

Niyangala (*Gloriosa Superba*) Poisoning Complicated with SIADH

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Abstract

Background: Niyangala poisoning used to be a common method of deliberate self-harm among people living in rural areas of Sri Lanka. It is a plant that grows in the wild and has no usage. All parts of this plant are poisonous. The toxic ingredient in Niyangala is Colchicine. Even though Colchicine poisoning is uncommon, it can lead to life threatening complications and be considered a toxicological emergency. It can cause severe gastroenteritis, abdominal pain, hypotension, electrolyte imbalance in the initial phase, as well as granulocytopenia, thrombocytopenia, clotting defects, hepatic insufficiency and renal failure after the first 24 hours.

Case presentation: A 62-year-old male presented to our medical unit with several episodes of severe watery diarrhea 6 hours after the ingestion of 3 tubers of Niyangala. He also had epigastric pain, nausea and vomiting. He had eaten Niyangala after consuming alcohol and claimed it was after a dispute with his wife. On admission, the patient was in pain with some dehydration but he was afebrile.

Discussion: SIADH consists of hyponatremia, inappropriately elevated urine osmolality (>100 mOsm/kg), and decreased serum osmolality in a euvoalaemic patient. SIADH should be diagnosed when these findings occur in the setting of otherwise normal cardiac, renal, adrenal, hepatic, and thyroid function; in the absence of diuretic therapy; and in the absence of other factors known to stimulate ADH secretion, such as hypotension, severe pain, nausea, and stress.

Conclusion: SIADH is a well-recognized complication of colchicine poisoning. We report for the first time SIADH after the ingestion of tubers of *Gloriosa superba*. Hyponatremia in a patient after poisoning with *Gloriosa superba* is usually attributed to severe diarrhea which is a common and dominant clinical feature often managed with fluid replacement.

Keywords: *Gloriosa superba*; Niyangala; poisoning; SIADH

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INTRODUCTION

Niyangala poisoning used to be a common method of deliberate self-harm among people living in rural areas of Sri Lanka. It is a plant that grows in the wild and has no usage. However, village folks are fully aware of its highly poisonous nature. This knowledge and its ready availability in rural areas has resulted in the consumption of Niyangala traditionally as a common mode of suicide in the rural communities. In the western province of Sri Lanka, *Gloriosa superba* is responsible for 44% of plant poisonings with a 15% case fatality rate.⁽¹⁾ All parts of this plant are poisonous.⁽¹⁾ The toxic ingredient in Niyangala is Colchicine. Even though Colchicine poisoning is uncommon, it can lead to life threatening complications and be considered a toxicological emergency.⁽¹⁾ It can cause severe gastroenteritis, abdominal pain, hypotension, electrolyte imbalance in the initial phase, as well as granulocytopenia, thrombocytopenia, clotting defects, hepatic insufficiency and renal failure after the first 24 hours. In the initial phase, patients can develop hyponatremia as a result of severe gastrointestinal losses. Severe colchicine poisoning has

also been associated with hyponatremia.⁽²⁾ Hyponatremia in the initial phase can be easily corrected with fluid replacement with isotonic saline. Refractory hyponatremia in a euvoalaemic patient few days after Niyangala poisoning is very unusual. The presumed mechanism is a transient episode of SIADH.⁽³⁾ We present a case of inappropriate secretion of ADH following Niyangala poisoning as such cases have not been reported before.

CASE PRESENTATION

A 62-year-old male presented to our medical unit with several episodes of severe watery diarrhea 6 hours after the ingestion of 3 tubers of Niyangala. He also had epigastric pain, nausea and vomiting. He had eaten Niyangala after consuming alcohol and claimed it was after a dispute with his wife. On admission, the patient was in pain with some dehydration but he was afebrile. His pulse rate was 80bpm and the blood pressure was 130/80mmHg. He did not have any lung signs but there was a generalized abdominal tenderness. The patient was given activated charcoal at the ETU of our hospital once the vomiting subsided. The vomiting was a transient symptom the patient had

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experienced immediately after the ingestion of Niyangala owing to its bitter taste. This was easily controlled with intravenous Ondansetron and activated charcoal was administered after that. He was passing black colored loose stools. His investigations on admission revealed a metabolic acidosis, Hemoglobin of 15.1g/dl and increased white cell count of $12.61 \times 10^3/\mu\text{L}$ with 73.9% Neutrophils. His platelet count was $471 \times 10^3/\mu\text{L}$, serum sodium was 144mmol/l and serum potassium was 4.64mmol/l with serum creatinine of 1.02mg/dl. ALT was 26.5U/l and AST was 118.7U/l. Urine full report showed 8-10 red blood cells.

The patient was started on intravenous isotonic saline and vomiting was controlled with intravenous Ondansetron. He was also given Sodium Bicarbonate to correct the acidosis and the pulse rate, blood pressure, oxygen saturation, and respiratory rate were measured hourly.

He continued to have episodes of loose stools for the next two days and it gradually settled. He was given intravenous isotonic saline about 2-2.5 liters per day. The relatives of the patient brought the flower and the tubers of the plant for identification and it was confirmed to be Niyangala.(Figure 1) He had consumed about 30g of Niyangala. His liver enzymes started rising after the 2nd day of admission and reached the maximum of AST 330.7 and ALT 59.6 on day 3 of admission. After day 3 of admission, his hemoglobin, WBC and platelets also started to drop and the lowest recorded Hb, WBC and platelet values were 11.1g/dl, $5.31 \times 10^3/\mu\text{L}$ and $29 \times 10^3/\mu\text{L}$, respectively. Even though his INR had risen to 2.10 from 1.11, he did not have any bleeding manifestations. The patient developed hyponatremia on day 6 of admission and his serum sodium value was 115mmol/l.



Figure 1. The remnants of tubers, leaves and flowers of the *Gloriosa Superba* plant

Despite adequate fluid resuscitation with isotonic saline, the serum sodium continued to drop and was 110mmol/l on the 8th day of admission. However, his platelet count started to rise gradually and the deranged liver enzymes also started to normalize. The patient was hemodynamically stable and was euvolaemic. The patient's urine Na was 104mmol/l, serum osmolality was 240mmol/kg and the urine osmolality was 460mmol/kg. The cause for hyponatremia was thought to be due to SIADH and his fluid intake was restricted. The patient continued to have low sodium despite water restriction and oral salt therapy of NaCl 5g tds. Therefore, he was given two doses of vasopressin receptor antagonist Tolvaptan 15mg daily and the serum sodium increased to 127mmol/l within 24hours. His 24-hour urine output increased to 4325ml from baseline average of 2.3L/day after the initiation of Tolvaptan. He remained clinically well throughout this period and started losing scalp hair on day 14 of admission. (Figure 2) His chest x ray was normal and the 2D echo showed LVEF of more than 60%. The USS of abdomen revealed mild prostatomegaly. His serum Magnesium was 1.20mg/dl (1.7-2.7mg/dl) and serum potassium found to be low during this period. His repeat serum Sodium found to be 132mmol/l one week after discharge from the ward.

DISCUSSION

SIADH consists of hyponatremia, inappropriately elevated urine osmolality ($>100 \text{ mOsm/kg}$), and decreased serum osmolality in a euvolaemic patient. SIADH should be diagnosed when these findings occur in the setting of otherwise normal cardiac, renal, adrenal, hepatic, and thyroid function; in the absence of diuretic therapy; and in the



Figure 2. Alopecia in the patient on day 14 of admission

absence of other factors known to stimulate ADH secretion, such as hypotension, severe pain, nausea, and stress.(4)

According to Barrter and Schwartz criteria (5-7) for the diagnosis of SIADH; a diagnosis of SIADH was made in this patient as he remained euvolaemic throughout this period with a serum sodium value less than 135mmol/l (Figure 3) and a spontaneous urine sodium value of 104mmol/l (>20 mmol/L).

His serum osmolality was found to be 240 mOsm/kg (< 275 mOsm/kg) and spontaneous urine osmolality was 460 mOsm/kg (> 100 mOsm/kg). And the patient did not have any other cause for hyponatremia such as hypothyroidism, cortisol deficiency, marked hyperproteinemia, hyperlipidemia or hyperglycemia. The patient was a previously healthy person and he had not been on any regular medication prior to this admission. His clinical, biochemical and imaging investigations did not reveal any underlying cardiac, respiratory or renal pathology.

There had been cases of transient episodes of the syndrome of inappropriate anti-diuresis following colchicine poisoning. These are the first cases reported.(3) But our literature review did not reveal any reported case of SIADH following the ingestion of *Gloriosa superba*.

Intoxication by colchicine causes the inhibition of cell division at the affected organs by fixing the intracellular tubulin and arresting their polymerization into microtubules. Thus, mitosis and transport systems within the cells are disrupted. Organs which have a high rate of cell turnover, such as the gastrointestinal tract and bone marrow, are the ones most affected. (8)

The symptoms of intoxication can be classified in three phases. Phase 1: early gastrointestinal symptoms, volume depletion, and hypotension resulting from severe vomiting and diarrhea, and peripheral leukocytosis; phase 2: (generally 24 to 72 hours) mental status change, oliguric renal failure, hematopoietic problems, electrolyte imbalance, acid-base disturbance, and shock; and phase 3: rebound leukocytosis and alopecia. Electrolyte and acid-base imbalances such as metabolic acidosis, hyponatremia, hypocalcaemia, hypokalemia, hypophosphatemia, and hypomagnesaemia have been reported. (9)

Our patient had both hypokalemia and hypomagnesaemia. This patient developed leukocytosis initially and then developed pancytopenia after a few days. Rebound leukocytosis was seen after about 10 days of admission suggesting transient bone marrow suppression due to Niyangala poisoning. (Figure 4) It was revealed that the loss of hair begins on days 5-16 of the ingestion in a study done regarding the epidemiology and clinical profile of *Gloriosa superba* poisoning in Sri Lanka.(10) Alopecia can be seen as a consequence of exposure to Colchicine and this patient developed alopecia around day 14 of admission. (12)(Figure 2) Colchicine may exert direct hepatic toxicity with moderate cytolysis and this may reduce the production of clotting factors.

Thus, bleeding tendencies may occur associated with high prothrombin time (PT) /international normalized ratio.(10) This patient developed acute liver dysfunction as patient's both AST and ALT started to rise gradually in the initial phase and then started to decline after day 06 of admission. Though his INR had risen to 2.10 from 1.11, there were no features of bleeding.

Barrter and Schwartz describe the following criteria for the diagnosis of SIADH: (5-7)

- Decreased serum osmolality (<275 mOsm/kg)
- Increased urine osmolality (>100 mOsm/kg)
- Euvolaemia
- Increased urine sodium (>20 mmol/L)
- No other cause for hyponatremia (no diuretic use and no suspicion of hypothyroidism, cortisol deficiency, marked hyperproteinaemia, hyperlipidaemia or hyperglycaemia).

CONCLUSION

SIADH is a well-recognized complication of colchicine poisoning. We report for the first time SIADH after the ingestion of tubers of *Gloriosa superba*. Hyponatremia in a patient after poisoning with *Gloriosa superba* is usually attributed to severe diarrhea which is a common and dominant clinical feature often managed with fluid replacement. Persistent hyponatremia despite fluid replacement should alert the clinician to the possibility of this

Figure 3. Serum Sodium values of the patient throughout the hospital stay

Day of illness	Day 06	Day 08	Day 09	Day 17
Serum Sodium level	115mmol/l	110mmol/l	127mmol/l	132mmol/l

Figure 4. Hemoglobin, white cell and platelet counts of the patient throughout the hospital stay

	Day 01	Day 02	Day 03	Day 04	Day 05	Day 06	Day 07	Day 09	Day 11
Hb (g/dl)	15.1	12.9	11.8	11.1	11.4	12.5	13.2	13.1	11.7
WBC 10 ³ /U1	12.61	22.8	7.35	5.31	5.20	6.13	9.64	8.27	9.76
PLT 10 ³ /uL	471	314	96	64	46	29	32	85	166

rare complication of SIADH with important management implications. Under such circumstances, inhibition of vasopressin receptors with Tolvaptan could be lifesaving rather than persistence of fluid replacement with the attended risk of fluid overloading and aggravation of hyponatremia with disastrous consequences.

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