Performance of the Manual Microscopy, Sysmex UF-100 and Sysmex UF-1000i Urine Analyzer on urine bacteria quantitative

Ling-Chaio Tsai, Pin-Ching Pan, Fang-Ju Chen, Cheng-Chih Chen, Jin-Biou Chang, Tzong-Shi Chiueh

Division of Clinical Pathology, Tri-Service General Hospital

Urinary Tract Infection (UTI) diagnosed by bacterial culture always consumes 3 to 5 days and up to 50% of the sample submitted for culture are either negative or grow insignificant amounts of bacteria. Rapid screening test can reduce unnecessary bacterial culture and improve turnaround time. The objective was to assess on the ability of bacteria detection to exclude negative result by fully automated urine sediment analyzer the Sysmex UF-100 and the Sysmex UF-1000i. There are totally 202 routine urine specimens conducted with manual microscopic, Sysmex UF-100, Sysmex UF-1000i, and bacterial culture. Two criteria for bacterial culture are used for determining negative result, <10^4 CFU/mL and <10^5 CFU/mL respectively, the cut-off value of the exclusion is established with Receiver operating characteristics (ROC) curve by selecting sensitivity up to 95%. Our studies of <10^5 CFU/mL as negative result is standard, <10^4 CFU/mL as negative result is the reference method. By using criteria of <10^4 CFU/mL as negative result, cut-off value of 2400 bacteria/μL in UF-100 can achieve sensitivity of 100% and specificity of 66.9%, and the reduction of urine culture was 53%. In contrast with cut-off value of 300 bacteria/μL in UF-1000i can achieve sensitivity of 100% and specificity of 76.3%, and the reduction of urine culture was 60.4%. The sensitivity and specificity of manual microscopy in this criterion were 100% and 26.9% respectively. By using criteria of <10^4 CFU/mL as negative result, the cut-off value of UF-100 to achieve sensitivity of 95% and specificity of 18.9% is 430 bacteria/μL, and the reduction of urine culture was 12.4%. In contrast with, specificity of 57.5%, the cut-off value of UF-1000i is 40 bacterial/μL, and the reduction in urine culture was 32.2%. The sensitivity and specificity of manual microscopy in this criterion are 92.7% and 34% respectively. Our studies elucidate the use of fully automated urine sediment analyzer can provide patient report to clinician in the early phase of diagnosis, more importantly, reduce unnecessary use of antibiotics.

Key Words : Urinary tract infection, flow cytometrySysmex UF-100, Sysmex UF-1000i