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FINE-NEEDLE ASPIRATION BIOPSY WITH A NEW AUTOMATIC FINE-NEEDLE GUN VERSUS HISTOLOGICAL CORE IN ULTRASONICALLY-GUIDED TRANSRECTAL BIOPSY FOR DETECTION OF PROSTATE CANCER

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Abstract

In connection with a health control study of 2 400 men for early detection of prostate cancer the authors have compared fine-needle aspiration biopsy using a new automatic fine-needle gun with histological cores obtained by the Biopsy gun. Both procedures were ultrasonically guided. Prostate cancer was found in 62 patients and in 46 of these both biopsy methods were used on the same occasion. There was no essential difference in sensitivity between the two methods. The authors recommend fine-needle aspiration biopsy as the primary method but regard the histological core technique as a valuable supplement.

Key words: Prostate, screening, cancer, fine-needle biopsy, core biopsy, transrectal, ultrasound-guided.

For three decades routine diagnosis of prostate cancer in Sweden has leaned on fine-needle aspiration biopsy (FNAB) as described by Franzén et al. (1). This technique is accurate and relatively free from complications (2). Biopsies for histopathology have earlier been obtained by Tru-cut technique either by a perineal route or transrectally, the latter combined with a considerable risk of infection (3).

Transrectal ultrasound (TRUS) has in recent years provided an opportunity for us to direct our needles towards small lesions in the prostate or towards areas of special interest. Core biopsy performed by hand in ultrasonic guidance, is a difficult procedure, due to technical factors such as dislocation of the target with subsequent decrease of the precision. The biopsy gun has served as a solution to this problem, by its fast and precise movements (4). The technique is accurate, convenient for the patient and reasonably safe which has led to an increasing interest in diagnosis by histopathology (5).

Similar technical problems still exist when ultrasonically-guided FNAB is performed, but may be solved by the use of a device moving the needle automatically and relatively fast.

This study compares the results of the automatic core biopsy with those of fine-needle aspirates obtained with a new automatic puncture device according to I. Näslund.

Material and Methods

In a health control study for early detection of prostate cancer, 2 400 men, 55 to 70 years old, were randomly selected from the population register. Transrectal ultrasonically-guided biopsies were performed if digital rectal examination (DRE) by an independent examiner or TRUS or both raised a suspicion of prostate cancer.

Histological cores were obtained using the Biopsy gun armed with an 18G needle. Cytological material was obtained using a new automatic fine-needle gun armed with a 22G needle (Figure). The needle is connected to a syringe, in which vacuum is created as in conventional fine-needle technique. The connecting tube is closed until the needle is positioned at the target and the trigger is pulled—opening to the syringe and at the same time initiating a fast movement (amplitude 4 mm) of the needle.

In the study, cancer was diagnosed in 62 patients. In 46 of these patients, core biopsy and FNAB using the

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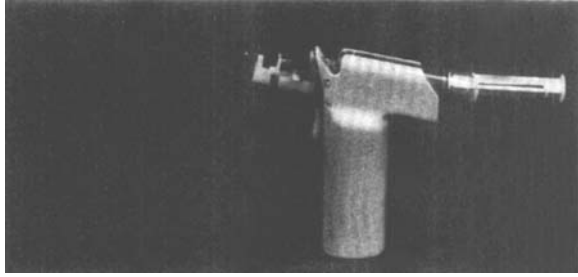


Figure. The automatic fine-needle gun (Weland Medical AB, Sweden).

described techniques were performed primarily and on the same occasion. In the present study, these 46 cytological and histological preparations were reviewed together with 25 corresponding samples from benign cases. The reevaluation was made by one pathologist (T. R-N.) without knowledge of the initial judgements and without identifying the individual patients.

The cytological as well as the histopathological specimens were classified as inadequate, benign, atypia suspicious for cancer, or cancer. Finally, the results of cytology and histopathology of the 46 patients, initially judged as cancers, were compared.

Results

Biopsy performed with the automatic fine-needle gun was, without exceptions, considered as less painful by the patients than biopsy performed with the Biopsy gun. The automatic fine-needle gun was easily handled and the needle could be directed with a high precision under ultrasonic supervision. Due to the fast movement of the needle, the target was not dislocated during the procedure.

In the reevaluation, the cytological material was considered inadequate in 3 of the 46 patients, while all histological preparations were evaluable (Table). Complete concordance between cytology and histopathology was registered in 31/46 examinations (67%). If atypia suspicious for cancer was considered a positive finding, there was concordance in 41/46 cases (89%).

In one of the 46 cases, both cytology and histopathology were classified as benign in the revision of the material. Repeated biopsies in this patient have been negative and he exhibits no other signs of prostate cancer. In 29 cases there was agreement on the cancer diagnosis as judged by both techniques.

In the 16 cases in which either cytology or histopathology was positive or exhibited atypia suspicious for cancer, the diagnosis was confirmed by repeated positive morphology (new biopsies, transurethral resection or radical prostatectomy) or by clinical signs of disseminated or progressive disease (bone scan, lymph node metastasis, elevated acid phosphatases or elevated and rising PSA).

Thus, according to these criteria, 45 patients of the 46, had a confirmed prostate cancer. In relation to these 45 cancers, histopathology was falsely negative in 2 cases and cytology in none. The sensitivity of histopathology was 82% (37/45) and of cytology 78% (35/45). If atypia suspicious for cancer was included, the corresponding figures were 96% (43/45) and 93% (42/45) respectively.

No difference was observed in sensitivity between the two techniques when the results were related to tumor stage or whether or not the tumor was palpable. In this material of 45 tumors, 16 were non-palpable.

Discussion and Conclusions

With the techniques used, FNAB was as sensitive as core biopsy in the detection of prostate cancer.

In a material, to be published, consisting of 145 patients who underwent core biopsies we registered febrile reactions in 6%, and half of these patients were hospitalized and given antibiotics intravenously (6). None had been given prophylactic antibiotics. We therefore believe that core biopsy should be preceded by an enema and prophylactic antibiotics should be given. In consequence, we believe that FNAB should be considered as the primary method in routine detection of prostate cancer as it compares in sensitivity, demands no preparations and is connected with a low risk for the patient.

Table

Results of reevaluation of cytology and histopathology in 46 patients with earlier diagnosed prostate cancer

Histopathology	Cytology				Total
	Inadequate	Benign	Suspicion	Cancer	
Inadequate	0	0	0	0	0
Benign	0	1	0	2	3
Suspicion	1	0	1	4	6
Cancer	2	0	6	29	37
Total	3	1	7	35	46

Biopsy using the automatic fine-needle gun is less painful for the patient than 'manual' FNAB in ultrasonic guidance or biopsy using the Biopsy gun. The fine-needle gun serves a solution in ultrasound guided biopsy, to the difficulties caused by dislocation of the target. Due to these advantages, the fine-needle gun deserves a place in our diagnostic armament.

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