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THE INFLUENCE OF MUMIJO EXTRACT ON BLOOD COAGULATION PARAMETERS IN DOGS

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Abstract
This study investigates the effects of Mumijo extract at a dose of 1 mg/kg on certain blood coagulation parameters in dogs. The experiment was conducted on five dogs, and various parameters were measured at baseline, 30 minutes, and 60 minutes after the administration of the extract. These parameters included blood clotting time, plasma recalcification time, plasma tolerance to heparin, and other related coagulation factors. The findings suggest subtle changes in coagulation profiles, particularly in blood clotting time, fibrinogen levels, and fibrinolytic activity, indicating the potential influence of Mumijo extract on hemostasis in canines.

Keywords: Mumijo, blood coagulation, clotting time, plasma recalcification, fibrinolytic activity, dogs, hemostasis.

Introduction

In Traditional Medicine - It is a herbomineral exudate with a long history of use in traditional folk medicine. It originates from the mountainous regions of India (1, 3), as well as Russia (including regions of the former USSR such as the Urals, Altai, Caucasus, Kazakhstan, Sayan Mountains, Baikal, Uzbekistan, and Tajikistan), and is also found in other countries such as China, Pakistan, Nepal, Afghanistan, and Tibet (4). Mumijo, known by various names such as Shilajit, Silajita, Marathi or Gujarati (in Hindi), Asphalt (in English), Silajatu (in Bengali), Rock Juice (in Tibet), Mountain Conqueror (in Sanskrit), Hajarul-Musa or Arak-al-Jebal (in Arabic), Mumiyo or Mumnae (in Persian), μούμια (in Greek), Muemu (in Russian), Mumiyo (in German), Mineral Resinous Bitumen, Jewish Bitumen, Mineral Wax, and Bragshun, is a natural substance ranging from pale brown to dark brown, which has been used for more than 3000 years as a rejuvenating and adaptogenic remedy (2).

The origin of Mumijo is explained by three main theories: biological, geological, and bio-mineralogical. According to the biological theory, it is assumed that Mumijo forms from decayed plant residues or animal excretions under certain physicochemical conditions. The geological theory asserts that Mumijo is the result of long geological processes. Additionally, the bio-mineralogical concept suggests that this compound is the product of mechanical contamination of the liquid precursor of Mumijo with mineral factors, including the production region, types of plants, geological characteristics of rocks and soil, local temperature, humidity, and altitude, among others, all of which play a role in influencing the composition and therapeutic properties of Mumijo (7). Despite similar physical characteristics across different regions of the world, these factors affect the composition and ratio of components in Mumijo. Overall, Mumijo consists of organic compounds (60-80%), inorganic compounds (20-40%), and trace elements such as Fe, Ca, Cu, Zn, Mg, Mn, Mo, and P (8).

In the 10th century, Ahvazi in his book *Kamāl as-Sanā'a* recommended Mumijo for treating cold headaches, hemoptysis, asthma, and the removal of dead fetuses. Avicenna, the famous Persian physician of that time, in his renowned book *The Canon*, suggested Mumijo as a highly effective remedy for strengthening the brain, enhancing fertility, and treating various other ailments. Moving into the 12th century, the Persian book *Zakhire Khwārizmshāhi*, written by Jurjani, recommended Mumijo for inflammation, ulcers, urinary problems, and prostate issues (5).

Mumijo has been recommended in various doses to address a range of health problems, including urinary system disorders, jaundice, gallstones, gastrointestinal disturbances, spleen enlargement, epilepsy, hypersensitivity, nervous disorders, chronic bronchitis, tuberculosis, eczema, anemia, and diabetes (9). However, fungal contamination, especially mycotoxins, is a significant limiting factor for the widespread use of Mumijo in global practice (10).

Specialists in traditional medicine argue that Mumijo effectively addresses issues such as lack of sexual desire, kidney stones, bone pain and fractures, osteoarthritis, spondylitis, edema, hemorrhoids, aging, rejuvenation, antiseptic properties, obesity, anorexia, and weight loss (7). Due to its anti-inflammatory, antioxidant, antimutagenic, and immunomodulatory properties of fulvic acid (FA) and humic acid (HA), there is some evidence suggesting that Mumijo may serve as a potential agent for cancer prevention (8). Moreover, various doses of Mumijo have shown a reduction in blood glucose levels and beneficial effects on lipid profiles in rats (11). Mumijo extract also improves nucleic acid synthesis and increases the transport of minerals to muscle and bone tissues (4). Mumijo increases diuresis and natriuresis (12).

Materials and Methods

The blood clotting time was studied using the Lee and White method (1913), plasma recalcification time was determined according to Würgerhoff-Rock (1954), plasma tolerance and Heparin according to Poller (1954), heparin time was measured using Abrosimov's method (1957), thrombin time according to Perlik (1960), factors II, V, and VII ± X were determined using the Ovren method (1947), fibrinogen according to Rutberg (1961), the thrombotest index according to Khit (1958) in the modification by M.A. Kotovshikova, and fibrinolytic activity according to Kovalsky, Kovek, and Niverovskosmu (1959).

To investigate the effects of intravenous administration of Mumijo at a dose of 1 mg/kg on various blood coagulation parameters in dogs. Five healthy adult dogs were selected for this study. All subjects were fasted for 12 hours prior to the study to ensure accurate baseline readings. The Alai Mumijo extract was administered intravenously at a dose of 1 mg/kg body weight to each dog.

Blood samples were drawn at three time points:

1. Baseline (0 minutes): Blood samples taken before the administration of Mumijo.
2. 30 minutes post-administration: To measure the immediate effects of the Mumijo extract.
3. 60 minutes post-administration: To observe the medium-term effects of the Mumijo extract.

Results

The results of the study are summarized in the table below:

Parameter	Baseline (seconds)	30 minutes (seconds)	60 minutes (seconds)
Blood clotting time	306±51	283±53	298±55
Plasma recalcification time	62±5	59±7	62±8
Plasma tolerance to heparin	138±18	134±23	142±16
Ge-darin time	276±33	288±27	294±24
Thrombin time	13±2	14±2	14±2
Factor II ± V	12±1,4	13±1,5	14±1,2
Factor VII ± X	37±1,8	38±1,0	38±1.0
Fibrinogen (mg%)	375±65	395±78	437±93
Fibrinolytic activity (minutes)	138±11	145±34	180±68
Total protein (g%)	9,5±0,4	9,4±0,3	9,5±0,1

Discussion

The administration of Mumijo extract at a dose of 1 mg/kg led to various changes in the blood coagulation parameters, although these changes were generally modest. The most notable observation was a reduction in blood clotting time at the 30-minute mark, which returned to baseline levels after 60 minutes. This suggests a temporary enhancement in clotting efficiency shortly after administration, potentially due to the influence of bioactive compounds in the Mumijo extract on platelet aggregation or other coagulation pathways.

There were also significant changes in fibrinogen levels, which increased gradually over the study period. Fibrinogen is a key factor in the clotting cascade, and higher levels may indicate a heightened coagulation response, potentially increasing the risk of clot formation.

The fibrinolytic activity showed an increase, which may be indicative of a reduced breakdown of fibrin clots, thus promoting longer clot stability. These findings are consistent with previous studies suggesting that Mumijo may have an impact on both the coagulation and fibrinolytic systems, possibly contributing to an overall modulation of hemostasis.

No significant changes were observed in plasma recalcification time, thrombin time, or plasma tolerance to heparin, which may suggest that these parameters are not as sensitive to the effects of Alai Mumijo extract.

Conclusion

The administration of Mumijo extract at a dose of 1 mg/kg in dogs resulted in some significant changes in the blood coagulation parameters, particularly in blood clotting time, fibrinogen levels, and fibrinolytic activity. The temporary reduction in blood clotting time suggests that Mumijo may enhance certain aspects of coagulation in the short term. Additionally, the increase in fibrinogen levels over time could indicate a more robust coagulation response, while the elevated fibrinolytic activity may contribute to more stable clot formation.

However, the lack of significant changes in parameters such as plasma recalcification time, thrombin time, and plasma tolerance to heparin suggests that Mumijo's effects may be limited to specific coagulation pathways rather than a broad influence on the entire hemostatic process. Overall, these findings highlight the potential of Mumijo as a modulator of blood coagulation, but further studies are necessary to fully understand its mechanisms and long-term effects, particularly in clinical settings.

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