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

RESULTS: There were 412 (83.4%) males and 82(16.6%) fe-
males. 237 (48%) and 257 (52%) on right and left side respectively. The
mean transverse diameter was 6.9 ± 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 diam-
eter is crucial in stone management.

Source of Funding: none

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 normo-
calciuric 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 cal-
citriol 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 hy-
percalcemia 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 sta-
tus 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 pa-
tients are required to prove our claim.

Source of Funding: none

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 pa-
tient 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 radio-
 logical 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 diam-
eter. 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 CT. 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
± 19.9 mGy for FBP CT and 27.4 ± 35.0 mGy (p<0.001) for AIDR CT,
while mean internal organ doses were 20.12 ± 9.7 mGy (FBP CT) and
6.9 ± 3.8 mGy (p<0.001, AIDR). Mean CTDI for all stone protocol FBP
CT studies was 31.4 ± 11.8 mGy compared to 15.4 ± 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 (respec-
tively) 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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