

運用腦室外引流管測量顱內壓之準確性與再測信度評估

本研究旨在測試運用腦室外引流系統測量顱內壓的準確性與再測信度，並探討腦脊髓液比重對此顱內壓測量方法準確性之影響。共收集 62 位裝置有腦室外引流系統之病患。利用腦室引流管連接外引流系統裝置與監測器系統，分別測量個案平躺、15 度及 30 度三種床頭高度之顱內壓，每一種高度做 6 次。腦室外引流系統測量顱內壓之準確性以皮爾森積差相關、配對 t 檢定及 Bland-Altman 分析法做分析，而腦室外引流系統測量顱內壓之再測信度則以皮爾森積差相關及變異係數做分析。結果顯示二種測量方式所得之平均測量值在床頭高度 0 度時有顯著相關($r=.93$, $p<.001$)，平均差異值(bias)及標準差為 2.0 ± 1.6 mmHg，平均差異值具統計顯著差異($p<.001$)，一致性界限($\text{bias} \pm 2\text{SD}$)從 -1.2 到 5.2 mmHg，在床頭抬高 15 度時亦有顯著相關($r=.94$, $p<.001$)，平均差異值及標準差為 2.1 ± 1.5 mmHg，平均差異值有統計顯著差異($p<.001$)，一致性界限從 -0.9 到 5.2 mmHg，床頭高度 30 度時也是有顯著相關($r=.95$, $p<.001$)，平均差異及標準差為 2.0 ± 1.6 mmHg，平均差異值有統計顯著差異($p<.001$)，一致性界限從 -1.2 到 4.9 mmHg。腦脊髓液比重對腦室外引流系統與監測器測量之平均值差異的影響，結果顯示無統計顯著相關($P>.05$)。以腦室外引流系統測量顱內壓具有良好再測信度($p<.001$)，而變異係數於平躺時 Coefficient of variation(CV)=3.69%，15 度時 CV=6.62%，30 度時 CV=7.88%。綜合以上結果發現，腦室外引流系統與監測器測量值之間缺乏一致性，而腦脊髓液比重並不影響此一致性不佳的結果。臨床上若使用腦室外引流系統直接測量顱內壓，建議以再測信度佳、測量變異最少的平躺姿勢做測量。

The purpose of this study was to examine the accuracy and reproducibility of intracranial pressure (ICP) measured by the external ventricular drainage (EVD) system. The effect of specific gravity (SpGr) of cerebral spinal fluid (CSF) on the accuracy of the EVD-measured-ICP was also determined. Sixty-two subjects with EVD system were included. The ventriculostomy catheter connected to both the ICP monitor and EVD system was used to measure ICP. ICP was repeatedly measured 6 times in three positions: head at 0 degree, head up 15 degree, and head up 30 degree. The accuracy of the EVD-measured-ICP was determined using the Pearson's correlation, paired t-test, and the Bland-Altman method. Analysis of the reproducibility of ICP measurements by EVD system was done with the Pearson' correlation and coefficient of variation (CV). The mean ICP between two measurements was significantly correlated ($r = .93$, $p < .001$) at head 0 degree position; the bias (mean difference) showed significant differences ($p < .001$); the standard deviation was 2.0 ± 1.6 mmHg; and the limit of agreement (bias \pm 2SD) were between - 1.2 and 5.2 mmHg. Position at head up 15 degree displayed significant correlation ($r = .94$, $p < .001$); the bias showed significant differences ($p < .001$); and the standard deviation was 2.1 ± 1.5 mmHg, with the limits of agreement being - 0.9 and 5.2 mmHg. At head up 30 degree, the correlation between measurements was significant ($r = .95$, $p < .001$); the bias had significant difference ($p < .001$); the standard deviation was 2.0 ± 1.6 mmHg; and the limits of agreement were - 1.2 and 4.9 mmHg. There was no significant correlation between SpGr of CSF and difference of mean ICP by EVD system and monitor measurements ($p > .05$). The EVD-measured ICP had good reproducibility ($p < .001$). The CV at head 0 degree was 3.69%, head up 15 degree was 6.62%, and

head up 30 degree was 7.88%. In conclusion, the agreement of ICP measurements between the EVD system and monitor was poor and the SpGr of CSF did not affect this result. The results suggested good measurement at the supine position when ICP was measured by the EVD system.