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Dose-Dependent Effects of Mumie (Shilajit) Extract on Platelet Count in Dogs

Rizakova Dilorom Pulatovna

Andijan State Medical Institute, Department of Pharmacology, Clinical Pharmacology, and Medical Biotechnology.

Abstract

Platelets play a critical role in hemostasis, and their number and function are key determinants of bleeding risk. Mumie (shilajit), a natural herbo-mineral substance used in traditional medicine, has been suggested to influence various physiological processes. However, its effects on platelet parameters remain poorly understood.This study aimed to evaluate the effect of mumie extract on platelet count in dogs at varying dosages and time intervals following administration.Healthy adult dogs were administered mumie orally at doses of 10, 25, and 50 mg/kg. Platelet counts were measured before administration (baseline), and at 1 and 2 hours post-administration. Data were analyzed for statistical significance using paired t-tests.

Keywords: Mumie extract, Shilajit, Platelets, Thrombocytopenia, Hemostasis, dogs, Natural compounds, Traditional medicine.

Introduction

Shilajit, also known by names such as mumie, moomiyo, or mummiyo, is a naturally occurring herbo-mineral substance with deep roots in traditional medicine. It is primarily harvested from mountainous regions, including the Himalayas in India [1], as well as areas in Russia and the former Soviet Union—such as the Ural, Altai, Caucasus, Sayan, and Baikal regions, along with Kazakhstan, Uzbekistan, and Tajikistan. Other significant sources include Nepal, Tibet, China, Pakistan, and Afghanistan [2].

For centuries, shilajit has been used in traditional systems of medicine to manage a wide range of ailments. These include bone fractures, digestive disorders, joint inflammation, muscular and tendon injuries, cardiovascular and nervous system disorders, impotence, and urinary tract infections. Folk medicine also attributes wound healing, anti-diabetic, and anti-ulcerative properties to this substance.Although much of this knowledge is based on anecdotal evidence, scientific investigation into its pharmacological potential is growing. Despite the lack of large-scale, double-blind, placebo-controlled trials, preliminary studies and reports suggest a range of therapeutic properties [8,9].

However, existing research suggests that shilajit may have antioxidant, anti-inflammatory, immune-boosting, and cancer-protective properties. It is also believed to have adaptogenic and anabolic effects [1,2,3]. Notably, during the Soviet era, it was reportedly used in secret to improve both physical and mental performance in Olympic athletes and elite military personnel, helping reduce stress injuries and accelerate recovery [4]

The composition of shilajit varies depending on its origin, but it generally consists of 80–85% humic substances and 15–20% non-humic compounds [5]. Typical components include 14–20% moisture, 18–20% minerals, 13–17% proteins (with strong amylase activity), 4–4.5% lipids, 3.3–6.5% steroids, 18–20% nitrogen-free compounds, 1.5–2% carbohydrates, and 0.05–0.08% of alkaloids, amino acids, and other compounds [6]. In addition, it contains a wide variety of organic substances over 65 identified including albumins, coumarins, fatty acids, organic acids like adipic, succinic, citric, oxalic, and tartaric acids, as well as waxes, resins, polyphenols, essential oils, and

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vitamins B1 and B12 [7]. The primary bioactive components are thought to include dibenzo-α-pyrones and related metabolites, tirucallane-type triterpenes, small peptides with non-standard amino acids, phenolic lipids, tannoids, and fulvic acid. These compounds likely result from humification a natural process that breaks down organic material, leading to the formation of both simpler and more complex molecules than those originally present. Humus, from which shilajit is partly derived, consists of decomposed organic matter that has lost its original structure [2]

Platelets play a central role in the body's ability to stop bleeding, a process known as hemostasis [10]. Individuals with blood disorders and reduced platelet counts (thrombocytopenia) face a heightened risk of bleeding. As a result, significant attention has been directed toward preventive strategies, particularly in patients with hematological malignancies. [11]. These strategies often rely on platelet count thresholds to guide transfusion decisions. However, platelet quantity alone does not fully determine bleeding risk [12, 13, 14]. Other factors, such as platelet function, also play a crucial role. Dysfunctional platelets can lead to reduced clotting efficiency, further increasing the risk of bleeding even when platelet numbers are adequate. Current research indicates that platelet function is an important factor in bleeding among thrombocytopenic patients, especially in those with blood-related diseases [15, 16]. It is important to interpret these findings with caution, as the methods used to assess platelet function vary in reliability, particularly in samples with low platelet counts

Materials and Methods

The Effect of Mumie Extract on Platelet Count, Aggregation, and Adhesion in Dogs

The animals were housed under standard laboratory conditions with free access to food and water. All experimental procedures were conducted in accordance with institutional guidelines for the care and use of laboratory animals and approved by the relevant ethics committee. Purified mumie extract was used in the experiments. The extract was dissolved in sterile distilled water to prepare the appropriate dosages. Dogs were randomly assigned to three experimental groups based on dosage: 10 mg/kg, 25 mg/kg, and 50 mg/kg of body weight. The mumie extract was administered orally via a syringe fitted with a dosing needle. Blood samples were collected from the cephalic vein using standard venipuncture technique immediately before administration of the mumie extract (baseline), and again at 1 hour and 2 hours post-administration. Platelet counts were determined using an automated hematology analyzer. Each sample was measured in duplicate to ensure accuracy, and results were expressed as mean ± standard deviation (SD). Data were analyzed using paired Student’s t-tests to compare post-treatment platelet counts with baseline values within each dosage group. A p-value of less than 0.05 was considered statistically significant.

Results

The data presented in the table show that mumie at a dose of 10 mg/kg causes only a slight (statistically insignificant) decrease in platelet count. However, doses of 25 mg/kg and especially 50 mg/kg lead to a significant reduction in this parameter.

At the same time, a slight increase in platelet count was observed just two hours after mumie administration, but in the cases of 25 and 50 mg/kg doses, the platelet levels did not fully return to baseline.

Effect of Mumie on Platelet Count in Dogs

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Mumie Dose	*Baseline*	*After 1 hour*	*p-value*	*After 2 hours*	*p-value*
10 mg/kg	*240 ± 32*	*215 ± 26*	*> 0.5*	*235 ± 24*	*> 0.5*
25 mg/kg	*266 ± 34*	*186 ± 24*	*< 0.05*	*207 ± 21*	*< 0.05*
50 mg/kg	*250 ± 28*	*153 ± 18*	*< 0.001*	*183 ± 20*	*< 0.001*

Discussion

The present study aimed to evaluate the effect of mumie extract on platelet count in dogs, given the central role of platelets in hemostasis. The results demonstrate a dose-dependent response to mumie administration, with higher doses resulting in a more pronounced reduction in platelet count.

At a dose of 10 mg/kg, mumie led to only a modest and statistically insignificant decrease in platelet numbers after 1 hour, with partial recovery observed by the 2-hour mark. This suggests that low doses of mumie have minimal impact on thrombocyte levels and are likely within a safe range regarding hemostatic function.

In contrast, 25 mg/kg and especially 50 mg/kg doses of mumie resulted in statistically significant reductions in platelet count as early as 1 hour post-administration ($p < 0.05$ and $p < 0.001$, respectively). Although a mild rebound in platelet levels was observed at 2 hours, the counts did not fully return to baseline, and the changes remained significant ($p < 0.05$ for 25 mg/kg and $p < 0.001$ for 50 mg/kg). These findings indicate that higher doses of mumie may temporarily suppress platelet production or increase platelet consumption/destruction.

The mechanism behind this dose-dependent thrombocytopenic effect is not yet fully understood. It is possible that active compounds within the mumie extract—such as fulvic acid or dibenzo-α-pyrones—interact with hematopoietic processes or alter platelet lifespan. Alternatively, changes in vascular endothelium or immune-mediated pathways might also play a role in reducing circulating platelets.

From a clinical perspective, these results suggest that higher doses of mumie could pose a potential bleeding risk, particularly in patients or animals with existing hemostatic disorders or those receiving other anticoagulant therapies. However, the transient nature of the platelet reduction, as indicated by partial recovery at 2 hours, may point toward reversible or short-acting mechanisms.

Conclusion

The findings of this study indicate that mumie extract has a dose-dependent effect on platelet count in dogs. While a low dose of 10 mg/kg showed minimal and statistically insignificant changes, higher doses of 25 mg/kg and 50 mg/kg resulted in significant reductions in platelet levels within one hour of administration. Although partial recovery was observed by the second hour, platelet counts did not fully return to baseline at the higher doses.

These results suggest that, at elevated doses, mumie may transiently impair platelet homeostasis, potentially posing a risk in conditions where platelet function is critical. Further investigation is necessary to explore the long-term effects, mechanisms involved, and the impact on platelet aggregation and adhesion.

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