

A comparison of Sysmex UF-5000 flow cytometer and Fuchs-Rosenthal chamber in urine sediment analysis

ASS.PROF. ÖZLEM UNAY DEMİREL

BAHCESEHİR SCHOOL OF MEDICINE GOZTEPE MEDICAL PARK HOSPITAL

Objectives-Aim

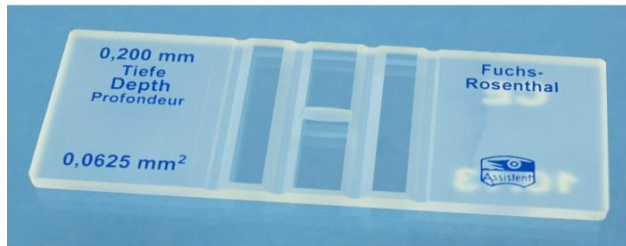
- ▶ Urine analysis is a basic test in the clinical laboratory.
- ▶ Urine sediment analysis is a part of urine analysis that gives laboratory professionals valuable information.
- ▶ Since manual examination is the gold standard for analysis it is time consuming and work-intensive procedure
- ▶ To compare the performance of Sysmex UF-5000 flow cytometer with the manual Fuchs-Rosenthal chamber in terms of urine sediment analysis.

When the patient dies the kidneys may go to the pathologist, but while he lives the urine is ours. It can provide us day by day, month by month, and year by year with a serial story of the major events within the kidney.

Dr. Thomas Addis (1881-1949)

Materials and Methods

- ▶ A total of 127 fresh urine samples from outpatient clinics are analyzed.
- ▶ We used Sysmex UF-5000 fluorescence flow cytometer for urine analysis and Fuchs-Rosenthal chamber for urine sediment analysis



Materials and Methods-2

Collection of urine samples



Examination of urine sediment microscopically by 2 well trained personnel



Performing the examination of sediment by flow cytometer



Method comparison between manual microscopy and flow cytometer

Materials and Methods-3

- ▶ We compared two methods by using Passing-Bablok regression analysis, Pearson correlation coefficient (r) and Bland-Altman bias plot.
- ▶ Statistical analysis was performed using Analyse-it software version 3.80 (Analyse-it Software, Ltd., Leeds, UK), CLSI Statis-Pro software version 3.0.

Results

- ▶ A good correlation was observed between manual and automated white blood cell (WBC) counts in all urine samples.

($r = 0.988$; $y = 1,162x + 0,489$; $n = 127$).

- ▶ UF-5000 demonstrated a significant proportional overestimation with Passing–Bablok regression (95% CI slope: 1,110 to 1,226).

- ▶ For red blood cell (RBC) counts, correlation between UF-5000 and the counting chamber was observed in all samples

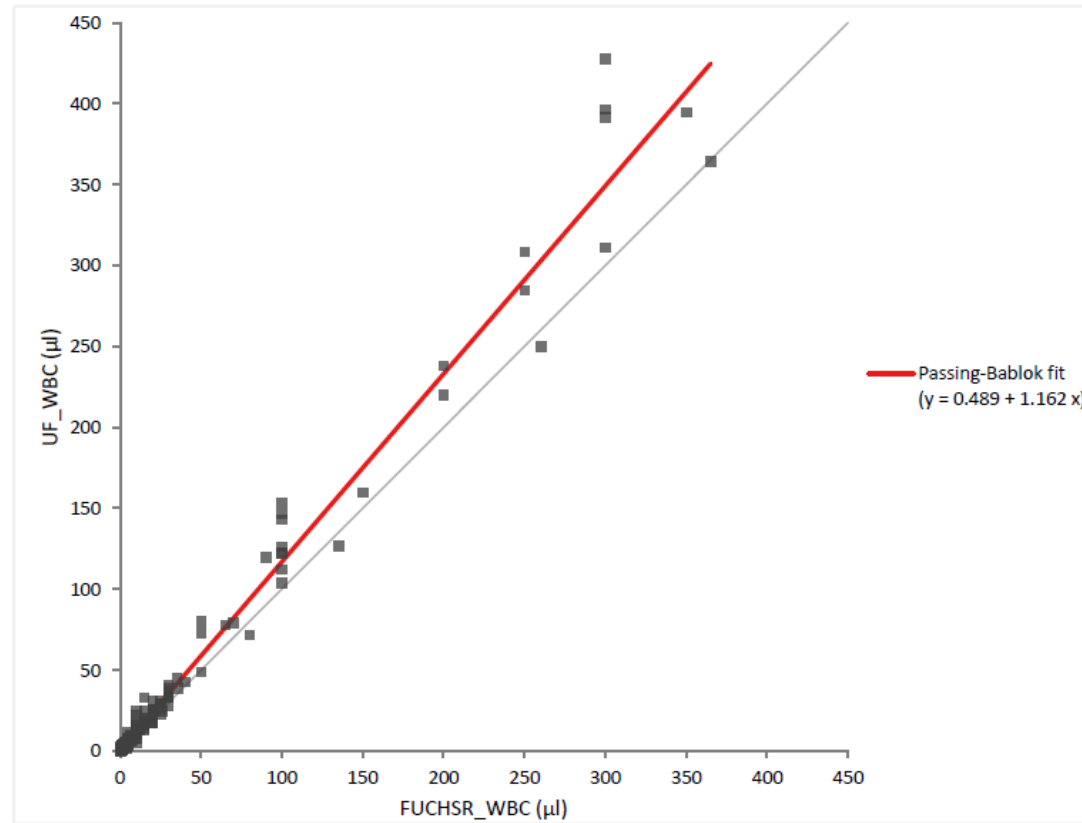
($r = 0,966$; $y = 1,1x + 0,75$).

Results-2

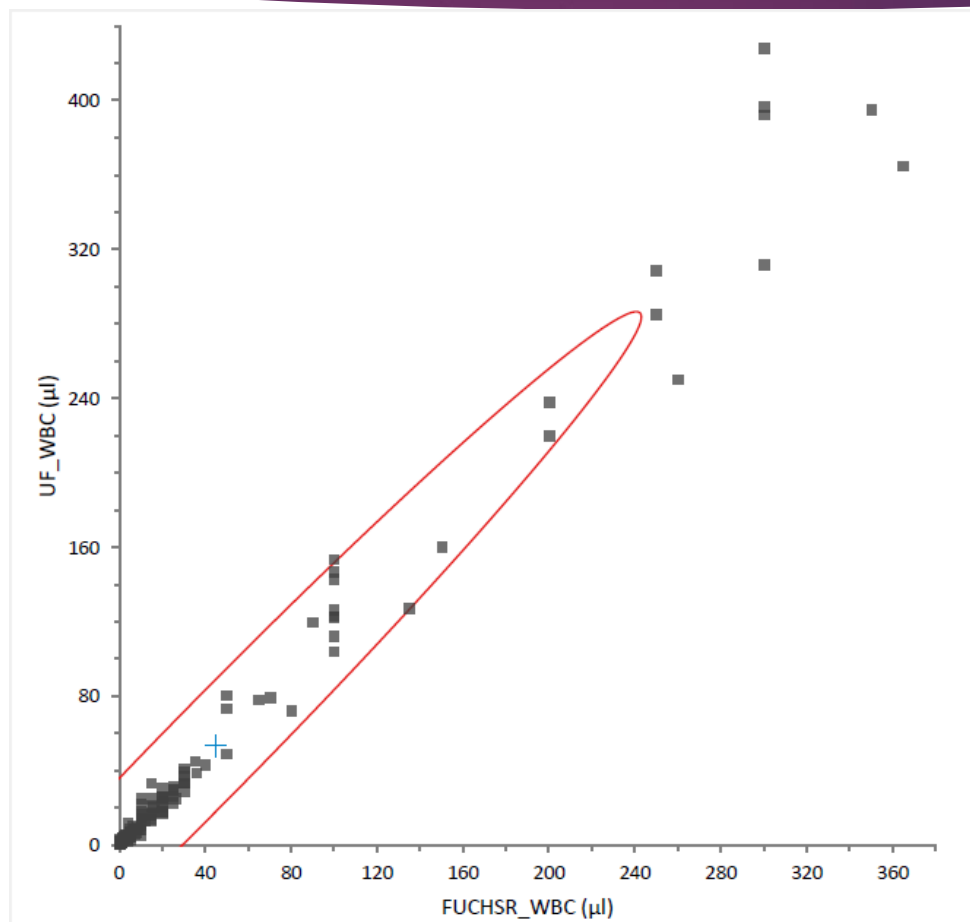
Table 1. The comparison of WBC and RBC counts obtained with UF-5000 and the reference counting chamber

		Passing-Bablok regresion			Bland-Altman difference plot	
		r value	Slope (95% CI)	Intercept (95% CI)	Mean Bias	95% Limits of agreement (mean bias $\pm 1,96$ SD)
WBC	All Sample (n=127)	0,988	1,162 (1,110 - 1,226)	0,4890 (-0,1069 to 1,0000)	8,51 (5,108 to 11,912)	-29,46 to 46,48'
	WBC <20 x 10 ⁶ /L (n= 71)				1,08 (0,564 to 1,602)	-3,21 to 5,38'
RBC	All Sample (n=126)	0,966	1,1 (1,038 to 1,180)	0,75 (- 0,1 to 1,25)	4,47 (2,321 to 6,614)	-19,39 to 28,32'
	RBC <20 x 10 ⁶ /L (n=77)				0,89 (0,019 to 1,758)	-6,62 to 8,40'

Results-3



Results-4



Conclusion

- ▶ This study showed us that urine analysis with flow cytometers is a very promising area
- ▶ Automation is getting more commonly used in clinical laboratories in the world
- ▶ It is likely to replace the manual microscopy and thus reduce the workload and also time and energy needed in laboratories.

References:

1. Kouri, T. *European urinalysis guidelines: ECLM - European Urinalysis Group*;2000.
2. Chien TI, Kao JT, Liu HL, Lin PC, Hong JS, Hsieh HP, et al. *Urine sediment examination: a comparison of automated urinalysis systems and manual microscopy* ;*Clin Chim Acta* 2007.
3. *CEP evidence review CEP 10030 automated urine screening systems*; 2010.