Case Series

ANNALS OF MEDICINE & SURGERY

OPEN

Mad (wild) honey poisoning: a case series of eleven cases

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Introduction: Mad (Wild) honey, used as alternative medicine in some countries where cases of poisoning are reported, got its name due to its intoxicating effects. Poisoning due to mad honey mostly presents as bradycardia and hypotension.
Case reports: We report 11 cases involving 6 females and 5 males, of mad honey poisoning used for medicinal purposes. All patients were young adults (average age 43.9 years) except for one. Lightheadedness, dizziness and nausea were the most common complaints. All presented in bradycardia ranging from 35 to 60 beats per minute. All cases were managed conservatively while one required vasopressors support. All patients improved with a couple of days of supportive care.
Discussion: Mad honey poisoning seems to be a geographically restricted entity as the majority of cases are reported from a particular region. Because of its use as an alternative medicine for various purposes, cases of intoxication occur year around. Although the signs and symptoms of mad honey can be life threatening including nausea, dizziness, bradycardia, and hypotension, the prognosis is generally good
Conclusion: Although the prognosis is fairly good, mad honey intoxication has significant morbidity. Lack of awareness about the potential complications of consuming mad honey seems to be the cause of cases of poisoning seen annually.

Keywords: bradycardia, grayanotoxin, hypotension, mad honey, poisoning

Introduction

The term 'mad honey' alludes to the intoxicating effect of grayanotoxin, a contaminant substance honey bee gathers from the nectar of plants in the Rhododendron genus. While reports of mad honey poisoning are infrequent, documented cases primarily originate from Turkey and Asian countries such as South Korea, Japan, and Nepal[1,2]. Mad honey is traditionally used by local communities as alternative medicine for conditions like respiratory viral infections, gastrointestinal problems, joint pain, hypertension, sexual problems. Patients with poisoning present with varied symptoms including dizziness, syncope, lightheadedness and findings such as hypotension, bradycardia, ECG findings of AV block, ST elevation, etc[2]. Although there are test to determine the level of toxin in serum and urine, and these test are not readily available and the clinical implications of such test are low[3]. Hence, diagnosis is made on clinical judgment based on relevant history of consumption of mad honey and physical examination findings. The adverse effects that comes with the use of mad honey including bradycardia, hypotension, altered awareness, sweating, nausea, vomiting, and other heart problems, have fairly good prognosis[3,4]. Here, we report 11 cases of mad honey poisoning observed at our center.

Case reports

A total of 11 cases are included in this case series. Among these, six were females and five were males. Average age of the patients was 43.9 ± 12.3 years (range 31–70). Most of them reported symptoms after consuming 1–2 teaspoons of mad honey. Symptoms appeared 20 minutes to 2 hours after consumption. Dizziness, nausea and vomiting were the most common symptoms. There was no history of trauma, alcohol intake, drug intoxication in any cases. Apart from hypotension and bradycardia in all patients, there were no pertinent findings on physical examination; 12 lead electrocardiograms (ECG) were performed in all patients (Figs. 1-5). Management at the emergency department included intravenous fluids, intravenous hydrocortisone and other supportive care for all while three patients received 0.6 mg of intravenous atropine and one required vasopressor support for persistent hypotension (Table 1). Baseline investigations including thyroid function tests were normal in all (Table 2). However, serum toxin level could not be measured because of the unavailability of the test. All the cases were kept under close observation and discharged within 1–2 days of admission and supportive care. This case series has been reported in line with the PROCESS Guideline.[5]

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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Annals of Medicine & Surgery (2025) 87:460–465

Received 31 July 2024; Accepted 09 December 2024

Published online 7 January 2025

http://dx.doi.org/10.1097/MS9.0000000000002889

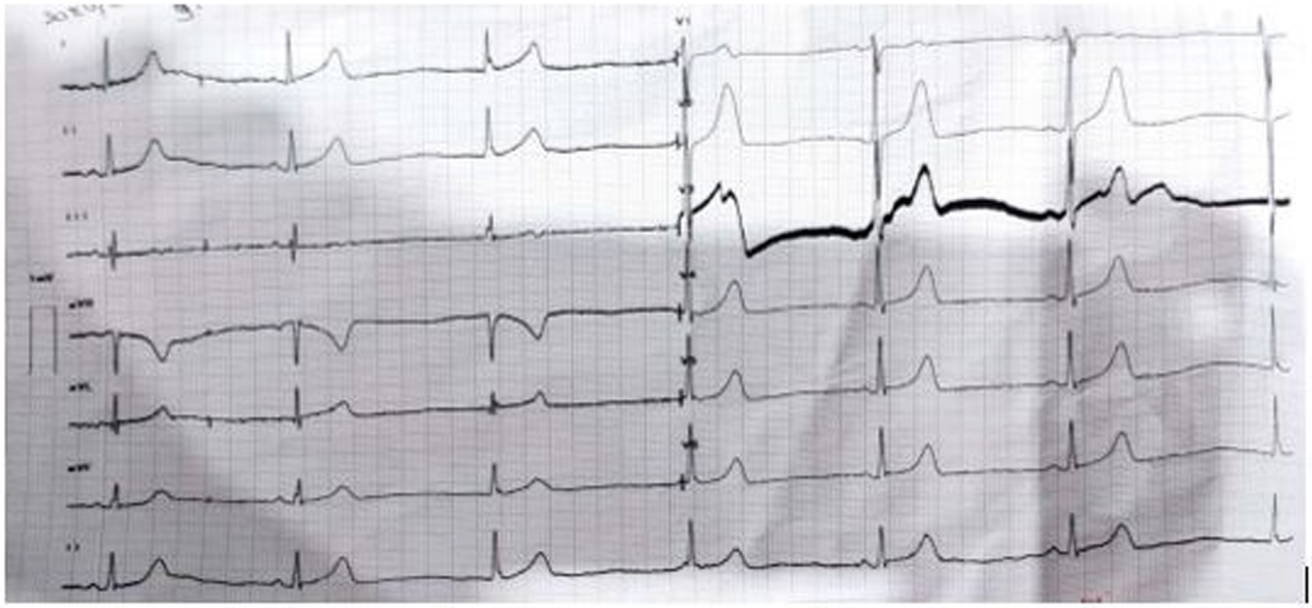

Figure 1. ECG of the patient at the time of ER arrival; Heart rate: 39 bpm.

Discussion

The term "mad honey" refers to the intoxicating properties of grayanotoxin, a contaminant that honey bees gather from the nectar of plants in the Rhododendron genus.[1-3] Only few cases of mad honey poisoning are reported in the medical literature, primarily from Turkey and Asian nations (Nepal, South Korea, Japan)[2]. This probably is the largest case series reported from Nepal.

There are several uses for mad honey that aren't the same as those for regular honey. This alternative medication is used to treat a variety of conditions, including hypertension, diabetes (hyperglycemia and related complications), the flu, gastrointestinal disorders (peptic ulcers, gastritis, dyspepsia, indigestion, bowel disorders, and other discomforts), arthritis, abdominal/gastric pain, stimulating sex (dysfunction, impotence, enhancement, and performance), multiple viral infections, skin conditions, pain, and colds.[3]. Most of the patients in our case series

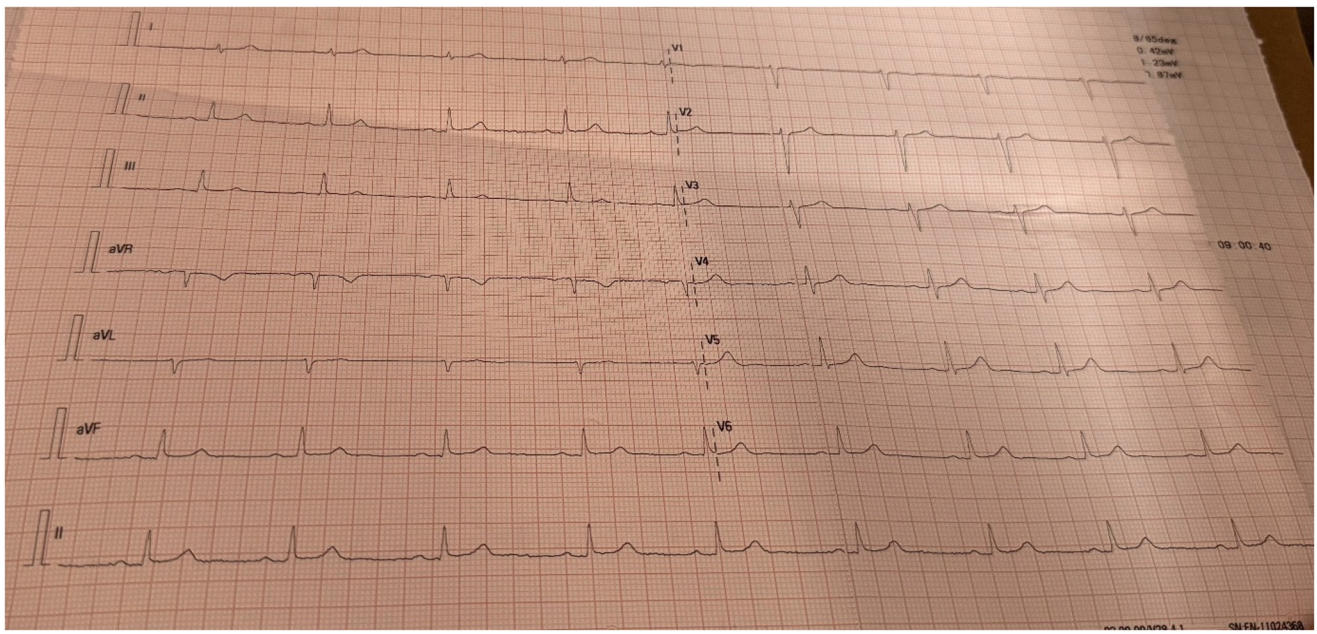

Figure 2. ECG of the patient at the time of ER arrival; Heart rate: 55 bpm.

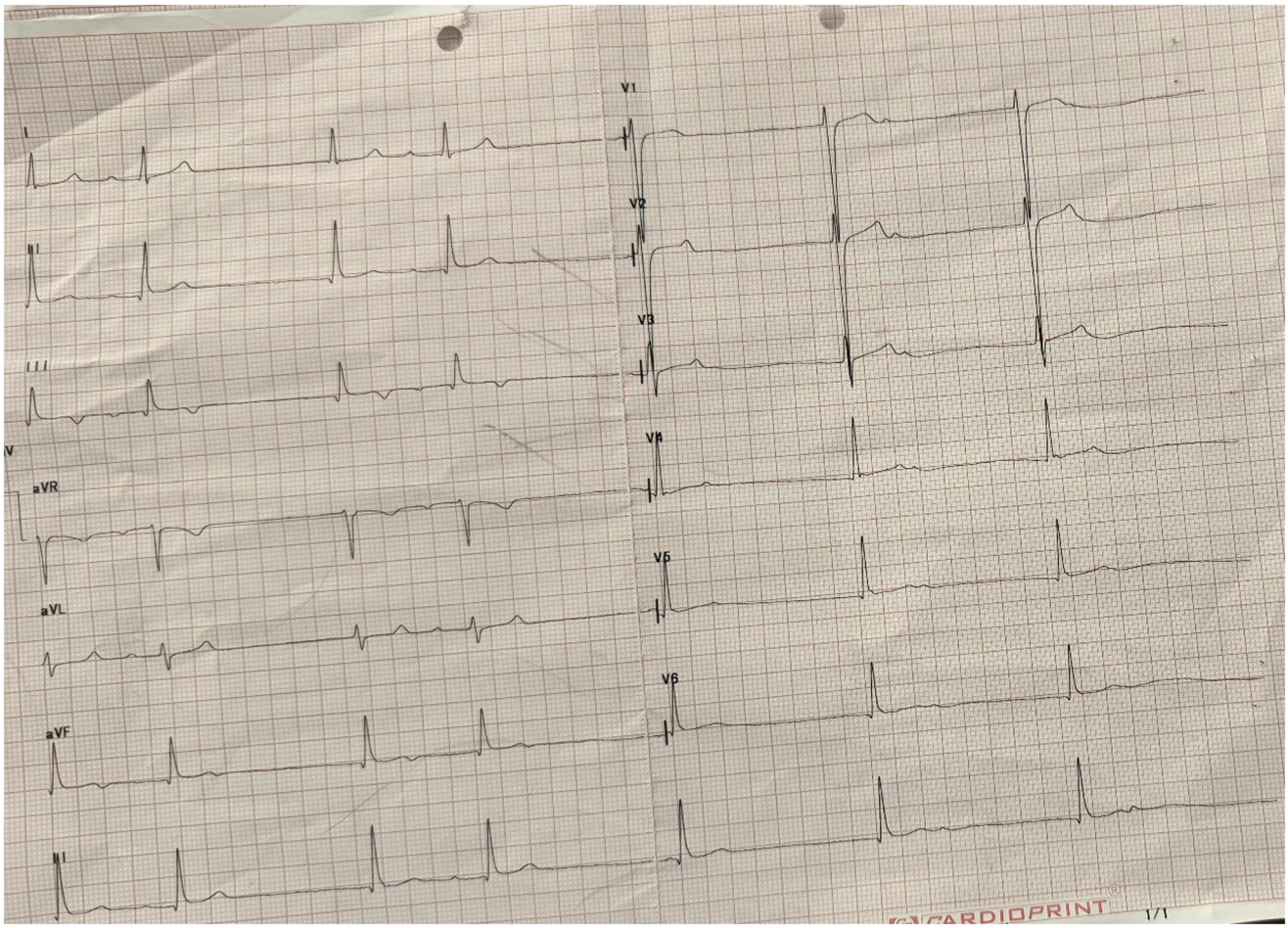

Figure 3. ECG at the arrival time in the ER department; HR: 40 bpm.

reported using it for boosting the immune system and fighting flu-like illness.

Negative, sometimes fatal adverse effects are associated with mad honey. "Bradycardia" and "hypotension," which can result in symptoms like dizziness, nausea, vomiting, weakness, blurred vision, syncope, vertigo/headache, impaired consciousness, sweating, fainting, hypotension, malaise, excessive perspiration, chest pain, presyncope, and exhaustion, are the most prevalent indicators of mad honey intoxication[6]. All of our patients presented with generalized weakness, lightheadedness and nausea.

In order to cause bradycardia, hypotension, and a decrease in respiratory rate, grayanotoxin binds to the sodium channel, inhibits its repolarization, increases its membrane permeability, and moves the membrane potential in the direction of hyperpolarization. Ultimately, the toxin prolongs depolarization and acts like a cholinergic agent.[1,7-9]

Compared to cardiac muscles, skeletal muscle sodium channels are more vulnerable to grayanotoxin[10]. These membrane effects are related to the observed reactions of the central nervous system, skeletal and cardiac muscles, and nerves[11]. The symptoms of mad honey poisoning are transient, as grayanotoxin is metabolized and excreted within a day. The amount of mad honey consumed and its toxic effects are correlated linearly; however, the distribution of grayanotoxin inside honey varies throughout patients, resulting in varying degrees of intoxication[3,6]. Similar observations were made in our series as well (Table 1).

The quantity of mad honey consumed, the concentration of grayanotoxin in the honey, and the time of year it is produced all influence the degree of intoxication.[7] However, a descriptive study determined no association between blood level of grayanotoxin and clinical findings.[12] Akca and Kahveci reported that men experience mad honey poisoning/intoxication five times more frequently than women, with men aged 40-60 years being more commonly affected[13] This higher prevalence in this age group is attributed to the higher prevalence of hypertension and increased usage of mad honey as sexual stimulant.[2,14]. However, our case series included six females out of eleven reported cases, all of whom were young adults.

Although there is standard test to determine the patient's blood level of grayanotoxin, clinical findings – such as the patient's history of honey consumption prior to the onset of symptoms – are sufficient to diagnose mad honey intoxication, particularly in regions where the condition is common[3]. High performance liquid chromatography and mass spectrometry can be used to determine the level of toxin in blood or urine, but has limited clinical implications and are only used for research purposes so far.[12,15] If left untreated the signs and symptoms can persist for a day. Full recovery with normal vital signs may take

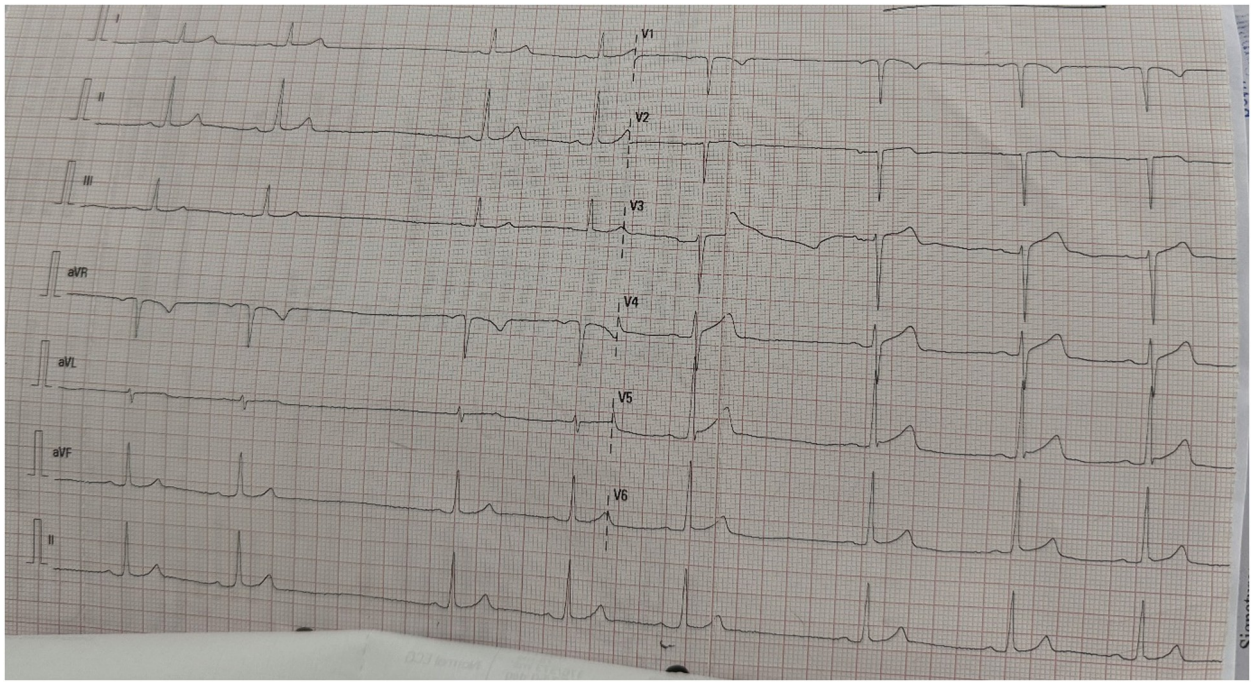

Figure 4. ECG at the arrival time in the ER department; HR: 46 bpm.

a few days[16]. The return to normal mental condition occurs gradually. Saline infusion is used to treat dizziness and mild hypotension; atropine is recommended for severe hypotension and bradycardia. Transvenous pacing and epinephrine or dopamine infusion are recommended if saline infusion and atropine are insufficient[17]. Intoxication with mad honey has a fairly

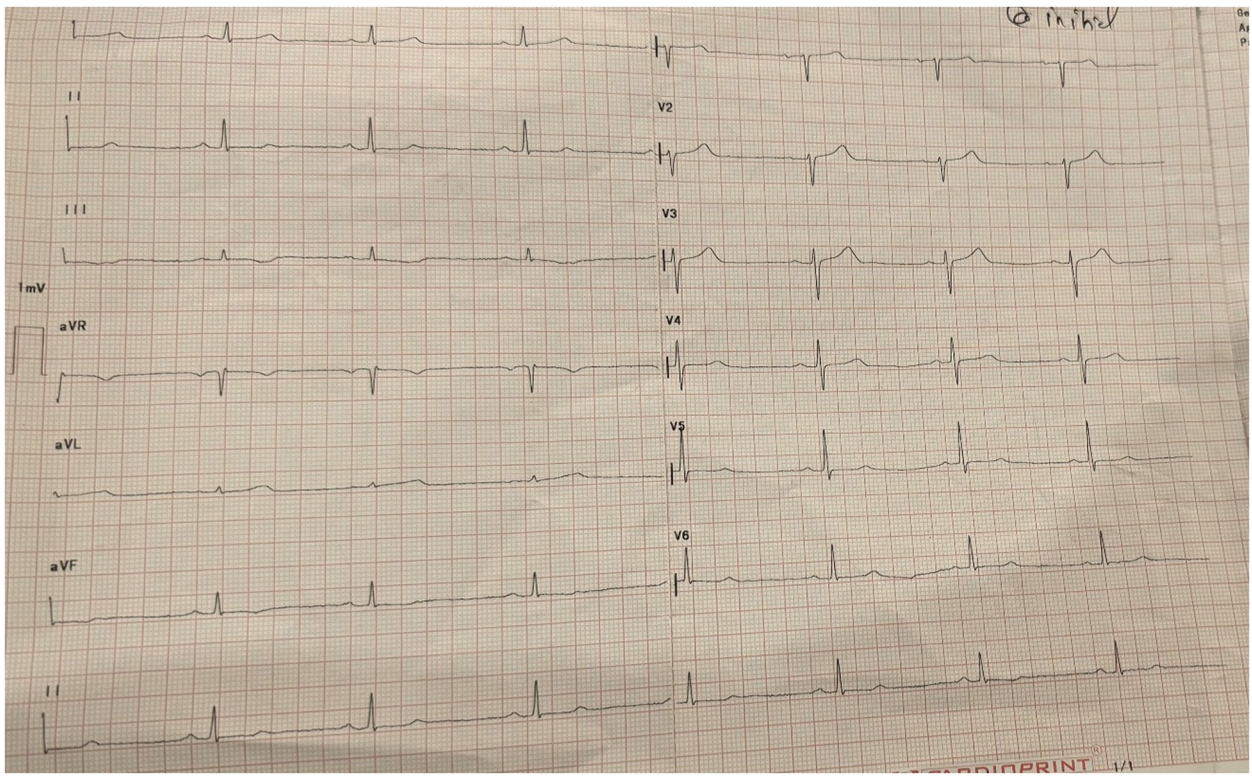

Figure 5. ECG of the patient at the time of discharge; Heart rate:54 bpm.

Table 1

Cases summary

CASE	Age/ Gender	Amount of mad honey ingested(approximate) (1 teaspoon equivalent to 5 ml)	Onset of symptoms	Symptoms	Heart rate at presentation	Blood pressure at presentation (mm of Hg)	Atropine in ER	Vasopressor Support
1	59/M	30 ml	2hrs	Nausea, Dizziness, Loss of consciousness	39 bpm	70/50	0.6 mg IV stat	Not Required
2	42/F	1 teaspoon	30 mins	Dizziness, Nausea, Vomiting	45 bpm	80/50	Not required	Not required
3	49/M	2 teaspoon	1 hour	Dizziness, nausea, Vomiting	49 bpm	70/50	Not required	Noradrenaline started @ of 0.05mcg/kg/min and adjusted and tapered
4	70/F	1 teaspoon	2 hours	Nausea, sweating, Dizziness	60 bpm	80/60	Not required	Not required
5	43/M	2 teaspoons	1 hour	Sweating, syncope, vomiting	38 bpm	80/60	0.6 mg IV stat given	Not required
6	35/M	4 teaspoons	1 hour	Nausea, vomiting, Dizziness	35 bpm	80/60	0.6 mg IV stat	Not required
7	34/F	3 teaspoons	20 mins	Nausea, vomiting, Dizziness	48 bpm	80/50	Not required	Not required
8	35/F	20 ml	1 hour	Nausea, Vomiting, sweating	50 bpm	70/50	Not required	Not required
9	51/F	2 teaspoons	30 mins	Lightheadedness, nausea	50 bpm	80/40	Not required	Not required
10	31/M	1 teaspoon	2 hrs	Generalized weakness, vomiting	42 bpm	90/60	Not required	Not required
11	34/F	1 teaspoon	3 hrs	Dizziness, epigastric pain	54 bpm	80/50	Not required	Not required

good prognosis, and almost all patients respond to therapy even though the symptoms appear to be life-threatening[4].

Mad honey harvesting is a traditional culture among Gurung communities in Nepal[18]. Various documentaries and videos are made showcasing the risk involved in its harvest.[19-21] Increasing cases of mad honey poisoning are seen every year because of the lack of awareness of its potential complications among individuals as well as traditional belief regarding its healing and immune boosting powers. The curiosity to try mad honey at least once seems to be a contributing factor.

Conclusion

Although the prognosis is fairly good, mad honey intoxication has significant morbidity. Lack of knowledge about the potential complications of consuming mad honey seems to be the cause of cases of poisoning seen annually.

Ethical approval

Not applicable

Table 2

Lab Investigations

Case	Total Leukocyte count	Hemoglobin	Random Blood Sugar	Sodium/ potassium	Serum calcium (ionized)	Serum creatinine	Thyroid stimulating hormone(TSH)	Liver function tests(SGPT/ SGOT)
Reference range	(4000-12 000/ul)	(13-18 g/dl)	(70-120 mg/dl)	(135-145 mmol/L)/ (3.5-5.5 mmol/L)	(4.5-5.3 mg/dl)	(0.3-1.1 mg/dl)	(0.4-4mU/L)	SGPT (5-49 IU/L) SGPT(5-46 IU/L)
1	7560	12.5	90	141/4.6	4.7	1.1	2.1	44/30
2	6470	11.5	127	134.9/3.3	4.4	0.8	2.5	47/40
3	12 000	12	126	139.9/3.9	4.8	1.3	3.0	42/39
4	5670	12.2	104	143.3/3.7	4.9	0.9	3.5	40/35
5	8530	16.1	136	140.3/3.6	4.6	1.4	2.7	44/35
6	7880	15.4	98	140.9/4.4	4.6	1.1	2.9	43/39
7	7630	13.1	128	140.6/4	4.4	0.8	2.5	44/36
8	5560	8.7	101	136.8/4.1	4.5	0.99	2.8	41/38
9	7180	12.6	110	138.5/4.5	4.9	1.02	3.1	44/38
10	11 630	14.6	108	136/3.7	4.8	0.95	3.3	42/34
11	9580	12.3	67	139/3.8	4.6	1.0	2.2	44/32

Consent

Written informed consents were taken from the patients for publication of this case series.

Sources of funding

All the authors declare to have received no financial support or sponsorship for this study.

Author's contribution

B.K.S.: study design, data collection, writing the paper, reviewing; S.H.: study design, writing the paper, reviewing; J.G., S.S., S. P., G.P., S.K.J., N.S., S.T., S.D.: writing the paper, reviewing.

Conflicts of interest disclosure

All the authors declare to have no conflicts of interest relevant to this study.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

Sushan Homagain.

Provenance and peer review

No.

Data availability statement

Data will be provided by the corresponding author on reasonable request.

Acknowledgement

We are grateful and thankful to the patient and their relatives for cooperating during this report study.

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