Determination of biochemical relapse after radical prostatectomy by biological detection limit (BDL) after cystoprostatectomy using two PSA assays

J. Hadzi-Djokic1, N. Lalic2, Z. Dzamic1, M. Acimovic1, C. Tulic1, Z. Markovic3
1Institute of urology and nephrology, Clinic of urology, Clinical Center of Serbia
2Institute of biochemistry, Clinical Center of Serbia
3Institute of radiology, Clinical Center of Serbia

The monitoring of PSA values following prostatectomy demands for the use of highly sensitive tests with low detection level. The possibilities to use the EIA Dialab test to monitor the PSA values after radical prostatectomy for early detection of persistent diseases were investigated by determining the biological detection limit (BDL) in serum of patients who underwent cystoprostatectomy. The obtained values were compared with Abbott Imx test for PSA determination. A good correlation between the two studied methods was established, r = 0.9827 with the regression curve Yx = 0.20463 + 0.96277. Test indicated that there was no significant difference (p<0.001) between the investigated methods.

Key words: prostatectomy, PSA values, biochemical relapse

INTRODUCTION

PSA (prostate specific antigen) was under this term for the first time described by Wang in 1979, although the PSA molecule was discovered as early as in 1971, and since 1981 it was related to prostatic carcinoma. Today PSA is considered as one of the most important organspecific tumor markers which found its place in screening and monitoring programs. PSA is serine protease similar to chymotrypsin created by the production of epithelial prostatic cells. It is found in the serum and seminal plasma. In the seminal plasma it is found mainly in a free form or partially, about 5% bound to the C inhibitor. About 75-90% of PSA in serum is bound to the two main inhibitors of alpha-1-aminochymotrypsin and alpha-2-macroglobulin, and about 10-15% is found in a free, unbound form. PSA occurs by the production of human glandular gene for kalikrein localized on the 19 chromosome. Gene for PSA is found in normal, adenomatous and malignant prostatic tissue. Since PSA belongs to the group of extracellular proteases the main physiological substrate for this antigen are gel proteins from seminal vesicles (semenogelin I and II, and the lesser extent fibronectin). The initial values of PSA following radical prostatectomy can not be measured in majority of patients or they are very low (<0.1 ng/ml). The increase of PSA values in these patients is very significant for the prognosis.

MATERIAL AND METHODS

The values of PSA were determined in 16 patients during preoperative diagnostic procedures. After radical prostatectomy the PSA values were monitored during the postoperative period lasting 6 weeks. Serum samples of the patients were stored at - 20° C until the moment of analysis. PSA was determined by the EIA Dialab test and Abbott Imx test. Serum of 18 patients who underwent cystoprostatectomy were used as controls.

For statistical analysis the correlation test and Student’s t-test were used.

RESULTS AND CONCLUSIONS

A good correlation (p<0.001) was obtained in the study group by comparing the PSA values obtained by the EIA Dialab method with the Abbott Imx method. The EIA Dialab test had δ 4% lower values that the Abbott Imx test (Yx = 0.2049 + 0.96277x; r = 0.9827; the curve 0.96x).

The mean +/- 2SD performed ten times with 0 calibrator was used for determining the analytical sensitivity. The analytical sensitivity of EIA Dialab is presented on Table 1.

The biological sensitivity was determined in serum of 18 patients who underwent cystoprostatectomy. It is presented as the mean +/- 2SD on Table 2.

We investigated 16 patients who underwent radical prostatectomy. The preoperative finding in these patients is presented in Table 3.

The postoperative PSA values six months after presented in Table 4.
Bilateral orchiectomy was performed in 4 patients who had stage D and PSA values up to 2.5 ng/ml during the postoperative period. After this procedure the PSA value ranged as presented on Table 5.

Radical prostatectomy is the method of choice for the treatment of localized prostatic carcinoma. Theoretically, after removal of the complete prostatic tissue PSA should not be present in the serum. Practically, depending on the sensitivity of various methods for determining PSA, the dynamics of serum PSA values may offer the clinician useful information for early detection of persisting tumour. By determining the analytical and biological detection limit we are in the position to investigated the sensitivity of the PSA determination tests. For EIA Dialab test we found that it has a good correlation with the Abbott Imx test for PSA. We may also conclude that cystoprostatectomy is a good mode for determining the biological sensitivity of PSA test. In our case the BDL for EIA Dialab test is 0.2 ng/ml. The data obtained in this study indicate that EIA Dialab test can be used as a sensitivity test for monitoring PSA values after radical prostatectomy and for early detection of persistent disease.

**SUMMARY**

Pracija vrednosti PSA nakon radikalne prostatektomije zahteva korišćenje visoko osetljivih testova sa niskim detekcionim nivom. Mogućnosti korišćenja EIA Dialab testa u pracija vrednosti PSA posle radikalne prostatektomije u ranom otkrivanje perzistentne bolesti je ispitivana određivanjem biološkog detekcionog limita (BDL) u serumu bolesnika podvrgnutih cistoprostatektomiji. Dobijene vrednosti su uporedjivane sa Abbot Imx testom koji se koristi za određivanje PSA. Utvrđena je dobra korelacija izmedju vrednosti dobijenih ovim metodama, r = 0.9827 sa regresionom krivom Yx = 0.20463 + 0.96277x. Test je pokazao da nema značajne razlike (p<0.01) izmedju korišćenih metoda.

Ključne reči: prostatektomija, PSA vrednost, biohemijski relaps

**REFERENCES**


TABLE 5

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<th>PSA ng/ml after surgery</th>
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