Correspondence

A family with nutmeg poisoning due to a home-made 'Covid treatment syrup'

The enthusiasm to find an effective treatment or prophylaxis for Covid-19 has been seen in alternative medicine systems such as Ayurveda, Siddhi, and other traditional methods unique to Asians. The substances used include ginger, coriander, cardamom, cinnamon, pepper, garlic, holy basil, sweet flag, Malabar nut and nutmeg.

Various recipes of home-made syrups using nutmeg (*Myristica fragrans*) as the main ingredient were circulated on social media among the Sri Lankan community, claiming to be effective against Covid-19. Human nutmeg poisonings with non-fatal and fatal outcomes are well documented, and these mixtures have several ingredients which could potentiate the toxic effects of nutmeg. The safe dose and toxic effect profiles of these substances are not scientifically studied.

We report a family with nutmeg poisoning following ingestion of a home-made Covid-19 preventive syrup. The diagnosis was based on the history and clinical features.

A 48-year-old woman weighing 68 kg was seen 3–4 hours after consuming a home-made syrup as a prophylactic treatment for Covid-19, with nausea, vomiting, gradual onset confusion and hallucinations. The main syrup ingredients were 200 g of nutmeg and 300 ml of bee honey made to a volume of one litre. She had consumed 75 ml, approximately a nutmeg dose of 220.58 mg/kg body weight. The children had consumed only a few sips.

She was restless and confused. Her heart rate was 120 per minute and blood pressure was 160/80 mmHg. There was generalized muscle weakness of grade 3-4/5, dry skin and acute retention of urine. She had hyponatraemia (125 mmol/L). The rest of the biochemical investigations were within normal limits. She was sedated with intravenous midazolam and hydrated with 0.9% NaCl and given activated charcoal. After 72 hours she made a complete recovery. The children developed similar clinical features to a lesser degree and were managed symptomatically.

Nutmeg is a spice used in small amounts to flavour food. In alternative medicine, nutmeg has been used as a stimulant, anti-diarrhoeal, carminative, aphrodisiac and anti-rheumatism agent. The fixed oil of nutmeg contains trimyristin and myristic acid, while the volatile oil comprises a mixture of terpenes and alkenylbenzene derivatives. Myristicin (5-allyl-1-methoxy-2,3-methylenodioxy-benzene), safrole and elemicin constitute about 80% of the alkenylbenzene derivatives. Myristicin is metabolized to 3-methoxy-4,5 methylenedioxyamphetamine (MMDA) a sympathomimetic with hallucinogenic properties. The human toxic dose of nutmeg is 1–2 mg/kg body weight. The toxic effects of myristicin include nausea, vomiting, palpitations, dehydration, hallucinations and urinary retention. These symptoms occur 3–6 hours after ingestion of myristicin and persist for up to 72 hours. Elemicin decreases muscle coordination and activity. The patient's confusion and hallucinations were due to a toxic dose of myristicin, generalized muscle weakness was likely to be due to elemicin while hyponatraemia could be due to a high level of MMDA-like substances with increased release of vasopressin resulting in syndrome of inappropriate antidiuretic hormone (SIADH) secretion.

The importance of scientific evaluation of treatments and the danger of self-medication is highlighted here. We hope that the worldwide health and regulatory authorities will educate the public regarding the danger of self-medication using medicinal regimens given in social media.

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[**To cite:** Medagoda K. A family with nutmeg poisoning due to a home-made 'Covid treatment syrup' [Correspondence]. *Natl Med J India* 2022; **35:**187.]

Covid-19-associated mucormycosis in patients with renal failure

A surge of an invasive fungal infection, mucormycosis has been reported in association with Covid-19. There is no reported literature yet in a subset of patients with renal failure. These patients tend to have severe Covid-19, warranting the use of steroids, which can potentially increase the risk of mucormycosis. Uraemia and metabolic acidosis are additional risk factors for this fungal infection in these patients.

Three hundred and eighty-seven patients were admitted with Covid-19 and renal failure between March 2020 and May 2021 at a tertiary care centre in western India. We studied 4 of these patients (1%) who developed mucormycosis and 1 patient who had a mild respiratory illness 2 weeks after the Covid-19 (Covishield) vaccine. The reported efficacy of these vaccines is 60%–65%, 4 weeks after a single dose.[1] Hence, it is likely that this patient had Covid-19 due to high community transmission. As the patient did not visit the hospital during this illness, the diagnosis of Covid-19 could not be made.

All these patients were on haemodialysis for either acute kidney injury (AKI), AKI on chronic kidney disease (CKD), or end-stage renal disease (ESRD; Table I). Four patients with uncontrolled diabetes had received high-dose steroids and had hypoxaemia on admission. All patients had rhino-orbital involvement with 3 patients having additional cerebral involvement and 1 had pulmonary involvement. Median (interquartile range) time to onset after

TABLE I. Description of patients with Covid-19-associated mucormycosis (CAM) on dialysis

Age, gender	Diagnosis	Serum creatinine (mg/dl)		Severity of Covid-19*	Diabetes			Hypoxaemia	Cumulative steroid dose equivalent to dexamethasone (mg)	Time of onset post Covid-19‡	Site of involvement	Microbiological diagnosis (KOH smear and fungal culture)	Antifungal therapy§		Timing of surgical intervention (if done)	Renal outcome	Patient outcome
		Baseline	On admission		Uncontrolled†	Blood sugar on admission (mg/dl)	HbA1c (if available)						Timing	Duration (days)			
30, woman	ESRD	na	na	Severe	No	93	na	Yes	75	Day 15	Rhino-orbital-cerebral	*Rhizopus* sp	Day 2	45	Day 7	ESKD	Alive
50, man	AKI on CKD	1.8	8.6	Severe	Yes	353	Not available	Yes	460	Day 12	Rhino-orbital	*Rhizopus* sp and *Mucor* sp	Day 2	45	Day 7	Serum creatinine 1.8 on discharge, stable after 3 months follow-up	Alive
70, man	AKI	na	4.4	Severe	Yes	567	8.6%	Yes	24	Day 6	Rhino-orbital	Patient expired before complete evaluation	Day 3	10	Not done	na	Died on day 14
55, man	AKI on CKD	2.5	9	Severe	Yes	468	12%	Yes	68	Day 13	Rhino-orbital-cerebral	No growth	Day 1	45	Day 6	Serum creatinine 2.7 on discharge, lost to follow-up	Alive
40, man	AKI on CKD	Not available	18.5	Mild Covid-19-like illness day 15 post-first dose of Covishield vaccine	Yes	250	Not available	No	0	Day 30 after mild Covid-19-like illness	Rhino-orbital-cerebral and pulmonary	No growth	Day 1	30	Day 25	na	Died on day 30

CAM occurrence of proven mucormycosis in patients with Covid-19, the diagnosis of Covid-19 was made by RT-PCR (reverse transcription-polymerase chain reaction), mucormycosis was defined as compatible with clinical, radiological manifestations with a microbiological diagnosis of fungi of the order *Mucorales* with either KOH smear and/or fungal culture. * *mild*: asymptomatic/symptomatic upper respiratory infection with or without comorbid conditions (>60 years, obesity, diabetes mellitus, hypertension, coronary artery disease, chronic lung disease, chronic kidney disease,immunocompromised state, immunosuppressive drugs) *severe* SpO_2 (oxygen saturation) <94% or requiring oxygen (hypoxaemia) † fasting blood sugar >130 mg/dl or postprandial blood sugar >180 m g/dl or HbA1c >7% ‡ diagnosis of Covid-19 being day 0 § amphotericin B deoxycholate (conventional) at 0.7–1 mg/kg/day DM diabetes mellitus AKI acute kidney injury CKD chronic kidney disease ESRD end-stage renal disease NA not applicable 1 based on clinical presentation and radiological extent

diagnosis of Covid-19 was 13 (9–22.5) days. Uncontrolled diabetes was defined as fasting blood sugar >130 mg/dl or post-prandial blood sugar >180 mg/dl or HbA1c >7% according to the glycaemic recommendations given by the American Diabetes Association.[2]

We also included detailed data on the timing of medical and surgical intervention after the diagnosis of mucormycosis. All patients were treated with amphotericin B deoxycholate (conventional) at dosages of 0.7–1 mg/kg/day and 4 patients underwent immediate surgical intervention. Median (IQR) duration of antifungal therapy was 45 (20–45) days and was continued until clinical and radiological resolution of active disease, which was assessed after surgical intervention. Timely surgical intervention could not be done in 2 patients due to haemodynamic instability. These 2 patients died within 6 weeks of the onset of illness. One had AKI, the other had AKI on CKD and they died while being on dialysis. Of the remaining 3 patients, one was on dialysis as a result of ESRD, 2 had AKI on CKD. Serum creatinine of both these patients returned to baseline on discharge. One of these 2 patients had followed up after 3 months of illness and had stable kidney function, whereas the other was lost to follow-up.

This study emphasizes that renal failure is an important risk factor for Covid-19-associated mucormycosis (CAM). Severe metabolic acidosis and uraemia, which is associated with impaired neutrophil chemotaxis, impaired activation of helper T cells make this group of patients a vulnerable population for acquiring this fungal infection. Our patients had uncontrolled diabetes, hypoxaemia and received high-dose steroids which were concurrent with the results of Patel *et al*.,[3] who reported that high-dose steroids and hypoxaemia were independently associated with the development of mucormycosis. The majority of our patients were managed with a combination of surgery and antifungal therapy. Mortality in 2 patients was possibly due to an inability to do and a delay in surgical intervention, respectively. These results were similar to that from the existing literature,[3] which reported that the combination of surgery and antifungal therapy was associated with better survival.

To conclude, a high degree of suspicion of mucormycosis is required in patients with Covid-19 and renal failure with an immediate medical and surgical intervention being necessary to reduce mortality.

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[**To cite:** Patil A, Rao N, Kumar K, Modi T, Gandhi C, Deb S, *et al*. Covid-19-associated mucormycosis in patients with renal failure [Correspondence]. *Natl Med J India* 2022;**35:**187–9.]

Awareness of surgical smoke risks and assessment of safety practices during the Covid-19 pandemic

Cases of pneumonia of unknown aetiology occurred in the Wuhan city of China in December 2019.[1] It was revealed that the pathogenic agent of pneumonia in these patients was 'severe acute respiratory syndrome coronavirus 2' (previously known as 2019-nCoV).[2] In February 2020, this disease was identified by the WHO as coronavirus disease 2019 (Covid-19).[3] The pandemic was declared on 11 March 2020, as the disease continued to spread rapidly and began to appear in the USA, and in parts of Europe. Covid-19 was a new virus and little was known about it. Guidelines were updated in the light of new information and experiences gained everyday. Further updates have continued in the coming months and years.

Operating theatres are high-risk areas with airway or potential splash and contact contamination. In patients with possible or definitive Covid-19, publications related to safe surgical algorithms appeared.[4]

Smoke is a harmful by-product produced using heat-producing tools such as electrocautery, laser, ultrasonic tools, high-speed drills, saws used for surgical smoke, haemostasis, excision and dissection. In the literature, it has been stated that surgical smoke contains dead and living cellular materials, blood particles, bacteria, viruses, toxic gases, vapours (benzene, toluene, carbon monoxide, etc.), and particles that damage the lung.[5]

Surgical smoke threatens the health of both patients and operating room employees due to the harmful substances it contains.[5] Many international organizations, associations and institutes whose field of study is the safety of employees and patients have included surgical smoke and smoke protection in their core business activities. The Occupational Safety and Health Administration of the US Department of Labour states that approximately 500 000 operating room employees are exposed to surgical smoke every year and emphasizes that surgical smoke should be removed from the operating room properly.[6] Guidelines developed by organizations such as the Association of Perioperative Registered Nurses, the American National Standards Institute, the Emergency Care Research Institute state that precautions should be taken to protect humans from surgical smoke.

In the literature, there is no evidence yet that Covid-19 can be transmitted through surgical smoke. However, previous studies have shown the presence of different viruses in surgical smoke including Corynebacterium, human papillomavirus (HPV), poliovirus, human immunodeficiency virus and hepatitis B virus.[7] Although the possibility of disease transmission through surgical smoke exists in humans, few cases have been documented.[8] Most commonly, HPV transmission has been reported during anogenital surgery. This is probably due to direct contact of the infected area with the electrocautery.[8]

These cases occurred in specialists performing gynaecological surgery without additional risk factors for the disease. In another study, it was revealed that 1 of 5 surgeons and 3 of 5 nurses were positive for HPV after laryngeal and urethral papilloma surgeries, and the detected HPV genotypes were the same as those of the patients.[9] This suggests that viruses in the blood may be present in surgical smoke. Although the transmission of Covid-19 is currently thought to be mainly through respiratory droplets, there is a theoretical risk of virus aerosolization during surgery.[10]

The operating room ventilation system is not the only method of smoke extraction; protection from surgical smoke can also be achieved by local extraction at the site of the surgery or using personal filtration masks. Surgical masks are standard equipment used to protect against microorganisms and aerosol body fluids during the procedure. However, it can only block large droplets or particles larger than 5μ. However, it is known that surgical masks do not protect against surgical smoke because the particle size in surgical smoke is less than 0.1μ. The Covid-