

Case Report

Open Access, Volume 4

Clinical analysis of 8 cases of Datura poisoning in children from Lanzhou areaYong kang Zhou^{1*}; Zhongbin Tao^{1,2}; Junqiang Yang¹¹The First Hospital of Lanzhou University Pediatrics, 730000, China.²No. 1, Donggang West Road, Chengguan District, Lanzhou City, Gansu Province, China.***Corresponding Author: Yong kang Zhou**Donggang West Road, Chengguan District, Lanzhou
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Received: Apr 03, 2023

Accepted: Apr 27, 2023

Published: May 04, 2023

Archived: www.jcimcr.org

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DOI: www.doi.org/10.52768/2766-7820/2400

Abstract**Objective:** To analyze the clinical features and prognosis of datura poisoning in children.**Methods:** Through retrospective investigation of 8 children with datura poisoning in Lanzhou on September 1, 2022, we analyzed the history of clinical features, adjunctive examination, treatment, and follow-up.**Results:** A total of 8 children were enrolled in this study, including 2 males (25%) and 6 females (75%). The oldest was 9 years old, the youngest was 7 years old; 1 case (12.5%) with mild symptoms, 5 cases (62.6%) with ordinary symptoms, and 2 cases with severe symptoms; in all cases, they had neurological impairment, shortness of breath, tachycardia and abdominal discomfort, and some children had clinical manifestations such as central fever and coma.**Conclusion:** Diagnosis of datura poisoning in children is more difficult and critical than in adults.**Keywords:** Datura; Poisoning; Children; Clinical analysis.**Background**

Datura is a genus of herbaceous plants of the nightshade family, also known as goldenrod, which is widely distributed worldwide [1], it is wild or cultivated all over the world, its flowers, leaves, stems, and seeds are all poisonous, especially seeds. Datura seeds are similar in appearance to pale ears and slightly sweetened (Figure 1), its main toxic components are hyoscyamine, scopolamine, atropine and other belladonna alkaloids. The toxin produces toxic effects by binding to muscarinic-like acetylcholine (Ach) receptors in the central and peripheral nervous systems. Studies have reported that children could be poisoned if they eat 3-8 seeds [2]. The clinical manifestations vary depending on the amount of intake and individual constitution, mild cases are only manifested as dry mouth, red face and red

ears, increased heart rate, abdominal discomfort, etc [3], severe cases can die due to respiratory failure [4,5].

Cases of datura poisoning are clinically rare; in particular, cluster poisoning in children has rarely been reported or studied. Due to the difficulty of communicating with pediatric patients, and the poisoned patients are often present with neuropsychiatric symptoms, this makes history collection difficult and often leads to misdiagnosis. At the same time, compared with adults, pediatric patients have smaller poisoning doses, and the onset of poisoning is more urgent, the disease is more serious, the progression is faster, therefore, they need more timely medical treatment. From September 1 to 5, 2022, the Pediatric Intensive Care Unit (PICU) of the First Hospital of Lanzhou University, admitted 8 children with community mass datura poi-

soning, and some of them were in critical condition. Our study aims to improve the diagnosis and treatment of these children by analyzing the clinical features and prognosis of these children.



Figure 1: Seeds of Datura.

Research methods

Research object

From September 1 to September 5, 2022, 8 children with cluster datura seed poisoning were admitted to the PICU of the First Hospital of Lanzhou University.

Diagnostic criteria

Refer to the diagnostic criteria and treatment principles of datura food poisoning issued by the Ministry of Health of China [6], gastric juice, stool, urine, and blood were sampled in all cases. The poisons exposed to the children were identified by the Department of Botany, College of Life Sciences, Lanzhou University.

Clinical classification

According to whether the child has clinical manifestations such as organ function damage and severe consciousness impairment [7], based on the expert opinions of the National Children's Center (Shanghai Children's Medical Center), we further classified the poisoning cases into mild, ordinary and severe.

Discharge criteria

Through systematic treatment, the children were discharged after their consciousness was restored, their respiratory and circulatory functions were stable, their gastrointestinal symptoms disappeared, and their laboratory test indicators were normal.

Research methods

Through retrospective analysis, the basic condition, clinical features, laboratory and imaging and other auxiliary examination results, treatment measures and follow-up data of the children were analyzed.

Outcome

History of exposure

We asked the children and their families about their exposure to toxins in detail, and found that all cases had eaten wild fruits together before onset of illness. Then, a sample of wild fruit that the child accidentally ate was obtained, and it was identified as datura seeds by professional technicians.

Population characteristics

In this study, we included a total of 8 children with datura poisoning, 2 males and 6 females, aged 7~9 years, with a weight of 25-37 kg, the amount of exposures varied from 1 to more than 20 seeds, as shown in Table 1.

Table 1: Basic information and clinical features of 8 children with poisoning.

Case	Gender	Age (year)	Weight (kg)	Exposure (capsules)	Time of onset
1	Female	9	25	>10	0.5h
2	Male	7	27	10	1h
3	Female	7	26	7	1h
4	Female	9	33	>20	0.5h
5	Female	8	37	4	1h
6	Female	7	27	7	1h
7	Female	8	35	1	1h
8	Male	7	32	5	1h

Clinical manifestations

The clinical manifestations of the eight children are detailed in Table 1. Two children developed poisoning symptoms after ingestion 0.5 hours later, and the others developed similar symptoms 1 hour later, and all poisoning symptoms gradually worsened. All cases presented with cholinergic neurosuppressive manifestations such as abdominal pain, flushing, dry mouth, mydriasis, increased heart rate, and tachypnea, two cases developed moderate fever, blurred vision occurred in 2 cases. All cases presented with lethargy and restlessness, two cases developed delirium and hallucinations, one case was shallow coma, and none of the cases showed convulsions, as shown in Table 2.

Laboratory tests

On admission, there was one case (12.5%) with elevated white blood cell count ($13.66 \times 10^9/L$), 2 cases (25%) with mild increase in liver enzyme, 1 case (12.5%) with elevated bilirubin. 7 cases (87.5%) with elevated Neurospecific Enolase (NSE), 1 case (12.5%) with elevated myocardial enzymes. Except for abnormal liver enzymes, the remaining indicators basically returned to normal before discharge (Table 3).

Imaging tests

In all cases, chest x-ray, cardiac ultrasound, and electroencephalogram were routinely performed, one child (case 4) was considered critically ill and underwent head MRI and middle cerebral artery blood flow spectroscopy. The examination results showed that there were no abnormalities in chest x-ray and cardiac ultrasound in all cases, only one critical child (case 4) showed slow waves in EEG (Figure 2).

Table 2: Clinical features of 8 children with poisoning.

Case	Heart rate	Nervous system	Respiratory rate	Other symptoms	Length of hospital stay
1	130~150	Delirium, hallucinations, lethargy, irritability, mydriasis (6 mm)	40~45	Abdominal pain, dry mouth, flushing, 38.3°C	3d
2	120~140	Drowsiness, irritability, dizziness, mydriasis (5 mm)	35~40	Abdominal pain, dry mouth, flushing	3d
3	110~120	Dizziness, irritability, mydriasis (5 mm)	30~35	Abdominal pain, dry mouth, nausea, flushing	3d
4	140~160	shallow coma, delirium, hallucinations, irritability, blurred vision, mydriasis (8 mm)	45~50	38.9°C, abdominal pain, dry mouth, flushing, limb shaking	5d
5	110~120	Drowsiness, dizziness, mydriasis (4 mm)	30~35	Abdominal pain, dry mouth, flushing	3d
6	110~120	Delirium, irritability, mydriasis (6 mm)	30~35	Abdominal pain, dry mouth, flushing, puffiness	3d
7	90~110	Drowsiness, mydriasis (4 mm)	28~30	Abdominal pain, dry mouth	3d
8	120~130	Drowsiness, irritability, mydriasis (5 mm)	35~40	Chest tightness, abdominal pain, dry mouth, flushing, conjunctival hyperemia	3d

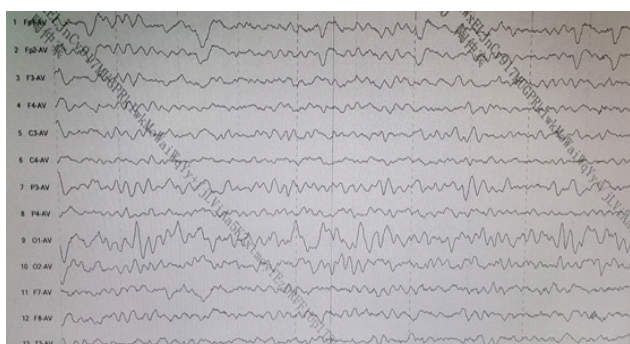
Table 3: Laboratory results of 8 children with poisoning.

Case	WBC	ALT	Bilirubin Umol/L	CK-MB	NSE (ng/ml)	D-D (ng/ml)	EEG	Brain MRI
1	6.84	N	N	NI	↑	N	N	-
2	7.17	N	N	N	↑	N	N	-
3	6.43	N	↑26.6	N	↑	N	N	-
4	13.66	↑69	N	N	N	↑0.86	Slow waves	Normal
5	7.51	N	N	N	↑	N	N	-
6	8.9	N	N	N	↑	N	N	-
7	5.92	↑77	N	N	↑↑↑	N	N	-
8	9.42	N	N	↑39	↑	N	N	-

Note: N represents normal, ↑ represents mildly increased, ↑ represents significantly increased, - represents not been examined.

Clinical classification

According to the degree of neurological involvement, the degree of poisoning in children was divided into mild, medium, and severe. Of these, 1 case was mild (case 7), five cases (cases 2, 3, 5, 6, 8) were medium, and two (cases 1 and 4) were severe.

**Figure 2:** Slow waves can be seen on EEG.

Therapy

After admission, all children underwent tongue depressors to stimulate pharyngeal vomiting, and gastric lavage with saline, 25% magnesium sulfate solution for catharsis, glycerol enema (20 ml), diuresis with furosemide (0.5 mg/kg), intravenous fluids. For the cause of poisoning was not clear at that time, except for 1 mild child (case 7), the other 7 children were treated with hemoperfusion combined with CRRT. The identification result of the poison exposed to the children was datura, and atropine components were detected in gastric juice and urine, these prove that the children were datura poisoning, so two children with severe poisoning (cases 1 and 4) were given the special antidote pilocarpine (0.1 mg/kg). Each child was given symptomatic supportive treatment measures such as oxygen, liver protection, and nutritional nerves at the same time according to their condition.

Prognosis

All cases were treated as described above, their consciousness gradually regained clarity, respiratory and circulatory functions gradually stabilized, gastrointestinal symptoms disappeared, and vision recovered, neurologic examination showed no unusual clinical signs. Slow waves were still visible in the EEG

of case 4 before discharge, and the EEG returned to normal after 2 weeks later. The minimum length of hospital stay was 3 days and the maximum was 5 days (median 4 days).

Discussion

Datura flowers are distributed throughout China, and mostly grow in warm, sunny places such as fields, ditches, and roadsides. The whole plant is toxic, especially the seeds [8]. Incidents of datura poisoning are rare worldwide, and cluster poisoning in children is particularly rare [9].

Due to insufficient awareness in children, such as in this study, poisoned children mistakenly played with and ate datura seeds as siberia cocklebur, which eventually led to collective poisoning. Through the medical staff carefully questioned the history of poison exposure of the children and their parents, and obtained the poison sample commonly ingested by the children, it was preliminarily identified as a datura by professional and technical personnel. The main toxic components of datura are hyoscyamine, scopolamine and atropine, which can be quickly absorbed into the blood after consumption, through inhibit the M-type ACh receptor, ACh is blocked from binding to the receptor and exerts an anticholinergic nerve effect in the peripheral nervous system, while in the central nervous system, it is manifested as first excitation and then inhibition. In this study, children with poisoning were first manifested as dry mouth, abdominal discomfort, skin flushing, increased heart rate, mydriasis, and irritability, a few children developed fever. About four hours after ingestion poisoning, the children developed central nervous system depression such as drowsiness, delirium and even shallow coma, slow waves appeared in EEG in individual children. These were generally consistent with the clinical features described in the literature [3,10].

Unlike adults, children tend to have a lower poisoning threshold. Previous studies have suggested that children with datura seeds can be poisoned by taking 3 or more capsules [2]. However, in this study, the child (case 7) developed clinical manifestations of dry mouth, tachycardia, shortness of breath and even drowsiness after taking only one capsules, This suggests that previous studies may have underestimated the toxicity of datura seeds to children.

In terms of treatment, in addition to conventional gastric lavage, enema, diuresis, etc [11], blood purification therapy plays an important role before the poison is identified. In this study, children with mild and medium poisoning were not given specific antidotes, however, they all recovered through blood purification. This suggests that in clinical practice, it is necessary to start blood purification therapy in a timely manner before poisoning is suspected but the poison is not identified, At the same time, attention should also be paid to the exclusion of contraindications and the prevention of complications [12,13]. Picocarpine is a special antidote for datura poisoning, which can antagonize the anticholinergic effect of atropine by cholinergic action. In this study, the symptoms of two children with severe poisoning were significantly improved after being given pilocarpine.

Conclusion

In summary, compared to adult datura poisoning, children show a lower dose, more obvious poisoning symptoms, and more critical conditions. Therefore, we should educate the community about the dangers of datura and raise safety awareness, avoid planting poisonous plants around the living environment, do not abuse datura and related products. If datura poisoning occurs, go to the hospital as soon as possible.

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