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POTENTIAL APPLICATIONS OF DAPAGLIFLOZIN (FORXIGA) IN COMPANION ANIMALS: METABOLIC, RENAL, AND MICROBIOLOGICAL PERSPECTIVES

Luminița-Diana HRIȚCU^{1,4}, Geta PAVEL^{1*}, Vasile BOGHIAN^{1*}, Teodor-Daniel HRIȚCU^{1,4}, Florin NECHIFOR¹, Alin-Stelian CIOBICĂ², Ștefan MIHALCEA³, Ioana-Ștefania CUCOȘ¹, Mădălina TELIBAN⁴, Andra-Cristina BOSTANARU-ILIESCU¹, Mihaela-Claudia SPATARU¹.

1. Ion Ionescu de la Brad University of Agricultural Sciences and Veterinary Medicine of Iași, 3 Mihail Sadoveanu Alley, 700490 Iași, România, e-mail: luminita.hritcu@iuls.ro, geta.pavel@iuls.ro, vasile.boghian@iuls.ro, teodor.hritcu@iuls.ro, florin.nechifor@iuls.ro, ioana.cucos@iuls.ro, andra.iliescu@iuls.ro, mihaela.spataru@iuls.ro.

2. Department of Biology, Alexandru Ioan Cuza University of Iași, Faculty of Biology, Iași, Romania, 700506, e-mail: alin.cioca@uaiasi.ro.

3. VETSOLUTIONS, 1 Cour du Havre 75008 PARIS, e-mail: Stefan.mihalcea@vetsolutions.eu.

4. C.M.V. Hrițcu Luminița-Diana, 33 Străpungere Silvestru Street, Iași, Romania, 700600, e-mail: madalinabrateanu@yahoo.com.

Abstract: A clinical case of diabetes mellitus in a geriatric obese cat highlighted significant metabolic and multisystemic disturbances. Treatment with Dapagliflozin, alongside supportive therapy and dietary management, improved clinical status and partially normalized biochemical parameters within two months. SGLT2 inhibitors may offer benefits beyond glycemic control, but require careful monitoring.

Keywords: Diabetes mellitus; Dapagliflozin; insulin resistance; chronic kidney disease.

Introduction: Diabetes mellitus in companion animals is a multifactorial endocrine disorder associated with insulin resistance, metabolic imbalance, and multisystemic complications, including hepatic, renal, and inflammatory alterations. Traditional treatment relies on insulin, but newer therapies such as SGLT2 inhibitors (e.g., Dapagliflozin) show promising insulin-independent effects, including improved glycemic control and potential organ protection. However, their use requires careful monitoring due to possible risks, highlighting the need for an integrated therapeutic approach.

Materials and Methods:

This study describes a clinical case of a geriatric obese diabetic cat evaluated before and during Dapagliflozin treatment. Clinical, hematological, biochemical, and urinary analyses were performed, including assessment of insulin resistance (HOMA-IR), glycemic control, and metabolic parameters. The therapeutic protocol combined Dapagliflozin, supportive therapy, and a specialized diet, with results interpreted descriptively in relation to clinical findings.

Results:

1. Clinical Findings and Physical Examination

Key points:

- 14-year-old male cat, 12 kg, BCS 9/9 (severe obesity)
- Mild dehydration (6-7%)
- Moderate bilateral gingivitis
- Suggestive of uncontrolled diabetes + chronic inflammation.

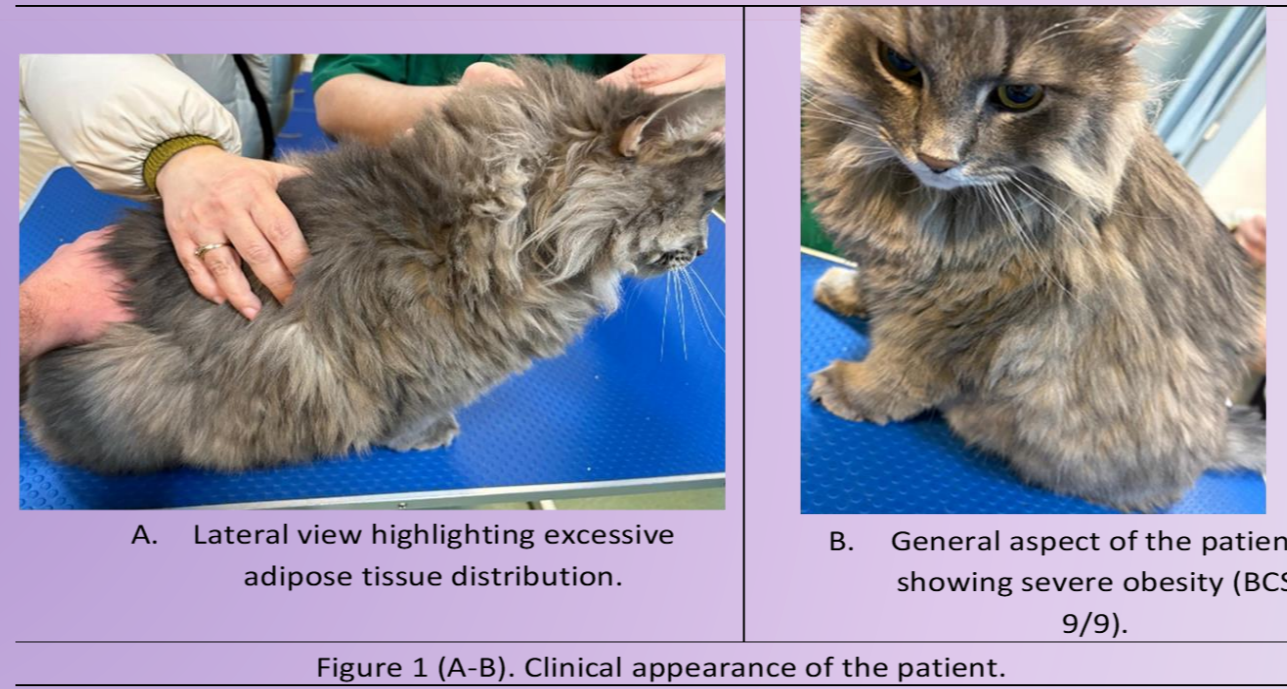


Figure 1 (A-B). Clinical appearance of the patient.

2. Hematological Findings

Key points:

- Hemoconcentration (↑HCT, Hb) → dehydration
- Leukocytosis with neutrophilia + left shift → inflammation/infection
- Lymphopenia → stress response
- Monocytosis → chronic inflammation
- ↑ Urea, creatinine → azotemia.

3. Biochemical Profile and Metabolic Status

Key points:

- ↑ ALT, AST → hepatic injury (likely lipidosis)
- ↑ Total proteins, albumin → dehydration
- HOMA-IR ~6.8 → insulin resistance
- Normoglycemia → under treatment.

4. Ketone Bodies and Glycemic Control

Key points:

- Mild ketonemia → active lipid metabolism
- Normal HbA1c → influenced by recent therapy
- Overall: **partially controlled metabolic state.**

Parameter	Value	Reference range	Interpretation
Ketones	0.4 mmol/L	<0.2	↑ Mild ketonemia
HbA1c	4.7%	4-6%	Normal

5. Urinalysis & 6. Salivary pH and Oral Implications

Key points:

- Presence of struvite ("coffin-lid") crystals in urine
- Active urinary sediment → increased risk of urolithiasis
- Associated with metabolic imbalance and glycosuria
- Slightly acidic salivary pH (~6.2)
- Promotes growth of acidogenic bacteria
- Confirms the relationship between diabetes mellitus and oral inflammation.



Figure 2(A-B). Microscopic and macroscopic examination of urinary sediment showing struvite crystals.

7. Therapeutic Management, Clinical Evolution & 8. Reevaluation at 2 Months

Key points:

- Fluid therapy and vitamin supplementation → correction of dehydration and metabolic support
- Dapagliflozin → reduced glycemia and polyuria/polydipsia
- Antibiotic therapy → decreased systemic inflammation
- Diet + probiotics → improved metabolic balance and supportive care
- Overall favorable evolution, without major complications
- At 2 months: improved clinical status and hydration
- Decrease in liver enzymes → partial recovery of hepatic function
- Reduction in azotemia → improved renal parameters
- Overall outcome: partial metabolic stabilization.

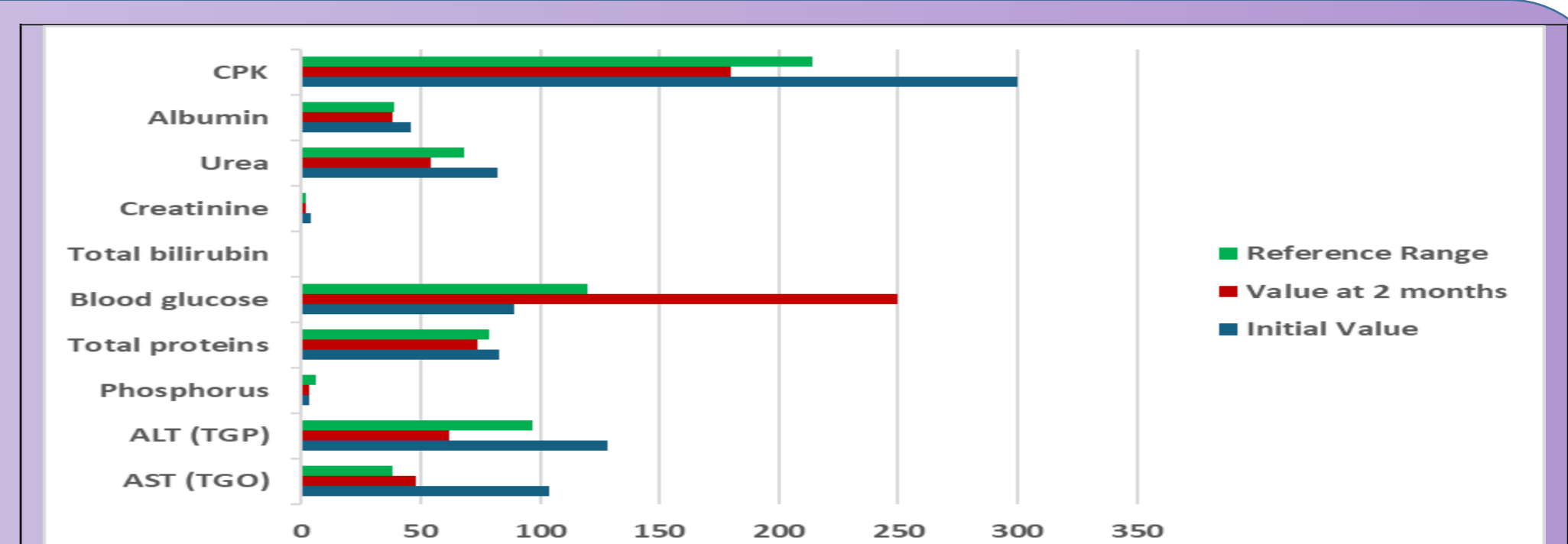


Fig. 3. Graphical representation of biochemical parameters at two months after re-evaluation.

Discussion:

Diabetes mellitus in companion animals is a multifactorial, multisystemic disorder driven by insulin resistance, obesity, and metabolic inflammation, leading to hepatic, renal, and systemic complications. SGLT2 inhibitors such as Dapagliflozin offer a promising insulin-independent therapeutic approach with potential metabolic and organ-protective benefits, but require careful monitoring due to variable response and associated risks, supporting the need for an integrated, multimodal management strategy.

Conclusion:

Dapagliflozin represents a promising adjunct therapy in feline diabetes mellitus, offering benefits beyond glycemic control; however, its use requires careful monitoring and should be integrated into a multimodal treatment strategy.

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