Filarial antigens detected in urine using the immunochromatographic card test

The immunochromatographic card test (ICT) for filarial antigens is considered sensitive and specific for active *W. bancrofti* infection [1,2], and can be performed with only 100 μl of blood. However, even finger-stick blood draw meets with some resistance and can pose a discernible risk wherever high rates of HIV, hepatitis C, or other blood-borne illnesses prevail. So the ability to screen urine to detect filarial infection has obvious advantages. We sought to determine whether filarial antigens could be rapidly detected in patients' urine samples using ICT.

Blood and urine samples were collected under approved protocols (Lady Ridgeway and University of Colombo Ethical Review Committees) from children admitted to Lady Ridgeway Hospital in Colombo, and from children admitted to Ragama Hospital in Gampaha. These government administered hospitals are located 20 km apart in adjacent districts of the Western Province of Sri Lanka where *Wucheria bancrofti* filariasis is considered endemic. Blood samples were collected from 135 children (6 months to 10 years) who were scheduled to have blood drawn for clinical purposes. Informed consent was obtained from guardians before routine blood draw. According to manufacturer guidelines, 100-200 μl of fresh venous blood samples were transferred to BINAX New ICT testing kits to assay *Wucheraria bancrofti* antigens. Reacted kits were read independently by two investigators and preserved by digital photography. Children testing positive by whole blood ICT also provided urine samples within four hours of blood draw. 80-100 μl of urine were applied to ICT testing kits. As with blood, urine samples could be identified as negative or positive within 10 minutes. Guardians of ICT-positive children were offered treatment with diethylcarbamazine (DEC).

Of 135 blood samples, only 4 produced two pink bands (control and test) indicative of circulating *Wucheraria bancrofti* antigens. The children in question all resided in Gampaha District and had been admitted to hospital for persistent fever. Urine specimens from these children were tested, and ICT was positive for the presence of filarial antigens in their urine as well (Figure 1A,B). One child, a girl of 9 years, was admitted in March. Her blood and urine samples tested positive by ICT and she received

appropriate treatment (50 mg DEC 3 times a day for 14 days). Ten weeks after the girl's positive tests and 8 weeks after completing treatment, follow up urine-ICT failed to show a positive band. This result was consistent with conversion of the girl to antigen-negative status following treatment (Figure 1C). A second child whose blood tested positive in March did not receive treatment. At follow up ICT 9 weeks later, this boy's urine produced a positive band (Figure 1D).

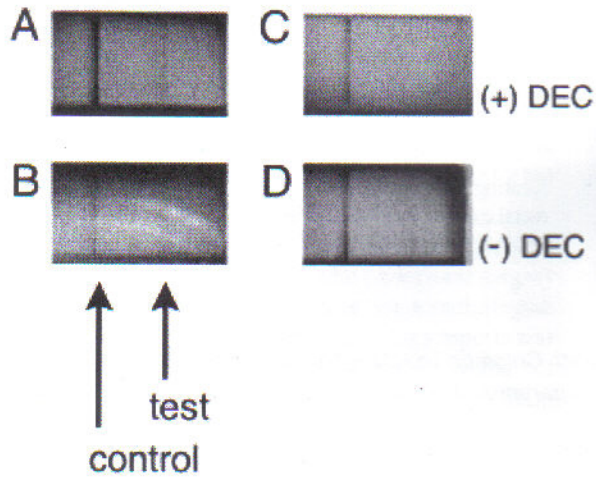

Figure 1. **Urine ICT demonstrated conversion to urine antigen negative status following treatment with DEC.** A and B depict positive urine ICT tests in two nine year old children who also demonstrated positive whole blood ICT. C and D show corresponding, follow up urine ICT tests in the same children. C shows a negative urine ICT test 8 weeks after DEC therapy, and D shows a persistent, positive urine ICT test in the absence of DEC treatment.

Filarial antigens have been described in the urine of microfilaraemic patients [3], and their slow disappearance following treatment with DEC. We report that all children identified as antigenaemic during the course of this study also tested positive by urine ICT. Our results appear to confirm the excretion of filarial antigens in the urine and indicate compatibility of urine with ICT testing. The persistence of filarial antigens in the untreated boy's urine coupled with disappearance of antigen from the urine of a DEC-treated girl, suggests that urine ICT is specific.

Acknowledgements

Financial support was received by CBR through a fellowship from the U.S. Fulbright Senior Scholar Program. The authors thank Dilini Hapangama, Wenura Palihawadana, KH Weerasena, A Wijewardana, Dhakshike Wickrema, and the Binax Corporation.

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