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**ANALISIS PENGARUH VOLUME DAN TEKNIK TRANSCARDIAL
PERFUSION FIXATION TERHADAP KUALITAS HISTOLOGIS OTAK
TIKUS SPRAGUE-DAWLEY PADA MODEL OTAK PENELITIAN
NEUROLOGIS**

RINCIAN HALAMAN (x + 68 halaman, 13 tabel, 2 bagan, 14 gambar, 5 lampiran)

ABSTRAK

Tujuan: *Transcardial perfusion* digunakan untuk fiksasi jaringan otak hewan tikus. Namun, berbagai parameter dalam protokol yang tersedia seperti volume fiksatif dan teknik perfusi masih belum pernah dieksplorasi, khususnya pengaruh kepada kualitas histologisnya. Penelitian ini bertujuan untuk mengevaluasi pengaruh volume dan teknik perfusi terhadap kualitas histologis jaringan otak tikus. **Metode:** 16 tikus Sprague-Dawley jantan dibagi menjadi kelompok yang terdiri dari *manual-200mL*, *manual-650mL*, *pump-200mL*, dan *pump-650mL*. Otak diproses dengan pewarnaan Hematoxylin-Eosin. Penilaian kuantitatif intensitas pewarnaan nuklir & sitoplasma dilakukan di Fiji. Artefak histologis (misalnya pengumpulan darah) dinilai. Perbedaan kelompok dianalisis menggunakan IBM SPSS Statistics. **Hasil:** Intensitas inti menghasilkan nilai terbaik pada kelompok manual 200mL ($103,31 \pm 19,29$) dan terburuk pada kelompok manual 650mL ($156,10 \pm 14,94$). Welch ANOVA mengkonfirmasi efek kelompok yang signifikan ($p < 0,001$) antara kelompok manual-200mL dengan manual-650mL dan pompa-200mL dengan kelompok manual-650mL. Intensitas sitoplasma menunjukkan tren yang sama. Tukey HSD menunjukkan signifikansi ($p < 0,001$) antara kelompok yang sama serta manual-200mL dan pompa-650mL. Jumlah artefak secara deskriptif lebih tinggi pada kelompok pompa, namun tidak menunjukkan hubungan yang signifikan ($p = 0,362$). **Kesimpulan:** Volume perfusi dan teknik mempengaruhi intensitas pewarnaan, dengan manual 200 mL menghasilkan kualitas histologis terbaik secara keseluruhan.

Kata kunci: *transcardial perfusion*, *hematoxylin & eosin*, model otak, fiksasi.

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**ANALYSIS OF THE EFFECTS OF VOLUME AND DELIVERY
TECHNIQUE ON SPRAGUE-DAWLEY RAT BRAIN HISTOLOGICAL
QUALITY FOR NEUROLOGICAL BRAIN MODELS**

PAGE DETAIL (x + 68 pages, 13 tables, 2 charts, 14 images, 5 appendices)

ABSTRACT

Objective: Transcardial perfusion is widely used to preserve rodent brain tissue. However, varying parameters in protocols such as fixative volume and delivery technique remain unexplored, particularly its histological quality. This study aims to evaluate the effects of volume and delivery technique to the histological quality of rat brain tissue. **Methods:** Sixteen male Sprague-Dawley rats were allocated into four groups consisting of manual-200mL, manual-650mL, pump-200mL, and pump-650mL. Brains were processed with Hematoxylin-Eosin staining and photographed. Quantitative assessment of nuclear & cytoplasmic staining intensity was performed using Fiji. Histological artifacts (e.g., blood pooling) were scored. Group differences were analyzed using IBM SPSS Statistics. **Results:** Nuclear staining intensity produced the best value in the manual-200mL group (103.31 ± 19.29) and worst in the manual-650mL group (156.10 ± 14.94). Welch ANOVA confirmed a significant group effect ($p < 0.001$) between the manual-200mL with the manual-650mL group and the pump-200mL with the manual-650mL group. Cytoplasmic staining intensity showed the same trend. Tukey HSD indicates significance ($p < 0.001$) between the same groups as well as manual-200mL and pump-650mL. Artifact counts were descriptively higher in the pump groups, but showed no significant association ($p = 0.362$). **Conclusion:** Perfusion volume and technique influenced staining intensity, with manual 200 mL producing the best overall histological quality.

Keywords: transcardial perfusion, hematoxylin & eosin, brain model, fixation.