

# DIANON SYSTEMS

840 Research Parkway, Oklahoma City, OK 73104-3699  
 VOICE (800) 634-9330 FAX (405) 290-4046

RTE: US!AFS SEQ: W93U

**FINAL**



**AH350000**

## Stone Urinalysis Report

Page 1 of 4

**WR93U01**  
**SAMPLE PHYSICIAN, MD**  
**DIANON SYSTEMS**  
**840 RESEARCH PARKWAY**  
**OKLAHOMA CITY, OK 73104**

Specimen:

Collection: 01/13/13

Bar Code: 006000000

Received: 01/15/13

Completed: 01/15/13

Report Date: 01/15/13

### Patient Information

Patient Name SAMPLE, PATIENT

Social Sec. No. \*\*\*-\*\*-0000

Phone # (000) 000-0000

Date of Birth: 07/00/1900

Age: 55 Yrs

Chart #:

Analyte	Results	Normal Range	Decreased Risk	Risk Threshold	Increased Risk
Urine Total Volume	1.44 L/24 hrs	0.51-2.56 L/24 hrs		2	1.44
pH	5.8 pH Range	5.6-7.1 pH Range	5.8	5.6	
Calcium	296.6 mg/24 hrs	8.5-277 mg/24 hrs		277	296.6
Sodium	161.4 mEq/24 hrs	26.4-243.8 mEq/24 hrs	161.4	244	
Citrate	710 mg/24 hrs	287-708 mg/24 hrs	710	287	
Magnesium	173.3 mg/24 hrs	43-246 mg/24 hrs	173.3	43	
Oxalate	43.1 mg/24 hrs	5.4-37 mg/24 hrs		37	43.1
Uric Acid	722.9 mg/24 hrs	136-763 mg/24 hrs	722.9	763	
Phosphorous	1224 mg/24 hrs	127-1318 mg/24 hrs	1224	1318	
Sulfate	25.9 mmol/24 hrs	3.7-29 mmol/24 hrs	25.9	29	
Ammonia	35.4 mEq/24 hrs	5.1-50 mEq/24 hrs	35.4	50	
Qualitative Cystine	Negative	Negative			
Potassium	112.6 mmol/24 hrs	7.7-91.3 mmol/24 hrs			
Chloride	195.3 mEq/24hr	28.2-244.7 mEq/24hr			
Urine Creatinine	1771 mg/24 hrs	384-2189 mg/24 hrs			

Stone Type	Saturation Ratio	Normal Range	Relative Risk Graph
Calcium Oxalate RSR	2.5	0-2	2, 2.5
Brushite RSR	0.7	0-2	0.7, 2
Uric Acid RSR	1.5	0-2	1.5, 2
Struvite RSR	0.1	0-75	0.1, 75

### Comments

- |  |   |  |  |
|--|---|--|--|
| <input checked="" type="checkbox"/> Hypercalciuria | <input type="checkbox"/> Hypocitraturia           | <input type="checkbox"/> Abnormal Urinary pH         | <input type="checkbox"/> Elevated Urinary Sodium |
| <input type="checkbox"/> Hypomagnesuria            | <input checked="" type="checkbox"/> Hyperoxaluria | <input checked="" type="checkbox"/> Low Urine Volume | <input type="checkbox"/> Hyperuricosuria         |
| <input type="checkbox"/> High Urine Cystine        | <input type="checkbox"/> High Urine Sulfate       | <input type="checkbox"/> High Urine Phosphorus       | <input type="checkbox"/> High Urine Ammonium     |

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## Recommendations

### Hypercalciuria

#### Medical condition causing Hypercalciuria:

- Hyperparathyroidism
- Hyperthyroidism
- Sarcoidosis
- Milk-Alkali-Syndrome
- Immobilization Syndrome
- Vitamin D Intoxication
- Metastatic Malignant Neoplasms
- Idiopathic Infantile Hypercalcemia
- Multiple Myeloma
- Leukemia
- Lymphoma
- Adrenal Insufficiency

When the above conditions do not exist, Hypercalciuria is considered 'Idiopathic'.  
 Nonspecific therapy for idiopathic stone disease may include the following options:

- Increasing urine output to over 2 liters per day.
- A low protein diet. Excess protein intake may result in transient metabolic acidosis. Calcium is released from bone in response to this acid load.
- Moderate sodium intake of less than 3000 milligrams per day.
- Strict calcium restriction should be avoided.

Based on the effectiveness of the above measures or the patient's condition and history determining the cause of idiopathic hypercalciuria may be warranted.

## Differential Diagnosis and Management of Hypercalciuria

Diagnostic Presentation					
24 Hr. Urine On Random Diet*	Serum	24 Hr. Urine On Restricted Diet**	Condition	Treatment Options	Monitoring
Elevated Calcium	Normal	<i>Elevated Calcium on Restricted Diet</i>	<b>Absorptive Hypercalciuria Type I</b>	Low Oxalate Low Sodium Diet (<1000 mg/day) Moderate Calcium (600-800 mg/day) Thiazides Sodium Cellulose Phosphate Orthophosphates	SERUM ** Electrolytes & Uric Acid URINE Citrate, Calcium, Sodium, Oxalate
		<i>Normal Calcium on Diet Restriction</i>	<b>Absorptive Hypercalciuria Type II</b>	Low Oxalate Low Sodium Diet (<1000 mg/day) Moderate Calcium (600-800 mg/day) Thiazides, If no response to diet	SERUM ** Electrolytes & Uric Acid URINE Citrate, Calcium, Sodium, Oxalate
	<i>Normal Calcium Elevated PTH</i>	<b>Renal Calcium Leak</b>	Thiazides	SERUM ** Electrolytes & Uric Acid URINE Citrate, Calcium	
Elevated Calcium & Elevated Phosphorus	<i>Low Phosphate</i>		<b>Absorptive Hypercalciuria Type III</b>	Phosphate Supplements	SERUM Calcium URINE Calcium, Phosphorus
	<i>Elevated Calcium Elevated PTH</i>		<b>Hyperparathyroidism</b>	Surgery	None
Elevated Calcium & Low Citrate	<i>Low Potassium Low Bicarbonate High Chloride</i>		<b>Renal Tubular Acidosis</b>	Citrate Therapy	SERUM Electrolytes Calcium, Citrate URINE Electrolytes Bicarbonate
	<i>Potassium Bicarb. &amp; Chloride are usually normal</i>		<b>Absorptive Hypercalciuria with Hypocitraturia</b>	Diet & Citrate Therapy or Thiazides & Citrate Therapy	SERUM Citrate, Calcium Sodium, Oxalate URINE Electrolytes

\* It has been suggested that two collections will increase detection of abnormal urine values.

\*\* 24 Hour urine collection after one week on a low calcium (<400 mg/day), low sodium (<100 mEq/day) and low oxalate diet.

\*\*\* Thiazide Treatment may result in electrolyte imbalance, increase uric acid production, and urine citrate depletion.

To confirm diagnosis of the above conditions, Pak et al. recommend evaluation of the patient using a calcium loading protocol

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### Elevated Urinary Oxalate (Hyperoxaluria)

Urinary oxalate is an important risk factor for recurrent calcium oxalate nephrolithiasis. More than urinary calcium concentration, small increases in urinary oxalate markedly increase the risk of crystallization. Endogenous metabolism of glycine accounts for the majority of urinary oxalate. Only 10-15% is derived from dietary oxalate.

#### There are three mechanisms to account for Hyperoxaluria:

- Inborn errors of metabolism – primary Hyperoxaluria is a rare genetic disorder, which usually presents in childhood with significant elevation in urinary oxalate >60 mg/day.
- Increased oxalate precursors – excessive Vitamin C ingestion greater than 1 gram/day.
- Increased dietary intake and intestinal absorption – excessive intake of oxalate rich foods such as chocolate, dark green leafy vegetables, nuts, citrus, tea, cocoa, and pepper. Inflammatory bowel disease, chronic diarrheal states, chronic pancreatitis, and low calcium diet (400 mg/day) may increase oxalate absorption.

#### Treatment of Hyperoxaluria:

- Decrease intake of oxalate rich foods
- Decrease Vitamin C consumption
- Control diarrhea and fat malabsorption
- Oral calcium supplementation
- Vitamin B (pyridoxine) supplementation
- Binding agents, orthophosphate, magnesium, ferrous sulfate

### Low Urinary Volume

Although the efficacy of a high fluid intake has not been proven, most experts recommend an increased fluid intake to produce a urinary volume from 2-4 liters per day. Most recommend a special effort to hydrate during the evening hours to produce nocturia. Water hardness does not seem to predispose to stone formation and epidemiologic studies indicate the incidence of stones is lower in hard water regions than in soft water regions. With regard to other types of fluids it is best to avoid large amounts of tea, cocoa, cola drinks, and fruit juices, which contain significant amounts of oxalate in soluble form. Low urinary volume can occur as a solitary finding in a patient secondary to poor dietary intake or as a consequence to any condition producing chronic fluid loss such as diarrhea.

#### Treatment of Low Urine Volume:

- Increase fluid intake to maintain urine output of least 2 liters per day. Patients will need 8-10 glasses of water per day.
- Direct patients to take two 8-ounce glasses of water between dinner and bedtime and one at night if they arise to void.
- Encourage patients to monitor the amount of urine they produce.

With adequate hydration.....

- The urine should remain colorless.
- Urine specific gravity should measure between 1.005 – 1.010.
- Direct volume measurements should be greater than 2 liters.

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## Recommendations

### Patient Management Plan

- Increase Fluid Intake
- 24 Hour Urine
- Blood Test
- Reduce Animal Protein Intake
- Calcium Load Test to Determine the source of Your Elevated urine Calcium
- Low Salt Diet
- Low Protein Diet
- Thiazide Treatment
- Sodium Cellulose Phosphate
- Phosphate Supplement
- Reduce Oxalate Intake
- Calcium Supplement (*for Enteric Hyperoxaluria*)

### Imaging Studies

- IVP
- KUB
- Other \_\_\_\_\_
- Other \_\_\_\_\_