Seminal Vesicle Hypertrophy due to **Schistosoma haematobium** Infection in Man as an Index of Schistosomal Obstructive Uropathy

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TABLE OF CONTENTS

ABSTRACT

Sixty-seven male lower urinary tracts were dissected into their 19 anatomical regions, then each portion was weighted separately. Prostate and seminal vesicle volume was also measured. These data, along with other comparably divided lower urinary tracts from American patients, were compared to similar data from similarly studied cases of urinary schistosomiasis (i.e. infection of the lower urinary tract by the trematode Schistosoma haematobium) and the data from two previous Egyptian autopsy series. It is concluded that seminal vesicle and seminal recepticle hypertrophy is a regular sequelum of urinary schistosomiasis and that seminal vesicle volume and weight acceptably correlate. While rectal examination of seminal vesicle hypertrophy does not appear to differentiate among patients with urinary schistosomiasis as to those individuals who have schistosomal obstructive uropathy and as to those who do not, it would appear to differentiate between schistosome-infected and non-infected adult men.

INTRODUCTION

Schistosomiasis is the fourth most prevalent disease in the world. Urinary schistosomiasis is one component of this disease and the most common cause of hematuria in the world. It is caused by digenetic trematodes, Schistosoma haematobium, which spend their adult life in the perivesical and pelvic venous plexuses of man and lay their eggs principally in the walls of the lower urinary tract viscera. Schistosomal obstructive uropathy is the most frequent and serious complication of urinary schistosomiasis. It is comprised of anatomical and/or functional stenosis of the interstitial ureters and extravesical ureters with subsequent resulting hydroureter and hydronephrosis. Its frequency is related to intensity of infection as indexed by tissue egg burden (eggs per gram of tissue after digestion). It may, in turn, be complicated by lower and upper urinary tract bacterial infection and accounts for significant morbidity and mortality among affected populations. Yet, its detection is difficult and can only presently be achieved by expensive high-tech and non-portable equipment, machinery that is often lacking in the areas where urinary schistosomiasis is endemic. Recently, Christie, et al (1). I have suggested that seminal vesicle weight increases in tandem with the weight of the lower and interstitial ureters and that palpation of seminal vesicles on rectal examination might be used to screen for schistosomal obstructive uropathy in males. The present studies extend control analysis of normal lower urinary tract organ weights and their relationships. The studies also include available data from the two unselected autopsy series from Cairo, Egypt, to compare the interrelationships of lower urinary tract weights and volumes in American "controls" to those of Egyptians with urinary schistosomiasis.

MATERIALS AND METHODS

A. Sixty-seven male lower urinary tracts were collected at autopsy from the University of Texas Medical Branch in Galveston, Texas, and from the Olin E. Teague Veterans Administration Medical Center in Temple, Texas. The tissue was fixed in formalin solution for storage before dissection. Data on age was also determined from hospital records. After thorough dissection of all adventitial adipose tissue, each lower urinary tract was divided into its component portions as follows: prostate; bilateral seminal vesicles; bilateral seminal recepticles; bilateral interstitial ureters; bilateral extravesical ureters (distal 5 cm. of pelvic ureters); urinary bladder trigone; anterior inferior, bilateral lateral inferior, and posterior inferior regions of the urinary bladder; urinary bladder apex; anterior superior, bilateral lateral superior, and posterior superior portions of the urinary bladder. Bladders were divided into superior and inferior halves by a single slice perpendicular to an axis between their apices and their urethral outlets. Seminal vesicles, seminal recepticles, prostate, extravesicular and interstitial ureters and bladder were dissected from each other. The urinary bladder proper was then cut in the 10 anatomical regions mentioned previously. All of the above

component parts were then weighted separately. The volumes of the seminal vesicles and prostate were measured by water displacement. Component weights of seventy-four male lower urinary tracts from a similar previous series from the University of Texas Medical Branch at Galveston by Christie et al. (1) were also used.

B. Previously collected data of schistosome-infected lower urinary tracts by Christie et al. (1, 2, 3,) Smith et al (4), and Cheever et al. (5, 6), were also employed in the study.

C. Data from A and B above, consisting of weights of various components of the lower urinary tract along with, where available, volumes, ages, and the degree of schistosomal obstructive uropathy, if any, were then entered into a Lotus 1-2-3 (spread sheet) program on an IBM PC XT microcomputer and analyzed for correlations. Mean, standard deviation, variance, number of observations, and standard error of the mean were computed for each category in both American control and schistosome-infected tissues. This information was then used to calculate regressions (r-values) and obtain t-values. P-values were then estimated from the t-values using a single tail t-test.

RESULTS

1. In the American autopsies between the ages of 19 and 40 years old, the average prostatic weight from 28 prostates was found to be 23.08 grams with an upper limit of normal weight (mean plus two standard deviations) being 32.16 grams. From 11 patients of the same group, average seminal vesicles and seminal recepticle weights and upper normal limits were as follows: right seminal vesicle 4.22 grams and 6.42 grams; left seminal vesicle 3.76 grams and 5.97 grams; bilateral seminal vesicles 7.98 grams and 12.00 grams; right seminal recepticle 1.70 grams and 2.67 grams; left seminal recepticle 1.72 grams and 2.50 grams; and bilateral seminal recepticles 3.42 grams and 4.99 grams. In 29 patients the mean weight of bilateral seminal vesicles and seminal recepticles was 9.13 grams with the cut-off point for two standard deviations above the mean being 15.37 grams. The ratio of the bilateral seminal vesicle and seminal recepticle weight to the weight of the entire lower urinary tract resulted in a mean of .103 and a value of .180 for the mean plus two standard deviations.

2. In a previous study by Christie et al. (1) it was assumed that prostatic and seminal vesicle weights correlated with their volumes. To determine if this assumption was valid, both weight and volume of prostates and seminal vesicles were measured and then analyzed. It was discovered that volume is directly proportional to weight in both seminal vesicles and prostates. Linear regressions yielded r-value very close to one, indicative of a very high probability of correlation. The regression formula for prostate volume to weight

was "prostate weight = 1.0121 (prostate volume) + 1.17", with an = .98. Right and left seminal vesicles had r-values of .79 and .85, respectively. The bilateral seminal vesicle r-value of volume to weight was .92, obtained from a regression equation of "seminal vesicle weight = .87 (seminal vesicle volume) + .599".

3. Upon comparing the American control data to the schistome data obtained from the Christie et al. (1) study (Table 1), several significant differences and similarities in the weights of the component parts of the lower urinary tract were noticed. A p-value of less than .05 was used to indicate a statistical difference between the two populations. The prostatic weight was found to be statistically heavier in control patients. The interstitial ureters (right, left, and bilateral) and total lower urinary tract weight were also found to be significantly heavier in the American control group as well. Other component parts of the lower urinary tract which were discovered to be statistically lighter (p-value less than .05) included the right lateral inferior, posterior inferior, and right lateral superior portions of the urinary bladder. The trigone, apex and bilateral seminal vesicles and seminal recepticles were all statistically heavier in the schistosome-infected population as compared to the American control group. The ratio of bilateral seminal vesicles and seminal recepticles to the total lower urinary tract weight was also found to be significantly greater in the schistosome group. All other portions (total urinary bladder; anterior inferior, left lateral inferior, anterior superior, left lateral superior, and posterior portions of the urinary bladder; extravesical ureters (right, left, and bilateral) of the lower urinary tract showed no statistical differences between the American controls and the schistosoma-infected individuals. In order to compare the American control data to a larger schistosome-infected group, data from Christie et al, (1, 2, 3), Smith et al (4), and Cheever, (5, 6), were pooled. This larger data base of schistosome-infected lower urinary tract had less division of each lower urinary tract, therefore not all of the 17 anatomical component portions of the lower urinary tract shown in the preceding section could be compared.

4. In another part of the study American controls, schistosome-infected individuals without obstructive disease of the ureters, and schistosome-infected patients with schistosomal obstructive uropathy were compared to each other (Table 2). When American controls were compared to individuals with non-obstructive urinary schistosomiasis, bilateral seminal vesicles and seminal recepticles, extravesical ureters (right, left and bilateral), total lower urinary tract, and the ratio of bilateral seminal vesicles and seminal recepticles to the lower urinary tract were all found to be statistically heavier (p-values less than .000) in the schistosome group. In addition to these differences, the American controls were also shown to be

significantly older and have heavier prostates. However, the total urinary bladder weight was shown to be approximately equal in both controls and schistosome-infected individuals and resulted in no significant difference between them (p-value greater than .5). Among the significantly different portions, all values were greater in the individuals with non-obstructive urinary schistosomiasis than in the American control group, except in age and prostatic weight, where the American controls were greater.

Upon comparing the American controls to individuals with schistosomal obstructive uropathy, all of the above groups, including the total urinary bladder weight, were found to have p-values less than .001, indicating the two populations are different in each category. The tissue from individuals with schistosomal obstructive uropathy was statistically heavier than that from the American control data in almost every category. Exceptions were prostate weight and age, where control individuals had heavier prostates and were older.

Non-obstructive urinary schistosomiasis was then contrasted with patients with schistosomal obstructive uropathy. The following relations were noted. Age, prostate and bilateral seminal vesicle and recepticle weights and the ratio of bilateral seminal vesicles and seminal recepticles to the total lower urinary tract weight were all statistically the same. Extravesical ureters (right, left and bilateral), total urinary bladder weight, and total lower urinary tract weight were all significantly heavier in schistosomal obstructive uropathy group and gave p-values (all .006 or less) indicative of this statistical difference.

5. Component weights from the lower urinary tracts of patients with (schistosome disease that is significant but not the cause of death) concomitant severe schistosomiasis weights from patients with incidental schistosomiasis were compared and contrasted to component (schistosome disease that is mild to moderate) (Table 3). These two of schistosome disease were suggested and described by Smith et al. (7). Only two categories showed a statistical difference, total urinary bladder weight and total lower urinary tract weight. Both were heavier in the patients with concomitant severe schistosomiasis. Age, prostatic weight, bilateral seminal vesicle and seminal recepticle weight, extravesical ureters (right, left and bilateral) weight, and the ratio of bilateral seminal vesicles and seminal recepticles to the total lower urinary tract weight all had p-values greater than .1, denoting them as one population.

6. Lastly, patients with unilateral schistosomal obstructive uropathy were compared to individuals with bilateral schistosomal obstructive uropathy (Table 4). From the p-values obtained, the patients with bilateral schistosomal obstructive uropathy were found to be younger and to have statistically heavier extravesical ureters (right, left and bilateral). Their total urinary bladder weight was also heavier and had a p-value of .056, which suggest that a significant difference might well exist. The other parameters (prostate weight, bilateral seminal vesicle and seminal recepticle weight, total lower urinary tract weight and the ratio of bilateral seminal vesicles and seminal recepticles to the lower urinary tract weight) gave p-values of .25 or greater and would, therefore, be considered one population in terms of these categories.

DISCUSSION

A. Extension of the control group allowed 28 cases between the ages of 19 and 40 years old (compared to 18 to 49.5 years) in Christie's study (1), but the upper limit of normal prostatic weight was nearly identical, approximately 32 grams.

B. Previous studies (1, 2, 3) concluded (without substantiating data) that seminal vesicle and prostatic weights could be equated with their volumes and ergo, heavier seminal vesicles could be determined by palpation of rectal exam. The present study shows near perfect correlation of prostatic weight and volume and acceptable correlation of seminal vesicle weight and volume. Seminal vesicle volume, and therefore weight, should be a detectable/assessable parameter.

C. Comparison of the enlarged control data base on lower urinary tracts with data from the previous study of patients with urinary schistosomiasis (1) revealed no significant difference in the weight of the entire lower urinary tract or the urinary bladder as a whole. However, control prostates were nearly 11 grams (i.e. 68%) heavier than the schistosome-infected patients. While this might infer a degree of prostatic atrophy in urinary schistosomiasis (for some obscure reason), it might be explained by the relatively smaller stature of Egyptians compared with Texans or the significantly older age of the control group with at least 66% of the controls being over 50 years of age and 21% of controls having prostatic weights over 32 grams compared with 6% of Egyptians having benign prostatic hypertrophy.

In constrast, bilateral seminal vesicles and recepticles in patients with urinary schistosomiasis were significantly (42%) larger (13.5 grams) than in controls (9.5 grams). This suggests hypertrophy of these organs in urinary schistosomiasis, but is still within the upper limit of normal (15.4 grams) for men ages 19-40 years of age. However, the ratio of bilateral seminal vesicle and seminal recepticle weight to the weight of

of the total lower urinary tract in patients with urinary schistosomiasis was significantly higher (.146) than in controls (.093) but was not higher than the upper limit of normal for men aged 19-40 years (.180). This does not agree with previous studies (1, 2, 3) and weakly supports the thesis that seminal vesicle hypertrophy is a sequelum of urinary schistosomiasis.

The average trigonal weight of the schistosome-infected lower urinary tracts was found to be almost 3.7 grams (51%) heavier than the weight of the mean trigone from the control group. It might be assumed that this change in weight in the trigone of the schistosome infected patients would be continued into the ureters, but surprisingly this is not found to be the case. In the interstitial ureters, the reverse is seen and no statistical difference between the extravesical ureters is noticed. The bilateral interstitial ureters from the control group were discovered to be heavier by 67% (.33 grams) and the average weight of the bilateral extravesical ureters were shown to be approximately the same (about 2.0 grams) in both groups.

C. In order to expand the data base of patients with urinary schistosomiasis and also study large numbers of schistosome-infected patients with and without schistosomal obstructive uropathy, the data of Christie et al. (1, 2, 3) was pooled with that of Smith et al. (4) and Cheever et al. (5, 6). The weights of the entire lower urinary tract progressively increased from control to unobstructed urinary schistosomiasis to patients with schistosomal obstructive uropathy. Prostates of both schistosome groups were similar and both were significantly lower (nearly 10 grams or 37%) than controls. Age was similar in both schistosome groups and significantly younger than controls.

While both obstructive and non-obstructive urinary schistosomiasis cases had similar bilateral seminal vesicle and seminal recepticle weights, they were significantly heavier (22+ grams) than the controls (9.3 grams) and the upper limit of normal for men of ages 19-40 (15.4 grams). Thus, seminal vesicle and seminal recepticle hypertrophy is a sequelum of urinary schistosomiasis but in a larger series does not appear to differentiate between urinary schistosomiasis patients with and without schistosomal obstructive uropathy. Among non-obstructed urinary schistosomiasis patients, those with severe disease had heavier (20%) seminal vesicles and seminal recepticles than those with incidental to (mild) disease, but this was not a significat difference; similarly, among patients with schistosomal obstructive uropathy, individuals with unilateral schistosomal obstrutive uropathy had similar seminal vesicle and seminal recepticle weights to individuals with bilateral schistosomal obstructive uropathy.

The ratio of the bilateral seminal vesicle and seminal recepticle weight to the weight of the entire lower urinary tract was found to have no statistical difference among individuals with schistosomal obstructive uropathy as compared to patients without schistosomal obstructive uropathy. Severity of schistosomal disease also affected no change in this ratio among patients without obstructive uropathy

When the weight of the urinary bladder proper and weight of the entire lower urinary tract were compared among patients with schistosomal obstructive uropathy, it was found that patients with severe disease had significantly heavier (32%) urinary bladders and heavier (33%) lower urinary tracts. The urinary bladder weight and lower urinary weight were both discovered to be similar in patients with without schistosomal obstructive uropathy.

The extravesical ureters of patients without schistosomal obstructive uropathy showed no significant change in weight with the severity of disease. In both severe and incidental schistosomiasis, the average bilateral extravesical weight was approximately equal to 6 grams. But among individuals with schistosomal obstructive uropathy, an extremely large increase (9.7 grams or 170%) in weight was noticed from patients with unilateral schistosomal obstructive uropathy to patients with bilateral schistosomal obstructive uropathy. This large increase in weight from unilateral to bilateral obstructive disease would be expected from the nature of the pathological changes caused by urinary schistosomiasis in the ureters (i.e. increase egg burden leads to increase size and weight).

CONCLUSIONS

In summary, it appears that both absolute and relative seminal vesicle and seminal recepticle hypertrophy are regular sequela of urinary schistosomiasis, but can not be used to differentiate between patients with and without schistosomal obstructive uropathy. It may be argued that the larger data base including previous Egyptian autopsy series (1, 2, 3, 5, 6) were not as carefully dissected of extraneous adipose tissue and that one (5, 6) series had undergone post mortem perfusion for worms which rendered a measure of artifactual edema which may not have been uniformly distributed throughout the various organs of the lower urinary tract. While it is disappointing that rectal exam estimation of seminal vesicle and seminal recepticle size may not adequately screen for schistosomal obstructive uropathy, it is evident that among men, the procedure may serve to screen for urinary schistosomiasis infection according to our data. Yet these conclusions would be more secure if a completely comparable series of prostatic and seminal vesicles and seminal recepticle weights of Egyptian farmers without urinary schistosomiasis were available.

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TABLE 1

Comparative weights (in grams) of component portions of the lower urinary tract from schistosome-infected and uninfected control groups

	SCHISTOSOMIASIS*	AMERICAN CONTROLS*	t	d.f.	p +
ROSTATE	16.155+-1.335 (32)	27.083+-0.760 (140)	7.113	170	<.001
ILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES	13.458+-1.402 (32)	9.501+-0.309 (136)	2.755	166	.009
RINARY BLADDER	58.751+-4.389 (32)	62.206+-1.572 (141)	0.741	171	.460
Trigone	7.506+-0.517 (32)	3.851+-0.165 (67)	6.724	97	<.001
Anterior Inferior	5.881+-0.648 (32)	7.294+-0.354 (67)	1.913	97	.065
Right Lateral Inferior	5.013+-0.546 (32)	7.623+-0.386 (67)	3.905	97	<.001
Left Lateral Inferior	5.661+-0.920 (32)	6.934+-0.335 (67)	1.301	97	.170
Posterior Inferior	3.935+-0.370 (32)	9.028+-0.487 (67)	8.325	97	<.001
Anterior Superior	5.569+-0.436 (32)	6.692+-0.331 (67)	2.054	97	.050
Right Lateral Superior	5.001+-0.390 (32)	6.822+-0.338 (67)	3.526	97	<.001
Left Lateral Superior	5.910+-0.782 (32)	6.518+-0.278 (67)	0.732	97	.304
Posterior Superior	5.630+-0.323 (32)	6.157+-0.341 (67)	1.122	97	.211
Apex	8.646+-0.698 (32)	5.014+-0.199 (67)	5.009	97	<.001
NTERSTITIAL URETERS	0.495+-0.068 (32)	0.828+-0.031 (137)	4.41	167	<.001
Right Interstitial Ureter	0.241+-0.029 (32)	0.413+-0.017 (138)	4.99	168	<.001
Left Interstitial Ureter	0.254+-0.042 (32)	0.414+-0.017 (137)	3.47	167	<.001
XTRAVESICAL URETERS	2.118+-0.306 (32)	1.953+-0.067 (106)	0.525	136	>.500
Right Extravesical Ureter	1.086+-0.191 (32)	0.997+-0.037 (115)	0.457	145	>.500
Left Extravesical Ureter	1.031+-0.159 (32)	1.000+-0.044 (115)	0.185	145	>.500
OWER URINARY TRACT	90.978+-5.512 (32)	104.080+-2.405 (104)	2.179	134	.031
ATIO of BILATERAL SEMINAL VESICLES and SEMINAL RECEPTILES to LOWER URINARY TRACT	0.146+-0.013 (32)	0.093+-0.003 (104)	4.096	134	<.001

* Mean +/- standard error of the mean and (number of observations)

\+ t-value, degrees of freedom, and p-value

TABLE 2a
Comparative weights (in grams) of various components of the lower urinary tract from non-obstructive schistosomiasis, obstructive schistosomiasis, and uninfected control groups

	AMERICAN CONTROLS*	NON-OBSTRUCTIVE SCHISTOSOMIASIS*	SCHISTOSOMAL OBSTRUCTIVE UROPATHY*
AGE	54.7+-1.51 (134)	39.4+-1.59 (120)	42.2+-1.37 (140)
PROSTATE	27.083+-0.760 (140)	17.423+-1.024 (117)	17.022+-0.964 (136)
BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES	9.325+-0.312 (141)	22.002+-1.229 (117)	24.400+-1.349 (137)
URINARY BLADDER	62.206+-1.573 (141)	61.911+-2.544 (120)	72.555+-2.629 (139)
EXTRAVESICAL URETERS	1.953+-0.067 (106)	6.052+-0.380 (48)	12.720+-1.741 (31)
Right Extravesical Ureter	0.997+-0.037 (115)	3.169+-0.252 (49)	6.397+-1.100 (31)
Left Extravesical Ureter	1.000+-0.044 (115)	2.900+-0.194 (48)	6.327+-0.930 (31)
LOWER URINARY TRACT	104.890+-2.408 (106)	128.900+-5.788 (46)	162.130+-7.9505 (28)
RATIO of BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES to LOWER URINARY TRACT	0.093+-0.003 (106)	0.215+-0.012 (46)	0.213+-0.018 (28)

TABLE 2b

	AMERICAN CONTROLS: NON-OBSTRUCTIVE SCHISTOSOMIASIS+			NON-OBSTRUCTIVE SCHISTOSOMIASIS: SCHISTOSOMAL OBSTRUCTIVE UROPATHY+			AMERICAN CONTROLS: SCHISTOSOMAL OBSTRUCTIVE UROPATHY+		
	t	d.f.	p	t	d.f.	p	t	d.f.	p
AGE	6.90	252	<.001	1.30	258	.190	6.10	272	<.001
PROSTATE	7.575	255	<.001	0.285	251	>.500	8.197	274	<.001
BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES	9.999	256	<.001	1.314	252	.190	10.887	276	<.001
URINARY BLADDER	0.099	259	>.500	2.909	257	.004	3.378	278	<.001
EXTRAVESICAL URETERS	10.61	152	<.001	3.743	77	<.001	6.180	135	<.001
Right Extravesical Ureter	8.507	162	<.001	2.858	78	.006	4.903	144	<.001
Left Extravesical Ureter	9.505	161	<.001	3.605	77	<.001	5.718	144	<.001
LOWER URINARY TRACT	3.830	150	<.001	3.379	72	<.001	6.891	132	<.001
RATIO of BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES to LOWER URINARY TRACT	9.887	150	<.001	0.070	72	>.500	6.635	132	<.001

* Mean +/- standard error of the mean and (number of observations)
+ t-value, degrees of freedom, and p-value

TABLE 3
Weights (in grams) of various components of the lower urinary tract from patients with concomitant severe schistosomiasis compared to those of patients with incidental schistosomiasis

	CONCOMITANT SEVERE SCHISTOSOMIASIS*	INCIDENTAL SCHISTOSOMIASIS*	t	d.f.	p +
AGE	41.10+-4.77 (10)	40.70+-2.48 (43)	0.06	51	>.500
PROSTATE	25.164+-6.350 (10)	20.346+-1.444 (40)	0.740	48	.465
BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES	31.318+-6.293 (10)	26.279+-1.807 (40)	0.770	48	.447
URINARY BLADDER	93.000+-9.550 (10)	70.497+-4.829 (43)	2.103	51	.042
EXTRAVESICAL URETERS	7.334+-0.852 (9)	5.756+-0.410 (39)	1.667	46	.103
Right Extravesical Ureter	4.089+-0.681 (10)	2.933+-0.251 (39)	1.590	47	.109
Left Extravesical Ureter	3.325+-0.324 (9)	2.823+-0.225 (39)	1.004	46	.314
LOWER URINARY TRACT	161.310+-8.148 (9)	121.020+-39.268 (37)	3.920	44	<.001
RATIO of BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES to LOWER URINARY TRACT	0.207+-0.036 (9)	0.216+-0.012 (37)	0.239	44	>.500

* Mean +/- standard error of the mean and (number of observations)
\+ t-value, degrees of freedom, and p-value

TABLE 4

Weights (in grams) of various component portions of the lower urinary tract from individuals with unilateral schistosomal obstructive uropathy compared to those of individuals with bilateral schistosomal obstructive uropathy

	UNILATERAL SCHISTOSOMAL OBSTRUCTIVE UROPATHY*	BILATERAL SCHISTOSOMAL OBSTRUCTIVE UROPATHY*	t	d.f.	p +
GE	49.30+-2.49 (43)	39.00+-1.53 (97)	3.52	138	<.00
ROSTATE	18.737+-1.803 (43)	16.229+-1.126 (93)	1.180	134	.25
ILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES	24.400+-2.557 (43)	24.401+-1.581 (94)	0.000	135	>.50
RINARY BLADDER	65.605+-4.072 (43)	75.669+-3.293 (96)	1.922	137	.05
XTRAVESICAL URETERS	5.537+-0.518 (8)	15.220+-2.103 (23)	4.47	29	<.00
Right Extravesical Ureter	3.000+-0.405 (8)	7.579+-1.394 (23)	3.15	29	.00
Left Extravesical Ureter	2.537+-0.229 (8)	7.645+-1.128 (23)	4.43	29	<.00
OWER URINARY TRACT	166.400+-15.809 (8)	160.430+-9.132 (20)	0.327	26	>.50
ATIO of BILATERAL SEMINAL VESICLES and SEMINAL RECEPTICLES to LOWER URINARY TRACT	0.227+-0.038 (8)	0.208+-0.020 (20)	0.443	26	>.50

* Mean +/- standard error of the mean and (number of observations)
\+ t-value, degrees of freedom, and p-value