be particularly useful in the treatment of acute early ulcerative colitis.

Summary. Rectal cortisol has been used in treatment of chronic ulcerative colitis with good results. Following administration of 200 mg of the steroid dissolved in 100 cc of normal saline, there was no significant increase in blood levels of cortisol. This was confirmed by absence in the plasma cortisol fraction of any appreciable radioactivity following instillation of cortisol-4-C^{14}. By implication, our data suggest that the good clinical results obtained were probably the result of a local effect of the cortisol on the rectal mucosa.

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Fluoride Content of Urinary and Biliary Tract Calculi.* (23835)

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In connection with an extensive survey of the fluoride content of human skeletal tissues (1,2), it was of interest to assess the relation of water-borne fluoride to the fluoride content of urinary and biliary tract calculi. With the exception of the recent duplicate reports‡ by Herman(3) and Spira(4), no data are available on the fluoride content of urinary tract calculi. Murray(5) reported that kidney stones contained fluoride, but no data were given. Data on the fluoride content of biliary calculi appear to be limited to the recent report of Spira(6). In the present study, the fluoride content of urinary and biliary tract calculi was also compared with that of bone obtained from individuals residing in low (0.0-0.6 ppm in the drinking water) and high fluoride areas (2.6 ppm in the drinking water).

Methods and materials. Thirty-three urinary and 9 biliary tract calculi obtained from individuals with verified histories of fluoride exposure were dried overnight at 105°C and pulverized. They were then extracted with alcohol for 8 hours and with ether for 4 hours, ashed at 550°C for 3 hours and analyzed for calcium(7), phosphorus(8) and fluoride(9,10,11). Samples of dry, fat-free urinary tract calculi were submitted for X-ray diffraction analysis to determine if calculi with strong apatite patterns showed higher concentrations of fluoride. A pooled sample of bile from four individuals who had resided in Washington, D.C. (1 ppm F in the drinking water) was also analyzed for fluoride. The fluoride content of urinary and biliary tract calculi was compared with that of some 35 bones taken at autopsy from individuals residing in low fluoride areas (0.1-0.4 ppm) and in a high fluoride area (2.6 ppm F). Data on the fluoride content of bones from individuals drinking water containing 0.1-4.0 ppm F will be presented elsewhere(1).

* Urinary tract calculi were kindly furnished by Elmer Belt Urological Group, Los Angeles, Calif., thru courtesy of Lucien A. Bavetta, and by the Glockner-Penrose Hospital, Colorado Springs, Colo. Biliary tract calculi were also furnished by Glockner-Penrose Hospital. We are also indebted to R. W. G. Wyckoff, M. V. Moseley, and D. B. Scott for X-ray diffraction analysis of a number of urinary calculi.

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‡ Since the fluoride data are identical in both reports, these studies do not appear to be independent investigations.

TABLE I. Fat, Ash, Calcium, Phosphorus, and Fluoride Content of Urinary Tract Calculi.*

Years of residence	Fat	Ash	Ca	P	F	Ca/P	Ca/P:F	Ca/F
	%							
				Low fluoride area†				
1					.41			
4	9.3	63.7	26.1	3.9	.27	6.7	24.8	96.7
9	8.0	66.9	26.6	4.1	.27	6.5	24.1	98.5
9	.3	67.7			.10			
12	20.1	6.9	13.9	16.0	.02	.9	45.0	695.0
13	11.8	76.8	20.7	15.2	.12	1.4	11.7	172.5
14	8.6	69.9	28.1	3.7	.41	7.6	18.5	68.5
15					.67			
16	20.0	54.1			.06			
20	14.8	71.4	10.7	19.6	.03	.6	20.0	356.7
23					.24			
28	6.5	62.5			.08			
32	6.2	84.6	29.8	15.9	.43	1.9	4.4	69.3
33	17.2	22.4			.12			
33	12.7	58.6	25.8	1.8	.15	14.3	95.3	172.0
51§	4.2	78.0			.66			
				Elevated fluoride area‡				
1	4.0	80.3	28.9	13.2	.82	2.2	2.7	35.3
2	14.6	59.1	23.2	1.8	.16	12.9	80.6	145.0
3					.65			
4§	2.0	80.7	27.3	17.0	.23	1.6	7.0	116.0
9	7.8	63.7	24.5	4.5	.39	5.4	13.8	62.8
13	11.9	68.5	11.0	11.9	.14	.9	6.4	78.6
14	8.5	62.6	25.9	9.7	.32	2.7	8.4	80.9
14	6.9	64.9			.10			
20	6.9	61.3			.11			
23	0	85.1			1.11			
25	11.4	63.4	1.9	15.9	.03	.1	3.3	63.3
26	11.6	69.3	28.2	8.9	.50	3.2	6.4	56.4
27					1.00			
29	14.5	39.0	13.7	.3	.06	45.7	762.0	228.3
40	5.0	80.7	23.9	16.1	.34	1.5	4.4	70.3
46	3.5	63.2	24.5	.6	.12	40.8	340.0	204.2
53	6.7	79.2	17.6	14.1	.24	1.2	5.0	73.3

* Based on oven-dry wt (overnight at 105°C).

† Washington, D. C., 0.1 ppm F, one individual; Los Angeles, Calif., 0.0-0.6 ppm F, in drinking water. All individuals resided in low fluoride area for at least 10 yr prior to removal of calculi. "Years of residence" refers to last period of residence.

‡ Colorado Springs, Col., 2.6 ppm F, in drinking water.

§ Same individual. Resided in Washington, D. C. 51 yr prior to fluoridation, and 4 yr thereafter when water contained 1 ppm F.

Results. The concentration of fat, ash, calcium, phosphorus and fluoride of urinary tract calculi classified according to water-fluoride exposure of the individual is presented in Table I.

The mean of 0.25% fluoride in urinary tract calculi of individuals from a low fluoride area, expressed on an oven-dry basis, was not significantly different from that of calculi of individuals from an area where the drinking water contained 2.6 ppm fluoride, *i.e.* 0.37%. Herman(3) and Spira(4) reported a range of 0-0.18% fluoride with a mean of 0.05% fluoride. Their values are considerably lower, in most cases, than those reported for all samples of urinary tract calculi in the present study (0.02-1.11% with a mean of 0.31%) and may be attributed, to some extent, to the fact that only part of the calculus was used for analysis.

As shown in Table I, the Ca/P weight ratio varied widely (0.1-45.7) and was unrelated to the fluoride concentration, Ca/P:F (3.3-762.0). In addition, no relation was apparent between the calcium and fluoride concentrations, Ca/F (35.3-695.0).

The concentration of fat, ash, calcium, phosphorus and fluoride in biliary tract calculi is presented in Table II on an oven-dry basis.

TABLE II. Fat, Ash, Calcium, Phosphorus, and Fluoride Content of Biliary Tract Calculi.*

Years of residence	Fat	Ash	Ca	P	F
	%				
2	96.5	2.1	1.2	.3	.002
15	97.1	1.2	.6	.2	"
17	52.5	40.3	15.9	.1	.006
28	92.2	5.2	2.2	.6	.003
29	77.6	15.0	4.3	.1	.004
35	89.5	8.6	4.2	.1	.001
39	94.5	3.4			.000
Unknown†	97.0	.2			"
" †	98.7	.1			"

* Based on oven-dry wt (overnight at 105°C).
† Amarillo, Texas, 1.6-3.2 ppm F in the drinking water from 1949 to 1957; remaining samples obtained from Colorado Springs, Col., 2.6 ppm F in the drinking water.

As expected, the "fat" comprised at least 90% of the calculus in nearly every case. Fluoride was absent, or present in very low concentration. Spira(6) also recently reported the presence of small amounts of fluoride in biliary tract calculi similar to those reported in the present study (Table II). It is interesting to note that the composite sample of human bile contained only 0.1 ppm fluoride. A sample of ox-bile obtained in this study from an animal exposed to high concentrations of fluoride on forage from air borne sources for four years contained 0.6 ppm fluoride. The small amount of fluoride in biliary tract calculi is in keeping with its low concentration in bile. The extremely low calcium and ash content of biliary calculi (Table II) is probably also a factor in their inability to incorporate fluoride.

The data on the fluoride content of urinary and biliary calculi and of bones from similar fluoride areas are summarized in Table III on both an oven-dry and ash basis.

As shown in Table III, the mean concentration of fluoride was significantly higher in urinary tract calculi than in the bones of individuals from both low fluoride ($p<0.01$) and elevated fluoride areas ($p<0.02$). The mean years of residence of those furnishing the urinary tract calculi and bones were 20.1 and 30.4 years respectively.

The higher concentration of fluoride in the urinary tract calculi may be due, in part, to the higher fluoride concentration reported in urine(12,13) than in blood(14). The concentration of fluoride in the urine closely approximates that in the drinking water at equilibrium(12,13). Blood contains about 0.01 ppm fluoride when the drinking water contains 0.1 ppm fluoride and approximately 0.04 ppm fluoride when the water contains 1.0 ppm fluoride(14). Although the calculi showed no significant increment in fluoride with an increase in the fluoride content of the drinking water, a 4 to 5-fold elevation of fluoride was found in the bones when expressed on either an oven-dry or ash basis. This may be attributed in part to growth and metabolic turnover in bone, whereas, urinary and biliary tract calculi may be considered foreign accretions and hence metabolically inert.

Differences in the composition of calculi and bones may also play an important role in their ability to incorporate fluoride. Thus, the major phase of the inorganic portion of bone is presumed to be a type of hydroxyapatite(15,16), whereas, eleven different crystalline compounds have been identified in some 600 urinary calculi by Lagergren(17) by X-ray diffraction analysis. Although an apatite pattern was seen in 7 of 9 calculi ex-

TABLE III. Fat, Ash and Fluoride Concentration* of Urinary and Biliary Calculi, and of Bones of Individuals from Areas Containing Similar Concentrations of Fluoride in the Drinking Water.

	Fat	Ash	Fluoride conc. Oven-dry basis	Fluoride conc. Ash basis
Low fluoride area (0.0-0.6 ppm F in drinking water)				
Urinary calculi	10.7 ± 7 (13)	60.3 ± 6.1 (13)	.25 ± .05 (16)	.34 ± .07 (13)
Bone	28.3 ± 4.4 (10)	38.0 ± 3.7 (10)	.04 ± .01 (10)	.11 ± .02 (10)
Elevated fluoride area (2.6 ppm F in drinking water)				
Urinary calculi	7.7 ± 1.1 (15)	68.1 ± 3.1 (15)	.37 ± .08 (17)	.42 ± .09 (15)
Biliary calculi	88.4 ± 5.0 (9)	8.5 ± 4.3 (9)	.002 ± .0007 (9)	.10 ± .03 (9)
Bone	35.6 ± 2.6 (25)	34.8 ± 2.1 (25)	.18 ± .01 (25)	.55 ± .04 (25)

* All values expressed as mean ± stand. error. No. in parentheses refer to No. of samples.

amined and was the chief component of four in the present study, no relation could be observed between crystal structure and fluoride concentration.

Summary. Thirty-three samples of urinary and 9 samples of biliary tract calculi from individuals with known histories of exposure to water-borne fluoride were analyzed for fat, ash, calcium, phosphate and fluoride. (1) Concentration of fluoride in urinary tract calculi was significantly higher than that in the bones. (2) Mean concentration of 0.25% fluoride in urinary tract calculi of individuals from low fluoride area was not significantly different from that (0.37%) of calculi of individuals whose drinking water contained 2.6 ppm fluoride. (3) No relation was apparent between the calcium and fluoride concentrations of urinary tract calculi. (4) Fluoride was present in biliary tract calculi in very low concentration (0.000-0.006%).

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Technic for Collection of Thoracic Duct Lymph of Man. (23836)

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Studies of transport of fat *via* the intestinal lymphatic pathway have been of fundamental importance for our understanding of the mechanism of fat absorption. Great progress has been made in this field during recent years due to utilization of new analytical technics and isotopic labelling of fats, and to a new method for collecting chyle in unanesthetized animals over long periods of time(1). Opportunities for studying chyle in the human have been rare and have been confined to patients with abnormal lymph connections as in the classical experiments that Munk and Rosenstein(2) performed on a girl with spontaneous lymph fistula. Subsequently, a number of cases of chylothorax have been observed (*cf.* Fernandes *et al.*(3)). Recently an extensive investigation was carried out by Blomstrand *et al.*(4) in a case of chyluria, where patient was studied under rigidly controlled conditions for 8 weeks, during which time a series of absorption experiments was conducted. Suitable cases such as those described above are extremely rare, and it is therefore desirable to have a method for collection of lymph from humans under standardized conditions. The present report describes a technic of cannulation of the thoracic duct in man, which has permitted collection of lymph of a given subject for periods of 2-5 days. With this technic for introduction of catheter into the thoracic duct it is possible