DE and Kidney Stones

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INTRODUCTION

• Prevalence: 10-14%

• ER: 1-2%

• Morbidity: colic pain, kidney obstruction, renal failure, urinary tract infection
INTRODUCTION

• Knowledge of the composition:
  – fundamental part of the preoperative evaluation
  – Influences treatment plan and recurrence prevention
INTRODUCTION

• Cystine stones or calcium oxalate monohydrate stones: success of extracorporeal lithotrispy

• Systemic and familial metabolic stone disease suspected. Specific medical measures
INTRODUCTION

- 3 techniques for stones analysis
  - In-vitro x-ray diffraction
  - Infrared spectroscopy
  - Polarization microscopy
- Cost
- Time consuming
- Chemical analysis AFTER extraction
INTRODUCTION

• NO BENEFIT during preoperative treatment planning.
Dual Energy

• Several clinical applications in GU imaging

• Excellent morphologic detail

• Unique capabilities for characterizing mineral content of renal stones
Graph of mass-attenuation coefficients for iodine (blue), calcium (green), and water (red) on CT images obtained at two different energies

Kaza R K et al. Radiographics 2012;32:353-369
Acquisition

NECT single energy 120 KV Low dose

NECT Dual energy
100 KV
140 KV
case 1
case 2
Acute phase

Calcium
- Stone extraction

Uric Acid
- Renal decompression
Alcalinisation
Case 3
Case 3
Case 3
Case 3
CAS CLINIQUE

Une application de la tomodensitométrie en double énergie dans le traitement d’un calcul coralliforme

Dual energy X-ray absorptiometry as a guide for treatment of a staghorn kidney stone

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Clinical case 2
KS1
App: Mixed/100/Sn140
CT-Value: 522/519/524 HU
Ratio: 0.99
Volume: 154 mm³
Diameter: 11.4±4.2 mm
Precision: high


George S. K. Fung et al. Differentiation of Kidney Stones Using Dual-Energy CT With and Without a Tin Filter. AJR June 2012;198(6)

Andrew N. Primak. Noninvasive Differentiation of Uric Acid versus Non–Uric Acid Kidney Stones Using Dual-Energy CT. Academic Radiology December 2007;14(12);1441-1447
THANK YOU FOR YOUR ATTENTION