

# Lithotripsy of Urinary Tract Stones by Using Eggshell

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## Abstract

This research aimed to use eggshell powder as a lithotripsy for different types of urinary stones and determine the efficiency of these preparations against different types of stone.

The grounded and sterilized eggshell was dissolved in fresh lemon juice .The treatment was orally given for successive 7 days before breakfast.

Eighty five patients with different types of urinary stone were participated in this research. All patients were subjected to Ultrasonography and intravenous pyelography examinations to localize the position and detect diameter of the stone. The above examination and also biochemical tests for diagnosis of stones ingredients were repeated after the administration of treatment and excretion of stone fragments in urine. The results cleared out 60 (100% ) of patients with pure uric acid stone undergoes completely lithotripsy of there stones, while 10 out of 25 (40%) of patients with mixed(uric acid/ ca-oxalate) stone were only undergoes lithotripsy events. The results were so promising especially against pure uric acid stone.

## Introduction

The renal stones are solid concretions or calculi (crystal aggregations) formed in the kidneys from dissolved urinary minerals[1]. There are several types of kidney stones depended on the type of crystals of which they consist. The majority are calcium oxalate stones, followed by calcium phosphate stones[2]. More rarely, struvite stones are produced by urea-splitting bacteria in people with urinary tract infections . People with certain metabolic abnormalities may produce uric acid stones or cystine stones[3]. Statistical studies showed that men with ages in the range of 20 to 40 have the highest risk. People living in the arid areas (warm climates) have the highest incidence rates[4,5].The common diet in these areas is usually vegetables and tea Much less common is the uric acid stone and the rare cystine stone. Uric acid stones are truly unique in that they dissolve readily in a favorable urinary pH milieu, achievable with oral medical therapy[6,7]. Eggshell contains about 4% organic matter and a substantial amount of calcium and other minerals, including magnesium and zinc[8]. Dried eggshell particles contain approximately 94% calcium carbonate, with 39% of the compound being absorbable calcium[8]. Although US Patent No. 045 323 describes a method for preparing compounds from eggshells, particularly from the chicken eggshell, which could be utilized for medical purposes for treating certain diseases and for replacement of deficient materials in living tissues[9]. So far egg shells have already been used for curing certain diseases, their application has been based rather on intuition without provision of a compound having stable, standardized properties, and without determination of their specific effectiveness and activity based on objective biological knowledge and pharmaceutical methods[10]. The pharmaceutical compositions according to the present invention proved particularly effective for geriatrics where currently used medicaments have not

been effective or exhibited unfavorable side effects, or have not been properly tolerated by the body [11]. Eggshell membrane of the hen also has been shown to contain acid

glucosaminoglycans including dermatan sulfate and chondroitin-4-sulfate [12]. Other components identified in eggshell membrane include ovotransferrin, desmosine and sodesmosine, lysozyme and lysozyme. [13] Gel electrophoresis reveals a complex array of matrix proteins can be classified as egg white proteins) lysozyme, ovalbumin, ovotransferrin, clusterin, (bone protein) osteopontin, [14] (and) ovocleidins-17 and -116; ovocalyxins-32 and -36 [15]. Glucosamine and chondroitin sulfate have been purported to be effective in the treatment of osteoarthritis over the last 3 to 4 decades [16]. Since eggshell membrane contains both glucosamine and chondroitin sulfate, it is suggested that this natural composition might be effective in relieving joint and soft tissue pain. However eggshell powder is widely used in India and eastern Asia, in traditional medicine, also in Iraqi folk medicine. The dose normally recommended in traditional Ayurvedic [17] use is one teaspoonful of this powder. Also the same dose was documented in Arabic antique manuscript (Tathkarat Daood AL-Antaky. [18])

## Material and Method

### Clinical Data

The participants in this study were 85 lithogenic patients who conducted from 2001-2009, diagnosed by specialist physicians in private clinics from different sites of Iraq (Baghdad, Diyala, Mosul, and Anbar).

### Method

**NOTE:** Before started giving preparation we obtained the written consent of the patients who included in this study.

- Eggshell powder was obtained by the patent described by Mickalek [19] which detailed by (A) emptying eggs, preferably chicken eggs (B) removing residues of egg yolk and white, ballast constituents, contaminants and then membrane sticking to the interior eggshell surface, and purifying the eggshell (C) drying the eggshell with hot air by using hair styler (D) crushing and grinding the eggshell to very fine powder and (E) sterilizing the eggshell powder at a temperature of 120 C<sup>0</sup> in oven to devitalize pathogenic and conditionally pathogenic microorganism.

- one teaspoonful of powdered eggshell was added to cup of fresh lemon juice which is a source of citric acid, the preparation was kept cool overnight to complete reaction and produce citrate.

- A single dose administration (before breakfast).

- This procedure was repeated for 7 days.

- Ultrasonography (U/S), intravenous pyelography (IVP), were performed pre- and post-treatment to detect size and site of stone, and then to be sure of emptying urinary tract from any stone after treatment.

- Urinary tract stones were of different sizes ranging from 7mm to 1.7cm and they were seen in the kidney (renal stone) at upper pole calyx, mid renal part and lower pole calyx, also they were seen in the ureter (uretral stone), and finally they were seen inside urinary bladder (vesicle stone)

- General urine examination (GUE) was done for all patients, urine routine which shows crystals in urine, blood cells and pus cells.

- Qualitative analysis of stone/fragments passed after treatment , a procedure described by Hodgkinson[20] ,was employed to figure out the structure of urinary stone.

## Results

Data in table (1) showed that 60 patient out of 85 patients at age range (25-57) years had pure uric acid stone , while the remainder 25 patients at age range ( 30-50) had (ca-oxalate /uric acid )mixed stone. The results in table(2) cleared out all the patients with pure uric acid stone (60) undergoes completely lithotriptic events(100%) , while 10 patients out of 25 with (ca-oxalate/uric acid) mixed stone undergoes lithotriptic events(40%). The duration of pure uric acid stone lithotripsy was (5-10) days , comparing to (8-14) days in case of (ca-oxalate/uric acid) mixed stone (table3).

## Discussion

Our results cleared out that the local preparation of eggshell was very powerful to dissolved uric acid stones, since a hundred percent of this type of stone had been lithotripped, comparing to (40%) for (ca-oxalate/uric acid) mixed stone. Since a home remedy about the wonder of eggshell dissolved by lemon juice being effective in breaking up kidney stone. The citric acid consists in lemon juice reacts with eggshell calcium to produce calcium citrate ,this reaction required several hours to be completed.

However ca-citrate decreased urinary saturation of ca-oxalate and undissociated uric acid. Also it will increase PH of urine, decreases urinary undissociated uric acid. Therefore ca-citrate may provide additional protection against formation of uric acid stone [21].

Although ,some researchers now suggest that citrate treatment may also be useful for those at risk for stones, those citrate excretion is normal [22].

Tanner et al.[23] have recently cited from [24,25] that citrate salts improve renal function in rats with polycystic kidney disease, mainly by its alkalinizing effects. Our results agreed of Toblli et al.,[26] who demonstrate a beneficial effects of ca-citrate supplementation in uric acid nephropathy. By the other ,ca- citrate supplementation also attenuates tubulointerstitial damage in the rat model of obstructive nephropathy [27].

It could be argued for that the effect of eggshell preparation is depending totally on chemical structure of urinary stone , also it is clear from the results presented in table(2) that uric acid whenever existed as one of the constituents of urinary tract stones, it will provoke or stimulate the action of eggshell preparation , in other word uric acid is a decisive component of urinary tract stone that leads to lithotripsy whenever eggshell preparation available. Finally it will be wise to conclude that eggshell preparation is a reliable treatment in lithotripsy , yet, we can not take this conclusion as a matter of fact unless a further study on large scale on urinary tract stone conducted to confirm or deny this conclusion.

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**Table(1) Chemical constituent of lithotripsed stones**

Patients age range (years)	%	NO. of patients	Type of stone
25-57	70.5	60	Pure uric acid
30-50	29.5	25	(ca-oxalate/uric acid) mixed stone
	100%	85	Total

**Table(2) Comparison of lithotripsy events of both types of stone**

%	NO. of lithotripsyed stone	NO. of patients	Type of stone
100	60	60	Pure uric acid
40	10	25	(ca-oxalate/uric acid) mixed stone
		85	Total

**Table(3) Duration required to lithotripsyed each type of stone**

Duration (days)	Type of stone
5-10	Pure uric acid
8-14	(ca-oxalate/uric acid) mixed stone

## تفتيت حصى المجارية البولية باستخدام قشور البيض

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### الخلاصة

استعملنا مسحوق قشور البيض علاجاً لتفتيت حصى المجاري البولية حسب معلوماتنا لأول مرة في هذا المجال. يهدف هذا البحث إلى استعمال قشور البيض علاجاً لتفتيت حصى المجاري البولية بأنواعها وتحديد الفعالية الأكبر تجاه أي نوع من الحصى. إن قشور البيض المطحونة والمعقمة استعملت بإذابتها في عصير الليمون الحامض الطازج وأعطى الخليط عن طريق الفم مدة 7 أيام متتالية قبل الإفطار. شارك في الدراسة 85 مريضاً ممن يعانون من وجود الحصى في المجرى البولي اخضعوا إلى فحوصات السونار (الموجات فوق الصوتية) ،والأشعة الملونة لتحديد موقع وحجم الحصى ، ثم اجري لعينات البحث كافة فحص الإدراج العام و أعيدت هذه الفحوصات بعد استعمال العلاج كذلك أجريت الفحوصات البايوكيميائية على الحصيات المتفتتة والنازلة في الإدراج لتشخيص مكوناتها اذ تبين إن هذا العلاج فعال بكفاية عالية تجاه حصاة حامض اليوريك النقية ،اذا كانت نسبة الحصوات المتفتتة هي 100% (60 مريضاً)، بينما لم تتفتت سوى 40% من الحصوات ذات التركيب الممتزج اي في 10 مرضى من مجموع 25 .