

# Case Series About Atropa Belladonna (Deadly Nightshade) Intoxication and Experience of Physostigmine

✉ Burak Hasgül<sup>1</sup>, ✉ Merve Çatak<sup>2</sup>, ✉ Arif İsmet Çatak<sup>3</sup>, ✉ Serhat Karaman<sup>1</sup>

<sup>1</sup>Tokat Gaziosmanpaşa University, Department of Emergency Medicine, Tokat, Turkey

<sup>2</sup>Tokat Gaziosmanpaşa University, Department of Internal Medicine, Tokat, Turkey.

<sup>3</sup>Tokat Gaziosmanpaşa University, Department of Pediatrics, Tokat, Turkey

## Abstract

Atropa belladonna (deadly nightshade) is a poisonous herb that can be especially seen in Northern regions of our country and cause anticholinergic toxic syndrome (ATS) when consumed. ATS can be seen when consuming the plant which contains atropine or in overdose of psychoactive drugs containing atropine (such as antipsychotics, tricyclic antidepressants). A 65-year-old female patient was admitted to emergency service with the clinic of agitation, speech disorder and consciousness change. It was learned that she consumed atropa belladonna fruits about an hour ago. She was followed up with the diagnosis of ATS and treated with conservative approach. A 58-year-old male patient was admitted to the emergency service due to impaired consciousness, agitation, difficulty in speaking, vomiting and fever. He also ate the same fruits with his relative, case 1. He also followed up with a diagnosis of ATS and treated with both conservative approach and physostigmine. Consuming atropa belladonna fruits and leaves can lead to ATS and life-threatening consequences can be seen in severe toxicity. Early diagnosis and treatment are important in prognosis. Physostigmine must be kept in mind in cases who does not benefit from conservative approach.

**Key Words:** atropa belladonna intoxication, anticholinergic syndrome, physostigmine

## Introduction

Atropa belladonna is a herb which is a member of Solanaceae family and also called 'deadly nightshade'. The leaves of this herb are green, the fruits are small, shiny, round, sweet and black in color (Fig. 1). Intoxication can occur when consuming the fruits, leaves or root of the Atropa belladonna plant. The fruit and leaves of the plant contain high levels of atropine, scopolamine and hyoscyamine alkaloids<sup>1-3</sup>. People generally consume the fruit of the plant because they do not know that it is poisonous but sometimes they think consuming will be good for their underlying chronic diseases, especially diabetes mellitus. In mild intoxication cases; nausea, vomiting and dizziness can be seen but; impaired consciousness, fever, flashing, mydriasis, dry skin and mucous membranes, tachycardia, ileus, urinary retention, muscle fasciculations, dysarthria and visual hallucinations can be seen in severe cases.

## Case Report

*Case-1:* A 65-year-old female patient was referred to us from a district state hospital with the clinic of agitation, speech disorder and consciousness change. It was learned that; the patient ate 5 or 6 fruits of Atropa belladonna plant 8 hours ago for treatment of her existing chronic disease, dia-

betes mellitus. The patient had complaints of dry mouth and dyspnea about half an hour after eating the fruit. Afterwards, when she had meaningless speech and difficulty in speaking, she applied to the state hospital. Her blood pressure was 120/90 mmHg, body temperature was 36 °C and peripheral oxygen saturation was %93 at the hospital admission. Her level of consciousness was confused, her Glasgow Coma Scale (GCS) score was 15, her pupils were dilated and bilateral pupillary light reflex were positive (Fig.2). The remaining system examinations were evaluated as normal. The patient was referred to our hospital with a initial diagnosis of cerebrovascular disease. At the time of admission to our hospital; her GCS score was 15, blood pressure was 155/97 mm/Hg, heart rate was 107 beats per min, and peripheral oxygen saturation was 97. The patient had a history of diabetes mellitus, hypertension, asthma and panic attacks. She had difficulty in speaking, amnesia and visual hallucinations. Her pupils were mydriatic and oral mucosa was dehydrated and hyperemic. Other system examinations were normal. Normal sinus rhythm was detected on electrocardiogram (ECG) and heart rate was 99 per min. There was no abnormality in the complete blood count and biochemical blood tests. Cranial tomography and diffusion magnetic resonance imaging (MRI) were performed to rule out cranial pathologies and no immediate pathological image was detected. The patient was admitted to the emergency department intensive care unit with the diagnosis of Atropa belladonna

**Corresponding Author:** Burak Hasgül **e-mail:** hasgul\_burak@hotmail.com

**Received:** 21.09.2021 • **Accepted:** 29.11.2021

**DOI:** 10.33706/jemcr.998002

©Copyright 2020 by Emergency Physicians Association of Turkey - Available online at [www.jemcr.com](http://www.jemcr.com)

**Cite this article as:** Hasgul B, Catak M, Catak AI, Karaman S. Case series about atropa belladonna (deadly nightshade) intoxication and experience of physostigmin. Journal of Emergency Medicine Case Reports. 2022;13(1): 25-28

intoxication. Conservative treatment was initiated. On the second day of follow-up, difficulty in speaking and dryness of oral mucosa disappeared, but visual hallucinations continued. On the third day her hallucinations also disappeared. No pathological finding was found in her physical examination and laboratory tests and the patient was discharged with full recovery on the third day. Since the patient's complaints decreased with a conservative approach after her arrival; physostigmine was not considered in the treatment.



**Figure 1:** Atropa belladonna plant and fruit photo was taken by the patient's relatives. (Permission was obtained from the patients for the photograph).

*Case-2:* A 58-year-old male patient was admitted to the district state hospital due to impaired consciousness, agitation, difficulty in speaking, vomiting and fever. It is learned that he ate 6 or 7 fruits of atropa belladonna about 8 hours ago, because he had thought it would be good for his current disease; diabetes mellitus. He had dryness in his mouth one hour after eating. In the next few hours, hot flashes, gibberish, and agitation developed. He was referred to our hospital for further research since his complaints did not resolve. His blood pressure was 115/60 mmHg, heart rate was 105 beats per min and body temperature was 37.5 °C at the time of admission to our hospital. He was disoriented and cooperation was difficult because of his rapid and meaningless speech. He had dry and sticky oral mucous membranes. His GCS score was 14 and he had severe agitation and visual hallucinations. Pupillary light reflexes were bilateral positive and pupils were mydriatic (Fig.2). His motor system examination and reflexes were normal. Abdominal examination was normal and there was no sign of urinary retention. He had sinus tachycardia during first minutes of follow-up (115-120 beats per min). Leucocyte count was 15,820 cells per microliter. Biochemical blood tests were normal. Cranial tomography and diffusion MRI were performed to rule out cranial pathologies and no immediate pathological image was detected. The patient was admitted to the emergency department intensive care unit with the diagnosis of Atropa belladonna intoxication. 5 mg diazepam infusion was administered and 5 mg haloperidol tablet was given to control the patient's agitation. Intravenous (IV) midazolam is also administered intermittently for this purpose. Despite all these conservative medication; patient's hallucinations, difficulty in speaking and agitation continued, 2 mg physostigmine was administered intravenously. A significant improvement in neurological findings was observed half an hour after the treatment. During his follow-up period, neurotoxic findings of the patient completely regressed within 24 hours. The patient, who was asymptomatic on the third day of follow-up period, was discharged with full recovery.



**Figure 2:** Mydriasis is observed in patients during acute poisoning. (Permission was obtained from the patients for the photographs)

## Discussion

ATS has a broad clinical spectrum range from nausea-vomiting to life threatening situations like coma. In mild cases, we can see dryness of skin or mucosa, fever, abdominal pain and nausea vomiting but in severe cases we can see serious symptoms like acute psychotic attack, convulsion and coma<sup>4,5</sup>. At high doses, atropine alkaloids cause ATS clinical features by competitively blocking parasympathetic post-ganglionic muscarinic receptors and acetylcholine binding sites in the central nervous system. While symptoms such as hallucinations, amnesia, delirium, agitation, cooperation and orientation disorders, acute psychosis, cardiovascular and respiratory failure and coma are observed due to central nervous system involvement; findings such as mydriasis, dryness and redness of the skin and mucous membranes, urinary retention and ileus may be observed due to peripheral nervous system involvement<sup>6</sup>. Ahıskalıoğlu et al reported a 62-year-old male patient who was admitted to the emergency room with GCS score of 5, 2 hours after consumption of atropa belladonna fruit. He had a low-grade fever (37.5 °C) and tachycardia (128 beats per min). His pupils were mydriatic, oral mucosa was dry and acute globe vesicalis was observed. 2 mg iv physostigmine was administered after gastric lavage and activated charcoal administration and the patient is extubated within 24 hours<sup>7</sup>. Ethemoglu et al. reported a 52-year-old male patient whose complaints started 2 hours after consuming the cooked leaves of the plant. He had restlessness, inability to urinate and he was in a state of severe delirium and agitation. His pupils were mydriatic and mouth was dry, bowel sounds were decreased. He had no fever but tachycardia (109 beats per min). The patient was taken under control with a conservative treatment approach because physostigmine could not be reached<sup>8</sup>. In a case series included 4 adult intoxication patients reported by Schneider et al.; visual hallucinations and delirium were observed in 3 of them and the other was intubated<sup>9</sup>. A 49-year-old female patient presented by Demirhan et al. was accepted to the emergency service with a poor conscious state and a GCS score of 7. Her body temperature was normal but pulse was 132 beats per min. She had a dry oral mucosa, dilated pupils and acute globe vesicalis. In laboratory tests; white blood cell count was 15.700 cells per milliliter and blood glucose level was 224 mg/dl. Gastric lavage was performed and activated charcoal were given after the patient was intubated. Conservative treatment approach was administered because physostigmine could not be reached<sup>10</sup>. In the study of Çaksen et al. in which they evaluated 49 pediatric patients with Atropa belladonna intoxication, meaningless speech, mydriatic pupils, tachycardia and rash were reported as the most common signs and symptoms<sup>2</sup>. We detected both central and peripheral findings of ATS in our cases. In our first case, which had a milder clinical course, there were altered consciousness, amnesia, visual hallucinations and

agitation as central findings, while mydriatic pupils and dry mouth were present as peripheral findings. In our second case, there were severe agitation, aggression, visual hallucinations, amnesia and speech disorder as central findings; while dry mouth and mydriatic pupils were observed as peripheral findings. There was no urinary retention in our patients. Among the vital signs, both patients had tachycardia, fever was normal in our first case but subfebrile fever was detected in our second case. While there was no significant finding in our first patient in laboratory tests, leukocytes were detected as 15,820 cells per microliter in our second patient. Since the patients were brought to hospital 6 hours after their complaints started, gastric lavage and activated charcoal were not applied, while IV diazepam was started for the agitation of both patients. Haloperidol was administered to second case because of persistent agitation with the recommendation of psychiatry. While the complaints of first case regressed with conservative treatment approaches, in our second case, there was no significant regression, so physostigmine was provided and 2 mg IV was administered in two minutes and a significant improvement was observed in his complaints 30 minutes after the treatment. Both patients were observed as asymptomatic for 24 hours and then they were discharged from our emergency service intensive care clinic with recovery.

The primary approach in the treatment of atropa belladonna intoxications is conservative treatments<sup>10</sup>. The patient should be monitored, airway patency should be ensured, conservative medical treatments should be started and attention should be paid to mechanical ventilation. Atropine is rapidly absorbed from the gastrointestinal tract, reaching peak levels in the blood 2 hours after ingestion. Gastrointestinal decontamination and activated charcoal administration should be given if the patient arrives at the hospital within this time frame<sup>7</sup>. In our cases, this procedure was not performed because the patients were brought 6 hours after oral intake. Benzodiazepines can be used if the patient has agitation<sup>11</sup>. We administered 5 mg IV diazepam to both of our patients. Especially in severe cases with central nervous system findings, physostigmine should be tried in the treatment<sup>12</sup>. We did not administer physostigmine to first case because it responded to conservative treatment, but we administered IV physostigmine to second case, due to non-regressive central nervous system findings with conservative approaches, and we observed a dramatic improvement after physostigmine. We discharged both of our patients asymptotically.

## Conclusion

Atropa belladonna intoxication is a rare condition that can lead to anticholinergic syndrome and life-threatening consequences in cases of severe toxicity. Early diagnosis and

treatment are important in prognosis. Physostigmine is a difficult drug to find in most health care provider. However, it can be obtained from certain centers if needed. In this report, we wanted to report our experience on the treatment processes of two patients with different clinical features, who consumed the fruits of *Atropa belladonna*.

## References

1. Heindl S, Binder C, Desel H et al. Etiology of initially unexplained confusion of excitability in deadly nightshade poisoning with suicidal intent. Symptoms, differential diagnosis, toxicology and physostigmine therapy of anticholinergic syndrome. *Dtsch Med Wochenschr* 2000; 125: 1361-1365.
2. Caksen H, Odabaş D, Akbayram S, Cesur Y, Arslan S, Uner A, Oner AF. Deadly nightshade (*Atropa belladonna*) intoxication: an analysis of 49 children. *Hum Exp Toxicol*. 22:665-8, 2003.
3. Southgate HJ, Egerton M, Dauncey EA. Lessons to be learned: a case study approach. Unseasonal severe poisoning of two adults by deadly nightshade (*Atropa belladonna*). *J R Soc Promot Health* 2000; 120: 127-30.
4. Lange A, Toft P. Poisoning with nightshade, *Atropa belladonna*. *Ugeskr Laeger*. 152: 1096, 1990.
5. Perlik-Gattner I. *Atropa belladonna* poisoning suggesting severe post – traumatic brain damage. *Przegl Lek* 54: 464-65, 1997.
6. Tulin F, Kirpinar I. Psychiatric Aspects of a Case with Deadly Nightshade Intoxication. *Journal of academic emergency medicine*. 10:86-88, 2011.
7. Ahiskalioglu A, Ince I, Dostbil A, Tör IH, Kursad H, Oral Ahiskalioglu E, et al. *Atropa Belladonna* ile Gelişen Antikolinergik Sendrom. *Ortadogu Medical Journal/Ortadogu Tip Dergisi*. 2016;8(2).
8. Ethemoglu FB, Kavalci G, Emre C, Akman C. *Atropa Belladonna* (Güzel Avrat Otu) Yaprakları Pişirilirse Ne Olur? Antikolinergik Toksik Sendrom Olgusu, Anticholinergic Toxic Syndrome, *Anestezi Dergisi* 2017; 25 (2): 87 – 89.
9. Schneider F, Lutun P, Kintz P, Astruc D, Flesch F, Tempe JD: Plasma and urine concentrations of atropine after the ingestion of cooked deadly nightshade berries. *J Toxicol Clin Toxicol* 34:113-17, 1996.
10. Demirhan A, Tekelioglu ÜY, Yildiz I, Korkmaz T, Bilgi M, Akkaya A, et al. *Atropa Belladonna* Fruit (Deadly Nightshade) Related Anticholinergic Toxic Syndrome: A Case Report. *Turkish Journal of Anaesthesiology & Reanimation*. 2013;41(6):226.
11. Joshi P, Wicks AC, Munshi SK. Recurrent autumnal psychosis. *Postgrad Med J*. 79:239-240, 2003.
12. Cıkla U, Turkmen S, Karaca Y, Ayaz AF, Turedi S, Gunduz A. An *Atropa belladonna* L poisoning with acute subdural hematoma. *Hum Exp Toxicol*. 30: 1998-2001, 2011.