

# Suicide Attempt by Subcutaneous Injection of Cyanide: A Case Report

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## ABSTRACT

Suicide attempt by subcutaneous injection of cyanide: a case report

Cyanide is a powerful poison which cause inhibition of mitochondrial cytochrome oxidase system. Cyanide poisoning can present in a wide variety of forms such as inhalation, ingestion or injection. Dermal exposure is rare, very few case reports have been reported about cyanide. In this paper, we present an uncommon case of a suicide attempt with cyanide injection. A 91 year old man with a history of depression admitted to the emergency department after injected cyanide to himself subcutaneously. He was diagnosed with depressive disorder and hospitalized after psychiatric assessment. The psychiatric history of this patient suggests that depression in elderly can give way to serious suicides attempts. Psychiatrists interested in treatment of elderly depressed patients should do careful monitoring about suicide.

**Key words:** Cyanide, depression, suicide



## ÖZET

Subkutan siyanür enjeksiyonu ile özyıkım girişimi: Bir olgu sunumu

Siyanür mitokondrial sitokrom oksidaz sisteminin inhibisyonuna yol açan güçlü bir zehirdir. Siyanür zehirlenmesi solunum, sindirim veya enjeksiyon gibi çok çeşitli yollarla ortaya çıkabilir. Cilt maruziyeti çok seyrek ve siyanürle ilgili çok az sayıda olgu bildirimini yayınlanmıştır. Bu yazımızda siyanür enjeksiyonu ile nadir görülen bir özyıkım girişimi olgusu sunuyoruz. Depresif bozukluk öyküsü olan 91 yaşında yaşlı bir erkek kendine siyanür enjekte ettikten sonra acil servise başvurdu. Psikiyatrik değerlendirme sonucunda depresif bozukluk tanısı konuldu ve hastaneye yatırıldı. Hastanın psikiyatrik öyküsü, yaşlılarda görülen depresif bozukluğun ciddi özyıkım girişimlerine yol açabileceğini işaret etmektedir. Yaşlılarda depresyon tedavisiyle ilgilenen klinisyenlerin özyıkım açısından dikkatli izlem yapmaları gerektiğini önermekteyiz.

**Anahtar kelimeler:** Siyanür, depresyon, özyıkım

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## INTRODUCTION

Suicidal behavior is described as an attitude for death in the dilemma between life and death. Suicide attempts take place in a broad spectrum involving a help message from people to definite decision to die. These behaviors may reflect a sudden decision or a well-thought, long-term plan. Rate of fatality depends on aim, preparation of the selected method, knowledge of the individual of suicide method, his/her expectations and sometimes other factors like intervention of other people (1).

Suicide attempts involving rarely used and complex methods are particularly important to differentiate suicide and homicide (2). Suicide attempts with

dangerous drugs, organic phosphorus, corrosive materials, hanging, fire-arms, jumping and sharp objects are considered to be serious (3). Suicide by cyanide ingestion may also be included in this group. Cyanide, which is also named as hydrocyanic acid or prussic acid, can be found in the nature free or in compounds such as sodium cyanide, potassium cyanide and hydrogen cyanide. Cyanide has been used extensively in industry, including metal electroplating, photography, jewellery making and plastic industry. Another source of cyanide is a glycoside named "amygdalin", which can be isolated from fruit seeds (peach, apricot, cherry, plum, etc.) (4).

In this article, we presented a subject who attempted suicide by subcutaneous cyanide injection, a rarely used method.

## CASE

Ninety-one years old male patient was evaluated at emergency service for suicide attempt. He tried to inject potassium cyanide, which he used for development of photographic films, into his left forearm vein, almost 24 hours ago. A subcutaneous mass formed after a few hours of the attempt and he applied to emergency service. The interview revealed that he had loneliness, unhappiness, pessimism, losing interest, and ideas of death for the last two years. The patient was hospitalized with depressive disorder diagnosis.

In mental status examination, external appearance was consistent with his age and socioeconomic status. His associations were slowed. Thought content included worthlessness, such as being a burden due to his age and illness, and suicidal thoughts. His affect was dysphoric. Orientation to person, place and time were intact. Physical examination revealed normal body temperature, pulse and blood pressure levels. He had bilateral blurred vision. There was a necrotic hemorrhagic tissue, 3 cm x 5 cm wide at the inside of his left forearm. Patient was under regular follow-up for 5 years for advanced stage prostate cancer and he was taking leuprorelin 11.25mg (once in three months) and terazosin 5mg/day.

Clinic follow-up of late stage neurological, respiratory and cardiac effects of poisoning was planned. During hospitalization, vital signs (body temperature, pulse, blood pressure, respiration) were within normal limits, but liver enzymes were mildly elevated in the first three days. Beck depression inventory score was 29 and Hamilton depression score was 17. Mirtazapine 15mg/day was initiated at the fourth day of hospitalization and it was increased to 30mg/day. Mini-mental test score was 29. Cerebral computed tomography scan taken in emergency service was within normal limits. Dementia was ruled-out with history and examinations. In the interviews, the subject stated that he was a retired electrical engineer, he was living alone in the last two years due to family problems, he lost his closest friend three months ago and that his complaints increased after these events. He was not meeting with anyone from his family in the last one and

a half years, and he told that he was a “useless man, a burden to the state” since he was old, ill and had cancer. He told that he planned this suicide attempt for a long time and searched for a suitable method. He was engaged in photography, he knew about harms of cyanide and he chose injection to prevent harm to officers during postmortem procedures. He told that he also left a warning message on the subject. Dermatology clinic followed-up the patient for the necrotizing lesion on his forearm. MMPI sub-threshold evaluation revealed obsessive personality features. His preparations before suicide attempt, such as his burial place, distribution of his assets and detailed suicide note supported these features. His depressive complaints decreased at the second week of hospitalization. He stated that he was content with the interest of clinic staff and patients and he thought his improvement was due to this interest. No relatives or friends visited him during his hospitalization. The patient decided to move to a nursing home with support of the social worker since his social support was insufficient. He stated that his “loneliness” will decrease that way. His Hamilton depression score was 3 and Beck Depression Inventory score was 9. He was discharged from the hospital in the second week since his clinical condition improved. Euthymic state of the patient persisted during outpatient follow-ups.

## DISCUSSION

Cyanide is a fast acting poison. It has toxic effects by impairing cytochrome oxidase system. Oxygen can reach tissue normally but it cannot be used and this cause histotoxic hypoxia (5). This leads to metabolic acidosis with increased anion gap and normal PaO<sub>2</sub> level. Onset of clinical symptoms in acute poisoning depends on cyanide type, concentration, and route of intake (4). Oxygen sensitive tissues, brain and heart, are affected most rapidly and extensively (5). Cyanide leads to death by decreased cardiac contraction, cardiogenic shock and respiratory depression (4,5).

Cases reported in the literature usually involve intake of cyanide by inhalation and per oral (6-9). Cyanide injection is quite rare (5). Our case stated that

he selected this method in order not to harm other people since oral intake would harm them when they touched him.

Physical conditions, disposition of the subject to select a violent death and seriousness of suicidal ideations play a role on the selection of suicide method. The most frequent suicide method is drug ingestion (72%), however most of the completed suicides involve use of firearms (70%) (1). Hanging is the most common suicide method in completed suicides in Turkey (10). A previous study reported that 19% of males and 15% females poison themselves with pesticides, herbicides or other toxic chemicals. Older men reported to prefer jumping from high places or in front of a moving motor vehicle (1).

Suicide attempt is a process in which cultural, social and demographical features play a role. Sadness, dysphoria, loss of interest and hopelessness are important factors which build suicide. It has been known that hopelessness is more important than depression to determine the seriousness of suicide attempt and suicidal behaviors (11). In elderly, risk factor for suicide are different from young adults; loss of a loved one, presence of physical illness, impaired health, uncontrolled pain and chronic disorders, social isolation and loneliness, prominent changes in social life and frequently undiagnosed depression increase suicidal tendencies (12). In our case, there were various risk factors, such as advanced age, advanced stage prostate cancer, loneliness and insufficient social

support. It can be suggested that all these factors were effective on potentially fatal suicide attempt like cyanide injection. Supporting this suggestion, it has been reported in the literature that physical illnesses which lead to serious disability in older men, is a very important risk factor for suicide, particularly when depressive symptoms are also present. Risk of death in suicide attempt changes with seriousness of intention to die, severity of injury and how fast the method leads to death (13). From this perspective, the seriousness of the suicide attempt of our patient was obvious. Our case attempted suicide in an "egoistic" manner, not depending on the control and thoughts of other people.

From a diagnostic point of view, the subject had major depression developed on a dysthymic background. Long-term and careful planning of the attempt indicated that it was not impulsive. It was quite interesting that improvement of depressive complaints of the patient began before antidepressant medication was initiated. Supportive attitudes and positive interaction was very important to decrease feelings of hopelessness and for clinical improvement. Sessions with the patient aimed to improve coping and problem solving skills. His decision to move to a nursing home to deal with loneliness was an example of problem solving.

In conclusion, our case is important to draw attention to suicide risk and lethal methods of suicide in the elderly.

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