were recorded. The patients were followed up every two weeks by both techniques for 4 weeks and the management outcomes were evaluated. Data were analyzed by SPSS software.

RESULTS: There were 412 (83.4%) males and 82(16.6%) females. 237 (48%) and 257 (52%) on right and left side respectively. The mean transverse diameter was 6.9 $\pm$ 2.1 mm and percentage of the stones with different diameter (mm) was; $<$5 (28.7%), 5$-$10 (67.8%), $>$ 17(3.4%). NCCT detected ureteral stones in 492 (99.6%) and 2 (0.4%) were negative. CDU detected stones in concordance with NCCT in 475 (96.2%) and negative in 19 (3.8%). 401 (81.2%) of stones passed spontaneously, 82 (16.6%) underwent ureteroscopy, 2 (0.4%) received Shock wave lithotripsy and 9 (1.8%) lost from follow up. The transverse stone diameter was the only factor that affected stone management.

CONCLUSIONS: Lower ureteral stones could be followed up successfully by Color Doppler Ultrasound. The majority of lower ureteral stones passed spontaneously. Ultrasound is a safe, reliable alternative to NCCT in follow up of lower ureteric stones. Stone transverse diameter is crucial in stone management.

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PD4-02

SHOULD BONE MINERAL DENSITY (BMD) BE INCLUDED IN THE METABOLIC EVALUATION OF YOUNG ADULTS WITH CALCIUM KIDNEY STONE DISEASE ?: A PROSPECTIVE STUDY

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INTRODUCTION AND OBJECTIVES: Despite the association between urolithiasis and bone fractures and the attendant high morbidity and health costs of both conditions, patients with urolithiasis are neither commonly evaluated for, nor subsequently treated for bone loss. Fractures are common amongst both hypercalciuric and normocalciuric kidney stone-forming subjects indicating abnormal bone metabolism. Age is the major variable affecting BMD. The current study was designed to determine whether Bone Mineral Density (BMD) is altered amongst young (aged between 20 to 40 years) stone forming patients and to correlate BMD t-score with urinary calcium, serum calcitriol and iPTH.

METHODS: Young patients, both male & female, either first timer or recurrent radio opaque stone former were included. Patients with CKD, on thiazide diuretics or taking vitamin D / bisphosphonate were excluded. While the patient was on a free choice diet, 24 hour urine sample was analyzed for volume, sodium, potassium, chloride, urea, creatinine, uric acid, calcium, phosphorus & protein using standard laboratory technique. A fasting blood sample was also collected and analyzed for urea, creatinine, calcium, phosphate, blood sugar, uric acid & proteins. Serum sample was also analyzed for iPTH & Vitamin D3. The BMD of lumbar spine was measured on HOLOGIC densitometer machine in supine position. The T score was calculated.

RESULTS: A total of 30 patients (14 male & 16 female) and 10 age matched control were recruited. Only 40% (n=12) of the stone formers had normal BMD compared to 90% of the non-stone formers. 26.7% of the stone formers had osteoporotic range BMD and one third (33.3%) of them were in the osteopenic range. Two patients had hypercalcemia and low BMD. 3 patients had hypercalciuria 2 of them had normal BMD. 33.3% of patients with normal BMD (n=4), 30% (n= 3) with osteopenic BMD and 37.5% (n=3) with osteoporotic range BMD had high serum level of parathormone. Only one patient had high serum vitamin D3 level who incidentally had low BMD. Low vitamin D3 was evident in equal frequency amongst patients with either normal, osteopenic or osteoporotic BMD.

CONCLUSIONS: Bone loss was evident amongst young stone formers irrespective of serum parathormone, vitamin D3 level and status of hypercalciuria. Therefore, we suggest bone mineral density (BMD) analyses should be included in the routine evaluation of stone formers. The question of how to best treat these patients with low BMD has not yet been answered. Larger studies with more number of patients are required to prove our claim.

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PD4-03

A COMPARISON OF CALCULATED ABSORBED RADIATION ORGAN DOSES AND IMAGE QUALITY FOR ITERATIVE VERSUS FILTERED BACK PROJECTION CT IN KIDNEY STONE PATIENTS

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INTRODUCTION AND OBJECTIVES: Methods commonly used to reduce patient radiation exposure, such as standard Filtered Back Projection CT (FBP CT), may still result in significant image noise and decreased image quality. Adaptive Iterative Dose Reduction (AIDR), a CT image reconstruction algorithm, has been touted to lower patient radiation dose while maintaining adequate diagnostic quality. Our group recently developed a validated method to estimate CT patient absorbed dose based on statistical modeling and post-mortem dosimetry. The purpose of this study is to determine absorbed dose in urinary stone patients undergoing FBP CT compared to AIDR CT and compare the quality of the scans.

METHODS: After IRB approval, we reviewed records of all patients who underwent stone protocol CT scan from 11/1/12 $-$ 7/1/13 at our single institution which houses 2 ADR-capable and 4 FBP CT scanners, a modified form of random assignment. Clinical and radiological data was then recorded from patients found to have urinary tract stones. Two blinded, board-certified radiologists independently reviewed data sets for image quality (1$-$5), noise (1$-$3), and calculi (number, size, location),and discrepancies were resolved by a blinded third board-certified radiologist. Absorbed skin and internal abdominal organ doses were calculated using equations that utilize the scanner-reported CT dose Index (CTDI) and the patient central effective diameter. Statistical analysis was performed using Fisher's Exact and paired t tests.

RESULTS: Of the 54 patients who met inclusion criteria, 28 patients underwent FBP CT while 26 underwent AIDR. Both groups were similar in regard to gender, race, BMI(31.7 +/- 9.9), stone burden detected, image quality, and image noise. Absorbed skin dose was 42.9 $\pm$ 19.9 mGy for FBP CT and 27.4 $\pm$ 35.0 mGy ($p<0.001$) for AIDR CT, while mean internal organ doses were 20.12 $\pm$ 9.7 mGy (FBP CT) and 6.9 $\pm$ 3.8 mGy ($p<0.001$, ADIR). Mean CTDI for all stone protocol FBP CT studies was 31.4 $\pm$ 11.8 mGy compared to 15.4 $\pm$ 13.9 mGy ($p<0.05$) for AIDR CT.

CONCLUSIONS: In our random cohort and using a validated absorbed dose formula, urinary stone patients who underwent AIDR CT had 36% and 65% reduction in skin and internal organ dose (respectively) compared to FBP CT, without compromising scan readability. Measured CT output using CTDI did not correlate to calculated patient absorbed dose and should not be used as a valid patient dose parameter. AIDR technology decreases radiation doses in urinary stone formers undergoing stone protocol CT and may replace FBP CT as the standard of care in CT imaging.

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