Is one-minute microcentrifugation of samples ensuring rapid and reliable results for intraoperative PTH measurement in a routine lab ?

BOTHY Anaïs, DEBOIS Régis

Department of Clinical Chemistry, CHU UCL Namur Site Sainte Elisabeth, Belgium

Contact : ana.b@live.be

BACKGROUND

Treatment of primary hyperparathyroidism requires surgical removal of hyperfunctioning gland. Precedently achieved by bilateral neck exploration, less invasive surgical approaches have been developped with different techniques such as intraoperative parathormone (ioPTH) measurement. With a short half-life, PTH directly reflects the activity of the gland and monitoring of the hormone during operation gives surgeons a nonvisual confirmation that all hyperfunctioning tissues have been removed. According to the Miami criteria, PTH levels should be assessed just before excision as a baseline value and success of surgery is defined as a fall of >50% from the baseline at 10 minutes post-excision. Challenge for the laboratory is to make the measurement quickly available for surgical decisions. Recent years have seen the development of reliable point of care testing for ioPTH but such an equipment is not always available in operating rooms and may be difficult to manage for laboratories. The goal of this study is to improve turnaround time of ioPTH laboratory testing by shortening preanalytical phase and to evaluate the accuracy of this new procedure.

RESULTS

Statistical analysis showed an extremely significant and positive correlation coefficient (r=0.997, p< 0.0001) between the two methods. Two discordant results were found but comparable values after retesting suggests that correct homogenization is an important pre-requisite to short centrifugation step. The mean difference observed on Bland and Altman plot (Fig.2) was 9.9 ng/L (95% CI: − 16.6 to 36.4). The Passing and Bablok regression analysis (Fig.3) provided a slope of 0.91 (95% confident interval: 0.90 to 0.92) and an intercept of 0.51 (95% confident interval: − 0.18 to 1.24) meaning that no systematical but a slightly proportional difference was observed. Nevertheless, clinical impact should be very limited as results need to be compared to the baseline value for their interpretation.

CONCLUSION

This study shows that accurate and reliable results for ioPTH are obtained with very minimal preanalytical phase. Implementation of this new procedure in our laboratory results in a significant shorter turn-around time and along with close collaboration with surgical teams will have direct benefits on patient care.

MATERIAL & METHODS

163 blood samples from 29 parathyroid surgeries were included in this study (Fig.1). Number of samples per surgery varies from 2 to 10 with a systematic pre-skin incision and/or pre-gland-excision sample as baseline. Each sample (whole blood collected on K2-EDTA tube) was divided in two fractions to perform two different centrifugation procedures before iPTH STAT analysis on the Cobas 6000® analyzer (Roche Diagnostics, Mannheim, Germany). The first aliquot underwent a short centrifugation step of one minute at 13 000 rpm (short procedure) and the second one was centrifuged 10 minutes at 3500 rpm as initially done in our laboratory (normal procedure). Results from the two centrifugation procedures were statistically compared using Medcalc® software. Passing-Bablok regression analysis was performed for method comparison and Pearson's coefficients of correlation were calculated. Bland-Altman plots were used to calculate the mean bias between methods.

Fig. 1

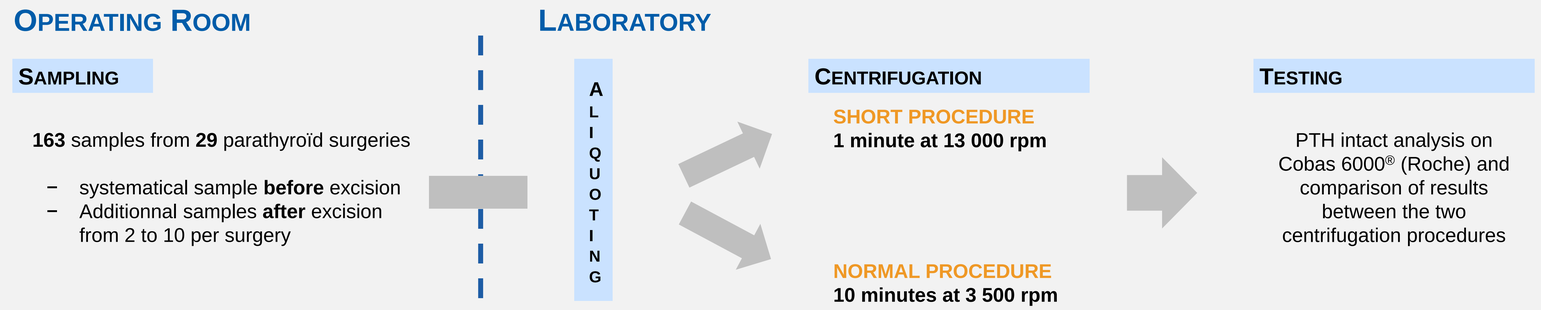

Fig. 2

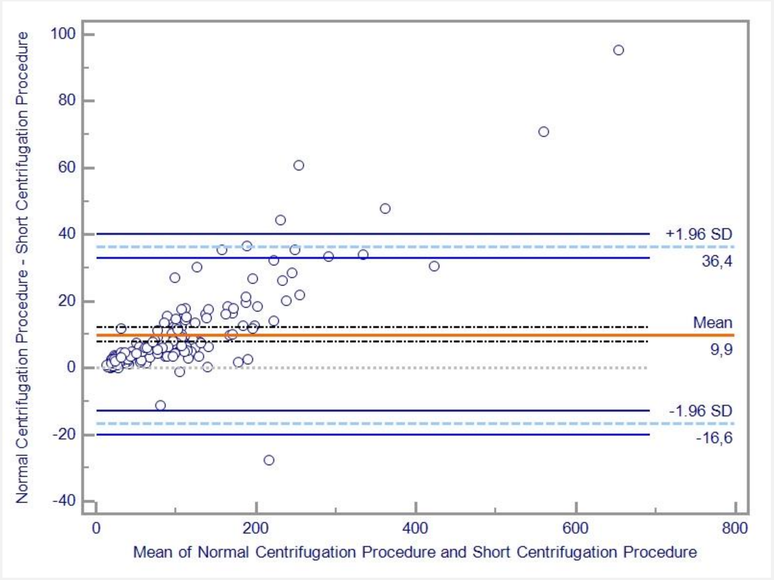

Fig. 3