Summary & Conclusion

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Prostate cancer remains the most common cancer and the second most frequent cause of cancer related deaths. For many years the diagnostic triad of DRE, PSA, and TRUS was the olny available method for diagnosis of prostate cancer.

Although the sensitivity of PSA level is clearly better than DRE results, problems may arise with non-specificity for PSA levels, particularly at the PSA ranges of 4-10 ng/ml. More confusing prostate cancers were found in individuals with normal PSA levels. Also, the low PPV of gray-scale TRUS adds to the problem, where only about one third of the TRUS positive patients are proved to be prostate cancer.

Recently, the application of CDI to detect the neovascularity in cancerous tissue is well known. Increased blood flow has been described for cancer liver, kidney, breast, ovary and rectum. Actually many prostate cancers are hypervascular by CDI, and the distribution of the flow signals shown by CDI in the normal prostates helped to clarify the changes on CDI in relation to malignancy.

PDI has overcome the drawbacks of the conventional CDI; allowing an increase in the sensitivity and specificity for blood flow detection.

This study was carried out between October 2000 and July 2004 to demonstrate the value of both CDI and PDI as new diagnostic tests in the diagnosis of prostate cancer.

101 patients, suspected to have prostate cancer, were chosen from those attending the *out-patient clinics of Urology Departments* in Benha Faculty of medicine, Cairo Faculty of medicine and Damanhour National & Medical Institue. Their ages ranged from 53 to 87 years. All patients were complaining of LUTS, they were subjected to thorough clinical examination, DRE, PSA-measurement TRUS, CDI and PDI. Moreover, TRUS-guided biopsies from the prostates were done for all patients to confirm the diagnosis.

Forty patients (39.6%) were proved to have prostate cancer by TRUS-guided biopsy. DRE detected 27 prostate cancer patients (67.5%), while it was negative in 13 prostate cancer patients (32.5%). PSA was high in 37 prostate cancer patients (92.5%), while it was normal in 3 prostate cancer patients (7.5%).

Positive TRUS findings were detected in 35 prostate cancer patients (87.5%), while 5 cancer patients (12.5%) were negative by TRUS.

CDI was positive in 15 prostate cancer patients (37.5%), while it was negative in 25 (62.5%).

PDI was positive in 24 prostate cancer patients (60.0%), while it was negative in 16 (40.0%).

In addition, the results of both CDI and PDI were studied in view of those of DRE, PSA and TRUS.

* CDI detected 9 (33.3%) prostate cancer patients out of 27 DRE-positive cancer patients. While 6 DRE-negative prostate cancer patients were detected by CDI. Also, CDI detected 15 (40.5%) prostate cancer patients out of 37 cancer patients with elevated PSA levels while; no prostate cancer patients with normal PSA were detected by CDI alone. Finally CDI was positive in 15 (42.9%) prostate cancer patients out of 35 patients who were TRUS-positive, and none of TRUS-normal cancer patients were detected by CDI.

* PDI detected 17 (63.0%) prostate cancer patients out of 27 DRE-positive cancer patients. Seven prostate cancers (53.8%) DRE-negative prostate cancer patients were detected by PDI. PDI detected 23 (62.2%) prostate cancer patients out of 37 cancer patients with elevated PSA levels and one (33.3%) prostate cancer patient with normal-PSA. Finally PDI was positive in 23 (65.7 %) prostate cancer patients out of 35 patients who were TRUS-positive, and one (20.0%) of TRUS-normal cancer patients detected by PDI.

It has been proposed that the study of prostatic vascularity by CDI and PDI may provide a fourth tumor risk grading and may improve the diagnostic sensitivity and specificity of the triad. Howevr, the PDI alone, showed a better sensitivity and specificity than CDI.

Although having a limited accuracy, the diagnostic triad of DRE, PSA, and TRUS remains the clue and first step in the

diagnosis of prostate cancer. In this respect, CDI and PDI can draw attention to the presence of hypervascular suspected lesions; however, a confirmatory TRUS-guided biopsy will still be necessary as a glod standard test in the diagnosis of prostate cancer.

Recommendations:-

As they add minimal effort to the examiner, and they are also not time consuming, CDI and PDI should be applied during the examination of the prostate by TRUS, provided that they are available.

It is also recommended that, the use of three-dimentional techniques that assess the vascular component in power and color Doppler ultrasonography may have advantages over the conventional methods in the assessment of prostate cancer. Moreover, the use of the newer technologies like contrast enhanced color Doppler and power Doppler endorectal ultrasonography will significantly increase the detection of prostate cancer.