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Original Research**Comparison of Hispanics to Caucasians in Metabolic Evaluation of Nephrolithiasis**

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Corresponding author*Michael S Davis, MD**Chief, Division of Urology, Surgical Director, Transplant Program, Professor, Department of Surgery, University of New Mexico Health Science Center, Albuquerque, NM 87131, USA; E-mail: MSDavis@salud.unm.edu**Article Information****Received:** July 26th, 2018; **Revised:** October 9th, 2018; **Accepted:** October 10th, 2018; **Published:** October 23rd, 2018**Cite this article**Riley JM, Ming J, Alba F, Davis MS. Comparison of hispanics to caucasians in metabolic evaluation of nephrolithiasis. *Urol Androl Open J.* 2018; 3(1): 1-5.
doi: [10.17140/UAOJ-3-116](https://doi.org/10.17140/UAOJ-3-116)**ABSTRACT****Introduction**

It is well-known that nephrolithiasis is related to urinary metabolic abnormalities. However, it is not known what, if any, difference exists between Caucasians and Hispanics in regards to metabolic stone disease. The Southwest United States offers a unique patient population to compare these two groups.

Materials and Methods

A retrospective study was performed at a single institution of all patients that underwent 24 hour urine stone risk studies over a 5-year period. All urine studies were performed by Litholink. Age, ethnicity, BMI, 24 hour urine parameters, serum electrolytes, Parathyroid hormone (PTH) level and stone composition were evaluated. Ethnicity was determined by patient self-selection. Patients that did not select Hispanic or Caucasian were excluded. Differences in the metabolic evaluation of these patients in regards to the risk of nephrolithiasis were analyzed.

Results

A total of 208 patients with 349 urine studies were included in the study. There were 122 Caucasians (Group A) and 87 Hispanics (Group B) with 206 and 143 urine studies respectively. BMI was not statistically different between Group A (28.3) and Groups B (29.1), $p=0.4$. However, there were more women in Group B (64.4%) than Group A (50%). Group A had significantly higher urinary volume, oxalate, potassium, phosphorus, sulfate, urine urea nitrogen and 24 hour creatinine compared to Group B but lower urinary citrate, supersaturation of calcium phosphate and magnesium levels. Group B had higher PTH compared to Group A (69.7 vs. 42.6, respectively, $p=0.048$). Group B also had a higher percentage of Calcium phosphate stones.

Conclusion

Our results suggest that there is a difference in metabolic evaluation between Caucasians and Hispanics. Caucasians have an increased risk of stone formation due to increased oxalate excretion while Hispanics demonstrate increased risk due to lower urinary volumes and elevated supersaturation of calcium phosphate.

Keywords

Nephrolithiasis; Metabolic evaluation.

INTRODUCTION

The Hispanic population is the largest minority group in the United States and constitutes 17% of the population.¹ Projections show that by 2060, Hispanics will make up 31% of the US population.¹ Little is known regarding Hispanic-Americans in re-

gards to the metabolic risk of stones and how this compares to the Caucasian-American population, which is traditionally the largest group of stone formers.^{2,3,4}

Our Institution is located within a state where Hispanics are the majority and that has the highest percentage of Hispanics

in the country at 47.3%.¹This allows for a unique comparison of Hispanics to Caucasians within one geographic region.

MATERIALS AND METHODS

After institutional IRB approval, a retrospective review was performed at our single tertiary care center. All patients diagnosed with kidney stones who underwent a 24 hour urine stone risk analysis at our institution from 2008-2013 were evaluated. All 24 hour stone risk urine tests were performed by Litholink. Pediatric patients (age <18-years-old) were excluded from analysis as this population has a greater risk of underlying metabolic disease.

Patients were divided into 2 groups based on self-reported ethnicity. Group A included Caucasian patients and group B included Hispanic patients. Other racial/ethnic groups and those who did not designate were excluded. In addition to the urinary stone risk evaluation, stone composition, serum metabolic evaluations, past medical history, patient demographics and body mass index (BMI) were evaluated. The two groups were compared with each other to determine any differences between ethnicities.

RESULTS

A total of 224 patients with 370 urine studies were identified. Fifteen patients with 21 urine studies were excluded because their race/ethnicity was not Caucasian or Hispanic or they did not self-identify a race/ethnic group. This left 208 patients with 349 urine studies including 122 Caucasians (Group A) and 87 Hispanics (Group B) with 206 and 143 urine studies, respectively.

Group B was significantly younger with an average age of 45.6 (18-78) compared to 50.3 (19-74) in Group A ($p=0.02$). BMI was not statistically different ($p=0.4$) between the Group A and Group B (28.3 *vs.* 29.1, respectively). There were equal numbers of men and women in Group A, yet proportionately more women in Group B (64.4%). Equal percentage of patients within each group had family history (defined as 1st or 2nd degree relatives) of stones (42.6% in Group A and 41.4% in Group B). There were slightly more patients with hypertension in Group A at 31.1% compared to 26.4% in Group B but equal number of diabetics (21.3% for Group A *vs.* 23.0% in Group B). Table 1 demonstrates the patient demographics of each group.

When comparing the two groups for all tests completed, several 24 hour urine parameters were significantly different. Table 2 shows the urinary parameter measurements for each group. Group A had a higher mean urine volume of 2.24 liters compared to 2.21 liters in Group B ($p=0.006$). Group A had significantly higher urinary oxalate, potassium, phosphorus, sulfate, urine urea nitrogen and 24 hour creatinine compared to Group B. Group A had lower urinary citrate, supersaturation of calcium phosphate and magnesium levels. Remaining urinary parameters were not significantly different.

Table 1. Patient Demographics

	Group A (Caucasians)	Group B (Hispanics)	p value
Number	122	87	
Number of 24 hour collections	206	143	
Age (range)	50.3±14.06 (19-74)	45.6±15.12 (18-78)	0.022
Gender (M:F)	61:61	31:56	
BMI	28.34±6.869	29.13±6.584	0.412
Positive Family history	52 (42.6%)	36 (41.4%)	
Presence of hypertension	38 (31.1%)	23 (26.4%)	
Presence of diabetes mellitus	26 (21.3%)	20 (23.0%)	

Table 2. Comparison of all 24 hour Urine Parameters

	Group A	Group B	p value (*=significance)
Volume (Liters)	2.24±1.065	1.95±0.886	0.0062*
SS CaOx	6.48±3.254	6.78±3.920	0.456
Calcium (mg/day)	219.84±120.653	217.93±120.409	0.884
Oxalate (mg/day)	39.69±16.590	34.14±13.789	0.0008*
Citrate (mg/day)	586.58±386.808	512.75±307.483	0.0485*
SS CaP	1.15±0.896	1.46±1.210	0.0091*
pH	6.20±0.666	6.27±0.534	0.299
SS UA	0.78±0.837	0.68±0.798	0.267
Uric acid (g/day)	0.61±0.195	0.61±0.219	0.909
Sodium (mmol/day)	172.30±72.313	182.22±82.307	0.246
Potassium (mmol/day)	65.63±32.537	53.77±23.076	0.0001*
Magnesium (mg/day)	101.74±48.342	90.61±40.936	0.0220*
Phosphorus (g/day)	0.92±0.337	0.79±0.343	0.0004*
Ammonium (mmol/day)	31.62±19.051	29.06±12.424	0.134
Chloride (mmol/day)	164.44±68.205	168.04±73.774	0.647
Sulfate (mEq/day)	38.82±15.179	34.98±14.576	0.0185*
Urea Nitrogen (g/day)	10.73±3.645	9.55±3.566	0.0029*

SS CaOx=supersaturation of calcium oxalate, SS CaP=supersaturation of calcium phosphate, SS UA=supersaturation of uric acid

Further analysis was done to evaluate only the first collection, taken prior to any dietary or medical therapy was commenced. Group A remained significantly higher in urinary oxalate, potassium, magnesium, phosphorus, ammonium and 24 hour creatinine when compared to Group B. Group B continued to have significantly higher supersaturation of calcium phosphate.

The urine volume was not significantly different between the two groups. Table 3 lists the urinary parameters of the first urine collection.

Table 3. Comparison of First Urinary Collection

	Group A	Group B	p value (* = significance)
Volume (Liters)	2.08±1.061	1.87±0.889	0.107
SS CaOx	6.82±3.470	6.71±3.608	0.818
Calcium (mg/day)	217.45±135.288	202.75±109.187	0.387
Oxalate (mg/day)	39.08±16.917	32.17±14.061	0.0035*
Citrate (mg/day)	559.66±334.364	501.45±303.009	0.191
SS CaP	1.11±0.937	1.46±1.278	0.034*
pH	6.10±0.647	6.20±0.510	0.219
SS UA	0.94±0.925	0.76±0.876	0.149
Uric acid (g/day)	0.60±0.181	0.60±0.223	0.868
Sodium (mmol/day)	169.92±76.040	178.28±83.894	0.462
Potassium (mmol/day)	60.19±28.718	50.21±22.011	0.0051*
Magnesium (mg/day)	100.16±51.188	83.30±34.143	0.0050*
Phosphorus (g/day)	0.92±0.337	0.79±0.331	0.0045*
Ammonium (mmol/day)	33.01±20.325	28.05±12.405	0.031*
Chloride (mmol/day)	162.09±70.827	163.20±75.774	0.915
Sulfate (mEq/day)	36.69±14.483	34.01±15.029	0.202
Urea Nitrogen (g/day)	10.45±3.677	9.15±3.586	0.011*

SS CaOx=supersaturation of calcium oxalate, SS CaP=supersaturation of calcium phosphate, SS UA=supersaturation of uric acid

Of the 208 patients, 195 (93.7%) had a basic metabolic panel (BMP). There were 111 (90.1%) patients in Group A and 84 (96.6%) patients in Group B who completed a BMP. Serum potassium was higher in Group A (4.15) compared to Group B (4.02). Twenty-eight patients in Group B (32%) had a PTH level and on average the level was higher compared to the 32 patients (26%) in Group A (69.7 vs. 42.6, respectively, $p=0.048$). Table 4 shows the serum results for the two groups. The remaining serum levels were not significantly different between the two groups.

Stone analysis was collected on 117 patients overall. A stone was classified as the predominant stone type if there was more than 80% of that compound present. It was classified as mixed composition if there was less than 80% predominant compound. Stone analysis was performed in 71 (58.2%) of the patients in Group A. Of these 71 patients, 41 (57.7%) had calcium oxalate, 4 (5.6%) had calcium phosphate, 4 (5.6%) had uric acid, 3 (4.2%) had cysteine, 17 (23.9%) had mixed stones. There were no struvite stones present. Stone analysis was performed in 46 (52.3%) of the patients in Group B. Of these 46 patients, 18 (39.1%) had calcium oxalate, 12 (26.1%) had calcium phosphate, 3 (6.5%) had uric acid and 12 (26.1%) had mixed stones. There were no struvite or cysteine stones present. Table 5 shows the stone analysis data.

Table 4. Comparison of Serum Results

	Group A	Group B	p value
Sodium	139.51±2.586	139.63±2.610	0.775
Potassium	4.15±0.392	4.02±0.394	0.022*
Chloride	105.23±3.246	105.76±3.535	0.279
Bicarbonate	24.68±2.848	24.02±3.065	0.126
Blood urea Nitrogen	15.84±5.800	14.83±6.201	0.253
Creatinine	1.01±0.425	1.81±8.027	0.367
Calcium	9.24±1.038	9.26±0.631	0.855
Magnesium	2.00±0.349	1.91±0.232	0.067
Parathyroid hormone	42.63±28.625	69.74±63.400	0.0486*
Uric acid	5.81±2.209	5.09±1.388	0.202
Vitamin D 25(OH)	29.39±14.411	25.27±14.758	0.286

Table 5. Stone Analysis by Group

	Group A (71 patients)	Group B (46 patients)
Calcium Oxalate	41 (57.7%)	18 (39.1%)
Calcium Phosphate	4 (5.6%)	12 (26.1%)
Uric Acid	4 (5.6%)	3 (6.5%)
Cysteine	3 (4.2%)	0
Struvite	0	0
Mixed	17 (23.9%)	12 (26.1%)

DISCUSSION

To the best of our knowledge, we report the first direct comparison in the literature of metabolic evaluation for urolithiasis between Hispanic and Caucasian populations. Our institution is located within a state with nearly equal Hispanic and Caucasian populations. Our unique demographic allowed us to evaluate differences between these two groups who are exposed to the same environment and relatively similar diets.

The analysis showed that Caucasians are more likely to have higher oxalate levels than Hispanics. However, neither group demonstrated overall hyperoxaluria (>40 mg/day) on average. Yet certainly it is known that higher urinary oxalate is associated with increased stone formation.⁵ Higher oxalate levels may be a more significant cause of stone formation in Caucasians and therefore should be a focus point when counseling and evaluating these patients.

In the Hispanic population, there is a significantly higher

urinary supersaturation of calcium phosphate compared to the Caucasian population. The pH was not significantly higher and there does not appear to be an increased risk of renal tubular acidosis. Interestingly, Hispanics did have a higher PTH level than Caucasians. Other studies have also reported this finding, however, its association with risk for stone disease is unclear.^{6,7} There was certainly a higher proportion of female Hispanic patients which may also explain the increased urinary supersaturation of calcium phosphate. It remains unclear at this time how this affects the overall metabolic evaluation in the Hispanic population but we feel this certainly warrants further study and evaluation.

The observed urinary parameter differences seem to correlate with stone type. The higher rate of calcium oxalate stone formation in Group A may be related to the increased urinary oxalate secretion in this group. In addition, Group B did have a higher rate of calcium phosphate stones with the corresponding increased supersaturation of calcium phosphate in the urine. Certainly this study is not designed to evaluate the cause of stone type among these two groups. Yet-further studies are warranted to determine if there is any relationship between the metabolic parameters and stone type, as well as differences in the causes of stone formation between groups.

While we have shown several differences between our two groups, several limitations exist. This is a retrospective review of data which certainly allows for bias to exist. We compared only those patients that actually completed a metabolic evaluation at our institution. There were many patients with stone disease that were seen and treated for urolithiasis but simply did not complete the workup or for whom work up was not recommended. This may explain why we have an overrepresentation of females in our groups when considering urolithiasis is a male dominated disease historically.³ Because the study was retrospective in nature and took all patients that completed a 24 hour urine study, unfortunately a gender discrepancy was introduced. Interestingly, however, Dell'era et al. reported in a single institution study, a 1:1 ratio male to female presentation of symptomatic upper tract stones in a Hispanic population.⁸ It is unclear if there is truly a gender disparity in stone disease within the Hispanic population in our state, or if the observed male to female ratio simply represents a bias error.

Mente et al performed an analysis of multi-ethnic calcium nephrolithiasis formers compared to Caucasians.⁹ This study included a very small number of patients from Latin America (34, 3% of the study) which were compared to a European control group. The findings demonstrated an increased risk of calcium stones among those from Latin America but there was little ability to interpret underlying causes for this difference. Our study is not designed to determine if the Hispanic population has an increased overall risk of kidney stones, and certainly further population based studies are warranted.

All of our patients completed at least one 24 hour urine test. While some literature supports two 24 hour urine testing initially, other significant data suggests that one is sufficient.^{10,11}

Our patients had poor compliance overall with follow up metabolic testing. Only 37.9% (45) of the patients in Group A completed subsequent 24 hour urine tests. Of the patients in Group B, 40.2% (35) completed repeat 24 hour urine testing. Given the small follow-up numbers, we determined that further analysis of a difference in repeat testing may not be valid. In the future however, with the addition of more patients this may be something to investigate.

While we have shown that there are differences in urinary parameters between the two groups, we do not know how this effects overall stone formation. Given the very poor compliance of our patient population it was not possible to evaluate for subsequent stone formation within the study time frame.

LIMITATIONS

This is a retrospective review of all patients completing a 24 hour urine study and this certainly introduces selection bias. We do not know how many patients did not complete the metabolic evaluation and therefore this could change the overall results. The groups are not matched and there is a significantly higher amount of women in the Hispanic group. This may explain the differences in the urinary parameters. However, this may also be a difference between the ethnic groups. Dall'era et al demonstrated that there was a 1:1 presentation of male to female stone patients in the Hispanic population in contrast to 2.5:1 male:female ratio in Caucasians.⁸ Further studies are needed to determine if there is a difference in gender ratio in stone disease in the Hispanic population. In addition, a case matches study may be useful to understand any difference between Caucasians and Hispanics in regards to urinary parameters. Our study, simply highlights that there appears to be a difference in the two groups and additional studies are warranted.

CONCLUSION

Our study suggests that there is a metabolic difference between Caucasian and Hispanic populations. Caucasians show an increased risk of stone formation due to increased oxalate excretion with subsequent higher rates of calcium oxalate stone formation. Hispanics show an increased risk of stone formation due to decreased urinary volume as well as increased supersaturation of calcium phosphate with associated higher rates of calcium phosphate stone formation. Further studies are needed to determine if this is applicable to a wider geographic region, and if this is applicable to all stone formers. This information may be useful for more generalized dietary recommendations pertinent to these two population groups.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

DISCLOSURE

No competing financial interests exist.

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Illustration

Fournier's Gangrene in a Diabetic Young Man

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Fournier's gangrene is a sometimes life-threatening form of necrotizing fasciitis that affects the genital, perineal, or perianal regions of the body. It is usually secondary to perirectal or periurethral infections associated with local trauma, operative procedures, or urinary tract disease.

We report the case of a 49-years-old man with uncontrolled type 2 diabetes, presented to the emergency department with painful swelling in the scrotum and perianal region. His temperature was 38.8 °C, his pulse 120 beats per minute, and his blood pressure 98/60 mmHg. The physical examination revealed necrosis in the external genitalia and erythema in the hypogastric region and perineum with induration and crepitus (Figure 1A). Computed tomography revealed a scrotal collection with subcutaneous emphysema in the lower abdomen, scrotum and perianal fascia. A diagnosis of Fournier's gangrene was made.

The treatment consisted of a necrosectomy and drainage of collections with achieving discharge incisions in the perineum and lower abdomen. In addition to surgery, the patient received volume replacement and broad-spectrum intravenous antibiotics.

The evolution was favorable after several days of care (Figure 1B). After that the patient was entrusted to reconstruction surgery.

CONSENT

The authors have received written informed consent from the patient.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

Figure 1. A. Pre-Operative Photo Showing External Genitalianecrosis and Hypogastric Erythema. **B.** Post-Operative Photo After Excision of the Necrotic Tissue and Discharge Incisions



Case Report

Incidentally Found Meckel's Diverticulum Used in the Creation of an Orthotopic Neobladder

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ABSTRACT

An incidentally discovered Meckel's diverticulum while performing radical cystoprostatectomy with neobladder for muscle invasive carcinoma bladder was utilized as the most dependent part of the pouch for anastomosis with the urethral stump leading to a simple tension free anastomosis with very good post-operative results.

Keywords

Meckel's diverticulum; Ileal neobladder; Radical cystectomy; Carcinoma bladder.

CASE REPORT

A 62-year-old patient presented with gross total painless hematuria and was diagnosed with muscle invasive transitional cell carcinoma of urinary bladder (T2N0M0).

We planned to perform a radical cystoprostatectomy with formation of an orthotopic neobladder. After completing cystoprostatectomy and bilateral lymph node dissection, when we picked and chose terminal ileum for formation of neobladder, incidentally a Meckel's diverticulum of size 6 cm was found (Figure 1) approximately 28 centimetres from the ileocaecal valve, so we decided to complete detubularisation of selected segment of bowel except Meckel's diverticulum and to use it for lengthening the neobladder (Figures 2 and 3). Meckel's diverticulum was kept at pouch's most dependent location. After forming a good capacious, near sphere shaped pouch, meckel-urethral anastomosis was done. No major post-operative complications occurred. After removal of the transurethral catheter, the patient voided with good flow. Before removing suprapubic cystostomy tube, cystogram was done which showed bladder, bladder neck and urethra similar in

appearance to the native one (Figure 4). At 12-months of follow-up the neobladder functioned well without residual volume in the neobladder with occasional nocturnal incontinence.

Figure 1. Per-operative Photograph of Ileal Segment with Incidentally Found Meckel's Diverticulum

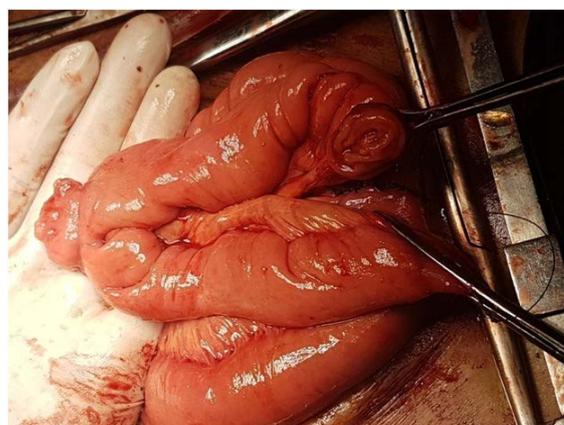


Figure 2. Configured Ileal Neobladder with Meckel's Diverticulum as Neourethra

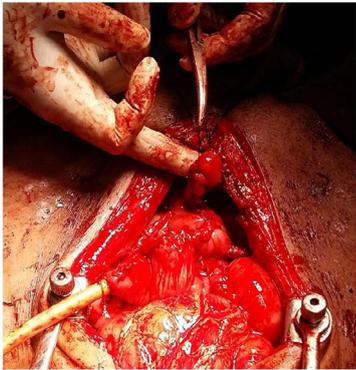


Figure 3. Bilateral Ureters Reimplanted into the Neobladder with D J Stenting

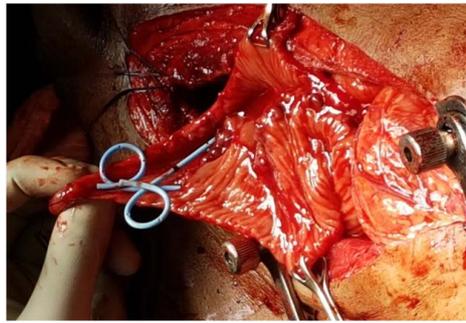
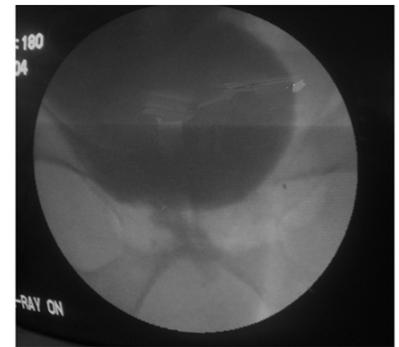


Figure 4. Post-operative Cystourethrogram Mimicking Near Normal Native Bladder And Urethra



DISCUSSION

In review of literature, we found a single case report of using a Meckel's diverticulum for creation of neobladder in which they found short mesoileum.¹ In another case report Meckel's diverticulum was used for implanting the ureters.² It has also been used for ureteric repair and as an alternative conduit for the Mitrofanoff procedure.^{3,4}

Meckel's diverticulum is the most common congenital malformation of the gastrointestinal tract.⁵ It is an embryologic rest of the omphalomesenteric duct, which normally obliterates in the seventh week of gestation.⁶ However, it is formed when the intestinal end of the duct remains. Meckel's diverticulum is normally diagnosed due to a complication, such as a gastrointestinal bleeding in 25 to 50% of the cases or an infection in about 20% of the cases.⁵ Obstruction, diverticulitis and intussusception are also commonly seen. Symptoms may be due to inflammation and ulceration in a Meckel's with ectopic gastric or pancreatic tissue.⁶ However, older patients are unlikely to have such findings.⁵

Ileal orthotopic neobladder is considered to be the first choice for a continent urinary diversion after radical cystectomy because ileum can easily be manipulated into the pelvis without tension and we can create a low-pressure reservoir which is capacious and continent.⁷ Using 40 cm of bowel does not result in any malabsorption or any major bowel dysfunction.^{8,9}

The Meckel's diverticulum we found incidentally was in a very suitable location, and the tip could be easily mobilized into the pelvis. By using the Meckel's diverticulum we could easily perform an anastomosis with the urethral stump without undue tension. A sphere-shaped pouch was created above the diverticulum. The ureters were implanted laterally into the pouch. This operative technique enabled us to create a good capacious pouch and to reach the urethra without traction. In our opinion, we can safely use the diverticulum if found in the absence of any inflammatory bowel disease.⁴ To our knowledge, this is the first report on the elective use of a Meckel's diverticulum in the formation of an orthotopic neobladder.

CONCLUSION

We described the elective use of a Meckel's diverticulum to lengthen the distal part of an orthotopic neobladder which can be used to create a tension free and relatively easy urethral anastomosis if found incidentally. It may be very useful in case of short mesoileum.

CONSENT

The authors have received written informed consent from the patient.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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Illustration

Scrotal Calcinosis: A Dermatosi Not so Rare

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A 35-year-old man consulted for calcified nodules of the scrotal skin. He complained of an impact on his sexual performance. The nodules progressively increased in size. He had no history of trauma or genitourinary or hormonal disorders. His physical examination revealed multiple bilateral calcified cutaneous lesions of the scrotum with no associated inflammation (Figure 1A). The dermatoscopic examination noted erythema with telangiectatic vessels (Figure 1B).

The described lesions were exclusively scrotal; there were no extensions to the penis. As this was a young patient with multiple lesions, blood and urine tests were performed, including calcium, phosphorus, and parathyroid hormone, which were normal. He underwent surgery. Complete resection of the lesions

was performed.

Scrotal calcinosis is a benign condition first described by Lewinski over a century ago.¹ Lesions are nodular and indolent, often bilateral and present without any discharge or inflammation. The question about the etiopathogenesis is not resolved.

Some authors concluded that the common characteristics are calcified dystrophy of epidermal cysts.² A penile location has been reported for multiple scrotal calcinosis. Nodules may cause sexual discomfort.³ Scrotal calcinosis is not associated with any metabolic, hormonal or endocrine disorder and is thus considered idiopathic in origin.⁴ Surgery is usually performed in patients presenting with voluminous lesions causing psychological and

Figure 1. A. Multiple and Bilateral Calcified cutaneous Lesions of the Scrotum with No Inflammatory Lesions. **B.** The Dermatoscopic Examination Noted Erythema with Telang Ectatic Vessels



A



B

sexual distress.⁴

CONSENT

The authors have received written informed consent from the patient.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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Case Report

A Bilateral Incomplete Duplex System in the Upper Urinary Tract: A Case Report

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ABSTRACT

Incomplete duplex system is a congenital abnormality, which is often found in children. It corresponds to a doubling of the upper urinary tract with two ureters which join into a common distal portion with a single ureteral orifice. In adults, this infection is fortuitous and often asymptomatic. Therefore, it does not require surgery in the absence of complications. Therefore, we would like to present this new case.

Keywords

Upper urinary tract; Duplex system; Bifid ureter; Incomplete duplication.

INTRODUCTION

Duplex collecting system is described as the kidney having two pyelocaliceal systems, superior and inferior. It may have either single, bifid ureter (partial or incomplete duplication) or double ureter draining separately into the bladder (complete duplication).

CLINICAL OBSERVATION

We report the case of a 60-years-old woman, with a history of diabetes mellitus, who presented with a slight lower back pain without other urinary signs. The clinical examination found no abnormalities. The kidney function was normal and the urine culture was negative.

A computed tomography (CT) urogram was performed and it set the diagnosis by showing a bilateral incomplete duplex collecting systems with bifid ureters. It also revealed a modest hydronephrosis in inferiors pyelocaliceal systems without any obstruction (Figure 1). However, we did not find any vesicoureteral reflux at cystography. A cystoscopy was performed revealing two ureteral meatus without bladder abnormalities. Retrograde ureteropyelography confirmed the absence of obstruction on the excretory tracts (Figures 2 and 3). The therapeutic strategy was

surgical abstention with a closer clinical follow because of the paucisymptomatic aspect of the clinical picture.

Figure 1. 3D Reconstruction of CT Scan Revealing a Slight Hydronephrosis with Bilateral Duplex Collecting System and Bifid Ureters



Figure 2. Distal Picture of Retrogradeuretero-Pyelography Showing the Convergence of the Ureters (Y-junction) at 4 cm from the Ureterovesical Junction



Figure 3. Proximal View of Retrogradeuretero-pyelography Showing Superior and Inferior Pyelocaliceal Systems



DISCUSSION

Renal collecting system duplication is one of the common congenital abnormalities of the urinary tract.¹

In the upper part, there are two ureters while lower down the ureters join to form a single ureter. This joining may be intravesical (V-junction) or extravesical (Y-junction).²

Duplication in adults is usually clinically asymptomatic and it is often a chance finding during a radiological examination.³

Ultrasound (US) will reveal evidence of upper tract damage. It may also show the presence of a ureterocoele and an asymmetric dilation of the pyelocaliceal cavities, either of the upper pole (by obstruction) or of the lower pole (most often secondary to the reflux). Visualization of both ureters is difficult at ultrasound in the absence of dilatation. Sectional imaging after injection of contrast makes it possible to visualize them at best. Cystography may demonstrate vesicoureteral reflux, which is common in the lower system with a typical amputation of the upper calyx.^{4,5}

Cystoscopy define the number of ureteral meatus as well as their anatomical situation. It also makes it possible to perform a retrograde ureteropyelographia which will confirm the diagnosis of the double system with bifid ureter and will look for a possible obstacle.

CONCLUSION

The duplication of the upper urinary tract is usually asymptomatic thus requiring no treatment. However, patients should be monitored closely because of the risk of complications such as

infection, obstruction or vesicoureteral reflux.

CONSENT

The authors have received written informed consent from the patient.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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