Digital Rectal Examination Does Not Increase Serum Concentrations of Prostatic-Specific Antigen, A. Angelsen, A. Hole,\(^1\) P. Lundmo, and I. Romso\(^2\) (Depts. of Urology and \(^1\) Clin. Chem., Univ. Hosp. Trondheim, N-7006 Trondheim, Norway)

We report here results of serial determinations of prostatic-specific antigen (PSA) after digital rectal examination in 10 men (ages 42–77 years) admitted to our urological clinic because of obstructing urinary symptoms. Their diagnoses were localized prostatic adenocarcinoma (n = 3) and benign prostatic hyperplasia (n = 7). Digital rectal examination was standardized in that the prostate was classified according to size, shape, and consistency. This procedure took about 10 s. Blood samples were collected before the examination and at 10 min, 30 min, 60 min, 3 h, 6 h, 24 h, and 48 h afterwards.

PSA was assessed by the Diagnostic Products Corp. (Los Angeles, CA) immunoradiometric assay method. In our laboratory the CV of the assay was 5.2%, and the cutoff value for normal subjects was <4 µg/L.

Above-normal values were found in three patients pre-examination (6.3, 9.2, and 13.2 µg/L); one patient had PSA <0.1 µg/L. After digital rectal examination, PSA remained unchanged in nine patients; in one patient, PSA increased by about 50%, from 6.3 to 9.8 µg/L. Taking the group as a whole, digital rectal examination produced no significant changes. Our results are thus in accordance with those of Brawer et al. (1) and Yuan and Catalona (2), but at variance with those of Stamey et al. (3).

Because we are dealing with patients with normal or near-normal PSA values, one could argue that our results should not be directly extrapolated for patients with PSA values of 10–20 µg/L. According to Brawer et al. (1), however, a high pre-examination value does not predispose to a higher value post-examination.

We conclude that serum concentrations of PSA do not increase significantly after routine digital examination. The claims that one would obtain spurious results from PSA assays of post-examination specimens seem untenable.

References

Direct Methods vs Blanking Methods for Iron Determination: Effect of Serum Turbidity, M. Deespine, D. Labbe, H. T. Phung, A. Vassault, and M. Bailly (Lab. de Biochim. A, Hôpital Necker, 75743 Paris Cedex 15, France)

Here we document the effect of turbidity on iron measurements in serum and show that the positive bias observed with hypertriglyceridemic samples can be corrected by using a blanking method. Results of direct and blanking methods for iron determination, carried out with a centrifugal analyzer (Monarch 760; Instrumentation Laboratory [IL], Lexington, MA) and two different reagent kits, based on Ferene (IL test 1835800) and Ferrozine (no. 3830; Bio-Rad, Richmond, CA), have been compared with those for a deproteinized method involving bathophenanthroline (1, 2).

The effect of turbidity of the samples was tested by adding Ivelip (Gernep Synthelabo, Le Plessis Robinson, France) (3) to serum according to the Société Française de Biologie Clinique (SFBC) protocol. The turbidity of these samples was evaluated by measuring the absorbance at 600 nm (after 20-fold dilution) and quantifying the triglycerides (TG) concentration.

We measured the concentration of iron in each serum sample by five methods: the deproteinized bathophenanthroline method, direct methods with Ferrozine and Ferene, and blanking methods with Ferrozine (adapted from the manual procedure of the manufacturer) and Ferene.

Determination of iron by a blanking method requires two different assays, one with the whole reagent and the other without the chromogen; calibration with aqueous solution and calculation were performed by the Monarch 760.

Figure 1 shows that the results of iron determination for samples with TG >1.5 mmol/L were significantly increased (by >1.5 µmol/L) in the direct methods, as a linear relation between the difference between samples supplemented with Ivelip and samples without Ivelip (y) and the absorbance of the samples (x) in the equations below the SDEs of slope and intercept are listed in parentheses.

- Direct Ferene method: \( y = -117.6(4.58)x - 1.86(1.52) \) µmol/L \((r = 0.999)\).
- Direct Ferrozine method: \( y = 129.2(5.46)x - 1.77(1.96) \) µmol/L \((r = 0.998)\).

Results obtained with deproteinized bathophenanthroline and blanking methods, whatever the chromogen, were not affected by the addition of Ivelip.

In an additional study, we compared results for sera from patients with hypertriglyceridemia and for nonlipemic sera (TG <1.5 mmol/L). The means of the differences between the results obtained with the direct method and the blanking method were as follows:

- For samples with TG <1.5 mmol/L, the differences for the assays were neither statistically nor biologically signif-
Fig. 1. Effect of serum turbidity on iron determinations by direct methods and blanking methods vs the deproteinized bathophenanthroline method (1)

For each method, the difference between samples with added hvelip solutions (TG ranging from 1 to 6 mmol/L) and samples without this addition is plotted against the amount of turbidity of the sample (expressed as absorbance at 500 nm after 20-fold dilution and as assayed TG concentrations). The accepted limit of inaccuracy given in the protocol is ± 1.5 μmol/L.

* For samples with TG between 1.5 and 5 mmol/L, the results obtained for direct methods were statistically and biologically different from those obtained with blanking methods (Ferrozine: t = 4.68, α = 1%, difference mean = 11.4 μmol/L, SD = 7.7 μmol/L, n = 10; Ferene: t = 5.32, α = 1%, difference mean = 7.2 μmol/L, SD = 4.3 μmol/L, n = 10).

* For samples with TG >5 mmol/L, the results obtained for direct methods also were statistically and biologically different from those obtained with blanking methods (Ferrozine: t = 5.21, α = 1%, difference mean = 17.4 μmol/L, SD = 7.1 μmol/L, n = 10; Ferene: t = 6.10, α = 1%, difference mean = 15.2 μmol/L, SD = 9.5 μmol/L, n = 10).

For example, in one sample with a TG concentration of 9 mmol/L the iron concentration was 15 μmol/L when measured with Ferene reagent by the blanking method and 34 μmol/L by the direct method (difference 19 μmol/L). This emphasizes the effect of turbidity pointed out in the manufacturer's comments for the direct Ferene method, "Do not use turbid samples."

References