

ABSTRAK

Latar Belakang : Pemeriksaan sedimen urine idealnya dilakukan dalam waktu ≤ 2 jam setelah pengambilan sampel. Penundaan pemeriksaan dalam praktik sehari-hari sering tidak dapat dihindari sehingga pengawetan spesimen menjadi penting untuk mencegah degradasi elemen seluler. Formalin 10% telah lama digunakan sebagai pengawet urine, sementara Neutral Buffered Formalin (NBF) 10% yang mengandung buffer fosfat secara teoritis mampu menjaga stabilitas sel lebih optimal karena pH yang lebih terkontrol.

Tujuan : Mengetahui perbedaan jumlah eritrosit, leukosit, dan epitel pada sedimen urine yang diawetkan dengan formalin 10% dan NBF 10% setelah penyimpanan 4 jam dibandingkan urine yang diperiksa < 2 jam.

Metode : Penelitian menggunakan desain *true experimental pretest-posttest control group*. Sampel berupa urine *pooling* dari spesimen urine sewaktu yang dibagi ke dalam empat kelompok: pemeriksaan < 2 jam, penyimpanan 4 jam dengan formalin 10%, penyimpanan 4 jam dengan NBF 10%, dan penyimpanan 4 jam tanpa pengawet. Pemeriksaan dilakukan secara mikroskopis pada pembesaran $400\times$. Analisis statistik menggunakan uji Kruskal-Wallis untuk eritrosit dan leukosit, serta uji *One Way ANOVA* dengan uji *post hoc* Bonferroni untuk sel epitel.

Hasil : Rerata eritrosit pada kelompok diperiksa langsung 15,01 sel/LPB, formalin 10% 12,23 sel/LPB, NBF 10% 13,54 sel/LPB, dan tanpa pengawet 3,70 sel/LPB. Rerata leukosit masing-masing 5,21; 3,50; 4,01; dan 1,66 sel/LPB, sedangkan rerata sel epitel 3,93; 2,32; 2,96; dan 1,37 sel/LPB. Uji statistik menunjukkan perbedaan bermakna di antara semua kelompok pada ketiga parameter ($p < 0,05$).

Kesimpulan : NBF 10% lebih efektif dibandingkan formalin 10% dalam mempertahankan jumlah eritrosit, leukosit, dan sel epitel pada sedimen urine selama penyimpanan 4 jam.

Kata Kunci : sedimen urine, formalin 10%, NBF 10%

ABSTRACT

Background : Urine sediment examination should ideally be performed within ≤ 2 hours of specimen collection, while delays that frequently occur in practice make specimen preservation essential to prevent cellular element degradation. Formalin 10% is a commonly used urine preservative, whereas Neutral Buffered Formalin (NBF) 10% containing phosphate buffer is theoretically capable of maintaining cell stability more optimally through better pH control.

Objective : To determine differences in the count of erythrocytes, leukocytes, and epithelial cells in urine sediment preserved with 10% formalin and 10% NBF after 4-hour storage compared to immediate examination.

Method : This study is a true experimental pretest-posttest control group design. Samples consisted of pooled urine from random urine specimens divided into four groups: immediate examination (< 2 hours), 4-hour storage with 10% formalin, 4-hour storage with 10% NBF, and 4-hour storage without preservative. Microscopic examination was performed at $400\times$ magnification. Statistical analysis used the Kruskal-Wallis test for erythrocytes and leukocytes, and One-Way ANOVA with Bonferroni post hoc test for epithelial cells.

Results : Mean erythrocyte counts in the immediate examination, 10% formalin, 10% NBF, and no-preservative groups were 15.01, 12.23, 13.54, and 3.70 cells/HPF, respectively; leukocytes 5.21, 3.50, 4.01, and 1.66 cells/HPF; and epithelial cells 3.93, 2.32, 2.96, and 1.37 cells/HPF. Statistical tests revealed significant differences among all groups across all three parameters ($p < 0.05$).

Conclusion : 10% NBF is more effective than 10% formalin in preserving erythrocyte, leukocyte, and epithelial cell counts in urine sediment during 4-hour storage, although neither can fully replace immediate examination.

Keywords : *urine sediment, 10% formalin, 10% Neutral Buffered Formalin*