

**Internal Quality Control Evaluation of Therapeutic Drug Monitoring of Lamotrigine by Westgard Multi-rule Theory.** Wu Y, Li H, Wang L, Deng X, Wang X, Shi T (*Department of Pharmacy, The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, Anhui, 230001, P.R. China*)

#### **ABSTRACT**

**Background:** Lamotrigine(LTG) is a novel antiepileptic drug, which is the first-choice drug for several epilepsy syndromes, such as focal and generalized epilepsy. The clinical efficacy of LTG was closely related to its blood concentration. However, LTG has a narrow therapeutic range, a large inter and intra-individual pharmacokinetic variability and some concentration-dependent side effects. So, therapeutic drug monitoring (TDM) is useful to adjust dosages during treatment. In our hospital, TDM of LTG has been widely implemented by high performance liquid chromatography-ultraviolet spectrometry(HPLC-UV) since 2016. We know that quality control for TDM is necessary, but LTG quality control materials are not available on the market yet in China. We intend to establish an internal quality control system by quality control materials prepared in laboratory, and evaluate its effectiveness. **METHODS:** The quality control materials with high( $10\mu\text{g}\cdot\text{mL}^{-1}$ ), medium( $5\mu\text{g}\cdot\text{mL}^{-1}$ ) and low( $1\mu\text{g}\cdot\text{mL}^{-1}$ ) concentrations were prepared in laboratory. HPLC-UV was applied to determine the concentrations of 30 groups' quality control materials from October to December 2018. The quality control charts of Levey-Jennings quality and Z-score were generated by EXCEL, and Westgard multi-rules were used to evaluate internal quality control. **RESULTS:** The intra-day and inter-day RSDs of LTG quality control materials ranged from 2.33% to 9.62% and from 5.63% to 9.07% , respectively, while the extraction recovery rates ranged from 70.48% to 78.92% and from 74.68% to 80.77%, respectively. Each index was accorded with the quality level request in Chinese Pharmacopoeia 2015 . However, quality control charts showed that the results of quality control materials' concentrations have violated Westgard's multi-rule theory with one warning (violation of  $1_{2s}$  rule) and one out of control (violation of  $2_{2s}$  rule). Finally, we found that it was related to the long storage time of LTG working liquid. Then, the monitoring data were returned to normal after reformulation. **CONCLUSIONS:** The quality control materials prepared in laboratory are available. The establishment of internal quality control system can effectively improve the accuracy of LTG concentration monitoring, and provide more accurate clinical personalized pharmaceutical services.

**KEY WORDS**□Lamotrigine; Internal quality control; Therapeutic drug monitoring; Westgard multi-rule theory