



**CHICAGO VETERINARY
EMERGENCY & SPECIALTY
CENTER**



Chicago Veterinary Emergency & Specialty Center works closely with Chicago-area veterinarians to provide emergency, critical and specialty care to cats and dogs when they need us most.

Case Study: Heat Stroke

THIS IS A REVIEW OF AN 87-POUND, FOUR-YEAR-OLD, INTACT MALE LABRADOR THAT WAS BROUGHT INTO CHICAGO VETERINARY EMERGENCY & SPECIALTY CENTER (CVESC) AFTER BEING INADVERTENTLY LEFT IN A CAR FOR FOUR HOURS LAST SUMMER.

INITIAL ASSESSMENT: Patient presented with temperature of 107.6, profuse vomiting and inability to stand. The patient had tachycardia (HR 170) and showed intermittent, non-sustaining runs of VPCs as detected through an electrocardiogram. Soon after presentation, the patient began to have profuse bloody diarrhea and became obtunded.

Such high temperature often increases cellular oxygen demand above oxygen delivery. This results in deterioration of cellular function and integrity that could lead to DIC with thrombosis and bleeding, or serious damage to organ systems. Therefore, careful monitoring of blood work, arrhythmias, urine output and neurologic condition was implemented.

INITIAL BLOODWORK: Using CVESC's in-house laboratory, we were able to get results quickly for the patient's blood work. In addition to the results below, the patient showed mild azotemia.

TEST	RESULT	NORMAL
Lactate	4.6 mmol/L	0.3 – 2.5 mmol/L
Platelet	96,000	Critical Value: 50,000/ μ L
PCV	62%	37 – 55
TP	5.2g/dL	5.4 – 8.2g/dL
PT	18 sec	12 – 17
PTT	113 sec	71 – 102

INITIAL TREATMENT: The patient was given 2L Normosol-R (NormR) boluses and 500mls Hetastarch bolus. Using CVESC's Helmer Quick Thaw Plasma Thawing System, staff quickly thawed 720mls of plasma and gave it to the patient. This equipment allowed us to thaw plasma for this patient in 10-15 minutes rather than the usual two or more hours.

A urinary catheter was placed for hygienic reasons and to monitor intake and output. The patient was also placed on a continuous ECG. Norm R IV fluids were continued with KCl and dextrose supplementation. Patient was started on Baytril at 10 mg/kg IV SID; Unasyn at 30mg/kg QID; metronidazole at 10mg/kg BID; Pepcid at 1 mg/kg IV SID; Burpenex 0.02 mg/kg TID. At this point, the patient was critical and was admitted to the CVESC intensive care unit for continuous monitoring.

EIGHT HOURS LATER: Patient developed runs of VPCs and was given a bolus of lidocaine and placed on lidocaine CRI. Petechia had developed on the patient's gums. Blood work showed platelets 40,000; PT 45 sec; PTT 134 sec. The patient was given 480mls more of fresh frozen plasma.

12 HOURS LATER: A recheck showed a slight worsening of PT and PTT. Platelets were 14,000. An additional 600mls of fresh frozen plasma was administered.

(continued on back)

CVESC BLOOD BANK SAVES LIVES

Chicago Veterinary Emergency & Specialty Center (CVESC) maintains a full blood bank for dogs and cats. In addition to helping our own patients, the CVESC makes blood available to Chicago-area veterinarians who need blood for their patients.

This service is made available through our dog and cat donors. Healthy dogs between the ages of two and eight that weigh more than 55 pounds may be eligible to donate. Greyhound dogs are particularly welcome as they are likely to carry a universal blood donor type. Canine donors must be

current on vaccinations, be on a heartworm preventative year-round and have a friendly disposition.

Call us for more information about our blood donor program or visit our website:

www.ChicagoVeterinaryEmergency.com

24 HOURS LATER: Kidney values, although slightly increased, had stabilized. PT >100 sec; PTT >300 sec; CK 2,036 U/L (n 10-200 U/L). Lactate was normal. The patient remained depressed and minimally responsive. Patient's urine was brown-red. Patient was given an additional 480mls of plasma.

36 HOURS LATER: Patient drank a small amount of water for his owner and tried to stand but was unable to do so. PT 35 sec; PTT 127 sec; platelets 10,000. The DVM on duty did not give additional plasma at this time because the owner could not be reached for approval. The patient showed mental improvements. VPCs improved and the lidocaine CRI was weaned.

The following morning showed no change in PT and slightly worsened PTT (134 sec). Platelets were at 5,000. CK had not changed. The patient developed pathologic VPCs and another lidocaine bolus was given and lidocaine CRI was increased. An additional 740mls of plasma was administered, which helped improve PT (31 sec) and PTT (114 sec) on follow-up blood work later that night. The patient was started on Sotolol to treat VPCs. He became more mentally dull.

72 HOURS LATER: Azotemia resolved. Electrocardiogram showed no VPCs. Patient was slightly more alert and able to walk with slinging assistance, but remained ataxic. Unasyn was decreased to TID from QID; Buprenex was discontinued. The patient was started on IV ondansetron for possible nausea. Liver values increased. ALT 800 U/L (n 10-118). TBili 2.0 mg/dL (n 0.1-0.6) Denamarin (a liver supplement containing SAME and silybin) was started. Lidocaine CRI was again weaned.

NEUROLOGY CONSULTATION: One of the advantages CVESC offers is having specialists in the same building, available for consultation. A neurology consultation showed clinical signs consistent with neuronal injury secondary to hyperthermia and metabolic stress.

84 HOURS LATER: A recheck of PT and PTT showed that they had worsened. PT was >35 sec and PTT >146 sec. At this time, the patient was given another 740mls of plasma.

96 HOURS LATER: The patient's ambulation was much improved. ALT was 2,930 U/L; CK decreased to 1,400; TBili increased to 13.8; PT >35 sec; PTT 200 sec; platelets 30,000. Lidocaine CRI was discontinued. B vitamins were placed in his IV fluids and he was started on oral vitamin K1 (100mg BID). Baytril was discontinued. Urinary catheter was removed. He was mentally more appropriate, although still physically weak. An additional 720mls of plasma was given.

DAYS 5, 6, 7: During days five and six, the patient's PT remained at >35 sec and PTT remained at >200 sec. An additional 720mls of plasma was administered on day five. The patient was started on a Reglan CRI and Mirtazepine, which was followed by the patient becoming ataxic again and more depressed. Mirtazepine was stopped due to the depression. On day six, an ultrasound showed a markedly distended gallbladder. Patient was started on 300mg Urosodiol twice a day. On day seven, the owner elected to take the patient home. At that time PT 45; PTT 145; ALT 1,098; TBili was very high, but stable at 19.4 mg/dL; platelets 47,000.

OUTCOME: Follow-up calls to the owner at three days and at one week reported that the patient was eating, drinking, beginning to play in the yard and generally doing well.

CONCLUSIONS: This case demonstrates DIC secondary to heat stroke as well as elevated clotting times when other clinical signs improved. Recheck of ALT and TBili 96 hours post admission to the clinic revealed a large spike in ALT and TBili. This is suspected to be secondary to rhabdomyolysis induced liver disease following the heat stroke event (perhaps in this case prolonged extreme heat exposure of four hours) as well as cholestasis secondary to marked inflammation.



PLASMA THAWING MACHINE HELPS CVESC SAVE LIVES

Each year, Chicago Veterinary Emergency & Specialty Center (CVESC) uses more than 100 units of plasma to help save the lives of Chicago-area cats and dogs. Earlier this year, CVESC purchased a Helmer Quick Thaw Plasma Thawing System. Designed for use in human hospitals, this machine allows CVESC staff to safely and quickly thaw frozen plasma in 10-15 minutes, rather than the two or more hours usually required. We can also use this machine to quickly and safely warm blood.

CVESC uses fresh frozen plasma for a variety of cases

Coagulopathies such as anti-coagulant rodenticide poisoning. It contains vitamin K dependent factors II, VII, IX and X as well as factors V and VII.

Consumptive coagulopathies such as Disseminated Intravascular Coagulation (DIC), commonly seen in our heat stroke patients.

Acute hemorrhage when blood loss has been replaced with Packed Red Blood Cells (PRBCs).

Some benefit in hypoproteinemic patients (hepatic, renal and GI disease) and may be helpful pre-op in hypoproteinemic patients (liver biopsy, kidney biopsy, GI surgery).

Potential benefit in treatment of pancreatitis.



MEET OUR TEAM: JAMES HARDIMAN, DVM

Jim Hardiman, DVM, is the most recent veterinarian to join the emergency staff of Chicago Veterinary

Emergency & Specialty Center (CVESC). A native of Chicago's Beverly neighborhood, Dr. Hardiman

received a B.S. in Biology at the University of Iowa and a DVM from the University of Illinois.

Dr. Hardiman joins us from The Animal Medical Center of New York City. There he provided routine and emergency care for companion animals in a busy metropolitan clinic.

Dr. Hardiman appreciates our fast-paced, technologically advanced, urban emergency center. When not at CVESC, Dr. Hardiman enjoys hiking, playing golf, the Chicago White Sox and spending time with his nine-year-old black lab, Reilly. He is a member of AVMA, ISVMA and IVECCS.