Oh No! Troubleshooting Anesthetic Complications and Emergencies

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1. Closed pop-off
2. Pressure begins to build within the system, even the patient’s lungs
3. With excessive pressure, significant trauma can occur to the patient including barotrauma to the lungs, a ruptured trachea, cardiovascular collapse by impaired venous return, and pneumothorax
4. If the rebreathing bag is noticed to be enlarged with the creases of the bag taut, the pop-off should be immediately opened or the bag pulled off of the machine
5. Excess gas will be allowed to escape the system and the pressure released
6. The patient should then be thoroughly assessed for signs of pneumothorax or cardiovascular collapse and appropriate treatment administered
7. Drug reactions
8. Rare
9. Animals can be profoundly affected by a sedative/anesthetic/analgesic and are rarely having a drug reaction
10. A true reaction is usually accompanied by the characteristic signs of an allergic reaction
11. The drug should be reversed if a reversal is available
12. Steps should then be taken to limit an allergic reaction, including theadministration of an antihistamine and/or the administration of a corticosteroid
13. Hypothermia
14. Very common
15. When hypothermia is severe, approaching 90°, life threatening complications may occur
16. Hypothermia causes bradycardia and can detrimentally affect cardiac output
17. Warm water circulating blankets are very effective in preventing heat loss
18. Warm air blankets are also very effective in maintaining a patient’s body temperature
19. Heating bottles or heating pads should be used with care, as they can burn patients easily and rapidly
20. Decrease heat loss by using a rebreathing system with a low flow of oxygen heat
21. Equipment malfunctions
22. Best addressed by proper equipment maintenance and a thorough knowledge of their operation
23. Proper monitoring will usually alert the anesthetist to equipment malfunctions before they become problematic
24. Hemorrhage
25. Initial Trauma
26. Complications in surgery
27. Monitoring PCV
28. Clinical signs can include: pale mucous membranes, prolonged CRT, increased heart rate, thready pulses
29. Address immediately and aggressively
30. Arrhythmias
31. Bradycardia
32. Can occur from a number of causes; increases in parasympathetic tone/decreased sympathetic tone, hypothermia, electrolyte imbalances, pharmacologic factors, and heart disease
33. The concern is the secondary effects the bradycardia has on decreasing cardiac output
34. An ECG can then help to characterize the arrhythmia
35. Treatment of bradyarrhythmias involves identifying the underlying cause and treating that cause
36. Tachycardia
37. Typically occur secondary to an increase in sympathetic tone (pain, excitement, hypoxemia, electrolyte imbalances) or due to administered drugs (ketamine, anticholinergics)
38. A decrease in cardiac output secondary to a decrease in ventricular filling time is the primary concern with tachycardias
39. Treatment of tachyarrhythmias depends on the underlying cause
40. Atrial or ventricular arrhythmias, including atrial premature contractions and ventricular premature contractions, are not as common with routine anesthetic procedures
41. Typically associated with conditions such as metabolic disturbances, surgical manipulation, and respiratory gas abnormalities
42. Diagnosis is based on auscultation and ECG interpretation
43. Treatment of these arrhythmias depends on their severity and their secondary alterations to blood pressure
44. Hypotension
45. Very common under general anesthesia
46. Hypotension occurs secondary to a multitude of factors including everything from hypovolemia from anemia to vasodilation from gas anesthetics to hypothermia
47. The causes are numerous and the consequences can be severe; kidney disease and brain damage
48. The diagnosis is based on arterial blood pressure
49. Most references site hypovolemia as a mean arterial blood pressure of 60 mmHg or less
50. The treatment for hypovolemia is dependant on the cause, but typically includes volume replacement
51. A bolus of 5-10 ml/kg of crystalloid fluids will correct mild hypovolemia
52. Methods employed to reduce to amount of gas anesthetics given, including the administration of additional analgesics, will reduce the dose-dependant vasodilatory effects of inhalant anesthetics
53. Colloids can be given
54. If previously mentioned efforts do not improve the mean arterial blood pressure, pressors can be given or the procedure can be stopped and the patient woken up
55. Hypertesion
56. Not typically seen under general anesthesia
57. When hypertension is observed, usually defined as a mean arterial blood pressure of 160 mmHg or greater (although concern frequently occurs around a MAP of 120 mmHg or higher), it should be addressed
58. Hypertension is more often than not a sign of a light plane of anesthesia or a painful patient
59. Increasing the plane of anesthesia or administering supplemental analgesics will aid in reducing the MAP to within the normal range
60. Other, more serious, causes are possible but not common
61. Cardiac failure
62. Complete cardiac failure, not very common in routine cases, is the worst case scenario for an anesthetic emergency
63. It is diagnosed by weak or absent peripheral pulses, a prolonged capillary refill time, cardiac arrhythmias, cyanosis, possible apnea, and other signs of shock
64. The loss of a carbon dioxide waveform on capnography can aid in the diagnosis of cardiac failure under anesthesia
65. CPR
66. Aspiration
67. Aspiration under anesthesia is best prevented rather than treated
68. The risk of regurgitation, leading to possible aspiration, can be diminished by fasting an animal for at least 8 hours prior to anesthesia
69. The risk of regurgitation can be decreased by adequately anesthetizing an animal prior to attempting intubation
70. By trying to intubate an animal in stage 2 of anesthesia, the patient is more likely to regurgitate when the larynx is touched by an endotracheal tube.
71. Proper endotracheal tube placement and cuff inflation will limit aspiration should regurgitation occur under anesthesia
72. Apnea
73. Very common complication of anesthetized animals, especially those induced with propofol
74. Easily addressed by manually or mechanically ventilating the patient to maintain normocapnia
75. Cyanosis
76. The outward sign that is associated with a patient that is hypoxemic
77. The causes of hypoxemia include; low inspired oxygen, hypoventilation, diffusion impairment, shunting, and ventilation-perfusion mismatch.
78. Because the anesthetize patient is receiving 100% oxygen, a low inspired oxygen level should only occur if there is a machine malfunction
79. The cyanosis should resolve with manual breathes if the cause is hypoventilation
80. The last three causes are more concerning, including severe atelectasis and pulmonary edema, and consideration should be given to waking the patient up and doing further diagnostics to determine the cause of the cyanosis. This should be based on the pros and cons of continuing with anesthesia
81. Obstructed airway
82. Generally, this happens when a mucus plug occludes the endotracheal tube
83. An obstructed airway can be diagnosed by the loss of the carbon dioxide waveform on capnography, but more routinely by the difficultly in giving the patient a manual breath
84. Often, the diagnosis comes from the complete inability to give the animal a manual breath.
85. When this occurs, immediate action must be taken as the patient is not able to inhale oxygen
86. The endotracheal tube cuff should immediately be deflated to allow the possible movement of air around the endotracheal tube
87. The patient should then be extubated, and re-intubated with a new endotracheal tube
88. The act of extubating a patient often dislodges the mucus plug, and the endotracheal tube will no longer be occluded once removed
89. Pleural cavity disease
90. Pleural cavity disease is not common under anesthesia without prior knowledge of the disease
91. With any pleural cavity disease, it is best to limit the compression of the lungs prior to anesthetizing the patient (i.e. thoracocentesis to draw off air or fluid in the pleural cavity)
92. It is also very beneficial to pre-oxygenate the patient prior to inducing anesthesia