INTRODUCTION

Colic is the number one killer of horses. Each year 10% to 36% of horses will experience an episode of colic. There are many forms of colic ranging from mild to life threatening. The various types are shown in the picture of the digestive tract below, and the life threatening cases are starred in gold. Approximately 2% of the cases are life threatening. All cases can result in death. There are five variables in the dataset that were used to classify a horse as dehydrated: pulse (>60 bpm), packed cell volume (>50%), total protein (>7.5 g/dL), capillary refill time (>3 sec), and mucous membrane color (bright red, pale cyanotic, and dark cyanotic). Using the five dehydration variables in this dataset, I created a dehydration variable that tallied the number of dehydration variables that were present. 0 = Hydrated. 1 = More than Likely Hydrated, 2 to 3 = In Between, and 4 to 5 = Dehydrated.

METHODS

Data Wrangling: to create dehydration variable involved conditional logic to increment a counter.

Bar Chart: visually displays the breakdown of how many horses were in each dehydration level.

Stepwise Logistic Regression: used to determine which of the 28 health measures on the horse best predicted surgery.

Kruskal Wallis: used to test equality of median respiratory rates for each dehydration level.

Chi Square Test of Independence: used to determine whether there was a relationship between dehydration level and pain level, dehydration level and surgery, dehydration level and outcome, pain level and surgery, and outcome and surgery.

Two-Sample T Tests: used to test the relationships between surgery and pulse, respiratory rate, nasogastric reflux pH, packed cell volume, total protein, rectal temperature, and abdomen size as total protein.

Graphical Displays: bar charts, stratified confidence intervals, and mosaic plots were used to visually display the findings.

RESULTS

• SURGERY: Table 1 indicates that the following variables and specific levels are predictors of colic surgery: Age (young), Peristalsis (hypermobile, hypomobile, normal), and Surgical Lesion (none). Table 2 shows that there is a relationship between the level of pain the horse is in and if they have a colic surgery, with a p-value of <.00001. Figure 2 shows that more horses were in mild pain, indicated by the wider bar. As the pain level increases the likelihood of a horse having surgery increases.

• SURGERY AND PAIN: Table 2 shows that there is a relationship between the level of pain the horse is in and if they have a colic surgery, with a p-value of <.00001. Figure 2 shows that horses who did not have colic surgery were more likely to survive. This would make sense if surgical treatment was based solely on how severe and complicated the colic was.

• DEHYDRATION: Figure 1 shows that the number of horses in each dehydration level decreases as the horse gets more dehydrated.

• DEHYDRATION AND RESPIRATORY RATE: Table 4 is a nonparametric alternative to ANOVA called the Kruskal Wallis Test. The significant p-value of .00002 combined with Figure 4 indicates that hydrated horses have a significantly slower respiratory rate. A normal respiratory rate indicates that the horse is healthy.

• DEHYDRATION AND PAIN: Table 5 shows that there is a significant relationship between a horse's pain level and their dehydration level, with a p-value of <.00001. Figure 5 shows that, as opposed to the rest of the groups, most hydrated horses experienced no pain or mild pain. As the level of dehydration increases, the number of horses experiencing continuous extreme pain and intermittent severe pain increases.

• DEHYDRATION AND SURGERY: Table 6 shows that a horse's level of dehydration is related to whether they have surgery, with a p-value of <.00001. Figure 6 shows that the likelihood of a horse undergoing colic surgery generally increases as the level of dehydration gets worse. However there is a dip in the rate of surgery when the horse is dehydrated. Could this dip be because horses are prematurely euthanized? Notice the huge increase in euthanizations for dehydrated horses in Figure 7 under Dehydration and Outcome. Could the increase in surgeries be due to insurance not paying doctors unless there is a procedure performed?

• DEHYDRATION AND OUTCOME: Table 7 shows that there is a significant relationship between the dehydration level and the outcome of the colic, with a p-value of <.00001. The likelihood of survival decreases as a horse becomes dehydrated. In addition, Figure 7 shows a large increase in euthanasia as the horse moves from In Between to Dehydrated. This increase is so out of proportion that it prompts a researcher to question whether all the euthanizations were necessary or due to owners not wanting to see their horse in pain when they may have survived.

REFERENCES

•保证你的马健康
•立即叫兽医
•考虑多次涉及
•避免不必要结肠手术

ACTION

• Dr. Laura Reig, DVM