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Comparison of total PSA and free PSA values in capillary blood and serum blood: A study with 308 patients

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Introduction & Objectives

The blood serum concentration of prostate-specific antigen (PSA) and free PSA are universally used yet controversial biomarkers for early detection and monitoring of prostate cancer. Whether these values can be reliably determined in capillary blood has not been sufficiently investigated. The aim of this study was to determine the accordance between PSA and free PSA values in capillary blood and serum blood.

Materials & Methods

In 308 patients, a sample of capillary blood from the fingertip and serum blood from the elbow vein was collected and both laboratory values were determined. Accordancewas calculated using Bland-Altman plots and correlation analysis. The correlation was analyzed in sub-cohorts with a PSA ≤4 ng/ml (Group 1) and >4 ng/ml (Group 2).

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Results

Correlation analyses for total PSA values showed strong positive agreement between measurements from capillary blood and serum blood in both groups. In Group 1, the correlation was 0.94 ($p < 0.001$). The average difference between the measurements was 0.44ng, (95%CI, -0.76,1.63). In Group 2, the correlation was 0.93 ($p < 0.001$). The average difference between the measurements was 5.30ng, (95% CI,-14.52, 25.13).

For the value of free PSA, a strong positive correlation of 0.97 ($p < 0.0001$) was found between measurements from capillary blood and serum blood. The average difference was 0.52ng, (95%CI, -2.93,3.96).

Conclusions

Overall, the results show strong accordance of the measured values in capillary blood and serum blood for total PSA and free PSA. The analysis of the sub cohorts for subclinical and clinical levels of PSA also confirms the correlation.

The calculated average differences and confidence intervals suggest that the use of capillary blood in clinical practice could be a resource-saving method for determining PSA and free PSA. However, it should be noted that the differences and confidence intervals in the sub-cohort with PSA values > 4 ng/ml were larger than in the sub-cohort with PSA values ≤ 4 ng/ml, which may indicate a greater variation at higher PSA values.

Further studies with larger patient cohorts and under various clinical conditions are needed to confirm these results and further evaluate the clinical applicability of capillary blood measurements.