

## Case Report:

# Cantharidin Poisoning after Insect Ingestion

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### Abstract

**Background:** Cantharidin is a toxic compound present in the "Spanish Fly", commonly known as "Blister Beetles", which is vesicant and toxic in nature. Clinical features of cantharidin poisoning include hematemesis, gross hematuria, and dysuria.

**Aim of the Study:** To report a case of cantharidin poisoning in a child, after accidental ingestion of a blister beetle.

**Case Report:** We report a case of accidental ingestion of blister beetle in an 18-month old girl, a resident of Aseer Region, Saudi Arabia, who was brought by her father with classical signs and symptoms of cantharidin poisoning, including hematemesis, abdominal pain, hematuria and suspected poisoning. Her condition was confirmed by her father who brought a similar insect to which was ingested by the patient. The patient recovered after being managed conservatively, serum electrolytes and blood gases were closely monitored. She was discharged after 7 days.

**Conclusion:** Cantharidin poisoning cannot be diagnosed with particular clinical features, but a detailed and in-depth history combined with the presenting clinical symptoms should alert for this rare event. Health education for both the general population and the medical community about cantharidin poisoning may have some value in the prevention of such events.

**Key Words:** Cantharidin – Hematemesis – Toxic – Acantholysis – Meloidae.

### Introduction

**CANTHARIDIN** is a toxic substance secreted by beetles (Spanish Fly) of the Meloidae family (Coleoptera order). These insects are collectively called

"blister beetles" and are well known to be toxic and vesicant [1].

The cantharidin compound is an odorless, colorless in nature that is insoluble in water. It is highly irritating and causes acantholysis and vesicle formation when in contact with skin or mucous membranes. After ingestion, it is instantly absorbed from the Gastrointestinal (GI) tract and is rapidly excreted by the kidneys [2].

Cantharidin has an inhibitory effect on Protein Phosphatase 1 (PP1) and Protein Phosphatase 2A (PP2A). It is collected in the hemolymph, genitalia and other tissues [3,4]. Spanish flies and other meloids have also been used medicinally as cutaneous irritants, vesicants, abortifacients and aphrodisiac [5].

We aimed to report a case of cantharidin poisoning in an 18-month old Saudi girl, after accidental ingestion of a blister beetle insect.

### Case Report

On April, 17<sup>th</sup>, 2017, an 18-month old Saudi girl, who was previously healthy, presented to Alberk General Hospital, Aseer Region, Saudi Arabia. The child was in her usual condition of health till one day prior to admission, when she presented with a history of vomiting of fresh blood bright red in color, sometimes with clots, almost 8-10 times during one day. She was kept in the Emergency Room (ER) for few hours for stabilization, and then she was shifted to our tertiary care center for pediatrics in Abha City. Her complaint was associated with lethargy, poor feeding and

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activities for the last day, but there was no history of fever, abdominal distension, jaundice or diarrhea, convulsion skin rash, drug ingestion or trauma. Other systemic reviews were unremarkable. The child was completely healthy before with unremarkable past and neonatal history. She is on usual regular diet and formula with no recent dietary changes. Her parents were cousins (i.e., second degree relatives), healthy with other three healthy siblings and no history of similar condition. They were living in Alberg in their own house with good socioeconomic status.

On examination, she looked unwell, lethargic, but not pale or jaundiced. Her vital signs were: Temperature: 37.3°C, heart rate: 132beats/min, blood pressure: 95/59mmHg, respiratory rate: 35 breaths/min, oxygen saturation: 95%. Her growth parameters were normal. Central nervous system examination showed that the girl was conscious, lethargic, intact cranial nerves, with normal tone, power and reflexes in both upper and lower limbs. Cardiovascular system examination showed normal first and second heart sounds with no added sounds, good capillary refill and peripheral and central pulses. Examination of abdomen showed that it was soft, lax, with no distension, tenderness, organomegaly, or ascites. Other systemic examination findings were unremarkable.

After admission, the child passed three times black color stool, which was resolved next day. Shortly after admission, she developed gross hematuria.

Blood examination parameters revealed a red blood cell count of  $4.5 \times 10^6 / \mu\text{L}$ , a white blood cell count of  $11.6 \times 10^3 / \mu\text{L}$ , platelets count of  $199 \times 10^3 / \mu\text{L}$ , hemoglobin: 10.7gm/dL, urea: 5mmol/L, serum creatinine 0.2mg/dL, sodium 145mEq/L, potassium 3.8mEq/L, serum calcium was 8.2mg/dL, total bilirubin was 0.3mg/dL, total serum protein was 5.6gm/dL, Albumin 3.4gm/dL, serum aspartate aminotransferase (AST) was 82u/L, serum alanine aminotransferase (ALT) was 20u/L. Venous blood gasses, pH 7.2, PCO<sub>2</sub>: 34mmHg, HCO<sub>3</sub>:14 mmol/L, prothrombin time: 13.7sec, activated partial thromboplastin time (aPTT): 30.6sec, and International Normalized Ratio (INR) was 1.1. Urine analysis showed numerous red blood cells.

When we explored the detailed history, the father stated that, at the night before presentation, he saw a dead insect within the child's early vomitus. Because that kind of insects is commonly found in their home. So, we searched medical literature and realized that beetle ingestion in

children is a common-known cause of cantharidin poisoning. We asked the father to bring one of these beetles available in their area and it was exactly the same causative agent as described in literature Fig. (1).

Since there is no known antidote for cantharidin intoxication, management of our case has been supportive. She was kept on nothing per mouth and was given intravenous fluids, and 5% dextrose with 1/2 normal saline. Serum electrolytes and blood gases were closely monitored. The child's condition progressively improved over the next 5 days. Vomiting stopped and the hematuria cleared up gradually. She was discharged after 7 days.



Fig. (1): Blister beetle.

## Discussion

Our reported case stresses on a clinical presentation of cantharidin toxicity as a result of ingestion of a blister beetle. The amount of cantharidin content in one beetle ranges from 0.2mg to 0.7mg, depending on the type of species [5]. The range of lethal dose in adults is estimated to be 10-80mg [6]. Gross hematuria with granular casts is a significant feature which manifests on the first or the second day [7].

Karras et al., stated that toxic effects of cantharidin include multi-organ failure and its effects are directly attributed to chemical irritation. It undergoes excretion by glomerular filtration, causing glomerular damage and acute tubular necrosis, as well as blister formation in the lower urinary tract. Renal microscopy shows edema of Bowman's capsule and basement membranes, causing constriction of glomerular capillaries. Tubular microscopy of the kidney shows, epithelial disintegration and edema of the basement membrane with resulting lumen occlusion. Areas of complete tubular degeneration have been observed. It may lead to death due to renal failure [8].

Till now, there is no antidote for cantharidin [5]. Therefore, in our case, supportive management has been initiated with intravenous fluids. Serum electrolytes and blood gas abnormalities were closely monitored.

Given cantharidin's high-binding affinity for albumin, hemodialysis would be expected to have minimal effect, if any [8]. However, the ultimate prognosis is good with regard to renal function in initial phase [9].

In conclusion, cantharidin poisoning does not present with a particular clinical feature, but a detailed and in-depth history combined with the presenting clinical symptoms should alert for this rare event. Health education for both the general population and health care providers about cantharidin poisoning may prove to be of some value in prevention and early management of such event.

### References

- 1- TAGWIREYI D., BALL D.E., LOGA P.J. and MOYO S.: Cantharidin poisoning due to "Blister beetle" ingestion. *Toxicon*, 38 (1): 1865-9, 2000.
- 2- DAVID G.: Schmitz, Overview of Cantharidin Poisoning. Website: <http://www.merckvetmanual.com/toxicology/cantharidin-poisoning/overview-of-cantharidin-poisoning>. Retrieved on 24 January 2018.
- 3- International Veterinary Information Service. In: V. Beasley, Ed. *Veterinary Toxicology*. Available from: [www.ivis.org](http://www.ivis.org). Retrieved on February 2010.
- 4- RAUH R., KAHL S., BOECHZELT H., BOUER R., KAINA B. and EFFERTH T.: Molecular biology of cantharidin in cancer cells. *Chin. Med.*, 2: 8, 2007.
- 5- AL-BINALI A.M., SHABANA M. AL-FIFI, DAWOOD S., SHEHRI A.A. and AL-BARKI A.: Cantharidin poisoning due to blister beetle ingestion in children: Two case reports and a review of clinical presentations. *Sultan Qaboos. Univ. Med. J.*, 10 (2): 258-61, 2010.
- 6- CARREL J.E., McCAIRE M.H., SLAGEL A., et al.: Cantharidin production in a blister beetle. *Experientia*, 49: 171-4, 1993.
- 7- TAGWIREYI D., BALL D., LOGA P., et al.: Cantharidin poisoning due to blister beetle ingestion. *Toxicon*, 38: 1865-9, 2000.
- 8- KARRAS D., FARRELL S., HARRIGAN R., et al.: Poisoning from 'Spanish fly' (cantharidin). *Am. J. Emerg. Med.*, 14: 478-83, 1996.
- 9- CHEN B.T. and TEIK K.O.: A case of cantharidin poisoning. *Singapore Med.*, 2 (2): 72-3, 1961.

## التسمم بالكانتاريدين بعد إبتلاع حشرة: تقرير حالة

الخلفية: الكانتاريدين مركب سام موجود في "الذبابة الآسبانية"، المعروفة بإسم "خنفساء البثور". وتشمل المظاهر السريرية للتسمم به الغثيان، القيء الدموي، البوال الدموي، وعسر البول.

الهدف: الإبلاغ عن حالة تسمم بلكانتاريدين في طفلة، بعد إبتلاعها لحشرة خنفساء البثور.

تقرير الحالة: نعرض حالة طفلة من سكان منطقة عسير، المملكة العربية السعودية، تبلغ من العمر ١٨ شهرا إبتلعت عرضا حشرة خنفساء البثور. وقد أحضرها والدها مع علامات وأعراض تسمم بالكانتاريدين، بما في ذلك القيء الدموي، آلام في البطن، البوال الدموي. وقد أكد لنا والدها تشخيص حالتها عندما أحضر حشرة مماثلة لما إبتلعته المريضة. وقد تعافت المريضة بعد علاجها بطريقة محافظة، وخرجت من المستشفى بعد سبعة أيام.

الخلاصة: لا يمكن تشخيص التسمم الكانتاريدي طبقا لخصائص سريرية معينة، ولكن يجب أن يتبع الطبيب تاريخا مفصلا ومعقما، جنبا إلى جنب مع الأعراض السريرية، لتشخيص هذه الحالة النادرة. كما قد يكون للتثقيف الصحي لكل من عموم السكان وأفراد المجتمع الطبي حول التسمم بالكانتاريدين بعض القيمة في الوقاية من مثل هذه الأحداث، وكذلك التعرف عليها وتشخيصها.