

decades later in patients who were treated with ESWL compared to controls. This study was undertaken to determine if patients treated with ESWL at our institution demonstrated an increased prevalence of hypertension and/or diabetes compared to patients treated with ureteroscopy (URS) or percutaneous nephrostolithotomy (PNL) after twenty years of follow up.

METHODS: 948 patients who underwent treatment for renal or ureteral stones between 1986 and 1989 were contacted by mail and asked to complete a detailed health questionnaire. Patients over 80 years of age at the time of the initial procedure were excluded from analysis. Treatments included ESWL using the HM3 lithotripter, ureteroscopy, or percutaneous nephrostolithotomy. Frequencies of disease states were tabulated. The t test was used to compare the prevalence of hypertension and diabetes across treatment groups.

RESULTS: 90 patients responded to the survey with a mean follow up time of 20 years. 4 patients declined to participate. 14 were deceased. Of these 14 patients, in 4 cases family members completed the survey on the deceased patient's behalf. 19% of patients were female. 65 patients were treated with ESWL and 12 were treated with either PNL or URS. Prevalence of hypertension and diabetes is reported below. There was no statistically significant difference in the prevalence of either disease state when the two treatment groups were compared.

Treatment type	HTN	DM
ESWL	42%	18%
URS/PNL	58%	33%
combined	47%	21%
P value	0.59	0.24

CONCLUSIONS: Using a retrospective cohort study with mean follow up of 20 years, we identified the prevalence of diabetes mellitus and hypertension in a cohort of patients treated with HM3 lithotripter ESWL for renal and ureteral stones. We compared this to patients treated with ureteroscopy and PNL during the same time period and found no statistically significant difference, in contrast to the findings of recent studies.

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1355 EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY AND ITS EFFECT ON RENAL FUNCTION, ASSESSED BY 99m TECHNETIUM DETHYLENE-TIAMINE-PENTAACETIC ACID SCINTIGRAPHY

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INTRODUCTION AND OBJECTIVE: This prospective study was performed to determine whether extracorporeal shock-wave lithotripsy (ESWL), widely used for treating renal and urethral stones, affects the kidney function, using Glomerular filtration rate (GFR) and time to peak clearance (Tf max) as predictors of renal function via radionuclide imaging.

METHODS: A total of 15 patients (9 male, 6 female, mean age of 37) with a single, less than 2 centimeter, lower calyx calculi in one kidney, confirmed by imaging modalities, underwent renal scintigraphy using diethylene-tiamine-pentaacetic acid (DTPA) 24 hours before, 1-3 hours after and two weeks after the ESWL. The setting of lithotripsy has been the same for all patients. GFR and Tf max were measured in both kidneys and also in the regions where stones were located (Region of Interest, ROI) and the same region in the contralateral kidney.

RESULTS: In kidneys with stones, GRF levels decreased 1-3 hours after employment of ESWL and returned to a slightly higher level two weeks after the procedure. The same pattern of variation was also observed in regions of interest of both kidneys although two weeks later the GFR level was fairly lower than pre ESWL. We observed lower GFR in region of interest in affected kidney compared to the normal one. Tf max values also decreased after ESWL but returned to pre-ESWL levels 2 weeks later except for region of interest in the kidney with stone where a significant decline in Tf max was observed immediately and 2 weeks after the procedure.

CONCLUSIONS: Patients with renal stones had a temporary decrease in GFR in the hours following ESWL in both the ipsilateral and contralateral kidneys, which returned to normal within 2 weeks. Tf max alteration also indicated an early increase in blood flow to both kidneys which could be due to systemic effect of inflammatory response resulting in vasodilatation of renal vessels. The torment is more prominent in the region where the stone is located.

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1356 FEVER FOLLOWING SHOCK WAVE LITHOTRIPSY – A CLINICAL PROSPECTIVE STUDY OF 15,324 CASES

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INTRODUCTION AND OBJECTIVE: To identify the risk factors for fever following Shock Wave Lithotripsy (SWL).

METHODS: Between the years 1985 and 2007 a total of 15,324 SWL treatments were conducted in our institution using the Dornier HM3 lithotripter. Clinical parameters before during and following treatments were prospectively collected using a computerized database. Risk factors for fever following SWL were evaluated. Statistical significance was assessed using the chi square test. A p-value below 0.05 was considered as statistically significant.

RESULTS: Patient's average age was 47 years. SWL was performed for stones in the kidney, upper, middle and lower ureter in 68%, 16%, 4%, and 12% of the patients respectively. In 16.4% of cases urine culture was positive prior to treatment and sterile in 83.6%. The clinical presentation leading to SWL was flank pain, hematuria, infection, sepsis or asymptomatic in 73.9%, 10.8%, 13.3%, 1.4% and 0.6% of cases respectively. During the procedure patients had a nephrostomy tube, stent, ureter catheter or no foreign object used in 7.6%, 36.4%, 13% and 43% of cases respectively. 46.5% of patients were treated with antibiotics perioperatively. 515 patient (3.9%) developed fever >37.5°C whereas fever >38.0°C was recorded in 326 patients (2.5%). Risk factors for fever following SWL were: a positive urine culture, carrying a nephrostomy or stent during the procedure, lithotripsy of stones in the kidney, stones larger than 2 cm and symptomatic UTI or sepsis prior to treatment. Lithotripsy of ureteral stones and the use of ureter catheters during the procedures were not associated with increased risk of fever following SWL.

CONCLUSIONS: Only 2.5% of the patients developed a temperature > 38°C. Patients who present with UTI, large kidney stones and those who required a nephrostomy or a stent, should be treated with prophylactic antibiotics.

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1357 THE ADVANTAGE OF A BROAD FOCAL ZONE IN SWL: IN VITRO STONE BREAKAGE COMPARING TWO ELECTROMAGNETIC LITHOTRIPTERS

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INTRODUCTION AND OBJECTIVE: All lithotripters are the same in the sense that they generate similar waveforms, but they can differ considerably in acoustic output and the dimensions—particularly the width—of the focal zone. Indeed, focal widths vary from quite narrow (~3-4 mm for Storz Modulith) to broad (~18 mm for the XIXin-CS2012A-XX-ES and LithoGold), while most lithotripters have focal widths of 8-12 mm. Stone motion due to respiratory excursion is an important factor in SWL as the stone moves in and out of the focal zone. We sought to assess the role that focal width plays in the effectiveness of breakage when the stone is purposely placed off-axis in two electromagnetic lithotripters, one with conventional focal width of about 8mm (Dornier DoLi-50) and one with a very broad focal width of about 18mm (XX-ES).

METHODS: The DoLi has 6 power levels and was operated at power level 3. The XX-ES was operated at its recommended clinical setting 9.3kV. Both lithotripters were fired at 60 shock waves per minute. Gypsum model stones held in a 2 mm mesh basket were positioned

at the clinical target point on the acoustic axis, and at 5 mm steps laterally, and the number of shock waves (SW's) to complete breakage was counted.

RESULTS: On axis, the peak positive pressure of the DoLi (~56 MPa) was about three times higher than with the XX-ES (~17 MPa). This did not affect the efficiency of stone comminution, as the number of shock waves to breakage was not different for the two lithotripters (DoLi 676 ± 105 SW's vs. XX-ES 644 ± 123 SW's, P>0.6). When stones were positioned off-axis, breakage efficiency fell faster for the DoLi, but was not significantly different until 15mm lateral, where the DoLi required almost twice the number of shock waves as the XX-ES (3006 ± 780 SW's vs. 1726 ± 972 SW's, P<0.006). The DoLi was entirely ineffective at 20 mm (no breakage with 10,000 SW's), while the XX-ES achieved breakage (3691 ± 1618 SW's) even at this large distance off-axis.

CONCLUSIONS: These data demonstrate the importance of focal width rather than peak positive pressure to the effectiveness of a given lithotripter—as efficient breakage was achieved with a broad focal width machine at low acoustic pressures (<20 MPa). Most striking is the result that a broad focal width lithotripter (~18mm) can comminute stones as much as 2 cm off-axis, performance that is likely to be highly relevant in the clinical setting, where respiratory motion and patient movement can limit the effectiveness of narrower focal width machines.

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1358

EFFECT OF STONE-TO-SKIN DISTANCE ON SHOCK WAVE LITHOTRIPSY SUCCESS

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INTRODUCTION AND OBJECTIVE: We evaluated the effect of increased body habitus on stone-free rates following shock wave lithotripsy (SWL) determined by three reproducible stone-to-skin measurements on CT scan.

METHODS: We retrospectively reviewed the records of 85 patients with pre-operative CT scans available on Stentor Radiology Imaging (Philips Imaging, MA, USA) who had undergone SWL with the Dornier HM3 shock wave lithotripter (Dornier MedTech, Wessling, Germany) from 2002-2007. Using pre-operative CT scans, we measured three reproducible distances from the center of the calculus(i) to the level of the skin at the following angles: 0 (vertical), 30, and 90 (horizontal) degrees. Successful therapy was defined as stone-free (residual fragments < 2mm) on follow-up imaging. Data were analyzed using descriptive statistics and the Fisher's exact test.

RESULTS: Of the 480 patients who underwent SWL at our institution from 2002-2007, 85 patients (50.6% male, mean age 50.8±15.7 years, mean BMI 28.8±6.6) with pre-operative CT scans were identified. 75.3% had renal stones (25.9% lower pole), and 29.4% had proximal ureteral stones, with a mean total stone diameter of 8.5±3.8mm. On follow-up imaging (142.7±217.2 days), 49.4% of patients were stone-free. Mean CT scan stone-to-skin measurements (vertical, horizontal, 30 degrees) in patients who were stone-free versus those who were not stone-free were 104.3±26.2 vs. 102.6±29.9 (p=0.79), 106.6±25.3 vs. 107.1±29.3 (p=0.94), and 103.9±28.2 vs. 101.0 ±31.5 (p=0.66), respectively.

CONCLUSIONS: Multiple variables have been shown to affect the efficacy of SWL. In our sample of patients with pre-operative CT scans, stone-to-skin distance was found to have no effect on SWL success.

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1359

SAFETY AND EFFICACY OF SUPRACOSTAL PERCUTANEOUS NEPHROLITHOTOMY IN PEDIATRIC PATIENTS

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INTRODUCTION AND OBJECTIVE: This study was conducted to evaluate the safety and effectiveness of supracostal approach for PCNL in pediatric patients.

METHODS: We retrospectively reviewed 60 PCNL procedures

done for 50 pediatric patients (32 boys and 18 girls) between 2000 and 2007. The mean age was 7±4 years (range 9 months-14 years). Non-contrast computed tomography (NCCT) was the primary radiological investigation for most of the cases. Subcostal approach was used in 40 procedures and supracostal approach (above the 12th rib) was required in 20. We compared both approaches regarding preoperative characteristics, stone-free and complication rates and the need for auxiliary procedures.

RESULTS: The preoperative characteristics of the patients, urinary tracts and stones were comparable for both treatment groups. There were no major complications. Significant bleeding requiring blood transfusion, transient fever and urinary leakage through the nephrostomy site were encountered in 3 patients (5%) for each complication. Of the 60 renal units, 46 (77%) were stone-free after PCNL. Of remaining 14 units 9 (15%) were stone-free after ESWL and 5 (8%) had insignificant residual stones. Therefore, the overall stone-free rate at 3 months was 92%. Comparing the subcostal and supracostal approaches, there were no significant differences regarding hospital stay (p=0.664), complication rates (p=1), un-planned auxiliary procedures (p=0.624) and the stone free rates at discharge and after 3 months (p=0.725 and 0.741 respectively).

CONCLUSIONS: PCNL for treating renal stones in pediatric patients provides high degree of safety and effectiveness whether a supracostal or subcostal tracts were used.

Source of Funding: None

1360

SYNCHRONOUS BILATERAL PERCUTANEOUS NEPHROSTOLITHOTOMY: ANALYSIS OF CLINICAL OUTCOMES, COST, AND SURGEON REIMBURSEMENT

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INTRODUCTION AND OBJECTIVE: Previous studies have demonstrated favorable outcomes for patients undergoing synchronous bilateral percutaneous nephrostolithotomy (PCNL). We reviewed our series of contemporary synchronous bilateral PCNL and compared clinical outcomes, cost and physician reimbursement to estimates of these parameters for a comparable staged bilateral PCNL.

METHODS: We identified 17 patients who underwent synchronous bilateral PCNL (SB-PCNL) between September 2005 and May 2007, for whom cost and clinical information was available in 15. Patient history and perioperative outcomes were recorded and direct and component costs as well as physician reimbursement were obtained. In order to compare these outcomes and costs to comparable staged bilateral PCNLs, 152 unilateral PCNLs were used to derive similar parameters. Operative time, length of stay (LOS), direct cost and physician reimbursement were determined according to current procedural terminology (CPT) codes for stone complexity (50080 for stones < 2cm, 50081 ≥ 2 cm) to match case complexity per renal unit.

RESULTS: Mean patient age in the SB-PCNL group was 51 ±11 S.D. years. Males comprised 60% of patients and staghorn calculi occurred in 25%. Using CT criteria, 4 patients were completely stone-free after the initial procedure; second look flexible nephroscopy was performed on at least one side in 10 patients with residual fragments. Complications occurred in 4 patients (2 hydrothoraces, 2 post-operative fevers >38°), and none required transfusion. Room time, hospital length of stay (LOS) and direct costs were higher in the estimated staged procedures when renal units were matched for CPT codes (Table). Conversely, physicians were reimbursed 11-46% less when synchronous procedures were performed.

CONCLUSIONS: SB-PCNL benefits patients and third party payors by incurring shorter cumulative room/anesthesia times and LOS while decreasing direct costs. However, there is a disincentive for the surgeon, who is penalized financially, for performing SB-PCNL. Third party payors should consider revising putative physician reimbursement