



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research

Vol. 14, Issue, 06, pp.21676-21678, June, 2022

DOI: <https://doi.org/10.24941/ijcr.43677.06.2022>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

RESEARCH ARTICLE

MANAGEMENT OF UREMIC ENCEPHALOPATHY IN A CAT AFFECTED WITH POST RENAL AZOTEMIA – A CASE REPORT

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ARTICLE INFO

Article History:

Received 10th March, 2022

Received in revised form

09th April, 2022

Accepted 24th May, 2022

Published online 30th June, 2022

Key words:

Domestic short hair, Proteinuria, Post renal azotemia, Urinalysis, Uremic encephalopathy.

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ABSTRACT

Uremic encephalopathy is a toxic metabolic disorder rarely associated with acute kidney injury or chronic kidney disease. It is more readily recognized when the onset of uremia is rapid as in acute kidney injury but it can also be severe in chronic kidney disease. Post renal azotemia is a common urological condition that presupposes prompt treatment. A 4.5 year old male Domestic short hair cat weighing around 5.2 kg was presented to Small animal Critical care unit of Madras Veterinary College Teaching Hospital with the history of vomiting, not voiding urine, and seizures. General clinical examination revealed reduced appetite, dull attitude, pale mucous membrane and normal temperature. On palpation of abdomen turgid urinary bladder was noticed. The blood sample was collected and sent for hematology and biochemistry profile evaluation which revealed relative neutrophilia, azotemia and hyperphosphatemia. On radiography, no cystic and urethral calculi were visualized. Tom cat catheter was fixed using standard protocol and urine was relieved. Urine sample was collected and sent for urine analysis which revealed proteinuria. Owner was advised to drain the urine frequently. The animal was treated with fluid therapy and broad spectrum antibiotics. On review the animal condition was improved.

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Citation: Vaidehi Pasumarthi, S. Savitha, M. Chandrasekar. 2022. "Management of uremic encephalopathy in a cat affected with post renal azotemia – a case report". *International Journal of Current Research*, 14, (06), 21676-21678.

INTRODUCTION

Uremic encephalopathy is a rare metabolic disorder syndrome characterized by reversible neurological syndromes that occur in acute or sub-acute episodes [Raskinet al., 1976 and Kim et al., 2016]. It results from multiple metabolic derangements [Raskin et al., 1976 and Kim et al., 2016]. The most common causes of urethral obstruction in male cats are idiopathic cystitis, urethral plugs and uroliths which lead to post renal azotemia. Of these urethral plugs and idiopathic cystitis contributes to more than half of the affected male cats. The predilection site for lodging of urethral plug is penile urethra. The majority of the cats that are affected were within 4-5 years of age. Most of the cats exhibit clinical signs during their first episode of urethral obstruction. The clinical signs depend upon the severity and chronicity of the condition. When there is no intrinsic damage to the kidneys, azotemia caused by post renal causes can be treated [Ross et al., 1999].

In long standing cases of urethral obstruction, uremic signs like vomiting, lethargy, dehydration will be exhibited. Concurrent lower urinary tract infection signs like stranguria, hematuria, pollakuria will also be present. The analysis of serum blood urea nitrogen, creatinine and phosphorus values aids in prediction of severity of post renal azotemia.

Case Presentation: A 4.5 year old male Domestic short hair cat weighing around 5.2 kg was presented to Small animal Critical care unit of Madras Veterinary College Teaching Hospital with the history of vomiting, not voiding urine, and seizures. General clinical examination revealed reduced appetite, dull and depressed attitude, pale mucous membrane, temperature – 101.3°F, and heart rate – 126bpm. On palpation of the abdomen, turgid urinary bladder was noticed. Frequent episodes of seizures were noticed within the time interval of 3-5 minutes. At the time of seizures, frothy salivation was noticed.

The blood sample was collected and sent for hematology and biochemistry profile evaluation. Urine sample was collected and sent for urinalysis. Radiography was done.

Diagnosis: The hematological evaluation revealed relative neutrophilia and presented in Table. 1. The serum biochemistry evaluation revealed azotemia, and hyperphosphatemia which are presented in Table. 2. Urinalysis revealed proteinuria which is a usual finding in urethral obstruction cases and illustrated in Table. 3. Radiographic findings revealed absence of cystic and urethral calculi.

Table 1. The hematological findings

Parameter	Reference range	Day 1	Day 4
Hemoglobin (g/dl)	9.8-15.4	15.1	12
PCV (%)	30-45	42.3	34.8
RBC ($\times 10^6/\mu\text{L}$)	5-10	10.8	8.38
WBC ($\times 10^3/\mu\text{L}$)	5.5-19.5	29.3	13.3
Platelets ($\times 10^3/\mu\text{L}$)	300-800	223	370
Neutrophils (%)	45-64	85	73
Lymphocytes (%)	27-36	10	22
Monocytes (%)	0-5	5	5

Table 2. The serum biochemistry findings

Parameter	Reference range	Day 1	Day 4
BUN (mg/dl)	14-36	56.76	35.74
Creatinine (mg/dl)	0.6-2.4	4.55	1.72
Phosphorus (mg/dl)	8.2-10.8	11.58	6.98

Table 3. The findings of urinalysis

Parameter	Day 1	Day 3
Color	Light yellow	Transparent
Specific gravity	1.015	1.015
pH	Acidic	Acidic
Protein	Present	Present
Glucose	Absent	Absent
Ketone bodies	Absent	Absent
Blood	Absent	Absent
Bile salts	Present	Absent
Bile pigments	Absent	Absent
Sediment	Absent	Absent
Urine Protein Creatinine ratio	1.2	0.7

Treatment: The animal was treated with Inj. Butorphanol @ 0.2 mg/kg, I/V to control the seizures. After the seizures were controlled, the cat was anaesthetised with Inj. Ketamine @ 15 mg/kg, I/V and Inj. Diazepam @ 0.5 mg/kg, I/V. Then tom cat catheter of 3 Fr. was introduced into penile urethra (Fig. 1). Initially there was some resistance. Hence to dilate the urethra and to flush the obstructing material retrograde into the bladder, urethral irrigation (hydropulsion) with sterile physiological saline was done. To provide lubrication long the entire length of the urethra and to aid in catheter advancement a 50:50 mixture of water soluble lubricant and sterile physiologic saline was injected through the catheter. Once the urethra was patent, it was flushed thoroughly to remove any debris before introducing the catheter into the bladder. The bladder was flushed and drained several times with sterile saline after catheterization to remove debris to prevent the recurrence of urethral obstruction. The catheter was secured with stay sutures and urine was drained. The cat was administered with Inj. Ringer's lactate @ 10ml/kg, I/V, Inj. Ondansetron @ 0.2 mg/kg, I/V, Inj. Ampicillin and cloxacillin @ 15 mg/kg, I/V for a period of seven days. But there were recurrence of seizures, so the cat was prescribed with

Phenobarbital (@1.5 mg/kg, PO, BID).The owner was advised to drain the urine frequently.

Case discussion: In the present case the cause of urethral obstruction is because of the urethral plugs as there were no uroliths noticed in radiography. Urethral obstruction alone contributes to almost 1.5-9% cases in feline emergency practice [Lee *et al.*, 2003 and Lekcharoensuk *et al.*, 2022]. The male cats are more commonly affected because of their relatively long and narrow urethra predisposing them to urethral obstruction. The age of the presented cat was within the mean age of cats with urethral obstruction [Segavet *et al.*, 2011]. The blocked cat was an indoor cat fed with dry diet. As there were uremic signs like vomiting, lethargy and anuria, the cat was found to be in advanced stage of urethral obstruction which led to post renal azotemia. The seizures noticed in this animal was due to toxic metabolic encephalopathy exacerbated by renal failure induced by an accumulation of uremic neurotoxins, particularly ammonia, that interferes the polysynaptic pathways and the balance of inhibitory and excitatory amino acids [Brouns *et al.*, 2004]. When the flow of urine is obstructed, bacteria that enter the urinary tract are not flushed out thereby causing infection which led to increase in the WBC count in this case. After the use of broad spectrum antibiotic, neutrophil count came back to normal range. Soon after the underlying cause of obstruction addressed, the post renal azotemia resolved. There were no signs of inflammation at the site of fixation of catheter. The owner was advised to keep the animal in stress free environment. The feline urethral obstructions can be successfully managed when intervened earlier and by frequent follow up with serum biochemistry and urinalysis along with proper diet and environmental management.

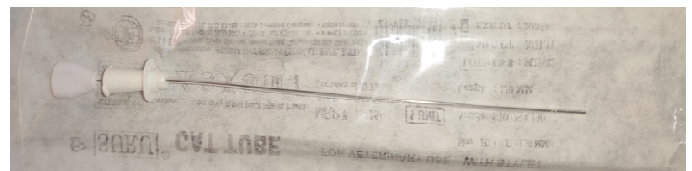


Fig.1 Tom cat catheter 3 Fr.



Fig.2 Tom cat catheter fixation

CONFLICT OF INTEREST: The authors declare that there is no conflict of interest.

ACKNOWLEDGEMENT

The authors are grateful to Tamil Nadu Veterinary and Animal Veterinary and Animal Sciences University, Chennai for

providing necessary facilities. We also thank Department of Veterinary Clinical Medicine, Madras Veterinary College.

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