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Effect of Oxidized Bile Salts on Gall Bladder Bile.

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The salts of the oxidized bile acids are known to be markedly choloretic. Whether or not this choloresis increases the flow of bile through the gall bladder or modifies some of the physical characteristics of gall bladder bile is not known. The present study was undertaken to determine the effect of a chloresis induced by oxidized bile salts on some of the physical characteristics of gall bladder bile in dogs.

Intravenous or oral administration of bile salts at the same time as, or following, the administration of tetraiodophenolphthalein has been demonstrated to cause an increase in the size of the X-ray picture of the gall bladder.[1] This evidence is indirect, but indicates that the choloresis following the administration of bile salts results in an increased flow of bile into the gall bladder.

Beck, *et al.*,[2] have determined the effect of an extract of ox bile on the pH and concentration of gall bladder bile in dogs. They concluded that, because of the high correlation between total solids and pH, concentrated bile will possess a greater hydrogen-ion concentration than those which are more diluted.

Methods. Two groups of dogs, each containing 28 animals, were used in this experiment. All of the dogs received one-half can of prepared dog food 3 times a day for 3 days. The treated animals received in addition 0.75 g of a mixture of ketocholanic acids (Ketochol) by mouth with each feeding. On the fourth day, 12 hours after the last feeding, the abdominal wall was incised, under ether anesthesia, the cystic duct was clamped and divided, and the gall bladder removed intact.

The pH of the gall bladder bile was determined by means of the glass electrode. The bile was withdrawn into the electrode chamber immediately after removal of the gall bladder from the dog. Specific gravity was determined by the falling drop method and in some instances checked by the gravimetric method, both methods yielding almost identical results. The percentage of solids was determined

[1] Taterka, H., *Med. Wilt.*, 1930, **4**, 1722; Impallomani, R., *Radiologica Medica*, 1938, **25**, 583; Jankelson, I. R., and Altman, W. S., *Radiology*, 1933, **21**, 448.

[2] Beck, F. F., Krantz, J. C., Jr., Feldman, M., and Carr, C. J., PROC. SOC. EXP. BIOL. AND MED., 1937, **37**, 357.

TABLE I.

	No. animals		pH	Sp.Gr.*	% solids	Cholesterol†
Controls	28	Avg	6.6	1.0408	22.86	85.3
		Min.	5.9	1.0314	17.18	54.5
		Max.	8.4	1.0506	29.27	163.0
Treated	28	Avg	6.6	1.0398	22.31	88.8
		Min.	5.8	1.0290	14.92	63.0
		Max.	8.0	1.0459	29.33	125.0

*Average of 38 samples in each group.
† " " 19 " " " "

by drying known quantities of bile in a vacuum oven for 72 hours at 100°C and 20 lb of vacuum. The samples were allowed to cool in a desiccator and weighed on a "Chainomatic" balance containing a calcium chloride tube in the balance case. Cholesterol determinations were made on mixed samples, according to the method of Elman and Taussig.[3]

Included in the specific gravity results are the findings in 10 treated and 10 untreated gall bladder biles upon which no other determinations were made.

The averaged results and ranges are shown in Table I. There are no significant differences between the control and treated animals. The quantity of bile salts given was sufficient to insure a maximum choloresis well within the time limit of the experiment.[4] No conclusions as to the flow of bile through the gall bladder can be drawn from these data. It can be assumed that if there is an increased flow of bile through the gall bladder due to the choloresis caused by the administration of ketocholanic acids, the gall bladder is able to concentrate the "choloretic bile" as well as normal bile. We have no way of knowing whether the concentrated choloretic bile is discharged and the gall bladder refilled, or whether the bile remains in the gall bladder until a meal is taken as in the normal animal.

The normal values for pH and percent of solids obtained in this experiment agree well with those of Beck, *et al.*[2]

Conclusions. The choloresis produced in dogs by the administration of oxidized ketocholanic acids does not affect the pH, specific gravity, percentage of solids, or the cholesterol content of the gall bladder bile.

3 Elman, R., and Taussig, J. B., *J. Lab. and Clin. Med.*, 1931, **17**, 274.

4 Berman, A. L., Snapp, E., Ivy, A. C., Atkinson, A. J., and Hough, V. S., *Am. J. Digest. Dis.*, 1940, **7**, 333.