Inter-Laboratory Comparison of Serum Lamotrigine Methods

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Abstract

Five laboratories participated in Inter-Laboratory Comparison of Serum Lamotrigine Methods. Serum Lamotrigine (LTG) levels were measured by the following methods: 1. LC-MS/MS (HPLC-UV), 2. GC/MS, 3. Chromsystems Antiepileptic Drugs in Serum/Plasma kit, 4. Pharmacia & Upjohn Liquid Chromatography (LCLC) method, and 5. Pharmacia & Upjohn Liquid Chromatography (LCLC) method. The objective was to assess the inter-laboratory variability of LTG measurement. Different sample handling, processing, and assay techniques were used among laboratories. Participating laboratories were asked to measure LTG levels in 100 µL of serum sample to which oxazepam-d5 is added.

Methods

1. LC-MS/MS method: LTG was extracted from serum samples using an Oasis HLB cartridge. The separation is developed isocratically using a mobile phase of 60:40 (Acetonitrile: 2mM Ammonium Acetate) plus 100 µL of internal standard (oxazepam-d5) is added. The tube is mixed and centrifuged. LTG is measured by monitoring the m/z 309.9 -> 197.9 ion pair. The analytical measurement range for the assay is from 0.5 to 20 mg/L. The mean difference from group mean was 2.50 µg/mL and the standard deviation was 0.001 µg/mL.

2. GC/MS method: 150 µL of internal standard is added to 100 µL of serum sample. The tube is mixed and centrifuged. The separation is developed using a mobile phase of 40:60 (Acetonitrile: 2mM Acetic Acid) plus 100 µL of internal standard (oxazepam-d5) is added. The tube is mixed and centrifuged. LTG is measured by monitoring the m/z 309.9 -> 197.9 ion pair. The analytical measurement range for the assay is from 0.5 to 60 mg/L. The mean difference from group mean was 2.50 µg/mL and the standard deviation was 0.001 µg/mL.

3. Chromsystems Antiepileptic Drugs in Serum/Plasma kit: Assay is developed isocratically using mobile phase supplied with the kit. Detection is at 307 nm. LTG elutes at 20.5 minutes. The mean difference from group mean was 2.50 µg/mL and the standard deviation was 0.001 µg/mL.

4. Pharmacia & Upjohn Liquid Chromatography (LCLC) method: LTG is extracted from serum samples using an Oasis HLB cartridge. The separation is developed isocratically using mobile phase supplied with the kit. Detection is at 307 nm. LTG elutes at 20.5 minutes. The mean difference from group mean was 2.50 µg/mL and the standard deviation was 0.001 µg/mL.

5. Pharmacia & Upjohn Liquid Chromatography (LCLC) method: LTG is extracted from serum samples using an Oasis HLB cartridge. The separation is developed isocratically using mobile phase supplied with the kit. Detection is at 307 nm. LTG elutes at 20.5 minutes. The mean difference from group mean was 2.50 µg/mL and the standard deviation was 0.001 µg/mL.

Results

Conclusions

This work highlights the continued need for performing testing when using therapeutic drug determinations.