C3 deficiency can predispose to recurrent upper respiratory tract infections and also infections with capsulated organisms. Deficiencies of C5 to C9 *i.e.,* membrane complex defect predisposes to infections with *Neisseria.* Defects in the alternative pathway of complement activation again predisposes to infections with capsulated organisms.

There is no curative treatment for complement deficiency. Prompt treatment of infections, prophylactic antibiotics and vaccination against *pneumococci*, *H. influenzae* and *Meningococci forms* the main stay of preventive treatment. Gene therapy is of promise in the near future.

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Role of DMSA in Pediatric UTI

I read the article published in the July 2005 issue of the Journal emphasizing the utility of DMSA (99mTc-dimercaptosuccinic acid) scans in the evaluation of acute pyelonephritis in children(1). It was interesting, however I have some comments:

1. The authors enrolled 32 children with first episode of febrile urinary tract infections (UTI) and 10 with recurrent infection with positive urine cultures. All patients were subjected to ultrasound, DMSA scan during acute phase of the infection and a voiding cystourethrogram (VCUG) was done after treatment of the episode. Vesicoureteric reflux (VUR) was present in 33 (78.6%) children and an abnormal DMSA was reported in 92.9% patients. The authors have not mentioned the grade of VUR. Also, they have not mentioned the number of patients below 2 years with VUR, as the incidence of structural abnormalities associated with UTI is highest in this group. All young children with febrile UTI are at increased risk of acute pyelonephritis and it is difficult to differentiate upper from lower UTI in this age group. Therefore, it is recommended that all these episodes in young children be managed as pyelonephritis as they have the potential for renal scarring(2,3). The benefit of DMSA in an acute stage in this category is questionable and does not change the management of individual cases(4).
2. The authors suggest that DMSA is an easily available and cheap investigation. However it needs to be emphasized that this nuclear scan is available only in metros and bigger cities and costs about Rs 2500 in the private sector. Also being a nuclear scan it delivers about 6 months of background radiation (exposure equivalent to 60 chest *X*-rays). In the evaluation protocol for the first UTI in

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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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