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AN INCREDIBLE CASE THAT REINFORCES WHY I LOVE BEING A VET!

SEVERE HEAD TRAUMA IN A CAT

Dr Moira van Dorsselaer BVSc
The Cat Clinic Hobart
+613 6227 8000
e. moira@catvethobart.com.au
C&T No. 5944

Presentation

Valentine presented to our afterhours practice After Hours Veterinary Emergency Clinic (AHVEC) with head injuries consistent with a motor vehicle accident. His owners saw him by chance, in their paddock, as they were driving down their long driveway. They live an hour and half from AHVEC.

When Valentine presented to the emergency centre he was yowling with obvious altered mentation. He had a heart rate of greater than 280 bpm, muffled heart sounds, respiratory rate of 60+ (increased effort), and upper respiratory stertor and bilateral epistaxis. Orally he had gravel and blood, both fresh and dried. His upper left dental arcade (maxilla) was obviously fractured and displaced laterally *(see images taken 48 hours later)*. There was an obvious laceration to the soft palate and his upper right canine tooth was fractured. He had marked facial swelling, dorsal head crepitus and his right eye was proptosed, desiccated with zero apparent neurological function. His mandible was swollen with multiple grazes. There was no obvious limb/spinal pain or trauma noted.

Initial treatment

Included placement of an intravenous catheter, flow by oxygen, methadone 1 mg per cat IV and a Hartmann's 10mL/kg IV bolus given over 10 minutes. His heart rate reduced to 240 bpm and a further 5mL/kg IV bolus of Hartmann's was given. He was then started on an intravenous fluid rate of 1.5 x BMR (basal metabolic rate) hourly. A fentanyl CRI at 1µg/kg/hr was initially started. He was admitted for overnight care, baseline imaging and arterial blood gas (ABL) testing was done. His

Figure 1. The patient anaesthetised and being examined

owners were adamant that he be resuscitated in the case of cardiorespiratory arrest. The results of his ABL test showed marked stress hyperglycaemia and marked metabolic lactic acidosis with respiratory compensation. Baseline radiographs showed an intact diaphragm. He had a normal bladder silhouette with no rib or spinal fractures noted. His lung fields, cardiac silhouette and pleural space appeared normal. An aFAST ultrasound was performed and no evidence of abdominal effusion was evident, and his bladder appeared normal. Valentine was placed in an oxygen tent.

Valentine was head pressing in the oxygen tent, his right eye had marked hyphaema and appeared to be bulging more. His left pupil was fixed and dilated with absent PLR. He was treated with a 3mL/kg bolus of 7% hypertonic saline over 5 minutes and continued IVFT at 2xBMR. His fentanyl was increased to 3µg/kg/hr, and Ketamine was added at 0.3mg/kg/hr. IV Ampicillin was started in the morning.

Transferred by AHVEC ambulance to our clinic

He was examined on the consult room floor as while his mentation was not normal, he would become frantic and attempt to jump out of his cage or off the bench. It was noted that he could walk but that he was ataxic. His rectal temperature was 37.4°C, his heart rate was still 240 bpm plus, and his respiratory effort was increased with a loud URT noise. He had significant facial swelling,

bilateral epistaxis and had thick saliva and blood in his mouth. He resented any examination and continued to make a groaning sound.

Decision to wait

On discussion with his owner, it was decided that we should give him another 24 hours before attempting a general anaesthetic for assessment of his jaw and eye, dental radiographs, eye enucleation and oesophagostomy tube placement.

Day 1

He remained unchanged throughout the day on his current therapy. He urinated and defecated with no awareness. He would become distressed and unsettled with noises in the clinic. He no longer required supplemental oxygenation. He was transferred back to AHVEC for ongoing monitoring overnight. AHVEC repeated his ABL blood test which showed improving hyperlactatemia and hyperglycaemia. His tachycardia was persistent, and they repeated a fluid bolus with hypertonic saline of 10mL/kg over 5 minutes. There was concern from his owner about whether he had sustained contralateral ocular trauma and was going to be blind in his left eye; they would consider euthanasia if that were the case.

Day 2

Valentine was on a fentanyl CRI 4µg/kg/hr plus a ketamine CRI 0.45 mg/kg/hr. We elected not to give him a pre-med given his fentanyl and ketamine CRI. He was induced with Alfaxalone® IV and intubated with an uncuffed ET tube and maintained on isoflurane and oxygen. His anaesthetic was without complication despite it going for close to 2 hours by the time we had completed everything.

Skull radiographs did not show an obvious fracture of the mandible. Assessment of the cranium was difficult due to the superimposition inherent to skull radiographs. Dental radiographs confirmed the fractured maxilla on the left side with a large hard and soft palpate wound. This was sutured closed with absorbable 5-0 suture.

A Braun 14g oesophagostomy tube was placed without complication and we proceeded to enucleate his traumatised eye. The globe was completely ruptured caudally and the optic nerve while intact was obviously stretched.

We attempted an ECG post-surgery but there was too much electrical interference, and we did not want to remove the oxygen while he was in recovery. His recovery was smooth, and he returned to laying laterally in his cage *(see figure 1 on previous page)*.

His post op medications were fentanyl plus ketamine CRI's, amoxicillin (20mg/kg 8q) and maropitant (1 mg/kg IV 24q). We started a metoclopramide CRI in recovery in preparation for starting his enteral feeding. I also had a discussion with Dr Sam Long regarding his potential head trauma and he agreed that we could give him a single dose of dexamethasone (0.4 mg/kg IV).

Transfer back to AHVEC

Valentine was again transferred for overnight monitoring post-procedure. The attending clinician was concerned about his persistent tachycardia and the potential for undiagnosed cardiac disease was considered. The clinician also thought that they could potentially hear a cardiac murmur. On discussion with them, we decided to wait on working up the possible cardiac disease until a later date when we had a better idea of what his brain function and vision would be like. His altered mentation/head pressing remained unchanged and vision in his remaining eye was questionable with a dilated fixed pupil with no menace response. He continued to urinate without awareness and would rest quietly with intermittent periods of restlessness. His level of analgesia was adequate.

Day 3

The next day at our clinic, Valentine had improved slightly. The most distressing thing was that he would not settle at all, he circled his cage constantly only to stop and head press in the corner of the cage. He only vocalised occasionally, and we thought his analgesia was adequate. He did continue to have episodes of being frantic and opening and closing the cage was a challenge.

We started tube feeding him with watered down Hills A/D® using a syringe driver (3mL/hr) and an IV giving set. On advice from Dr Richard Malik, we did not hurry to get him to his expected Resting Energy Requirement (RER) too quickly. Our main goal initially was to avoid Valentine vomiting as we introduced the A/D®.

Valentine could not be left with a litter tray due to his constant circling in the cage; he would just knock it over. Urination was noted but not measured. He had not defecated for 48 hours. He was unaware of his own urination. He showed no interest in food or water. These were not left with him at any stage initially.

All medication was swapped to oral via the oesophagostomy tube other than his fentanyl and metoclopramide CRI's. He was currently on Clavulox® 62.5mg BID, maropitant 4mg SID, Celluvisc® eye drops q4-6 hourly due to a reduced blink and menace response.

Day 4

Valentine was transferred to AHVEC for ongoing care over the long weekend The plan was to wean Valentine off his IV medications and IVFT. We decided to place a fentanyl patch and start oral meloxicam (plus omeprazole because of the dexamethasone injection given earlier) now that he was being fed regularly. Four days post initial trauma he still had altered mentation/head pressing, he could stand but was extremely ataxic and would fall over after less than a couple of steps, he had questionable vision in his left eye and had an ongoing tachycardia with a gallop rhythm. There was still concern about his persistent tachycardia and there was discussion about contacting a specialist about this.

Day 5

Valentine was weaned off all IV requirements. His medications consisted of a fentanyl patch (25µg/hr), amoxyclav 62.5mg BID, maropitant 4 mg SID, gabapentin 25mg BID, meloxicam 0.2mg SID and omeprazole 4.3mg SID all given via the O tube. He was initially given 25% of his RER using A/D and this was slowly increased to 50% of his RER. He tolerated the tube feeding very well and there was never any sign of regurgitation noted in his hospital charts. His mentation remained altered but responsive. He started to respond to handling/smooching and voices. He was able to walk *(see video)* and no longer head-pressed for extended periods. He still had no menace or dazzle response and had a weak PLR. He appeared to navigate some objects on the floor while walking around the ward. Valentine urinated frequently, still without obvious awareness and defected after he was treated with a Microlax® enema.

Valentine's owners were going on a 6-week overseas trip that had been planned for many months prior to his accident. As we board cats, it was decided that he would spend those 6 weeks at our clinic; in particular, because he still required tube feeding and close monitoring. As he no longer needed intensive care, he was not returned to the after-hours practice again and remained an inpatient at our clinic for the next 6 weeks.

10 days post-accident

We thought that Valentine had developed some vision in his left eye and that he could distinguish light from dark but did not feel that he could actually see at this point. He also defecated on the clinic floor, although did not have any awareness that he was toileting. He would just defecate while he was walking around the clinic.

His owners also visited him for the first time after his accident (they lived over an hour and half away and were preparing for their 6-week overseas holiday). Valentine was so obviously excited to see them and absolutely remembered who they were. It was at this point we knew that we needed to persist.

Over the next 6 weeks

Relearning

We observed Valentine re-learn pretty much everything from learning how to eat again, use a litter tray and even sleep. We had to make many adjustments to his boarding cage to assist him to re-learn how to 'cat' again.

It took him approximately 3 weeks to learn how to eat again without assistance or requiring any enteral feeding. We had to raise his food bowl, placing it inside a litter tray as he was so messy and have a non-slip mat to stop the bowl moving around while he was eating. Valentine would put the entire right side of his face in the food (*see figure 2)*.

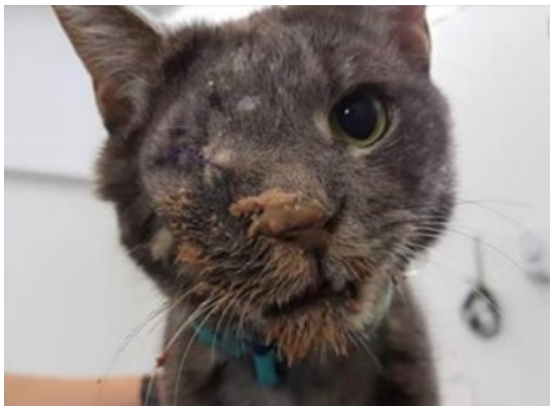

Figure 2. Neurological function during recovery was deficient—he was a messy eater and didn't realise his face was covered with food

Kitten-like behaviour

He behaved as a kitten would when first introduced to wet food. We would have to clean him up after every meal because he had no sense to groom himself. He would also be 'hangry' in the morning but not realise it was because he wanted food; he could not make the connection and although he was left with food at night he never ate until we arrived in the morning and fed him. We eventually got him onto Royal Canin Pediatric growth® wet and dry watered down into a slurry as Valentine was not able to drink water from the bowl himself. He only got water from what we put into his food each day.

Relearning to sleep curled up

Another very interesting thing to watch was that he had to re-learn to sleep curled up. This was

Figure 3. Litter tray lined with bluey

complicated by the fact that if we left him with a bed overnight, he would urinate and defecate in them. Ideally, we wanted to re-train him to use a litter tray so that his owners would not want to consider euthanasia due to him not being toilet trained as the option of him being an outside cat again was just not possible. Again, it took almost 6 weeks for Valentine to allow himself to sleep curled up. He was always alert, and we were never able to get a photo of him actually sleeping, because the minute he heard anything he would be straight back up. To stop him using his bedding as a litter tray overnight, we would only allow him a curled-up towel during the day on the puppy pads that lined his cage. He thought it was very special and would curl up inside the rolled-up towel during the day.

Relearning the litter tray

In order to re-teach him how to use the litter tray we started by lining his litter trays with blueys *(see figure 3)*, followed by blueys and litter, with eventually there just being litter.

Dental procedure

This was also required to remove the many fractured teeth that Valentine had sustained when he was hit by the car. We did postpone this for several months as we didn't want anything to set him back; we also wanted him to gain weight before doing something painful in his mouth which may prevent him from eating well for a period time.

Going home

The day Valentine went home was bittersweet. We had all grown incredibly fond of him; he was such a great cat and such a character. He had also become very bonded to us but he was ready to go home and seeing him remember his owners again after a further 6 weeks of hospitalization with us made it a little easier to say goodbye to him. There were tears.

Figure 4. Staff and carers had all bonded with Valentine

This was one of those incredible cases that reinforces why I love being a vet!

Valentine suffered a severe brain injury; it would not have been wrong to euthanase him and, honestly, it was considered more than once in the first few days. However, he made a complete recovery because of the dedication of many veterinary professionals, in particular my team at *The Cat Clinic Hobart*. In a case like this a holistic approach was essential, and it highlighted to me what an amazing profession we are when we can be a criticialist, a surgeon, a neurologist, a dentist, a physiotherapist, an occupational therapist, a nutritionist, a psychologist and the list goes on... and that was all just for Valentine ◆