

Title : PHYSIOLOGIC EFFECTS OF STEROIDS IN FOODSTUFF ASPIRATION
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Introduction. Corticosteroids are often recommended in the treatment of aspiration pneumonia but their use is controversial. Most experimental studies have examined the effectiveness of corticosteroids in modifying the pneumonitis induced by the aspiration of acid at pH less than 2.5, since it is believed that only gastric contents with a pH below 2.5 can cause lung damage. However, recent studies have shown that aspiration of gastric contents containing food particles can also cause severe lung damage even if the pH of the aspirate is above 2.5.¹ The administration of high doses of corticosteroids has been found not to improve the roentgenographic or histologic resolution of foodstuff aspiration, but physiologic consequences of steroid administration on this type of aspiration pneumonia have not been tested.

Methods. In the present study we assessed the physiologic effects of administering high doses of methylprednisolone to animals with a foodstuff induced aspiration pneumonia. Twenty healthy mongrel dogs were studied. All animals had a baseline PaO₂ obtained while awake and breathing room air of greater than 70 mmHg. While lying supine, the animals were anesthetized with sodium pentobarbital, 25 mg/kg i.v. and intubated with a large volume low pressure cuffed endotracheal tube. An esophageal temperature probe, arterial line and balloon tipped pulmonary artery catheter were positioned and systemic and pulmonary artery pressures monitored continuously. Arterial and mixed venous blood were sampled for determination of PO₂, PCO₂, pH and hematocrit prior to aspiration and at 10, 30, 60, 90, 120, 240, 300 and 360 minutes after aspiration. Additional arterial blood samples were obtained at one, three, seven and fourteen days after aspiration. Gastric contents containing small food particles were obtained by gastrostomy tube from the stomach of a normal dog ninety minutes after a meal of chopped vegetables and beef. The samples were collected over a five week period, combined and frozen and aliquots were used for each experiment. The pH of the material was adjusted to 5.9 using small amounts of NaOH. To administer this aspirate, animals were tilted 30 degrees to one side and a Coude catheter inserted down the endotracheal tube with the directional tip toward the dependent lung. The aspirates were administered through the catheter at a dose of 1 ml/kg. Body weight and the process was repeated to

the opposite lung providing a total aspirate of 2 ml/kg. Animals were randomly assigned to one of two treatment groups. Animals in group I received no therapy while animals in group II received 30 mg/kg methylprednisolone im q 8 h begun one hour after aspiration and continued for three days. Surviving animals were sacrificed at 14 days and their lungs inflated with fixative and prepared for histologic examination. Arterial blood gas tensions, intrapulmonary shunt fractions, and arterial-venous oxygen content differences were compared by analysis of variance.

Results. Seventeen of the twenty animals survived the entire two week experimental period. One animal in group I died at 6 hours and two animals in group II died at 24 and 48 hours respectively. All animals developed severe hypoxia, hypercarbia, acidosis and increased intrapulmonary shunting after aspiration. There were no statistically significant differences in pH, PaCO₂, Qs/Qt between groups at any time period studied. PaO₂ values obtained 24 hours after aspiration were significantly lower in steroid treated animals. Arterial PO₂ values continued to be lower in steroid treated animals for the remainder of the study but the difference from controls did not reach statistical significance. Pathologic examination of the lungs of 5 animals in each group sacrificed 14 days after aspiration, revealed bronchiolitis obliterans and scattered granulomas. There were no obvious pathologic differences between groups.

Discussion. These results correlate with a previous study² in which objective analysis of pathologic and roentgenographic findings indicated that corticosteroids did not reduce the extent of foodstuff aspiration or hasten its resolution. Taken together they strongly suggest that steroids are of no benefit in foodstuff aspiration.

References.

1. Wynne, J.W., Reynolds, J.C., Hood, C.I.: Pulmonary damage caused by aspiration of gastric contents containing small food particles (abstr). Abstracts of Scientific Papers. 1977 Annual Meeting, American Society of Anesthesiologists, pp. 181-182.
2. Wynne, J.W., Reynolds, J.C. Hood, C.I.: The effect of corticosteroids on aspiration of small particle foodstuff (abstr). Abstracts of Scientific Papers. 1977 Annual Meeting, American Society of Anesthesiologists, pp. 183-184.