ΤΕΛΙΚΑ ΟΙ ΛΙΘΟΙ ΔΙΑΛΥΟΝΤΑΙ;

Μια ακόμα ιατρική δοξασία!!!

Στυλιανός Θ. Γιαννακόπουλος
Επικ. Καθηγητής Ουρολογίας
Δημοκριτείου Πανεπιστημίου Θράκης

ΚΑΜΙΑ ΣΥΓΚΡΟΥΣΗ ΣΥΜΦΕΡΟΝΤΩΝ

ΤΕΛΙΚΑ ΟΙ ΛΙΘΟΙ ΔΙΑΛΥΟΝΤΑΙ;

ΝΑΙ διαλύονται, αλλά.....

1. Μόνο θεωρητικά

Ή

2. In vitro

Guidelines on Urolithiasis

C. Türk (chair), T. Knoll (vice-chair), A. Petrik,
K. Sarica, A. Skolarikos, M. Straub, C. Seitz

5.4 Chemolytic dissolution of stones

Oral or percutaneous irrigation chemolysis of stones or their fragments can be useful first-line therapy. It may also be an adjunct to SWL, percutaneous nephrolithotomy (PNL), ureterorenoscopy (URS) or open surgery to support elimination of small residual fragments, considering that its use as first-line therapy may take several weeks to be effective.

Combined treatment with SWL and chemolysis is a minimally invasive option for patients with partial or complete infection staghorn stones who are not eligible for PNL. Stone fragmentation leads to increased stone surface area and improved efficacy of chemolitholysis.

Chemolysis is possible only for the stone compositions listed below, therefore, knowledge of stone composition is mandatory before treatment.

5.4.1 Percutaneous irrigation chemolysis

Percutaneous irrigation chemolysis may be an option for infection- and uric acid stones (1,2).

Recommendations	GR
In percutaneous chemolysis, at least two nephrostomy catheters should be used to allow irrigation of the renal collecting system, while preventing chemolytic fluid draining into the bladder and reducing the risk of increased intrarenal pressure*.	A
Pressure- and flow-controlled systems should be used if available.	

** Alternatively, one nephrostomy catheter with a JJ stent and bladder catheter can serve as a through-flow system preventing high pressure.*

Table 11: Methods of percutaneous irrigation chemolysis

Stone composition	Refs.	Irrigation solution	Comments
Struvite Carbon apatite	1-6	10% hemiacidrin, pH 3.5-4, Suby's G	Combination with SWL for staghorn stones.
			Risk of cardiac arrest due to hypermagnesaemia.
Brushite	7	Hemiacidrin Suby's G	Can be considered for residual fragments.
Cystine	8-13	Trihydroxymethyl aminomethane (THAM; 0.3 or 0.6 mol/L), pH 8.5-9.0, N-acetylcysteine (200 mg/L)	Takes significantly longer time than for uric acid stones.
			Used for elimination of residual fragments.
Uric acid	10,14-18	THAM (0.3 or 0.6 mol/L), pH 8.5-9.0	Oral chemolysis is the preferred option.

Irrigation chemolysis appears to the panel to be used rarely, probably because of the complexity of the technique and the possible side effects.

5.4.2 Oral chemolysis

Oral chemolitholysis is efficient only for uric acid calculi, and is based on alkalinisation of urine by application of alkaline citrate or sodium bicarbonate (3-6).

When chemolitholysis is planned, the pH should be adjusted to 6.5-7.2. Within this range chemolysis is more effective at a higher pH, which, however, might lead to calcium phosphate stone formation.

In case of uric acid obstruction of the collecting system, oral chemolysis in combination with urinary drainage is indicated (7). A combination of alkalinisation with tamsulosin seems to achieve the highest SFRs for distal ureteral stones (8).

Recommendations	GR
The dosage of alkalising medication must be modified by the patient according to urine pH, which is a direct consequence of such medication.	A
Dipstick monitoring of urine pH by the patient is required at regular intervals during the day. Morning urine must be included.	A
The physician should clearly inform the patient of the significance of compliance.	A

5.4 Chemolytic dissolution of stones

Oral or percutaneous irrigation chemolysis of stones or their fragments can be useful first-line therapy. It may also be an adjunct to SWL, percutaneous nephrolithotomy (PNL), ureterorenoscopy (URS) or open surgery to support elimination of small residual fragments, considering that its use as first-line therapy may take several weeks to be effective.

Combined treatment with SWL and chemolysis is a minimally invasive option for patients with partial or complete infection staghorn stones who are not eligible for PNL. Stone fragmentation leads to increased stone surface area and improved efficacy of chemolitholysis.

Chemolysis is possible only for the stone compositions listed below, therefore, knowledge of stone composition is mandatory before treatment.

Table 11: Methods of percutaneous irrigation chemolysis

Stone composition	Refs.	Irrigation solution	Comments
Struvite Carbon apatite	1-6	10% hemiacidrin, pH 3.5-4, Suby's G	Combination with SWL for staghorn stones.
			Risk of cardiac arrest due to hypermagnesaemia.
Brushite	7	Hemiacidrin Suby's G	Can be considered for residual fragments.
Cystine	8-13	Trihydroxymethyl aminomethane (THAM; 0.3 or 0.6 mol/L), pH 8.5-9.0, N-acetylcysteine (200 mg/L)	Takes significantly longer time than for uric acid stones.
			Used for elimination of residual fragments.
Uric acid	10,14-18	THAM (0.3 or 0.6 mol/L), pH 8.5-9.0	Oral chemolysis is the preferred option.

Irrigation chemolysis appears to the panel to be used rarely, probably because of the complexity of the technique and the possible side effects.

Τί κάνουμε όταν δεν γνωρίζουμε τη σύσταση του λίθου;

1. Προσπαθούμε να υποθέσουμε; (π.χ. σε ασθενή με πρώτο επεισόδιο λιθίασης)

2. Εκτελούμε πλήρη μεταβολικό έλεγχο, ενώ ο ασθενής μας έχει κλινική συμπτωματολογία και ήρθε σε εμάς για άμεση ιατρική βοήθεια;

3. Στηριζόμαστε σε παλαιότερες αναλύσεις λίθων;

JOURNAL OF ENDOUROLOGY
Volume XX, Number XX, XXXXXX 2014

Pp. ■■■–■■■
DOI: 10.1089/end.2013.0524

Original Research

Radiopacity and Hounsfield Attenuation of Cystine Urolithiasis: Case Series and Review of the Literature

Sutchin R. Patel, MD,[1] Lauren E. Wagner, MD,[1] Meghan G. Lubner, MD,[2] and Stephen Y. Nakada, MD[1]

Abstract

Objectives: Given the high recurrence rate of cystine urolithiasis, understanding of the radiographic stone characteristics is important in following cystine stone formers over their lifetime. However, due to their infrequent incidence, *in vivo* radiographic properties of cystine stones have not been well characterized. The purpose of our study is to characterize the *in vivo* radiographic properties of cystine urolithiasis.
Methods: Patients with a cystine stone analysis and noncontrast computed tomography (NCCT) were extracted from our stone clinic database. Stone attenuation in Hounsfield units (HU) was measured for each stone and plain abdominal films (kidney, ureter, and bladder radiograph [KUB]) within 30 days of the NCCT prior to any intervention were reviewed by a blinded radiologist to assess whether urolithiasis could be visualized.
Results: Twenty patients met our study inclusion criteria. When plotted by attenuation, two distinct groups of stone attenuation were noted for cystine stone formers ($p < 0.001$). The largest group ($n = 16$) had an attenuation of < 550 HU (424 ± 106 HU), while a distinct second group ($n = 4$) was > 850 HU (972 ± 134 HU). Sixteen patients had a KUB, with 88% of the stones being visualized by a blinded radiologist. Stone size and attenuation were not significantly different between visualized and nonvisualized stones via KUB, however, the body mass index was significantly higher in the nonvisualized group (34.4 *vs* 26.9 kg/m^2, $p = 0.03$).
Conclusions: Cystine stones were visualized by KUB, which has implications in post-treatment follow-up imaging. Though most cystine stones had an attenuation of < 550 HU, a second distinct group of cystine stones were noted to have a high attenuation of > 850 HU. HU measurements alone are not sufficient to differentiate cystine stones from other stone compositions.

Τί κάνουμε όταν δεν γνωρίζουμε τη σύσταση του λίθου;

1. Προσπαθούμε να υποθέσουμε; (π.χ. σε ασθενή με πρώτο επεισόδιο λιθίασης)

2. Εκτελούμε πλήρη μεταβολικό έλεγχο, ενώ ο ασθενής μας έχει κλινική συμπτωματολογία και ήρθε σε εμάς για άμεση ιατρική βοήθεια;

3. Στηριζόμαστε σε παλαιότερες αναλύσεις λίθων;

Using 24-Hour Urinalysis to Predict Stone Type

Daniel M. Moreira,*,† Justin I. Friedlander,‡ Christopher Hartman,†
Sammy E. Elsamra,† Arthur D. Smith§ and Zeph Okeke†

From the Arthur Smith Institute for Urology, Hosftra North Shore-LIJ School of Medicine, New Hyde Park, New York

Abbreviations and Acronyms

BMI = body mass index
DM = diabetes mellitus
HTN = hypertension
SS = supersaturation

Accepted for publication May 31, 2013.
Study received institutional review board approval.

* Correspondence: The Arthur Smith Institute for Urology, North Shore - Long Island Jewish Health System, 450 Lakeville Rd., New Hyde Park, New York 11042 (telephone: 516-734-8500; FAX: 516-734-8535; e-mail: dmoreira@nshs.edu).

† Nothing to disclose.

‡ Financial interest and/or other relationship with the American Urological Association.

§ Financial interest and/or other relationship with the American Urological Association, Cook, Olympus and Boston Scientific.

Editor's Note: This article is the third of 5 published in this issue for which category 1 CME credits can be earned. Instructions for obtaining credits are given with the questions on pages 2316 and 2317.

Purpose: We determined the accuracy of 24-hour urinalysis in predicting stone type and identify the associations between 24-hour urine elements with stone type.

Materials and Methods: We performed a retrospective review of 503 stone formers with stone composition analysis and 24-hour urinalysis available. Analysis of 24-hour urine elements across stone types was performed using Fisher's exact test and ANOVA. Multinomial logistic regression was used to predict stone type based on 24-hour urinalysis.

Results: A total of 280 (56%) patients had predominantly calcium oxalate, 103 (20%) had uric acid, 93 (19%) had calcium phosphate, 16 (3%) had mixed and 11 (2%) had other stone types. There were several significant patient characteristics and 24-hour urinalysis differences across stone type groups. The statistical model predicted 371 (74%) calcium oxalate, 78 (16%) uric acid, 52 (10%) calcium phosphate, zero mixed and 2 (less than 1%) other stone types. The model correctly predicted calcium oxalate stones in 85%, uric acid in 51%, calcium phosphate in 31%, mixed in 0% and other stone types in 18% of the cases. Of the predicted stone types, correct predictions were 61%, 69%, 56% and 71% for calcium oxalate, uric acid, calcium phosphate and other stones types, respectively. The overall accuracy was 64%. Plots were used to explore the associations between each 24-hour urine element with each predicted stone type adjusted for all the others urinary elements.

Conclusions: A 24-hour urinalysis alone does not accurately predict stone type. However, it may be used in conjunction with other variables to predict stone composition.

J Urol 2013; 190: 2016

Τί κάνουμε όταν δεν γνωρίζουμε τη σύσταση του λίθου;

1. Προσπαθούμε να υποθέσουμε; (π.χ. σε ασθενή με πρώτο επεισόδιο λιθίασης)

2. Εκτελούμε πλήρη μεταβολικό έλεγχο, ενώ ο ασθενής μας έχει κλινική συμπτωματολογία και ήρθε σε εμάς για άμεση ιατρική βοήθεια;

3. Στηριζόμαστε σε παλαιότερες αναλύσεις λίθων;

Υλικό: 127 ασθενείς με ουρολιθίαση, υπό παρακολούθηση επί 15ετία, χωρίς να λαμβάνουν προφυλακτική θεραπεία

33 με ουρικό οξύ

52 με οξαλικό ασβέστιο

42 με στρουβίτη

ΣΥΣΤΑΣΗ ΠΡΩΤΟΥ ΛΙΘΟΥ	ΚΥΡΙΑ ΣΥΣΤΑΣΗ ΛΙΘΟΥ ΤΩΝ ΥΠΟΤΡΟΠΩΝ
Ουρικό οξύ	Ουρικό οξύ ή **οξαλικό ασβέστιο ή φωσφορικό ασβέστιο**
Οξαλικό ασβέστιο	Οξαλικό ασβέστιο ή **φωσφορικό ασβέστιο**
Στρουβίτης	Στρουβίτης ή **ουρικό οξύ ή οξαλικό ασβέστιο**

Konstantinova et al. Arch Ital Urol Androl 2011; 83: 20

Table 11: Methods of percutaneous irrigation chemolysis

Stone composition	Refs.	Irrigation solution	Comments
Struvite Carbon apatite	1-6	10% hemiacidrin, pH 3.5-4, Suby's G	Combination with SWL for staghorn stones.
			Risk of cardiac arrest due to hypermagnesaemia.
Brushite	7	Hemiacidrin Suby's G	Can be considered for residual fragments.
Cystine	8-13	Trihydroxymethyl aminomethane (THAM; 0.3 or 0.6 mol/L), pH 8.5-9.0, N-acetylcysteine (200 mg/L)	Takes significantly longer time than for uric acid stones.
			Used for elimination of residual fragments.
Uric acid	10,14-18	THAM (0.3 or 0.6 mol/L), pH 8.5-9.0	Oral chemolysis is the preferred option.

Irrigation chemolysis appears to the panel to be used rarely, probably because of the complexity of the technique and the possible side effects.

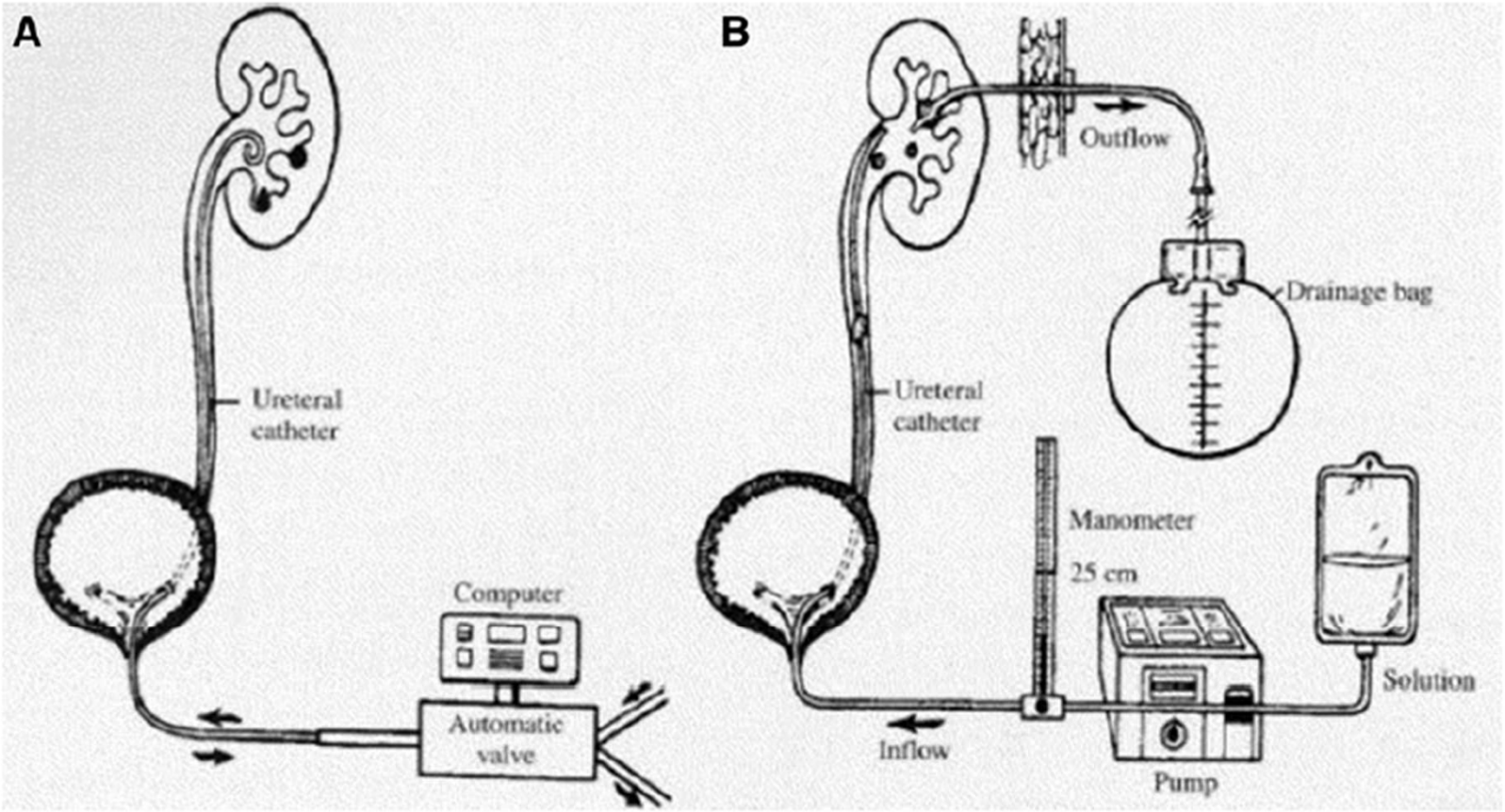

FIG. 2. Irrigation equipment configurations for direct chemolysis I. **(A)** Retrograde ureteral catheter with computer-driven inflow/outflow; **(B)** retrograde ureteral catheter with computer inflow and nephrostomy outflow. Reprinted with permission from Bernardo and Smith. Urol Clin North Am.[2]

5.4.1 *Percutaneous irrigation chemolysis*

Percutaneous irrigation chemolysis may be an option for infection- and uric acid stones (1,2).

Recommendations	GR
In percutaneous chemolysis, at least two nephrostomy catheters should be used to allow irrigation of the renal collecting system, while preventing chemolytic fluid draining into the bladder and reducing the risk of increased intrarenal pressure*.	A
Pressure- and flow-controlled systems should be used if available.	

** Alternatively, one nephrostomy catheter with a JJ stent and bladder catheter can serve as a through-flow system preventing high pressure.*

Table 11: Methods of percutaneous irrigation chemolysis

Stone composition	Refs.	Irrigation solution	Comments
Struvite Carbon apatite	1-6	10% hemiacidrin, pH 3.5-4, Suby's G	Combination with SWL for staghorn stones.
			Risk of cardiac arrest due to hypermagnesaemia.
Brushite	7	Hemiacidrin Suby's G	Can be considered for residual fragments.
Cystine	8-13	Trihydroxymethyl aminomethane (THAM; 0.3 or 0.6 mol/L), pH 8.5-9.0, N-acetylcysteine (200 mg/L)	Takes significantly longer time than for uric acid stones.
			Used for elimination of residual fragments.
Uric acid	10,14-18	THAM (0.3 or 0.6 mol/L), pH 8.5-9.0	Oral chemolysis is the preferred option.

Irrigation chemolysis appears to the panel to be used rarely, probably because of the complexity of the technique and the possible side effects.

Table 11: Methods of percutaneous irrigation chemolysis

Stone composition	Refs.	Irrigation solution	Comments
Struvite Carbon apatite	1-6	10% hemiacidrin, pH 3.5-4, Suby's G	Combination with SWL for staghorn stones.
			Risk of cardiac arrest due to hypermagnesaemia.
Brushite	7	Hemiacidrin Suby's G	Can be considered for residual fragments.
Cystine	8-13	Trihydroxymethyl aminomethane (THAM; 0.3 or 0.6 mol/L), pH 8.5-9.0, N-acetylcysteine (200 mg/L)	Takes significantly longer time than for uric acid stones.
			Used for elimination of residual fragments.
Uric acid	10,14-18	THAM (0.3 or 0.6 mol/L), pH 8.5-9.0	Oral chemolysis is the preferred option.

Irrigation chemolysis appears to the panel to be used rarely, probably because of the complexity of the technique and the possible side effects.

JOURNAL OF ENDOUROLOGY
Volume 26, Number 2, February 2012

Pp. 110–118
DOI: 10.1089/end.2011.0380

The History of Kidney Stone Dissolution Therapy: 50 Years of Optimism and Frustration With Renacidin

Ricardo D. Gonzalez, B.A., Bryant M. Whiting, M.D., and Benjamin K. Canales, M.D., M.P.H.

Abstract

Background and Purpose: Over the last 50 years, chemolysis as a primary or adjuvant treatment for urinary stones has fallen in and out of favor. We review the literature for a historical perspective on the origins and chronology of Renacidin therapy, focusing on landmark studies and impracticalities that have seemingly condemned it to history.

Materials and Methods: A MEDLINE search was performed on the topic of chemolysis of urinary calculi. Historical literature was reviewed with regard to stone composition, treatment modalities, outcomes, and complications.

Table 4. Contemporary Renacidin Dissolution Cases

Author, Year	*N*	*Delivery method (n)*	*Stone composition (n)*	*Mean duration (d)*	*Dissolution responses*	*Reported complications*	*F/U (mos)*
Blaivas et al 1975[3]	9	PNT	Struvite (8) Apatite (1)	11	Complete 6/9 Partial 2/9 Failure 1/9	UTI 4/19 Fever 3/9 Pain 3/9	12
Fam et al 1976[36]	11	PNT after OL (6); UC (5)	Struvite/apatite	OL 12–120 UC 14–115	Complete: -UC 4/5 -PNT 4/6	Fever 4/11 Hematuria 3/11 Recurrence 2/11	12
Jacobs and Gittes 1976[37]	11	PNT after OL	Struvite (7) Calcium (2)	7	Complete 9/11 Failure 2/11	Fever 2/11	17
Dretler et al 1979[28]	8	PNT	Struvite (presumed)	16	Complete 6/8 Partial 2/8	Flank pain 3/8 Fever 3/8	NR
Sant et al 1983[35]	21	PNT after OL (19); PNT (2)	Struvite	13	Complete 18/21 Partial 2/21 Failure 1/21	Back pain 9/21 Recurrence 2/21	66
Silverman and Stamey 1983[40]	46	PNT after OL (46)	Struvite/apatite (46)	4.5	Complete 40/46 Failure 6/46	NR	84
Dretler and Pfister 1984[48]	28	PNT	Struvite (presumed)	2–30	Complete 19/28 Partial 6/28 Failure 3/28	Fever 8/28 Candiduria 6/28 Sepsis 1/28	3–84
Palmer et al 1987[46]	15	PNT (1); PNT after OL (6) or MIS (8)	Struvite (12); apatite (3)	28	Complete 11/15 Partial 1/15 Failure 3/15	Leakage 15/15 Fever 14/15 Admission 3/15 Pain 2/15	NR
Spirnak et al 1988[45]	11	PNT after SWL	Struvite (presumed)	6	Complete 9/11 Partial 2/11	Pyelo 2/11 Candiduria 2/11 Edema and PNT 1/11	NR

TABLE 5. REASONS FOR THE DECLINE IN RENACIDIN THERAPY

Cost
Intense irrigation protocols
Narrow clinical stone population
Advanced monitoring equipment
Advent of minimally invasive therapies
Patient noncompliance and disinterest
Additional ureteral and nephrostomy tubes
Prolonged immobility and hospitalizations
Repeated fluoroscopy to verify effectiveness

Gonzalez R et al. J Endourol 2012; 26: 110

5.4.2 *Oral chemolysis*

Oral chemolitholysis is efficient only for uric acid calculi, and is based on alkalinisation of urine by application of alkaline citrate or sodium bicarbonate (3-6).

When chemolitholysis is planned, the pH should be adjusted to 6.5-7.2. Within this range chemolysis is more effective at a higher pH, which, however, might lead to calcium phosphate stone formation.

In case of uric acid obstruction of the collecting system, oral chemolysis in combination with urinary drainage is indicated (7). A combination of alkalinisation with tamsulosin seems to achieve the highest SFRs for distal ureteral stones (8).

Recommendations	**GR**
The dosage of alkalising medication must be modified by the patient according to urine pH, which is a direct consequence of such medication.	A
Dipstick monitoring of urine pH by the patient is required at regular intervals during the day. Morning urine must be included.	A
The physician should clearly inform the patient of the significance of compliance.	A


R ΩΡΑ 17.05

5.4.2 *Oral chemolysis*

Oral chemolitholysis is efficient only for uric acid calculi, and is based on alkalinisation of urine by application of alkaline citrate or sodium bicarbonate (3-6).

When chemolitholysis is planned, the pH should be adjusted to 6.5-7.2. Within this range chemolysis is more effective at a higher pH, which, however, might lead to calcium phosphate stone formation.

In case of uric acid obstruction of the collecting system, oral chemolysis in combination with urinary drainage is indicated (7). A combination of alkalinisation with tamsulosin seems to achieve the highest SFRs for distal ureteral stones (8).

Recommendations	**GR**
The dosage of alkalising medication must be modified by the patient according to urine pH, which is a direct consequence of such medication.	A
Dipstick monitoring of urine pH by the patient is required at regular intervals during the day. Morning urine must be included.	A
The physician should clearly inform the patient of the significance of compliance.	A

ORIGINAL ARTICLE

Vol. 39 (1): 103-107, January - February, 2013
doi: 10.1590/S1677-5538.IBJU.2013.01.13

Results of urinary dissolution therapy for radiolucent calculi

Maneesh Sinha, Kumar Prabhu, Prasanna Venkatesh, Venkatesh Krishnamoorthy

Department of Urology NU Hospitals, Bangalore, India

ABSTRACT

Purpose: In this paper we present our experience with dissolution therapy of radiolucent calculi.

Materials and Methods: This was a retrospective analysis of patients who were offered urinary dissolution therapy between January 2010 and June 2011. Patients were treated with tablets containing potassium citrate and magnesium oxide. Partial dissolution was defined as at least a 50% reduction in stone size. Patients with complete or partial dissolution were classified in the successful dissolution group. Patients with no change, inadequate reduction, increase in stone size and those unable to tolerate alkali therapy were classified as failures. Patient sex, stenting before alkalinization, stone size, urine pH at presentation and serum uric acid levels were analyzed using Fisher t-test for an association with successful dissolution.

Results: Out of 67, 48 patients reported for follow up. 10 (15%) had complete dissolution and 13 (19%) had partial dissolution. Alkalinization was unsuccessful in achieving dissolution in 25 (37%). Stenting before alkalinization, patient weight (< 60 vs. > 75kg) and serum uric acid levels (≤ 6 vs. > 6) were the only factors to significantly affected dissolution rates (p = 0.039, p 0.035, p 0.01 respectively).

Conclusions: A policy of offering dissolution therapy to patients with radiolucent calculi had a successful outcome in 34% of patients.

ARTICLE INFO

Key words:
Urolithiasis; Uric Acid; Therapy; Calculi; Urinary Tract

Int Braz J Urol. 2013; 39: 103-7

Submitted for publication:
May 17, 2012

Accepted after revision:
October 16, 2012

Table 1 - Dissolution rates and stone sizes before and after treatment in each group.

Group	n (%)	Pre Rx size(mm)	Post Rx size(mm)
Complete Dissolution	10 (15%)	15.67	0
Partial Dissolution	13 (19%)	18.9	6.74
No change/ increase	25 (37%)	14.8	15.9
Lost to follow up	19 (29%)	10.9	-

ΤΕΛΙΚΑ ΟΙ ΛΙΘΟΙ ΔΙΑΛΥΟΝΤΑΙ;

Δυστυχώς στην πράξη

ΟΧΙ

ΕΥΧΑΡΙΣΤΩ