

COMPLICATIONS OF TRANSRECTAL ULTRASOUND GUIDED PROSTATE NEEDLE BIOPSY: OUR EXPERIENCE AND REVIEW OF THE LITERATURE

Borislav Spajić¹, Ivica Brigić¹, Goran Štimac¹, Danijel Justinić¹, Božo Krušlin² and Ognjen Kraus¹

¹University Department of Urology, ²Ljudevit Jurak University Department of Pathology, Sestre milosrdnice University Hospital, Zagreb, Croatia

SUMMARY – Transrectal ultrasound guided prostate needle biopsy is the most important diagnostic procedure for early prostate cancer detection. It is a safe diagnostic tool with very few complications and well tolerated by patients. The aim of the study is to report complication rates after transrectal ultrasound guided prostate needle biopsy. All study patients, mean age 68.8 years, received antibiotic prophylaxis and a laxative was administered on the day prior to the procedure. A mean of 8.03 biopsy cores *per* patient were obtained. Laterally directed sextant biopsy plus two cores from transition zone of the prostate was performed along with biopsy of any hypo- or hyperechoic lesion seen on transrectal ultrasound. Results of 224 prostate biopsies performed in selected patients are reported. Biopsy proved negative in 54%, prostate cancer was confirmed in 31%, and prostatic intraepithelial neoplasia was detected in 15% of patients. Complications occurred in 35 (14%) patients: two were hospitalized for urinary retention, 15 (6.15%) patients had prolonged hematuria lasting for more than five days, and 18 patients showed clinical signs of urinary tract infection. The mean level of discomfort was 2.8 on a 10-point pain scale. Study results were generally consistent with other recent reports on complication rates, while showing a significantly lower rate of hematuria. Prostate biopsy is the only accurate method of preoperative prostate cancer detection; the more so, there is no need of hospitalization, regional or local anesthesia, and there are no false-positive results.

Key words: *Biopsy – methods; Biopsy – adverse effects; Prostatic neoplasms – pathology; Prostatic neoplasms – ultrasonography; Biopsy – needle*

Introduction

In the last decade, there has been an exponential rise in the number of patients diagnosed with prostate cancer, probably because of an increase in life expectancy and therefore an expanding population of men in the susceptible age range (>50 years). Other factors have also been involved such as the introduction and widespread use of the prostate-specific antigen (PSA) blood test. The use of PSA test with transrectal ultrasound

(TRUS) guided prostate needle biopsy has led to identification of a large number of asymptomatic men with prostate cancer. The latter has definitively become a routine diagnostic method not just in industrialized countries but also worldwide. TRUS guided prostate needle biopsy has proven to be the most efficient method available, detecting most prostate cancers today. The indications for biopsy include suspect digital rectal examination (DRE), elevated age-specific PSA levels depending on the prostate size, deviation from normal PSA parameters (PSA velocity, PSA density, F/T PSA), and visible hypoechoic lesions of the prostate¹. Sextant biopsy involving additional specimens of ultrasonographically suspect tissue has asserted itself as a standard method because it reduces the number of false-nega-

Correspondence to: *Borislav Spajić, MD*, University Department of Urology, Sestre milosrdnice University Hospital, Vinogradska c. 29, HR-10000, Zagreb, Croatia

E-mail: borislav.spajic1@zg.t-com.hr

Received February 22, 2006, accepted March 29, 2006

tive findings. Prostate TRUS allows for clear imaging of prostate zones and prevalent sampling of the peripheral zone where the cancer incidence is highest. Patients with prostate biopsy indications generally feel no discomfort, so what matters here is that it is a safe intervention relatively easy to sustain. Indeed, our prime objective, early stage cancer detection, raises new dilemmas as to the modality of cancer treatment: from patient monitoring, including the risk of cancer progression, to patient exposure to an unnecessary aggressive treatment.

Although prostate cancer largely affects men in advanced age, early diagnosis has made it to an increasing extent a middle-age problem as well¹.

Patients and Methods

During a three-year period, from January 2000 to late December 2002, a total of 244 patients who met the inclusion criteria entered the study. Their age ranged from 48 to 81 (mean age 68.8) years, and PSA levels from 2.4 ng/mL to 18.3 ng/mL (median 9.8 ng/mL). They all were prepared by laxative administration and antibiotic prophylaxis with fluoroquinolones (ciprofloxacin, norfloxacin) started on the day before, for a total of five days. Patients on anticoagulant therapy were instructed to discontinue it for several days before the procedure. Biopsies were performed on patients placed in dorsal lithotomy position on the table. All patients were discharged on the same day. Examinations and interventions were performed by a single urologist on a Siemens Sonoline SI 400 U/S diagnostic instrument. A biplanar transrectal probe was used, frequency 5/7.5 MHz, covered with a latex condom. Samples were obtained in the sagittal section by a biopsy guide and an 18-gauge needle triggered by Bard Magnum automatic gun. Seven days afterwards, during control check-up, the patients received biopsy results and were asked to complete a questionnaire on post-biopsy complications. We analyzed hemorrhages lasting for more than five days, signs of inflammation or temperature elevation beyond 38 °C, pain level during biopsy, acute urine retention, and admission to hospital.

Results

The study included 244 patients with previously performed TRUS guided biopsy of the prostate who completed a questionnaire on complications experienced. A total of 1959 specimens of prostatic tissue were

Table 1. Results of TRUS guided prostate needle biopsies (N=244)

Histopathology	n	%
Negative	132	54
Prostate cancer	76	31
PIN	36	15

collected, a mean of 8.03 *per person*, referred individually for histopathologic analysis.

Prostate cancer was detected in 76 (31%), negative findings in 132 (54%), and prostate intraepithelial neoplasia (PIN) in 36 (15%) patients (Table 1). Complications occurred in 35 (14.34%) patients (Table 2): two patients with acute urine retention were hospitalized and treated by placing a percutaneous cystostomy for seven days; 18 (7.38%) patients exhibiting signs of inflammation or elevated temperature were administered antibiotics; and 15 (6.15%) patients showed macrohematuria persisting for more than five days and resolving spontaneously. Data on hematospermia could not be obtained from most patients due to their age. The mean pain level during the examination as evaluated by the patients on a 1-10 scale was 2.8, and generally required no analgesics, regional or local anesthesia. None of the reported complications was life-threatening.

Discussion

Systematic TRUS guided biopsy is not the only one but is definitely the most significant way of detecting malignant neoplasms of the prostate in men with an indication. Obtaining three biopsy specimens from each lobe plus two cores from the transition zone of the prostate, along with additional samples of TRUS visible suspect hypoechoic lesions, has proven to be the golden rule (method of choice). On the one hand, taking more samples reduces the number of false-negative findings, yet on the other hand, it is more aggressive and according to some authors prone to more complications². A smaller number of biopsy cores are better tolerated by

Table 2. Complications in TRUS guided prostate needle biopsies

Complication	n	%
No complications	209	85.66
Acute urinary retention	2	0.8
Infection	18	7.38
Hematuria	15	6.15

Table 3. Comparison of recently published series (TRUS biopsy complication rates)

Author	Year	No. of patients	No. of cores	Antibiotic prophylaxis	Infection (%)	Hospital admission (%)	Hematuria (%)	Urinary (%) retention
Enlund ¹²	1997	426	1-8	no	2.9	0.7	21	0.2
Rodriguez ⁷	1998	129	=>6	yes	1.7	0.8	47.1	1.6
Manseck ¹⁰	2000	162	10	yes	0.6	0	17.9	0
Djavan ⁹	2001	1015	8	yes	3.0	?	15.9	2.6
Peyromaure ⁶	2002	289	10	yes	3.7	0	74.4	?
Raaijmakers ¹¹	2002	5802	6-7	yes	3.5	0.5	22.6	0.4

patients, yet according to some studies there is a greater number of false-negative results. Some 15%-30% of negative findings in standard sextant biopsy have in most studies been described as false-negatives³⁻⁵. In order to reduce morbidity and increase prostate biopsy safety, the complications of this intervention should be further monitored and recorded.

In comparison with other studies indicated in Table 3, our study yielded a higher incidence of infections. This could be explained by the fact that, unlike other authors, we assigned subfebrile patients with signs of inflammation to the study group. The number of acute retention cases and hospitalizations is consistent with most of other studies; however, a significantly lower number of hematuria cases (6.1%) were recorded in our population. In the study by Peyromaure *et al.*⁶, there were 74.4% of patients with hematuria, whereas the incidence of this complication was two to ten times lower in our study compared to others^{2,7-11}. Most authors argue that more biopsy specimens or the presence of prostate cancer do not necessarily entail a larger number of complications^{10,11}, yet Rodriguez and Terris⁷ in their 1998 study report on less febrile cases among patients with a lower number of samples obtained. Studies involving a placebo group and controls showed some benefits of antibiotic prophylaxis^{2,8}, whereas others¹² did not administer prophylaxis, yet reporting on a low febrility incidence (2.9%). The pain level observed in our patients undergoing prostate biopsy was rather low, mean 2.8 on a 1-10 scale. Some authors report more discomfort and pain in younger patients with multiple samples, in contrast to older patients^{7,9}.

Conclusion

Our study has demonstrated that prostate biopsy is an intervention relatively well tolerated by patients, with

the complications that are neither dangerous nor too frequent. In most cases they included hematuria, however, manifesting at a significantly lower rate than reported elsewhere, and resolved spontaneously. In case of infections, they responded well to antibiotic therapy, so that hospitalization was required in less than 1% of patients. The level of pain during and after prostate biopsy was assessed by the patients as low, although it is an unpleasant invasive diagnostic examination. If the benefits are weighed against complications, the performance of prostate biopsy will certainly prove justifiable on the outpatient basis and without the need of local or regional anesthesia.

References

1. STAMEY TA, McNEAL JE. Carcinoma of prostate. In: WALSH PC, RETIK AB, VAUGHAN DE Jr, WEIN AJ Jr, eds. Campbell's urology. Philadelphia: WB Saunders, 2002:3038.
2. KAPOOR DA, KLIMBERG IW, MALEK GH *et al.* Single dose oral ciprofloxacin *versus* placebo for prophylaxis during transrectal prostate biopsy. *Urology* 1998;52:552-7.
3. EPSTEIN JI, WALSH PC, CARMICHAEL M, BRENDLER CB. Pathologic and clinical findings to predict tumor extent of nonpalpable prostate cancer. *JAMA* 1994;271:368.
4. ESKEW LA, BARE RL, McCULLOUGH DL. Systematic 5 region prostate biopsy in superior to sextant method for diagnosing carcinoma of the prostate. Comment in: *J Urol* 1997;157:199-202; Discussion 202-3.
5. RABBANI F, STROUMBAKIS N, KAVA BR. Incidence and clinical significance of false negative sextant prostate biopsies. *J Urol* 1998;159:1247.
6. PEYROMAURE M, RAVERY V, MESSAS A *et al.* Pain and morbidity of an extensive prostate l0-biopsy protocol: a prospective study in 289 patients. *J Urol* 2002;167:218-21.
7. RODRIGUEZ LV, TERRIS MK. Risk and complications of transrectal ultrasound guided prostate needle biopsy: a prospective study and review of the literature. *J Urol* 1998;160:2115-20.

8. ARON M, RAJEEV TP, GUPTA NP. Antibiotic prophylaxis for transrectal needle biopsy of the prostate: a randomised controlled study. *Br J Urol Int* 2000;85:682-5.
9. DJAVAN B, WALDERT M, ZLOTTA A, *et al.* Safety and morbidity of first and repeat transrectal ultrasound guided prostate needle biopsies: results of a prospective European prostate cancer detection study. *J Urol* 2001;166:856-60.
10. MANSECK A, GUHR K, FROEHNER M, *et al.* Morbidity and discomfort of ten-core biopsy of the prostate evaluated by questionnaire. *Urol Int* 2001;66:197-200.
11. RAAIJMAKERS R, KIRKELS WJ, ROOBOL MJ, WILDHAGEN MF, SCHRODER FH. Complication rates and risk factors of 5802 transrectal ultrasound-guided sextant biopsies of the prostate within a population-based screening program. *Urology* 2002;60:826-30.
12. ENLUND AL, VARENHORST E. Morbidity of ultrasound-guided transrectal core biopsy of the prostate without prophylactic therapy: a prospective study in 415 cases. *Br J Urol* 1997;70:777-80.

Sažetak

KOMPLIKACIJE TRANSREKTALNE ULTRAZVUČNO VOĐENE BIOPSIJE PROSTATE: NAŠA ISKUSTVA I PREGLED LITERATURE

B. Spajić, I. Brigić, G. Štimac, D. Justimić, B. Krušlin i O. Kraus

Biopsija prostate kao najznačajnija dijagnostička metoda u otkrivanju raka prostate je indicirana većinom kod muškaraca bez kliničkih smetnja i vrlo je važno da je to siguran dijagnostički postupak s malo komplikacija koji bolesnici dobro podnose, iako ulazi u skupinu agresivnih dijagnostičkih pretraga. U radu su opisani rezultati biopsije prostate na ukupno 224 bolesnika s indikacijom. Prosječna starost je bila 68,8 godina, svi su prethodno dobili antibiotsku profilaksu i pripremljeni su davanjem laksativa dan ranije. Uzimalo se je prosječno 8,03 uzoraka po bolesniku. Svakom bolesniku je učinjena lateralna sekstant biopsija i transrektalnim ultrazvukom vidljive hipo- i hiperehogene lezije u prostati. Kod 54% bolesnika nalaz je bio negativan, 31% ih je imalo rak prostate, dok je u ostalih 15% nađena predmaligna lezija, prostatična intraepitelna neoplazija (PIN). Komplikacije su zabilježene kod 35 (14%) bolesnika, od kojih su dvojica liječeni bolnički zbog potpune retencije, hematurija duža od pet dana zabilježena je kod 15 (6,15%) bolesnika, a znakove upale ili febrilitet je imalo 18 (7,38%) bolesnika. Bolesnici su ocijenili razinu boli tijekom zahvata prosječnom ocjenom 2,8 na ljestvici od 1 do 10. Rezultati dobiveni u našem istraživanju sukladni su u većini parametara novijim studijama u kojima je obrađena ista tematika, a za razliku od drugih imali smo značajno manje hematurija. U zaključku se navodi kako je biopsija prostate jedina točna prijeoperacijska metoda otkrivanja raka prostate koja se radi ambulantno i bez potrebe za regionalnom ili lokalnom anestezijom, i nema lažno pozitivnih rezultata.

Ključne riječi: *Biopsija – metode; Biopsija – štetni učinci; Neoplazme prostate – patologija; Neoplazme prostate – ultrasonografija; Biopsija – iglena*