

Daisy's Rise

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Introduction:

Dystocia is a rare condition among Equids. There are a wide variety of treatment regimens, which depend on the severity of the situation. However, due to this specific case, assisted vaginal delivery will be the most extensively covered treatment. Dystocia occurs in approximately 4% of equine births.⁸ Even though its occurrence overall is low, dystocia can cause major medical complications for both the mare and the newborn foal. Dystocia is diagnosed when the first or second stage of labor is prolonged or not progressive.⁸

History and presentation:

Daisy, a 10-year-old, Quarter Horse mare, presented around 1:00 am on February 14, 2021 for dystocia and blood loss. Daisy was in labor when the owner contacted Mississippi State. They reported that she was bleeding significantly. It took a one and a half hours in a trailer to get her to the veterinary school. A moderate amount of blood was pooled in the shavings on the trailer under her hindquarters when she arrived. On presentation, no fetal parts were visible at the vulva. An initial vaginal examination caused the mare to strain, and the head of the fetus protruded from the vulva. The head appeared dry as if it had protruded before. The fetus was not responsive to reflex tests, and given the duration of labor, was deemed non-viable. Prior to further examination, a caudal epidural was performed to alleviate the straining from the mare and allow more thorough palpation and manipulation of fetal parts. The fetus was in a cranial longitudinal presentation, dorsosacral position with bilateral flexion of the forelimbs at the carpi. The flexed carpi were manipulated into extension and obstetrical chains were placed. A head snare was also placed for an additional point of traction. An assisted vaginal delivery was attempted. After approximately one hour with no progress, a wire was passed to cut the head and neck free from the rest of the fetus. However, with limited space because of uterine contracture

only the head was detached from the fetus and delivered. Once the mare fell into lateral recumbency, the fetus was pulled out to the level of the thorax. The fetus was rotated about 90 degrees before the mare stood back up. Once she was situated, traction was applied to the obstetrical chains, the mare laid down again in lateral recumbency and the remainder of the fetus was delivered. The foal was delivered at approximately 4:00 am. Following delivery of the foal, the Burns technique was used to aid expulsion of the fetal membranes. There were several areas where the membranes tore, which made this technique difficult. The Dutch technique (umbilical blood vessel infusion) was performed next, and the fetal membranes were extracted and examined. Other than the several tears noted during removal, the fetal membranes appeared complete.

When an overall physical exam was completed, a substantial amount of frank blood was flowing from the vulva and multiple lacerations were noted within the vaginal vault. A complete blood count and chemistry panel was conducted. It revealed that Daisy had hypoproteinemia (4.8 g/dL) consisting of a hypoalbuminemia (2.2 g/dL), neutrophilia (7,929.6/uL), and lymphopenia (1227.2/uL). Electrolyte abnormalities noted were hypocalcemia (9.9 mg/dL), hyperglycemia (384 mg/dL), and hypophosphatemia (1.7 mg/dL). Daisy was also acidotic (CO₂ 21.4 mEq/L, anion gap 17) and had hypercreatininemia (2.61 mg/dL). Another complete blood count was run later in the morning showing Daisy was significantly anemic (HCT 21.7%) due to hemorrhage.

Dystocia anatomy and physiology:

When presented with a dystocia, the first step is to examine the mare. The mare will need a caudal epidural with “2% lidocaine at 1-1.25mL per 100kg of body weight.”¹ The mare should be properly scrubbed and cleaned and have a tail wrap placed. The veterinarian needs to be scrubbed with disinfectant soap before entry into the birth canal. Lubricant, preferable sterile,

should be administered into the vulva during the examination of the reproductive tract and fetus.¹ The fetus is then evaluated for presentation, position, and posture. Presentation describes the position of the spine of the fetus to the spine of the dam. Examples of descriptor terms used include cranial, caudal, longitudinal, or transverse. Position refers to the dorsum of the fetus or the head of the fetus in relation to the quadrants of the dam's pelvis. Descriptor terms used are dorsosacral, right ilium, left ilium, or pubis. Posture defines the relationship of the extremities of the fetus to the body of the fetus. For example, the left forelimb is extended while the right forelimb is flexed. This can also be used to describe the fetus's head position. Daisy's foal was in a cranial, longitudinal presentation; dorsosacral position; with head extended and bilateral forelimb flexion at the carpi.^{1,2,7}

Three main treatments were attempted to resolve Daisy's dystocia. They were mutation, forced extraction, and fetotomy. Mutation is when the extremities of the fetus are manipulated so that it can be expelled naturally from the birth canal. The three techniques used are repulsion, rotation, and version. Repulsion involves pushing the fetus farther back into the reproductive tract, so the extremities are easier to manipulate. Rotation is turning the fetus on its long axis until it is in a dorsosacral position. Version is turning the fetus on its transverse axis until it is a longitudinal position. All these techniques are used to align the fetus into normal presentation, position, and posture for birth. In the case of Daisy's fetus, it had bilaterally contracted forelimbs at the level of the carpi, so the limbs were brought medial to the body and then forward into a normal position.^{1,7} This was done bilaterally. Another technique used was forced extraction. It is attempted after the fetus has been placed in the normal birthing position. There are two types of forced extraction, assisted vaginal delivery (AVD) and controlled vaginal delivery (CVD). AVD is completed by working with the mare's contractions while placing traction on the fetus. CVD is

performed by placing the mare under general anesthesia to prevent contractions. The extraction is then completed by the physician. In both cases, sterile lubricant is placed around the edges of the fetus to decrease friction in the birthing canal. Obstetric chains and handles are used on the forelimbs and constant pressure is exerted in order to pull the fetus out of the birthing canal.^{1,7} A fetotomy is only performed when the fetus has been pronounced deceased in the womb. Eighty percent of dystocia cases are resolved with a partial fetotomy.⁵ Materials needed for a fetotomy are an embryotomy knife, fetotome and threader, wire handle, wire cutters, wire guide, krey hook, and obstetric wire. The dam needs to be in an immobilized state either standing or in lateral recumbency. Epidural anesthesia is required for this procedure and if more than two cuts are anticipated general anesthesia is required. A generous amount of sterile lubricant should be used to decrease friction in the birthing canal. The wire can be prevented from breaking by palpating it after each successful cut. Minimizing the number of entries into the genital tract decreases trauma to the uterus and birth canal.^{1,5,6}

Postpartum complications are common after dystocias.¹ The main complications Daisy experienced were retained fetal membranes, vulvar tearing, and hemorrhage. Fetal membranes are normally expelled in 30 minutes to 3 hours after parturition.¹ Retained placenta is more common during a dystocia because the normal uterine contractions are disturbed by external traction and/or a caudal epidural.³ Oxytocin is one of the most common ways to treat a retained placenta. The oxytocin initiates uterine contractions and causes the placenta to be expelled normally. Calcium gluconate can also be administered. It supports uterine contractions by giving the muscles enough calcium to contract properly. Another technique is uterine lavage. It is used to distend the uterus and encourage the expulsion of the placenta. Uterine lavage also decreases risk of metritis, removes debris, and bacteria. Burns technique is an alternative option to uterine

lavage. This technique calls for the placenta to be filled with water. It gently uses gravity to remove the placenta from the reproductive tract.⁹ Finally, the Dutch technique can be implemented. The Dutch technique calls for a stallion catheter to be inserted into an umbilical vessel and water be pumped in. This causes the chorioallantois to bulge and the fetal membranes to be expelled. This is a good option when the fetal membranes are already known to have a tear.⁸ Vulvar tearing and hemorrhage can be a natural occurrence in a normal foal birth. However, marked damage can be caused by forceful removal of the fetus and use of a fetotome.¹ Large vessels are present in the cervix, vagina, and vulva. Lacerations in the vulva and vagina should be sutured closed. If there is damage to the cervix it will have to be repaired after the next involution.⁷ Overall, any serious damage to the reproductive tract requires broad spectrum antibiotics which can be given systemically and in the reproductive tract itself.

Diagnostics:

During the first day of Daisy's stay a complete blood count (CBC) and large animal chemistry panel (LAP) were completed. As iterated above, her blood work revealed she was hypoproteinemic, hypoalbumemic, had neutrophilia, lymphopenia, hypocalcemia, hyperglycemia, hypophosphatemia, and hypercreatinemia. The day after her entry into the hospital another CBC and Chemistry were completed. It was found that Daisy's hematocrit decreased from 34.2 to 21.7%. The lowest hematocrit value during her stay was 16.7% on February 22, 2021. CBC and LAP were completed incrementally throughout Daisy's stay to monitor her progress. Once Daisy was stable a vaginal and rectal exam were completed. The rectal exam was to detect if Daisy had a possible colonic impaction. Several days inter her stay, Daisy's fecal piles started decreasing in size and frequency. No impaction was detected upon rectal exam. Upon vaginal exam significant mucosal lacerations were noted.

On February 16, 2021 Daisy started showing increased tenderness in her distal limbs. Radiographs of the distal phalangeal joint and P3 were completed on all four of Daisy's feet. The radiographs showed chronic laminitic changes. It is suspected that Daisy's chronic laminitis worsened because of her abnormal blood and electrolyte values as well as an infection in her reproductive tract.

Once Daisy was completely stable a vaginal exam, transrectal ultrasound, uterine lavage, and hysteroscopy were completed. It was discovered that Daisy had a vaginal diverticulum on the right side of her vaginal vault the size of a fist. Another diverticulum, ventral and caudal to the larger cavity, was also identified. The deviations are due to partial thickness tearing of the vaginal vault during foaling. Both cavities were full of white cellular fluid. Her cervix was severely damaged and was no longer appreciable. Her cranial vagina contained copious amounts of fibrous tissue and fibrin adhesions.

Treatment and Management:

Daisy's assisted vaginal delivery was completed at 4:00 am. Due to the substantial blood loss, two liters of hetastarch and one liter of hypertonic saline were administered intravenously. Aminoproclic acid and oxytocin were also administered. A two-liter blood transfusion was started at 5:00 am. Due to spikes in heart rate the blood transfusion was discontinued until 8:15 am. During the blood transfusion seizure-like episodes of nystagmus and muscle fasciculations of the forelimbs were noted. These small focal occurrences continued to happen for the first week of her stay in the hospital. Methylprednisolone sodium succinate and diazepam were administered once throughout her first blood transfusion. The next day, another CBC and blood chemistry exposed severe anemia. Due to Daisy's anemic state, a nasal canula was placed to give by-pass oxygen. Daisy was started on Lactated Ringer's Solution and 100ml calcium gluconate, as well

as cefazolin, oral magnesium sulfate, and metronidazole. On the third day in the hospital, another blood transfusion was completed due to Daisy's continuing anemia. Additionally, Daisy developed leukopenia early on in her stay which was treated with Polymyxin B bolused three times a day with one liter of saline. As Daisy improved, she was switched to oral chloramphenicol. The dose of polymyxin B was decreased as her leukocyte count improved. Daisy's creatine also improved significantly (1.12 mg/dL).

Throughout Daisy's first week in the hospital, her fecal output decreased, and she was not eating adequate amounts of grain or hay. Upon auscultation of her abdomen, decreased GI sounds were appreciated. She was started on orogastric fluids of MgSo₄ (Magnesium sulfate) and regular water, which assisted in GI motility. Mineral oil was administered incrementally to monitor the transit time of her GI. Surfactant and misoprostol were also added to her treatment regimen in order to treat any ulcerative lesions and protect the GI tract. Daisy was given a medley of different hays and grains to encourage eating. Slowly her appetite returned, and her fecal piles became adequate consistency and size.

Early on in her stay, Daisy continued to have episodes of hemorrhage from her vulva, especially while urinating. Intravenous formalin boluses were administered for a few days, but no major changes were noted. Formalin was administered to cauterize any remaining bleeding vessels after her dystocia. A uterine and vaginal lavage were completed to detect the source of bleeding. It was found that the vaginal vault was the major cause of hemorrhage. A 10% formalin and 500 mL of saline solution was administered into the vaginal vault. This was done for three consecutive days. The evening after the first lavage, Daisy experienced an endotoxic shower. Daisy was shaking and sweating profusely. Her temperature was found to be 105.2 degrees Fahrenheit. Isopropyl alcohol was poured down her back to cool her, but had no effect.

A lidocaine bolus was administered, and a lidocaine CRI was started. Lidocaine was used as an antiarrhythmic to support her during the endotoxic shower. Another lidocaine CRI was given the next morning.

Daisy did have a flair of laminitis and was radiographed and placed in ice boots. Her hindlimbs would become incrementally edematous due to her shifting more weight off her front legs to her back. Leg wraps were placed on her hindlimbs to prevent her from 'stocking up'. The radiographs indicated chronic laminitis, but Daisy was monitored closely and given flunixin meglumine as a systemic anti-inflammatory. She slowly improved and became more comfortable on her feet. Her flunixin meglumine was decreased, which encouraged her to lie down for parts to the day. DMSO was given once daily, for 3 days to address systemic and local inflammation in her limbs.

Since her uterine lavages were no longer improving, the theriogenology department completed a vaginal exam, transrectal ultrasound, uterine lavage, and hysteroscopy. They then debrided the fibrin adhesions present in the vaginal level of the cervix. Debridement was completed the consecutive day as well as uterine lavage with dilute betadine solution. Animax ointment was placed into the cervix after every uterine lavage in order to treat and prevent further fibrous adhesions.

Case Outcome:

A final CBC and chemistry were completed at the conclusion of her treatment in the hospital. Her anemia had significantly improved (HCT 25.3%). She had intermittent elevated digital pulses and was lying down between 5 and 7 hours of the day. She was eating and drinking

well and passing normal feces. Daisy was still in pain while walking due to the lamenitic flair that occurred. She was sent home in easy stride boots and with oral flunixin meglumine for pain.

References:

1. Brinsko, P, Blanchard, T, et al. Dystocia and Postpartuient Disease. In: Brinsko, P, Blanchard, T, eds. *Manual of Equine Reproduction*. 3rd ed. Mosby Publisher, 2011; 131–142
2. Byron, C, Embertson, R, Bernard, W et al. Dystocia in a referral hospital setting: approach and results. *Equine Veterinary Journal* 2010; 35 (1): 82-85
3. Canisso, I, Rodriguez, J, Sanz, M et al. A Clinical Approach to the Diagnosis and Treatment of Retained Fetal Membranes with an Emphasis Placed on the Critically Ill Mare. *Journal of Equine Veterinary Science* 2013; 33 (7): 570-579
4. Frazer,G. Fetotomy Technique in the Mare. *Equine Veterinary Education* 2001; 13 (3): 151-159
5. Hassan, M, shahid, S, Asif, A, et al. Partial fetotomy: technique to resolve wry neck dystocia in mare. *Journal of Animal Reproduction and Biotechnology* 2020; 35(4): 366-369
6. Norton J, Dallap, B, Johnson, J, et al. Retrospective study of dystocia in mares at a referral hospital. *Equine Veterinary Journal* 2010; 39 (1): 37-41
7. Pinto, C, Frazer, G. Reproduction. In: Mair, T, Love, S et al eds. *Equine Medicine, Surgery and Reproduction*. 2nd ed. Saunders Elsevier, 2013; 283-308
8. Pozor, M. Equine placenta- A clinician’s perspective. Part 2: Abnormalities. *Equine Veterinary Education* 2015; 28 (7)
9. Samper, J, Plough, T. How to Deal with Dystocia and Retained Placenta in the Field. *AAEP Proceedings* 2012; 58: 359-361