

- Citrate-based oral chemolysis is effective in selected patients with staghorn uric acid stones.

- Complete dissolution achieved in 64% of cases.

- Stone density is a key predictor of success.

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Introduction

Staghorn nephrolithiasis is considered one of the most challenging forms of urolithiasis. Surgery (PCNL - gold standard but invasive) effective but high complication risk.

Oral chemolytic therapy: reported efficacy 61–88%, but no data for staghorn uric acid stones.

Aim: evaluate the efficacy and safety of citrate-based oral chemolysis for staghorn uric acid nephrolithiasis.

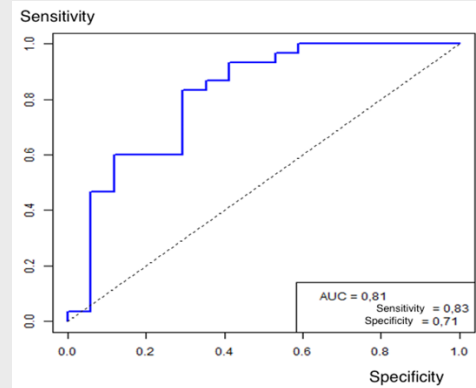
Methods

Prospective multicenter cohort, Jan 2023 – Oct 2024, Moscow outpatient clinics.

Inclusion: Staghorn calculi (≥ 1 calyx + pelvis), presumed uric acid (radiolucent, urine pH ≤ 5.8 , density ≤ 650 HU, no stent/nephrostomy, no obstruction).

Intervention: Oral citrate mix (citric acid, K-bicarbonate, Na-citrate), target pH 7.2. CT at 1/3/6 mo; continue if $\geq 10\%$ (1 mo) or $\geq 20\%$ (3 mo) volume \downarrow ; otherwise surgery.

Outcomes: Primary – complete dissolution; secondary – partial, volume \downarrow , surgery rate.



Logistic regression: density $\uparrow 1$ HU \rightarrow OR 0.988 for dissolution ($p=0.039$, 95% CI: 0.976–0.998). ROC AUC = 0.81 (good model performance).

Results

2 exclusions (4.1%): uncontrolled hypertension, recurrent renal colic.

Complete dissolution: 30/47 (63.8%; 95% CI: 48.5–77.3%).

Surgical intervention: 17/47 (36.2%; 95% CI: 22.7–51.5%).

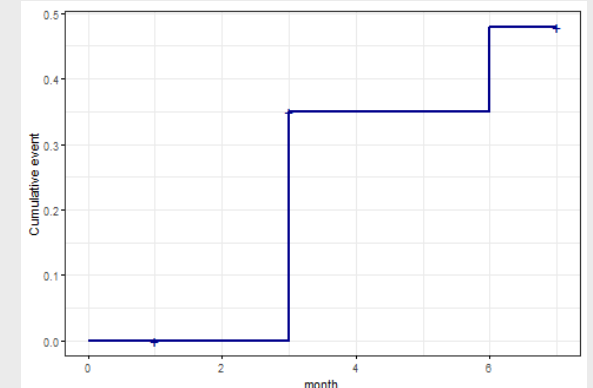
Dissolution timing: 1 mo – 8.5%; 3 mo – 38%; 6 mo – 17%.

Surgical Cases:

PNL – 3 (17.5%), RIRS – 14 (82.5%).

Among the retrieved stones, 12 (70.6%) were composed of calcium oxalate, and 5 (29.4%) were composed of uric acid

- **Failure rate in confirmed uric acid stones – 14.3%.**



Median monthly stone volume reduction: 51% (IQR: 0–69%).