## Nos soignants ont du talent 25 juin 2021

#### Introduction

Emergency Department, Cayenne General Hospital, (2) Clinical Investigation Department, Cayenne General Hospital, (1) Since 1956, a hybrid species of bees descending from African Apis (3) French Red Cross, French Guiana, (4) Intensive Care Unit, Cayenne General Hospital, (5) Inter-Army Medical Center, French Guiana

### mellifera scutellata and European Apis mellifera mellifera has

been proliferating on the American continent. Its nickname "killer bee" originates from its exceptionally high defensive behavior and its ability to form simultaneous attacks of several hundred individuals<sup>1</sup>. When stinging, these bees release pheromones on the skin of their target in addition to those injected within the venom, thus sending a powerful alarm signal to neighboring colonies and prompting a massive attack that may pursue the target over several hundred meters<sup>2</sup>.

Figure 1 : Par Wilfredor — African Bee (Apis mellifera scutellata) on a sacred lotus flower (Nelumbo nucifera)



An attack of killer bees leads to **massive envenoming** with a systemic toxic potential defined by a threshold of at least 50 stings for an adult<sup>3</sup>. It is responsible for an anaphylactoid reaction (cardiovascular shock, acute respiratory distress, gastrointestinal signs), and for a toxic syndrome (pain, rhabdomyolysis, hemolysis, acute kidney failure and disseminated intravascular coagulation) which most commonly requires intensive care with dialysis and may be fatal within 72 hours<sup>3</sup>. Bee venom is a complex cocktail of dozens of proteins and peptides, and no anti-venom has been commercialized to date. In French Guiana, a French overseas territory located in the Amazon between Suriname and Brazil, this species has been observed since 1975 but no collective attack of this scale has been reported so far. We report the first description of a massive "killer bee" attack in this region.



Figure 2: Symptoms reported immediately after envenomation by the ten patients and physicians on site

#### References

2018;150:96-104.

# "Killer Bee" Swarm Attacks in French Guiana : the Importance of Prompt Care

Swann Geoffroy<sup>1</sup>, Alexis Fremery<sup>1</sup>, Majdi Omri<sup>1</sup>, Yann Lambert<sup>2</sup>, Rémi Mutricy<sup>1</sup>, Maysoune Ben Nasr<sup>1</sup>, Abdoulaye Kama<sup>1</sup>, Christian Marty<sup>3</sup>, Mathieu Nacher<sup>2</sup>, Hatem Kallel<sup>4</sup>, Nathalie André<sup>5</sup>, Jean Pujo<sup>1</sup>

#### Cases description

**On December 5, 2019, in Cayenne, French Guiana**, 18 French military policemen were massively attacked by killer bees on the edge of the Amazon forest. The proximity of a mobile unit of the emergency department of Cayenne Hospital (SMUR) allowed an immediate pre-hospital emergency care for the victims. Another SMUR unit, five firefighter teams including two firefighter nurses, and then a medical team from the French army (CMIA) were also mobilized.

Ten policemen had been stung from 75 to 650 times. All victims were men aged between 22 and 52 years and weighing from 71 to 97 kg. They had no medical history, except one who reported an allergic reaction to hymenoptera stings in childhood. These ten patients were classified as "Absolute Emergency" because of signs of anaphylactoid reaction (figure 2). All patients received immediately an intramuscular injection of 1 mg epinephrine, respiratory support with 2 L/min oxygen, vascular filling with 500mL of 0.9% NaCl solution, intravenous (IV) injection of 2 mg/kg methylprednisolone, and 5 mg dexchlorpheniramine. Five patients improved quickly while the others required a second injection

of epinephrine 0.1 mg IV. After initial care, the patients were evacuated to Cayenne Hospital. In the ED, two hours after envenoming, the patients showed:

- Rapid respiratory improvement in all of them
- Mild tachycardia (< 110 bpm): 6 patients
- Moderate hypertension: 4 patients
- Moderate digestive symptoms: all patients

Biological tests were sampled at 2, 10, 16 and 40 hours after envenoming. They showed:

- **An initial phase** with moderate functional kidney injury, increased troponin levels and inflammatory syndrome, peaked at H2 and gradually normalized after H16.
- A second phase from H16 onwards with rhabdomyolysis, an elevation of aminotransferases predominating over AST (delayed elevation of ALT at day four). A return to normal values was observed after day four (figure 3).

Five patients were stung between 75 and 200 times and left the hospital after 18 hours of monitoring. The other five patients stung between 200 and 650 times were discharged after 44 hours of monitoring. A clinical and biological control was performed by the CMIA on D4 and D11.



standard deviation for the ten patients

#### Discussion

The kinetics of the clinical signs initially oriented the clinicians towards a diagnosis of anaphylactoid reaction<sup>4</sup> which led to immediate and adapted on-site management<sup>5</sup>. Anaphylactoid shock, an immediate explosive reaction not requiring prior exposure, is caused on the one hand by the direct action of biogenic amines of the venom and on the other hand by mast cell degranulation due to the simultaneous action of melitin and the mast cell degranulation peptide. In 2018, Schmidt defined three stages of clinical and biological severity of toxic envenoming based on the number of bee stings: moderate (50 to 200), severe (200 to 500) and fatal (over 500 stings)<sup>6</sup>.





According to Schmidt's classification, one patient with 75 stings met the category of moderate envenoming, seven suffered from severe envenoming, and two fell into the clinical definition of fatal envenoming.

The peak levels of AST, ALT and CPK seems to be correlated with the number of stings (figure 4). This observation suggests a dose-dependent, direct toxic mechanism causing rhabdomyolysis during the second phase (H16 to D4). The peak levels of urea, creatinine, leukocytes, neutrophils were not correlated with the number of stings, which could support the hypothesis of an initial anaphylactoid reaction.

The patients thus suffered a two-phase anaphylactoid and toxic reaction, which was treated very early with pre-hospital medical care and permitted to prevent the classic chain reaction: functional acute kidney failure, myoglobin accumulation, acute tubular necrosis, organic acute kidney failure. This observation is strengthened by the absence of complications or deaths in our patients, despite the potentially fatal envenoming <sup>2, 3,</sup> Upcoming complementary allergy tests will allow us to understand the pathophysiology of this disease.

In conclusion, massive killer bees attacks can involve multiple victims. Lifethreatening complications could be prevented by early intervention and appropriate management.













