers; in the male cadaver stomach content was dark-bloodish and semi liquid, while in the female it was brownish and liquid. It was also observed hemorrhagic pancreatitis, more severe in the male.

The circumstances of death obviously excluded the possibility of a death from natural causes and suggested that it was due to external factors, physical or toxic.

The preliminary hypothesis was about a perfrigeration-related death, considering the low winter temperature, the light clothes and the severe physical debilitation, but it was not fully credible because of the contemporaneity of deaths and the fact that the deceased have not made any attempt to protect themselves from cold, so that forensic investigation focused on toxic causes.

Materials and method

Toxicological analysis, performed with a ThermoElectron gas-chromatograph (GC) coupled to PolarisQ mass-spectrometer (MS), resulted negative for traditional drugs and many other chemical compounds.

A further hypothesis concerned the possibility of an intoxication from Oleander, a plant very common nearby the pine-forest where the bodies were found, so laboratory analysis was performed aimed at the detection of Digoxin in the blood, which cross-reacts with the molecule of Oleandrine in radioimmunoassay1. The test, performed with F. P.I.A. TDX Abbot® System resulted positive results for both the cadavers (1,4 ng/ml for the man, 0,7 ng/ml for the woman).

Discussion

The presence of Digoxin in the blood of both the cadavers had no other reasonable explanation other than that it was due to ingestion of Oleander. Some Authors (2,3,4) suggest the possibility of mistakes in blood-level post-mortem investigation of Digoxin due to the presence of endogenous compounds classified as Digoxin-Like Immunoreactive Substances (DLIS), which can be significantly elevated in specific clinical conditions. However these substances are not detectable with the method utilized in our case, confirming the exogenous provenience of Digoxin in blood.

Human intoxication from Oleander can occur via accidental exposure, ingestion by children, purposeful administration in food or drink, medicinal herbal products and criminal poisoning. The review of international literature points out that human intoxication from Oleander are not very common but, on the other hand, neither extremely rare (5): in U.S.A. Poison Control Centers listed 633 cases in 1988 (6). In Australia 27% of plant poisoning involve Oleander (7) while deliberate ingestion of Oleander seeds is a popular method of suicide in Sri Lanka (8).

All parts of the plants are poisonous due to the presence of Oleandrine, a toxic glycosides that can cause multiple arrhythmias as A-V blocks, bradicardia, ventricular excitability. It may cause also gastrointestinal symptoms as diarrhea, vomiting, gastric or intestinal hemorrhages (9). The mechanism of cardiovascular activity of Oleandrine

consists in inhibiting the activity of Na+ – K+ – ATPases that results in increasing intracellular Ca++, responsible of inotropic effect (10).

Reviewing world literature, it is possible to find also strange ways of intoxication from Oleander

a) two subjects (a female aged 43 and a male aged 66) presented gastrointestinal and cardiovascular symptoms (similar to those observed after acute digoxin intoxication) 8-10 hour after eating a meal which included escargot stew; the patients had found the snails near a Nerium Oleander plant in their garden and toxicological analisys showed significant level of digoxin in their blood and in snails tissue (11);
b) a 59-year-old man was admitted as a medical emergency for a severe degree of pulse rate (26/min) and AV block after having treated his psoriasis using a homemade lotion of Nerium Oleander blooms and leaves (12);
c) a 49-year-old man with known history of diabetes mellitum was admitted to the hospital with digoxin-like toxicity and died a few hours later; his wife referred that he had drunk an infusion of leaves provided from unknown person, which contained extract from Oleander (13).

Referring to our case, it's to notice that the identity of the two young people remained unknown, despite the efforts of Italian Police and Interpool, until 2008, when a married couple of Belgium recognized the daughter in a photo of the cadavers shown on television broadcast dedicated to missing persons. They told us that her daughter ran away from home in June 2004 with her friend, who belonged to Vegan movement, whose affiliated, for various reasons, choose to avoid using or consuming animal products, not only flesh foods, but also dairy and eggs, as well as fur, leather, wool, down, and cosmetics or chemical products tested on animals and they try to live exploiting the product of nature that they can find during their wandering.

This information reinforces the hypothesis that the two young has fed with vegetables, as confirmed also by the gastric contents, inadvertently eating Oleander that has caused their death.

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Figure – 1

Figure – 2

Figure – 3

Figure – 4