THE ROLE OF MEDICAL MANAGEMENT IN PEDIATRIC NEPHROLITHIASIS
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The incidence of nephrolithiasis in children has increased significantly over the last three decades with up to a 10% increase annually (Sas, et al., 2010). Guidelines recommend children should undergo a complete metabolic evaluation with a first stone occurrence because up to 70% of children with nephrolithiasis will have a urine abnormality that increases their risk of stone formation (Tasian, 2014). While medical management has been extensively studied in adults, there is limited evidence supporting medical management in children. Medical management of pediatric stones is based largely on extrapolation of studies performed in adult populations. The objective of this study is to determine if dietary modifications, potassium citrate and/or hydrochlorothiazide (HCTZ) are associated with improvement in Litholink parameters in pediatric stone formers.

**Methods:** Using a multi-institutional pediatric nephrolithiasis stone consortium database we retrospectively compared the pre and post treatment Litholink results for pediatric patients with normal anatomy and a history of nephrolithiasis who underwent treatment with dietary modifications, HCTZ or citrate between 1999-2013.

**Results:** There were 44 subjects included in the analysis. 39 (88.64%), 2 (4.55%) and 3 (6.82%) patients were treated with dietary changes, HCTZ and citrate respectively, as an isolated intervention. With dietary changes we found a significant improvements in 24 hour volume (p<0.05), decrease in supersaturation of calcium oxalate (p<0.0001) and a significant decrease in 24 hour calcium/creatinine ratio (p<0.0001). We had insufficient patient numbers to show any significant findings for HCTZ and citrate supplementation but the limited numbers available showed substantial changes in the calcium and citrate respectively.

**Conclusions:** Dietary changes correlated with a significant improvement in 24 hour volume, supersaturation of calcium oxalate and 24 hour calcium/creatinine ratio. This suggests that dietary management can lead to meaningful changes in the relative risk of stone formation in children with pediatric nephrolithiasis.
Does Newborn Circumcision Reduce the Risk of Future Penile Complaints and Need for Penile Surgery in Children?

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Introduction: Elective newborn circumcision remains a controversial topic. The American Academy of Pediatrics guidelines state that the benefits may outweigh the risks and justifies access to the procedure in well informed families who choose it. However many families are only made aware of acute complications and believe circumcision will prevent future penile complaints. We sought to evaluate the impact of non-acute complications of newborn circumcision on patients presenting with common pediatric penile complaints. In addition, we sought to compare the burden of care of these common conditions, for the circumcised versus uncircumcised patient.

Methods: Data was prospectively collected on 235 consecutive male patients who presented to our pediatric urology clinic over a 3-month period. Data included patient’s age, reason for visit, circumcision status, diagnosis and intervention required.

Results: Out of the 235 male consecutive patients, 101 (43%) presented with a penile complaint. Of those presenting without penile complaints, 73% of patients were noted to be circumcised which represents the unselected baseline rate of circumcision in our patient population. Of those presenting with penile complaints, 68% percent of them were circumcised. 45% of circumcised patients required surgical intervention versus only 18% in the uncircumcised group (p=0.01). Common interventions in the circumcised group included revision circumcision for significantly incomplete circumcisions (n=6), lysis of penile adhesions with skin bridging (12), meatoplasty for symptomatic meatal stenosis (8), and excision of large epithelial inclusion cysts (3) In the non-circumcised group the only surgical intervention was circumcision for symptomatic phimosis (2) and significant preputial abnormalities (4).

Discussion: While the acute complications of newborn circumcision are well known, the long-term outcomes and non-acute complications are less clear. Many families choose circumcision with the belief that it will prevent the risk of future penile complications. In our population of patients we found that circumcised patients were no less likely to have late penile complaints than those that were not circumcised, and that circumcised patients were significantly more likely to require surgical intervention to correct their penile complaint. This highlights the importance of educating families regarding non-acute complications at the time of newborn circumcision, and to dispel any beliefs that circumcision is expected to prevent all future penile complaints.
USE OF A NOVEL DIGITAL PHOTOGRAPHY BASED SMARTPHONE APP (MEDMEASURE!) TO MAKE PENILE LENGTH MEASUREMENTS BOTH DURING AND AFTER HYPOSPADIAS SURGERY: A VALIDATION STUDY

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Purpose: With hypospadias surgery, it is difficult to report reliable pre and post-op measurement data by reproducible technique. Stretched penile length (SPL) is the standard measurement used in reconstructive penile surgery (RPS), but is associated with high inter-rater variability, and is seldom reported. Furthermore, ruler-based measurements require that all measurements be made intraoperatively; post-hoc measurements are difficult to impossible. We used a novel smartphone application to assess the correlation of post-op digital-photo based length measurements to intra-operative ruler measurements.

Material and Methods: Intra-operative SPL was measured in a consecutive series of pediatric patients undergoing RPS who agreed to participate in this study. SPL was measured intra-operatively (SPL-IO), and a picture was taken, with the ruler and from a true lateral view, as proof. A second digital picture was taken at the same time, with a reference object (OBJ) (object whose dimensions are known and constant). Post-op, SPL was later measured using the MedMeasure! App for iPhone and iOS Android, using the picture with OBJ, by two different surgeons blinded to intra-op measurements. The three different measurements (Intra-op SPL (SPL-IO), and post-op using the App (SPL-S1 – SPL-S2) were then compared to assess overall correlation and correlation to ruler measurements using SPSS 20.0 statistical software package.

Results: 20 consecutive patients underwent surgery for hypospadias (n=15), buried penis (n=1), epispadias (n=3) and circumcision accident (n=1). Median age at surgery was 18 months [6-301]. Median penile SPL-IO was 3.8 cm [2.4 -8.9]. When ruler-based measurements (SPL-IO) and App-Photo based measurements were treated as independent measurements (Students t test), there was no statistical difference between any of the three groups (p 0.51-0.81). Even with SPL-IO measurements were treated as the gold standard, by Bland-Altman Limits of Agreement analysis, the correlation factor of SPL-IP to SPL-S1 & SPL-S2 was >99%.

Conclusions: When compared with intraoperative measurements, digital measurements using MedMeasure! are reliable and precise, provided that the picture is taken from a true anterior-posterior or lateral view. Because measurements are made based on captured images, a limitless number of length measurements (within the same plane as the reference object) can be made post-hoc. Use of digital photography and this smartphone app has the potential to aid in surgical planning, improve documentation, and, facilitate clinical research.
PUDENDAL NERVE BLOCK IS A VIABLE ALTERNATIVE TO CAUDAL BLOCK FOR HYPOSPADIAS SURGERY

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(Presentation to be made by Dr. Sarah Hecht)

Objective: Caudal blocks are commonly used as adjuncts to general anesthesia during hypospadias surgery as they decrease intraoperative anesthetic requirements and provide post-operative pain control. Anatomically, pudendal nerve blockade should also provide adequate local anesthesia for genitourinary surgery. The purpose of this study is to show that pudendal nerve blockade is a safe, effective alternative to caudal blockade for hypospadias surgery.

Materials and Methods: Data for this retrospective cohort study were obtained by chart review. Children who underwent hypospadias repair between April and October 2014 at a single academic institution were included. Patients either received pudendal block (n=7) or caudal block (n=11) as adjuncts to general anesthesia. All pudendal blocks were placed under the supervision of a single pediatric anesthesiologist.

Results: The pudendal block cohort was slightly older (13.2 vs 7.8 months, P=0.004), otherwise the cohorts were demographically equivalent. The pudendal block cohort underwent more surgically complex repairs. Postoperative length of stay was significantly shorter in the pudendal block cohort (81 vs 137 minutes, p<0.001). There was no difference in the amount of intraoperative opioid used (6.5 vs 7.3 mcg fentanyl, p=0.83). No patients in the pudendal block cohort required post-operative narcotics whereas four of 11 patients in the caudal block cohort did, however this difference did not achieve statistical significance (p=0.08).

Conclusions: Pudendal nerve blocks are an effective alternative to caudal blocks for pediatric hypospadias repair. Moreover, postoperative length of stay is shortened with pudendal block.

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CLEAN INTERMITTENT CATHETERIZATION IS A RISK FACTOR FOR URINARY TRACT INFECTION IN INFANTS WITH SPINAL DYSRAPHISM
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Objectives: Urinary tract infection (UTI) is a common source of morbidity among children with spinal dysraphism (SD), especially in the first few years of life. We sought to determine risk factors for UTI within the first two years of life in children with SD.

Materials and methods: Records of 54 children born with SD between June 2007 and January 2013 who were followed for the first two years of life at a pediatric spinal defects clinic were reviewed. UTI was defined as ≥ 100K CFU/mL of a single organism and one related urinary symptom in the absence of another identified infectious source. Gender, ethnicity, and spinal lesion specifics were noted. The following characteristics near the time of UTI, or prior to age 2 in those without a UTI, were also noted: daily antibiotic use, clean intermittent catheterization (CIC), circumcision status, vesicoureteral reflux (VUR), hydronephrosis, abnormality on dimercaptosuccinic acid (DMSA) renal scan (≥ 10% difference in differential function and/or renal scar), and abnormal urodynamic (UDS) parameters. Primary outcome was the presence of UTI prior to age 2 years. Fisher’s Exact test was used for statistical evaluation.

Results: UTI prior to age 2 years was identified in 25/54 (46%) of patients. CIC was being performed in 14/25 (56%) of patients who developed a UTI, and in 3/29 (10%) of patients who did not develop a UTI (p = 0.001, OR: 10.48). DMSA abnormality was found in 8/23 (35%) of patients with UTI and 0/14 (0%) of patients without (p = 0.015, OR: Inf). Spinal lesion type was myelomeningocele in 23/25 (92%) of patients with UTI, compared to 13/29 (45%) without UTI (p = 0.003). VUR, hydronephrosis, circumcision status, or abnormal UDS parameters were not significantly predictive of UTI.

Conclusions: CIC initiation prior to age two may increase the incidence of UTI in children with SD. Delayed initiation of CIC, even in those children with VUR, hydronephrosis, or abnormal UDS parameters should be considered.

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Objective: Renal disease causes growth retardation in children. There is a lack of data on the effects of unilateral renal dysfunction on growth. Ureteropelvic junction obstruction (UPJO) is the most common obstructive uropathy in children, and is most commonly unilateral. Our objective is to determine whether pyeloplasty can reverse growth delay associated with unilateral ureteropelvic junction obstruction (UUPJO). In addition, we want to determine whether change in somatic growth after pyeloplasty differs between those who presented with asymptomatic versus symptomatic obstruction.

Methods: A retrospective analysis was conducted on pediatric patients who underwent pyeloplasty for UUPJO at our institution from 2009 to present. Patients’ age at presentation, age at surgery, type of symptoms, MAG3 differential function, and MAG3 half time were recorded. Preoperative and postoperative height and weight percentiles were recorded according to the CDC growth charts for 0-36 months and 2-20 years. Exclusion criteria included patients who had bilateral UPJO, redo pyeloplasty, solitary kidney, or other congenital anomalies associated with growth retardation. Tanner 5 children were also excluded. Patients with low grade vesicoureteral reflux or non-obstructive low grade contralateral hydronephrosis were included.

Results: There were 58 patients included in the study. Mean age at presentation was 3.69 years, while mean age at surgery was 5.47 years. 30 (52%) were asymptomatic and detected prenatally, while 28 (48%) patients were symptomatic at presentation. The top three presenting symptoms were flank/abdominal pain, nausea/vomiting, and urinary tract infections. 77.6% and 91.38% of children’s height and weight were followed for at least 6 months postoperatively, respectively. 36.21% and 53.45% of children’s height and weight were followed for at least 12 months postoperatively, respectively. Mean change in weight percentile between preoperative and postoperative measurements was 6.65% and statistically significant (95% CI 2.43-10.87; p < 0.01). Mean change in height percentile was 3.07, but this was not statistically significant (95% CI -1.92-8.05; p=0.22). There were 28 children with at least a 5% increase in weight percentile. Of these, 19 presented in an asymptomatic manner, versus only 9 with symptoms; this difference was statistically significant (p = 0.02). Patients whose preoperative MAG3 washout time was less than 20 minutes demonstrated a significant change in weight percentile: least square mean preoperatively was 80.42, compared to 92.3 postoperatively (p<0.05). On multivariate analysis, none of the measured variables in the model were significantly associated with or able to predict the observed weight gains seen in our patient population.

Conclusions: Pediatric pyeloplasty for UUPJO is associated with an increase in weight percentile. Asymptomatic children are more likely to experience more dramatic weight gain after surgery. Shorter MAG3 washout times are also associated with a greater increase in weight postoperatively. This brings into question whether UUPJO is truly asymptomatic and questions whether those detected prenatally are truly asymptomatic as often is assumed. Our study also suggests that weight may serve as an indicator, in addition to blood pressure, renal ultrasounds, and MAG3 scans, of when to consider surgery timing for patients with UUPJO.
STATE OF THE ART

Stone Management and Surgery in Children.

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