children, it has been proposed that to reduce the number of VCUG's in the 2-5 years' age group if the initial ultrasound is normal a DMSA scan be done after 6-12 weeks. If this is abnormal then a VCUG may be planned(2). Most patients will show abnormalities if the DMSA scan is done in the acute phase; this may not have long-term implications. Also, in older patients (>5 years) if the ultrasound is abnormal or there are recurrent UTI, a VCUG should be done to evaluate for underlying structural problems. DMSA may be used to monitor progression or increase in the number of scars with further episodes of UTI.

3. The authors have stressed the need for DMSA in culture negative fever of unknown origin. However they have not mentioned what proportion of children with fever of unknown origin had pyelonephritis. The prevalence of UTI in children below 2 years without any focus for fever is about 5%(4). In the Methods the authors state that in the culture negative category all those who fulfilled 3 essential (fever without focus, fever >38ºC and negative urine culture) and two supportive (pyuria, elevated acute phase reactants, polymorphonuclear leuocytosis and ultrasonographic abnormalities) criteria were included. However, later it has been mentioned that all patients had DMSA positivity which was not one of the inclusion criteria. Twenty-six children were enrolled as culture negative pyelonephritis and all had DMSA abnormality. Ultrasound was abnormal in 17 (65.4%) patients and normal in 9 (34.6%). It has been mentioned that in 9 children with abnormal DMSA there was no VUR on VCUG. Were these the same patients who had normal ultrasound? Of the total patients 17 (65.4%) had VUR. The grade of VUR is not specified. The possibility of recurrent infections and scarring is lower for mild reflux (grade I, II and unilateral III) and most patients with mild or moderate VUR resolve over 1-4 years.

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Role of DMSA in Pediatric UTI (Reply)

We appreciate the thoughtful comments of Dr. Mukta Mantan on our article(1). Her comments have given us the opportunity to enlarge the published article.

1. The utility of DMSA scans in culture positive febrile urinary tract infections (UTI) has been well documented for diagnosing acute pyelonephritis (APN) (2-4). In our study 32 children had first episode of UTI and 10 had recurrent infections with positive urine cultures. Of the 33

children with VUR, 11 had grade I-II VUR and 22 had grade III-V VUR, 17 children were less than 2-years-old.

The gold standard investigation for documenting APN is DMSA scan. Renal ultrasonogram (RUS) can be normal in the presence of APN. The sensitivity of RUS for APN is low, in all age groups between 5-7%. The advantage of a DMSA scan in the early stages of infection is to document pyelonephritis and institute appropriate antibiotics. It gives an edge to the clinician to detect early the children at risk for renal damage and recurrent infection thereby preventing future sequelae(6). It has been shown in our study that early diagnosis of APN by the DMSA helped to diagnose vesicoureteric reflux (VUR) in a good percentage.

The association of renal dysplasia with VUR and UTI has been well documented particularly in children less than 2 years. DMSA done in the acute phase can help differentiate between dysplastic kidney with VUR and UTI, and APN with VUR in a structurally normal kidney(7). Delayed DMSA may lead to mistaken impression that a scarred kidney could be due to improperly treated APN where in reality it could have been a dysplastic kidney.

2. We have stated in our article that DMSA scan is a relatively inexpensive investigation needing no preparation to diagnose a serious infection like APN. On diagnosing APN with DMSA, full therapy is given for 14 days followed by chemo-prophylaxis. In the absence of DMSA evidence of APN, physicians may be reluctant to give the full course of antibiotic therapy and not convinced to give chemoprophylaxis resulting in progressive renal damage and sequelae of ESRD. The benefits of longer intravenous therapy in those patients with DMSA abnormalities during acute phase of infection(8). Management of ESRD is not economically viable and stress is being laid on utmost priority for preventive measures. It is agreed that the IPNG does not recommend routine VCUG in 2-5 years age group(9). However, in our study, out of 19 children less than 2 years of age, 17 had VUR and of 13 children between 2 and 5 years 12 had VUR. This strongly favors that this group needs further evaluation. For the same reason evaluating a child with both DMSA scan and VCUG above 5 years with an abnormal ultrasound in a first attack of febrile UTI or following recurrent UTI even with a normal ultra-sound is justified. Contrastingly, studies done in this group with first symptomatic UTI have shown high frequency of scintigraphic abnormalities and a strategy based only on ultrasound data would miss about 50% of the abnormal kidneys(10). It is only a conjecture that most patients with some scarring on an acute DMSA scan may not have any long term implication. This new experience gained away from the con-sensus statement will help in future to modify or to be considered for modification of the existing consensus statement. No consensus can be alive if experience is not added to the existing guidelines. We differ from the view of the reader that nuclear scan is highly radio-toxic. It is relatively less radiotoxic compared to intravenous urography and VCUG. DMSA scan has replaced IVU as a standard technique for the detection of renal inflammation and scarring for many years and its gonadal toxicity is negligible.

3. Regarding the need for DMSA scan in culture negative fever of unknown origin (FUO) it is mentioned in our study that the entry into the study was the DMSA positivity and hence 100% positivity of DMSA in the study group and it can be considered as an inclusion criteria. It is also mentioned that children were evaluated for FUO in the medical units and had DMSA scan on the basis of the clinicobiological features. No attempt was made to study the number of children who had DMSA scan prior to referral to the nephrology department. Hence it is difficult to state the number of children who were initially evaluated. It is stated by the reader from the literature that the prevalence of UTI in children <2 years without any focus for fever is about 4%(11). This is what we also stress through our article on including pyelonephritis as a possibility in FUO especially when clinical and biological features as mentioned in our study were present. In culture negative APN all 9 children who had normal ultrasound did not have normal VCU. Out of 26 children in the group of culture negative APN, 17 had VUR. Grading of reflux in them and the age group is given in *Table I*. Though the advantage of resolution of VUR is more in lower grades, the renal damage is not always proportionate to the degree of reflux from our experience.

TABLE I–*Voiding cystourethrogram in culture negative acute pyelonephritis (n=26).*

VCU findings	< 2 yrs (n=7)	2-5 yrs (n=13)	> 5 yrs (n=6)	Total (n=26)
No VUR	1	5	3	9
VUR Grade I-II	5	6	3	14
VUR Grade III-V	1	2	0	3

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IAP Drug Formulary 2004

A comprehensive pediatric drug formulary as CDROM which is updated regularly every year and containing a listing of all pediatric drugs under generic name with every available brand names; with recommended dosages for every possible pediatric illness with its toxicity and drug interactions – a much felt need as there is growing evidence that tools for computer based prescribing help pediatricians to make better and cheaper prescribing decisions - has become a reality with the launch of this prestigious project of IAP CMEG at Kolkata in January this year. It is already being used by around 2000 pediatricians all over India and has been accepted as an official publication of IAP and finds pride of place on the cover of Academy Today and the website of IAP – *www.iap india.org* with link to its own website *www.iapdrugformulary.com*. This IAP Drug Formulary 2004 is more that just a formulary. It has IAP recommendations on every pediatric illness in the book presented system-wise and formulated by respective sub chapters of IAP. Therefore, this becomes a handy desk-top reference in the clinic, during hospital rounds and for teaching purposes.

Tools for computer based prescribing range from computerised drug formulary to decision support tools that extract data from the patients records and suggest a ranged list of suitable drugs. These more sophisticated decision support tools can improve the accuracy, appropriateness, speed and cost of prescribing. Evidence from three randomised studies showed that use of decision support tools improved the accuracy of drug dosing (1) while ward pharmacists who used decision support tools in an American hospital made better choices of which antibiotic to prescribe(2). Computer tools is associated with more legible and complete prescriptions, compared to written prescription. Access to advanced decision support tools to general practitioners make their prescribing behaviour closer to that of expert doctors because they are able to select a higher proportion of appro-priate, generic and cost effective drugs.

Several new developments are taking place such as full integration with electronic patient records and providing patients with tailored leaflets to improve compliance. Once electronic signatures become legal, doctors will be able to send prescriptions electronically to a pharmacy eliminating signed print outs and speeding up follow up enquiries by pharmacists. Automated pill counters able to dispense some drugs directly could also see the light of day in the not-too-distant future(3).

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