Summary of Annual Meeting of Section on Pediatric Urology

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The Section on Urology of the American Academy of Pediatrics met for 2½ days in conjunction with the 58th Annual Meeting of the Academy in Chicago, IL, October 21 to October 23, 1989. The papers presented at this meeting that were thought to be of interest to the practicing pediatrician are summarized here according to topic. The recipient of this year’s Pediatric Urology Medal is Jack Lapides. Dr Lapides is recognized for his numerous academic achievements and his excellence in teaching as Professor and Chairman of the Department of Urology at the University of Michigan. His introduction and popularization of intermittent self-catheterization has revolutionized the treatment of neurogenic bladder dysfunction and is clearly one of the most significant contributions to urology during the past few decades.

GENITOURINARY TUMORS

Those of us involved in the care of patients with Wilms tumor continue to search for prognostic indicators which will allow identification of patients at low risk or high risk for the development of metastatic disease. The accumulated data from National Wilms’ Tumor Studies II and III showed that decreasing amounts of chemotherapy can be administered to patients with favorable prognostic factors, whereas patients with poor prognostic factors require more aggressive chemotherapy and radiation therapy. While favorable histology and the absence of nodal metastatic disease have clearly been shown to be associated with enhanced survival, Gearhart and coworkers have used nuclear morphometry to predict response to treatment in patients with Wilms tumor. In a retrospective analysis of 29 patients with Wilms tumor, morphometric nuclear analysis (using several shape descriptors) was very useful in identifying responders vs nonresponders to chemotherapy.

Flow cytometry has been applied to a variety of tumor systems including Wilms tumor,¹ in an attempt to stratify patients into good and poor prognostic groups. Peters and co-authors applied this technique to patients with multicystic kidneys to determine those patients who might be at greater risk for the development of neoplasia. Thirty formalin-fixed, paraffin-embedded archival specimens of multicystic kidneys were reviewed. All multicystic kidneys had a normal diploid pattern. These findings support the concept that multicystic kidneys are not at increased risk for tumor development and may not uniformly require prophylactic nephrectomy.²

Is contralateral surgical exploration necessary in patients with presumed unilateral Wilms tumor? In a preliminary study, Woo and co-authors showed that contralateral surgical exploration for Wilms tumor may be omitted in patients with a negative imaging assessment of the contralateral kidney. Of 46 patients with Wilms tumor, 5 Wilms tumors were diagnosed preoperatively and confirmed surgically, whereas operative exploration in the other 41 cases of radiographically diagnosed unilateral disease failed to reveal any evidence of contralateral malignancy. Although the consensus of the membership was that it is premature to omit contralateral exploration in all patients with Wilms tumor, the use of more sophisticated imaging techniques, particularly magnetic resonance imaging may eliminate the need for contralateral renal exploration in selected patients.

MYELODYSPLASIA

Hydronephrosis has been reported in 7% to 60% of newborns with myelomeningocele. At the meeting last year, Erickson et al³ reported the results of

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a prospective study involving renal sonography before and after back closure in newborns with myelomeningocele. Nine percent of patients had hydronephrosis before back closure. Twenty-seven percent of patients developed hydronephrosis after back closure, but the hydronephrosis resolved in all patients within 14 days after treatment with intermittent catheterization and adequate bladder emptying. At this year’s meeting, Kroovand and co-workers addressed the question of whether back closure adversely affected detrusor function in neonates with myelomeningocele. These authors studied 40 neonates with myelodysplasia and found that renal ultrasounds were normal before back closure and for the first 3 months after back closure in all patients. Urodynamics were used to study the effect of back closure on detrusor function. Neonatal closure of the spinal cord defect did not affect detrusor sphincter coordination adversely.

Deterioration of the upper urinary tract in patients with myelomeningocele is totally preventable when initial treatment is based upon leak-point pressure. This parameter continues to be the best predictor of abnormal bladder compliance, detrusor pressure. When initial treatment is based upon leak-point pressure.4 This parameter continues to be the best predictor of abnormal bladder compliance, detrusor sphincter dyssynergia, and eventual deterioration of the upper urinary tract. Traditional methods of decreasing elevated bladder pressures include decompression by means of a cutaneous vesicostomy or intermittent catheterization and anticholinergic medication. Bloom and co-workers proposed the use of urethral dilatation to decrease leak-point pressure. The rationale for this effect is that most myelomeningocele patients have a nonfunctioning internal sphincter with fixed resistance at the dysfunctional external sphincter. They reported urethral dilatation in 16 patients with high leak pressures and found that this procedure consistently lowered bladder pressures to safe ranges. None of the children experienced problems with urinary continence following urethral dilatation.

Khoury and co-workers from the Hospital for Sick Children in Toronto documented the benefits of neurosurgical intervention in selected patients with spinal dysraphism. None of these patients had myelomeningocele. Twenty-eight children with enuresis, bladder instability, and suspected of having a tethered spinal cord, underwent a laminectomy and division of the filum terminale. Daytime and nighttime incontinence and urodynamic bladder instability disappeared in 19 (68%) of 28 patients.

Joseph et al documented the variability of results using different infusion rates for urodynamic studies in infants and young children. Twenty-five percent of patients had hypertonicity with fast infusion rates which were not demonstrated during slow infusion. Furthermore, 32% of patients developed intravesical pressures exceeding 40 cm of water during fast infusion, but not during slow infusion cystometry. This paper clearly emphasizes the importance of standardizing infusion rates during urodynamic studies in infants and young children.

Although approximately two thirds of patients with myelomeningocele can acquire urinary continence with the use of intermittent catheterization and pharmacologic manipulation, there remains a group of patients with decreased bladder compliance and/or gross sphincteric and bladder outlet incompetence who require surgical intervention. Elder et al reported their experience with the use of puboprostatic and pubovaginal slings in the management of sphincteric incompetence for children with myelomeningocele.

Eleven (92%) of twelve patients were totally continent postoperatively. The fact that each patient also required an augmentation cystoplasty, as well as a sling procedure, underscores the importance of normalizing bladder pressures in children with myelomeningocele.

The group from Toronto Children’s Hospital discussed the effects of the artificial genitourinary sphincter on prostatic development and sexual function in pubertal males with myelomeningocele. These authors reported that the artificial genitourinary sphincter cuff placed around the bladder neck in pubertal males did not inhibit prostatic growth nor adversely affect erectile function. Of 11 pubertal males with myelomeningocele who had a cuff placed around the bladder neck, 9 (82%) reported erections and 8 (73%) reported seminal emissions.

AUGMENTATION

Several important papers documented the applicability of enterocystoplasty to lower abnormal bladder compliance in children undergoing lower urinary tract reconstruction procedures. Mitchell and co-workers updated their experience with the use of stomach for bladder augmentation or replacement. Thirty patients have been observed for a mean of 15.8 months. Twenty-seven (89%) of thirty patients are continent. Severe metabolic alkalosis requiring hospitalization occurred in three patients, symptomatic infections occurred in one, bowel obstruction in three, and two developed spontaneous perforation of the bladder. The use of stomach for augmentation cystoplasty appears to be applicable for patients with short bowel syndrome, metabolic acidosis related to renal failure, and in patients with severe and recurrent urinary tract infections who would not tolerate significant mucus production.
Many women who previously underwent augmentation cystoplasty are reaching childbearing age and some are now becoming pregnant. Hill and Kramer reported the results of their survey of 265 members of the Society of Pediatric Urology and found 14 patients who became pregnant and delivered a baby after undergoing augmentation cystoplasty. The results of the survey indicated that women who have undergone an augmentation cystoplasty and maintain their native continence mechanism can deliver a baby vaginally if no other obstetric contraindications exist. However, patients who have previously undergone bladder neck surgery to achieve continence should have a cesarean section delivery to avoid the possibility of disruption of the continence mechanism.

**RESEARCH**

This year's research prize was presented to Mark Rich and his colleagues for their work on “The Two-Step Model of Renal Development and Oncogenesis.” These investigators studied N-myc oncogene expression in a pig model to investigate the potential role of this gene in normal renal development and oncogenesis. The authors' hypothesis was that the loss of suppression of N-myc expression (“anti-oncogene”) was important in the pathogenesis of Wilms tumor.

**RENAI STONES AND URETERAL STRICTURES**

Ureteral and renal calculi occur infrequently in children and have been treated historically by open surgical techniques. Until recently, size limitations have prevented ureteroscopic and renoscopic techniques, commonly used in adults, for use in children. These instruments allow direct visualization of the ureter, renal pelvis, and calyceal system without the use of an incision. Hill and associates from the Mayo Clinic described the results of ureteroscopy in four children less than 10 years of age. Ureteroscopy was used for diagnosis, in combination with lasertripsy, percutaneous ultrasonic lithotripsy, and extracorporeal shock wave lithotripsy. Caione and co-authors from Rome corroborated these results and reported seven children aged 3 to 8 years who underwent successful rigid ureterorenoscopy with complete stone lithotripsy by ultrasonography and removal of residual fragments by grasping forceps. Extracorporeal shock wave lithotripsy has become a well-established procedure for the treatment of renal and ureteral calculi in adults. The group from the Hospital for Sick Children in Toronto reported 14 children between 5 and 16 years of age who were treated effectively with extracorporeal shock wave lithotripsy. These authors used the Siemens Lithostar, a newer generation lithotriptor which does not require immersion of the patient in a water tub. Tomograms at 3 months showed residual stone fragments in four patients for a stone-free success rate of 71% at 3 months following treatment. Three of these four patients had successful fragmentation of residual calculi after one or more treatments. The fourth patient awaits a second shock wave lithotripsy. This lithotriptor is attractive for use in children because of lower intensity shock waves, no need for general anesthesia, and the absence of a water tub. This procedure can be performed most often on an outpatient basis.

Ureteral strictures may develop in children who have undergone ileal conduits, pyeloplasty, or ureteral reimplantation. These postoperative strictures have usually required open surgical repair. Aliabadi and co-workers reported the successful use of percutaneous balloon dilatation of ureteral strictures after failed surgical repair in 5 of 6 children. While the authors' follow-up is quite short (mean 12 months) and their patient group is small, this technique does provide an attractive alternative to open surgical repair in selected patients with ureteral strictures.

**TESTIS**

This series of papers included a discussion of the timing and success of hormonal therapy for patients with cryptorchidism, the experimental effects of varicocele on the testis, the use of flow cytometry to predict fertility status and premalignant changes in cryptorchid testes, and surgical techniques for cryptorchidism. Dankoff and co-authors treated 78 patients with bilateral cryptorchidism with human chorionic gonadotropin injections. Complete descent after human chorionic gonadotropin therapy occurred in only 27 (17%) of 156 testes. Successful descent occurred in 26% of testes positioned in the superficial inguinal pouch, in 18% of those in the midinguinal canal, and in 10% of nonpalpable testes. Interestingly, only 3 (9%) of 33 patients younger than 24 months of age responded completely to therapy obviating the need for surgery! Conversely, 13 (33%) of 40 beyond age 24 months had complete testicular descent after human chorionic gonadotropin therapy. The documentation of histological abnormalities in testes which remain cryptorchid beyond 12 months of age, combined with the poor response rate in this study, raises serious concerns about the use of human chorionic gonadotropin treatment as initial therapy.

Ring and co-workers used the technique of flow
of these biopsies showed that histological damage surgically obtained biopsied specimen. The results bulb and cross-sectional tubular diameter of each whom had a preoperative caudal. There was no dal anesthesia was used preoperatively. Twenty- patients undergoing hypospadias repair when caudal for relief of pain. Manley and co-authors reported of caudals, epidurals, and local or regional blocks. Advances in pediatric anesthesia include the use occurrences early and is progressive with increasing age. Kogan and co-workers reviewed their experience with early orchidopexy in patients up to 1 year of age. Operative time and surgical anesthetic complications were not increased when orchidopexy was performed before 1 year of age. Early orchidopexy is clearly a safe and effective treatment and can usually be performed on an ambulatory basis without increased risk. Testicular biopsies were performed for assessment of germ cell counts per tubule and cross-sectional tubular diameter of each surgically obtained biopsied specimen. The results of these biopsies showed that histological damage occurs early and is progressive with increasing age.

HYPOSPADIAS

Advances in pediatric anesthesia include the use of caudals, epidurals, and local or regional blocks for relief of pain. Manley and co-authors reported reduced blood loss and operative time in a group of patients undergoing hypospadias repair when caudal anesthesia was used preoperatively. Twenty-four boys underwent general anesthesia, 12 of whom had a preoperative caudal. There was no statistical difference in age, weight, or intraoperative blood pressure between the two groups. Surgical time was significantly shorter, and measured blood loss was decreased by nearly 50% in patients undergoing preoperative caudal anesthesia. This technique should be considered a supplement to general anesthesia by reducing the need for hemostasis and thus shortening operative time and anesthetic requirements.

Perlmutter and co-authors reported their experience with 81 one-stage hypospadias repairs using preputial free-graft urethroplasties. Thirty-four (42%) patients required a second procedure: 27 for persistent fistula (33%) and 7 for stricture (9%). All patients eventually had an excellent functional and cosmetic outcome.

Kass and Bolong observed 206 consecutive patients undergoing primary repair of hypospadias during a 3½-year period. A two-layer closure was used in all patients undergoing creation of a skin tube, and a silicone urethral stent was placed into the bladder to routinely divert the urine for a period of 1 week. Only one patient developed a urethrocUTaneous fistula; a truly remarkable result!

REFLUX AND URINARY TRACT INFECTIONS

The submucosal injection of various substances for the prevention of reflux continues to be a highly controversial topic. This series of papers reported the results of using Ivalon, autologous cartilage, bovine collagen, and Teflon for the treatment of vesicoureteral reflux. Farkas and co-authors reported their experience with using Teflon in 115 ureters with reflux. Of patients with primary reflux, 95.8% had their reflux corrected following an initial Teflon injection. Reflux into duplex ureters was corrected in 82% of patients after the first injection and in 93% of patients after repeated injections. Although the subureteric injection of Teflon has been used to correct vesicoureteral reflux (primarily in Europe) with success rates of 85% to 95%, significant concern remains about the migration of Teflon to distant organs and about the formation of granulomas around the injection site in experimental animals. Most of us do not doubt the ease and simplicity of the technique. However, the majority of the audience had significant concerns about the continued use of Teflon and stressed the importance of further research efforts to develop a safer material that is biocompatible, permanent, causes little inflammatory response, and does not migrate from the injection site. The group from the Hospital for Sick Children in Toronto compared the use of Ivalon particles to autologous cartilage, injected submucosally into rabbit bladders for the prevention of reflux. Autologous cartilage underwent early reabsorption without evidence of a fibrotic reaction at the injection site and, therefore, would not be suitable for the...
long-term prevention of vesicoureteral reflux. Conversely, Ivalon was found to be biocompatible, permanent, and caused minimal inflammatory response at the injection site.

Leonard and co-authors updated their previous work with the use of glutaraldehyde cross-link bovine collagen (Zyplast) injected submucosally for the prevention of reflux in humans. Fifty patients have been treated to date, and morbidity has been insignificant. The authors previously have reported a success rate of 75% in short-term follow-up.\textsuperscript{6} Seven patients in whom Zyplast injection failed underwent open surgical correction for vesicoureteral reflux. In all seven cases, the reimplantation procedure was not hindered by the presence of the collagen implantation. Histologically, the implants appeared to be surrounded with a fibrous capsule, but no granulomas were identified. No distant tissue was available to determine whether or not migration of Zyplast had occurred. While this material has distinct advantages over Teflon, concern remains about the reabsorption of collagen and about the suitability of this material for the long-term prevention of vesicoureteral reflux.

The group from the Hospital for Sick Children attempted to answer the question, “When to operate?” for patients with high-grade vesicoureteral reflux. One hundred-twelve patients (86 female and 26 male) with grades 3, 4, and 5 reflux (International Classification) were observed nonoperatively. Sixty-one patients had grade 3, 38 had grade 4, and 13 had grade 5 reflux. Grade 3 reflux resolved in 21% of patients in an average of 2.6 years; and, of the patients who resolved their reflux, 92% did so by 4 years. Grade 4 reflux resolved in only one patient in 2.9 years follow-up, and 86% of patients with grade 4 reflux ultimately required surgery. The authors concluded that 4 years was an appropriate period of observation for patients with grades 3 and 4 reflux and that reflux would not likely improve or resolve after that interval. Patients with grade 5 reflux clearly benefited from early surgical repair. The concept that reflux will resolve within 4 years or not at all, irrespective of age at presentation, raised considerable discussion and speculation from the audience.

Two papers from the same institution used meso-2,3-dimercaptosuccinic acid (DMSA) scanning to assess renal scarring in patients with vesicoureteral reflux. Cohen and co-authors used DMSA renal scans to assess scarring and reflux in children with myelodysplasia. One hundred-eighty patients with myelodysplasia were observed from 3 to 18 years. Spontaneous resolution of reflux occurred in 62% of the remaining patients treated medically with clean intermittent catheterization and anticholinergic medication. Surgical correction of reflux was carried out in 24% of patients and was successful in all. The authors cautioned against immediate antireflux surgery and recommended a period of maximal medical treatment as reflux will resolve spontaneously in the majority of children. The DMSA scan was highly sensitive for the detection of renal scars which occurred in 28 (15.5%) patients in this group.

In a companion paper, Rushton and co-authors reported the results with DMSA scans for the detection and localization of pyelonephritis. It is presumed that the majority of cases of acute pyelonephritis in the absence of vesicoureteral reflux are caused by P-fimbriated \textit{Escherichia coli}. One hundred consecutive children with febrile urinary tract infections were studied.

Sixty-eight percent of patients had an abnormal DMSA scan. The clinical diagnosis of acute pyelonephritis, based on temperature greater than 39 C, leukocytosis greater than 12 000/mm\textsuperscript{3}, and elevated sedimentation rate greater than 30 mm/hour was confirmed by the DMSA scan in 76% of patients. Interestingly, vesicoureteral reflux was demonstrated in only 32% of the total group and, surprisingly, in only 39% of those with acute changes noted on the DMSA scan! In those patients with both positive DMSA scans and reflux, 54% were found to be infected with P-fimbriated \textit{E coli}. Conversely, in those with positive DMSA scans who were not found to have concurrent reflux, 71% were infected with P-fimbriated \textit{E coli}. There was no statistical difference in the incidence of P-fimbriated \textit{E coli} between children with and without reflux and DMSA-documented acute pyelonephritis.

**EXSTROPHY-EPISPADIAS**

Surgical correction of urinary incontinence in the patient with bladder exstrophy remains one of the most significant surgical challenges to the pediatric urologist. Koff described a surgical modification of the Young-Dees-Leadbetter procedure for bladder neck reconstruction. This technique used a demucosalized bladder muscle flap which encircles and compresses the reconstructed bladder neck to increase urethral resistance. His preliminary results suggest that the addition of an encircling demucosalized bladder muscle flap to the Young-Dees-Leadbetter procedure may help to achieve continence in cases of severe anatomic or neurogenic urinary incontinence.

Gearhart and co-authors reviewed the cases of 16 patients with bladder exstrophy in whom initial bladder neck reconstruction failed and who were incontinent. Seven patients underwent only a re-
peat Young-Dees procedure. Four underwent bladder augmentation and creation of a continent urinary stoma, three underwent bladder augmentation alone, one underwent simultaneous bladder neck reconstruction and enterocystoplasty, and one patient underwent placement of an artificial genitourinary sphincter. Six of seven patients who underwent bladder neck reconstruction alone are dry. Of the nine patients who underwent enterocystoplasty as part of their reconstruction, along with other adjunctive procedures, six were continent for 4 hours and two were continent for 3 hours on intermittent catheterization. This report confirms that there are indeed options short of urinary diversion for patients with bladder extrophy in whom initial bladder neck reconstruction has failed.

Brito et al. reported 13 patients with cloacal extrophy who were treated between 1978 and 1989. A variety of techniques were used to provide urinary continence including ileocystoplasty, gastrocystoplasty, and continent gastric urinary reservoirs. Of nine patients with completed reconstruction, eight were dry for periods greater than 4 hours. All but one patient requires clean intermittent catheterization. Eight patients have stable upper urinary tracts, and one has obstructed hydronephrosis. The use of stomach appears to be an excellent choice of bowel which can be used for reconstruction in these patients with short bowel syndrome.

Kropp reported his experience with the first 25 patients with urinary incontinence who underwent bladder neck reconstruction by use of bladder tube urethral lengthening-reimplANTation. Twenty-two patients were continent secondary to myelodysplasia, 1 secondary to multiple sclerosis, 1 from urethral trauma, and 1 from a urogenital sinus abnormality. Twenty-one of twenty-five patients are dry on intermittent catheterization. Interestingly, 23 patients required enterocystoplasty because of noncompliant bladders.

PAPERS PRESENTED UNDER THIS TOPIC PROVIDED FURTHER INSIGHT INTO THE NATURAL HISTORY OF GENITOURINARY DISORDERS DETECTED IN UTERO. Homsey and co-authors reported their retrospective clinical review of 187 hydronephrotic kidneys discovered antenataly in 134 fetuses. All cases of prenatally detected hydronephrosis were confirmed postnatally. Hydronephrosis was secondary to ureteropelvic junction dilatation in 119 kidneys (64%). Of these 119 units, 41 (34.5%) featured equivocal obstruction or dilatation without obstruction and were followed with ultrasonography and diuretic renography. Of the patients treated conservatively over 12 months, 19 (46%) showed improvement with normal washout, 14 (34%) had stabilization of renal function, and 8 (20%) had deterioration to unequivocal obstruction requiring pyeloplasty. The initial ultrasonogram appeared to be an important predictor of eventual outcome in that none of the mildly hydronephrotic units deteriorated, 14% of the moderately dilated deteriorated, and 32% of the severely dilated units showed deterioration.

Blyth and co-authors from the Children's Hospital in Boston reported a series of 308 patients followed over 2 years who were referred to their institution for prenatal evaluation of suspected genitourinary anomalies. In only 203 (66%) patients was suspected in utero hydronephrosis confirmed after delivery. The "suspected hydronephrosis" was either the result of false negative studies or resolved spontaneously after delivery in the other 34% of patients.

Only 8% of patients with prenatal hydronephrosis and 10% of those with postnatal hydronephrosis ultimately required a urologic operation! Only one fetus required in utero vesicostomy because of evidence of bladder outlet obstruction and oligohydramnios at 19 weeks gestation. The authors have clearly documented that, although prenatal ultrasonography is highly accurate in experienced hands and is extremely useful in identifying those infants at risk for subsequent deterioration in the postnatal period, in utero intervention is rarely indicated.

Ransley and co-authors from Great Ormond Street in London reported concerning 110 infants (139 affected kidneys) with postnatal hydronephrosis suggestive of ureteropelvic junction obstruction and diagnosed by prenatal ultrasonography. The kidneys were divided into functional groups on the basis of renal uptake of diethylene-triaminepentaacetic acid. Poor function was less than 20%, moderate function was 20% to 40%, and good function was greater than 40%. Nine kidneys showed poor function and underwent placement of a percutaneous nephrostomy tube as initial therapy. Six of these eventually underwent unilateral nephrectomy, and three had pyeloplasty. Twenty-six kidneys demonstrated moderate function. Twenty-three underwent pyeloplasty, and function improved postoperatively in 14. Three are being treated conservatively with no evidence of deterioration. Of the remaining 104 kidneys with good function, 6 had an early pyeloplasty and 98 have been treated conservatively. During the follow-up, 23 of these 98 cases underwent delayed pyeloplasty secondary to reduction in function or because of clinical indications. The authors concluded that
there was no indication for immediate pyeloplasty in children with hydronephrosis detected by prenatal ultrasonography and recommended that the renal uptake on diethylenetriaminepentaacetic acid scan be used as an important predictor of which patients need surgery and which can be treated conservatively.

IMAGING

Several papers were presented in which a variety of techniques to assess renal defects and scarring in children with pyelonephritis was discussed. Joseph and Young applied the principles of single photon emission computed tomography imaging to glucoheptonate cortical imaging for the evaluation of renal scarring. Thirty-five consecutive children underwent single photon emission computed tomography. The sensitivity of identifying defects noted on the standard images, pinhole images, and single photon emission computed tomography images was compared. Twenty-nine renal units were found to have one or more defects. Fifty-nine percent of the defects were identified using standard images compared with 83% identified when using pinhole or single photon emission computed tomography images. It appears that the single photon emission computed tomography technique is important in assessing defects where there is poor renal uptake of glucoheptonate and in confirming questionable defects. The group from Georgetown University Medical Center reported the use of single photon emission computed tomography in patients undergoing DMSA renal imaging. These authors prospectively compared single photon emission computed tomography to traditional pinhole DMSA imaging in 14 patients ranging in age from 4 months to 18 years. Of the kidneys that appeared “normal” on pinhole DMSA scan, 43% had focal cortical defects on single photon emission computed tomography imaging. High-resolution single photon emission computed tomography DMSA renal imaging clearly improves the ability to identify focal cortical defects and to visualize asymmetry of cortical thickness compared to standard pinhole imaging.

deVries and co-authors reported their large experience with the newly developed technetium mercaptoacetyltriglycine (99mTcMAG3) which is currently unavailable in the United States. This radiouclide appears to provide significantly reliable results, is associated with less radiation dose, is less expensive, and gives superior images when compared to standard radiopharmaceuticals.

Kogan and co-workers monitored renal function in 20 children with urologic abnormalities and moderate renal insufficiency using a variety of techniques. Traditionally, an accurate measurement of glomerular filtration rate is particularly problematic in children in whom complete timed urine collections and multiple blood samples are difficult to obtain. This study compared the plasma clearance of iothalamate during extended constant infusion to traditional methods of glomerular filtration rate measurement based on the uptake of diethylenetriaminepentaacetic acid during radiouclide imaging. The results of this study indicate that glomerular filtration rate, as measured by prolonged subcutaneous iothalamate infusion, was easy and highly accurate and should remain the standard for clearance rates in young children with poor renal function.

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