

# Suicidal Attempt Using Racumin: A Case Report from Gaza Strip, Palestine



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## Summary

Uncontrolled pesticide market enables easily handling of pesticides to everybody in Gaza Strip, Palestine. This situation makes the suicidal attempts using pesticides very possible. This study reports a suicidal case using Racumin in Gaza Strip, Palestine. A fifty six years old man was brought to the hospital with a complain of a suicidal attempt using red bait poisoning, commonly known as Racumin, a rodenticide being used by municipalities. Results showed severe abdominal colic without losing conscious and high value of international normalized ration (INR) indicating high potential of bleeding and skin hemorrhage, and moderate inhibition of acetyl choline esterase (ACHE). Management of the poisoning case was achieved with low dose of Atropine injection followed by gavage of vitamin K until the international normalized ration (INR) become in the normal range 0.8-1.2 during a three days treatment. Racumin poisoning may lead to death in case of large swilling dose. It is recommended to in force restrictions and/or using more power on controlling pesticide handling among population to reduce suicidal attempts.

**Keywords:** Racumin; Atropine; INR; ACHE; Bleeding

## Introduction

Suicidal attempts in Gaza Strip progressively increased due to bad socio-economical situation. So far, suicidal attempts may be occurred via intentional swelling medical drugs, agrochemicals such as pesticides, industrial chemicals such as detergents and disinfectants, and/or contaminated food. Ingestion of pesticide becomes the easiest way for suicidal attempts. However, ingestion of pesticides weather accidental or intentional is counted for poisonous cases among population. Several studies revealed acute occupational toxicity of pesticides [1,2]. Racumin, a rodenticide, widely used elsewhere including Gaza strip for agricultural and public health purposes. It is easily purchased by the community without any restrictions, or regulations neither from ministry of agriculture nor ministry of health. In the past ten years large amount of Red bait poison (Racumin) was applied in Gaza Strip for controlling rats. No occupational toxicity of Racumin was reported in Gaza. However, here below we presented a case report of suicidal attempt from Gaza using red bait poisoning (Racumin) to an old man, 56 years old and discuss its future consequences.

## Materials and Method

Mr. Lamboo M, an old man, 56 years old, married, and grandfather, was found with abdomen colic in his bed room at the bottom floor of his building in Gaza city. He was brought to

the hospital at 10:50 A.M. with history of suicidal attempt by swelling Rat Bait Poisoning locally known as Red rat poisoning. It is Racumin, a rodenticide being used to control rat and mouse.

So far Racumin is a rodenticide has the following IUPAC name: 4-hydroxy-3-(1, 2, 3, 4-tetrahydro-1-naphthyl) coumarin. Its chemical structure is shown in Figure 1. Its solubility in water depends on pH value; it has low solubility (4mg/L) at acidic media (pH 4.2) and high solubility (425mg/l) at pH 7. Its pKa is 4.5-5, with a  $K_{ow}$  Log P = 3.46 (Tomlin 2000). Racumin kill rodents through its activity as anticoagulant which inhibits blood coagulation by blocking prothrombin formation in the lever. Mr. Lamboo M was brought to the emergency department at the main hospital, then was admitted in the intensive care unit (ICU) for medical treatments.

## Medical treatment

Following the international guideline described previously for pesticide poisoning (WHO 2010), the clothes of Mr. Lamboo were removed and his skin was washed several times with water a soup to insure contamination free environment. Gastric lavage was then undertaken several times at least one of them after gavage of fresh milk to insure complete removal of Racumin residues.

Blood samples were collected for complete blood chemical analysis, and for Acetyl cholinesterase (ACHE) and liver biomarkers determination. These steps were repeated every day to monitor the level of international normalized ration (INR), which indicates the clotting feature of blood. Values above 1.2 indicate anticoagulation status of blood and high potential of bleeding and/or skin hemorrhage.

The case was given 10mg atropine in 500mL normal saline solution every 6h, for the 1<sup>st</sup> day only then it was stopped. The patient was given vitamin K until the INR becomes in the normal range 0.8-1.2.

### Results

In Table 1 we present the results of blood analysis.

**Table 1:** Blood analysis of the patient during the intensive care unit hospitalization.

Item	Frequency of Treatment		
	30/8/16	1/9/2016	2/9/2019
WBC (10 <sup>3</sup> /mm <sup>3</sup> )	5.2	4.8	4.9
RBC (10 <sup>6</sup> /μL)	4.27	4.58	4.68
HGB (g/dL)	11.7	12.09	12.2
HCT (%)	34.4	36.6	37.6
ACHE (U/L)	9860	9789	9620
AST (U/L)	22	20	21
ALT (U/L)	6	8	7
Urea (mg/ dL)	19	18	20
Creatinine (mg/ dL)	0.92	0.98	0.85

It can be seen that a gradient decrease in WBC concentrations are observed. In contrast RBC, HGB, and HCT are slightly increased. In the way around a reduction in ACHE activities are observed indicating slight inhibition or disturbance of enzyme activity. In contrast AST and ALT are nearly similar. So far urea and creatinine have similar behavior.

In Table 2 we present the value of INR, the important indicator of blood clotting as affected by Racumin poisoning.

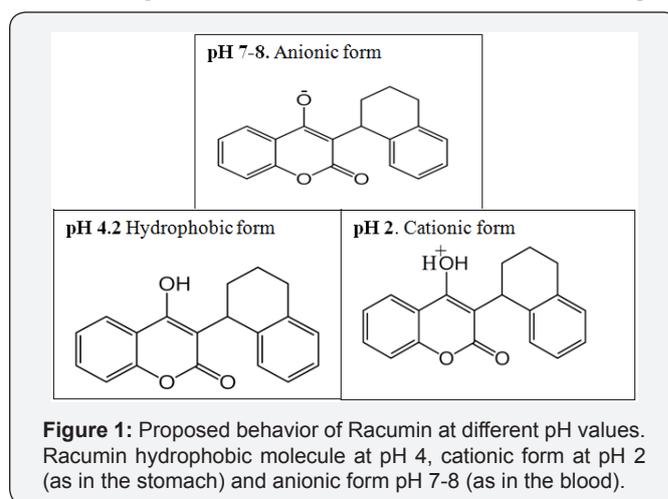
**Table 2:** INR value during ICU hospitalization.

Item	Frequency of Treatment		
	30/8/16	1/9/2016	2/9/2019
Control	13.5	13.5	13.5
Prothrombin time PT	17.3	16.5	15.7
Activity	60.3	80.7	71
INR	1.3	1.27	1.12

It is obvious that prothrombin precipitation time (PT) is reduced from 17.3min (the 1st analysis after poisoning) to 15.7min after three days of ICU hospitalization (Vitamin K was given every day). Due to this medical care the INR is reduced from 1.3 (slightly above range) to nearly in the range 1.12.

### Discussion

The present study demonstrated blood analysis and INR values of the suicidal attempt of an old man using anticoagulant rodenticide, Racumin. Generally, there were no cholinergic symptoms of toxicity regardless to the fact that the patient showed abdominal colic and a slight reduction in ACHE level. So far, it can be suggested that Racumin behaved in two different ways in the human body due to it large value of Kow Log P as affected by pH (Figure 1). Racumin is fully hydrophobic at pH4.2 and has high lipid solubility that enables partitioning in human body immediately at swelling and reaches the liver and caused inhibition of prothrombin formation to reduce blood clotting.



Moreover, the low values of ALT or ALP, indicate no liver stress due to the Racumin suicidal attempt. This agree with Mosterd & Thijssen [3] who revealed increased affinity of Racumin to hepatic tissues. This affinity may emerge from its chemical structure that contains 4-OH coumarins. Furthermore, it has been shown that Racumin elimination from the body is a slowly process [3], accordingly Racumin may have long anticoagulant effects on the exposed bodies and long bleeding may occur.

In addition, the amount of Racumin that reach the stomach may be protonated in the acidic media and become highly water soluble, and moves with the blood but its ionic form is changed from a positive molecule to a negative one according the high pH value of the blood (pH 7.35-7.45) (Figure 1). The anionic form of Racumin may react with sodium or potassium ions in the nervous system and disturb Na<sup>+</sup>/K<sup>+</sup> pump consequently a disturbance in nerve pulse or neuro chemical communication may occur. Our explanation is supported by the results in Table 1 which shows a slight reduction of ACHE activity during the ICU hospitalization.

In addition the stability of ACHE activity during the ICU treatments indicates that Racumin is not an acetylcholinesterase inhibitor. Moreover, the values of AST and ALT which are in the normal range indicate no harmful effects to the liver; furthermore the values of urea and creatinine indicate no effects on the kidney.

So far swelling of a low concentration of Racumin, the ionized fraction may be very low accordingly it may be attached by WBC and be prevented to reach the liver accordingly no anticoagulation may occur. Our explanation is supported by the results in Table 1 which showed a decrease in WBC during the ICU medication. Moreover, the data in Table 2 indicate high value of INR above normal range (0.8-1.2). This suggests that prothrombin formation was inhibited; this is also obvious from the high value of prothrombin precipitation time (PT) Table 2. In due time a reduction in the value was obtained due to Vitamin K gavage to the patient. Our results agree with [1] who found similar observation in medical treatment of Organophosphorus poisoning.

## Further consequences of Racumin poisoning

As shown in Table 1, Racumin is not a strong inhibitor to Acetylcholinesterase but it is an anticoagulant, this property in case of a pregnant female, Racumin and its fragments in Figure 1, may move through the placental membrane and cause a bleeding with the fetus. This suggestion is supported by the results of Freude et al. [4], Greer [5], Abadi et al. [6], Ageno et al. [7] and Morgan [8] who confirmed that coumarin derivatives pass the placental membrane and has the potential to cause bleeding in the fetus and teratogenicity when used in early pregnancy [9]. So far, at a high dose, Racumin may cause severe damage to the fetus and abortion or death may take place.

## Conclusion

Suicidal attempt with Racumin disturbed the nervous communication and increased the bleeding potential among poisoned cases. Moreover, the poisoning cases among females or pregnant women may lead death or fetus abortion.

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## Ethical Statement

This study was not funded by any organization

Compliance with Ethical Standards

## Conflict of Interest

Author declares that he has no conflict of interest.

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