SENSITIVITY AND SPECIFICITY OF PROSTATIC BIOPSY RESULT BASED ON PROSTATE VOLUME

[1]Joko Pitoyo, [1]Ferry Safriadi.

[1]Department of Urology, Faculty of Medicine/Padjadjaran University, Hasan Sadikin Hospital, Bandung, Indonesia.

ABSTRACT

Objective: To compare the sensitivity and specificity of both types of prostate biopsies, between 6 core biopsy/sextant biopsy with volume based biopsy prostate. **Material & method:** The subjects were patients that have been performed prostate biopsy in Hasan Sadikin Hospital in 2006 – 2010. The data was divided into two groups, the group A (before 2009) 327 patients had performed 6 cores biopsy, group B (after 2009), the biopsy was performed based on prostate volume (volume < 40 cc : 8 cores, volume 40-60 cc : 10 cores and volume > 60 cc : 12 cores). Biopsy results confirmed by definitive results from surgery, then analyzed specificity and sensitivity between two groups. The analytical statistic test using unpaired T test and Levene's test. **Results:** There were 654 patients divided in two groups. The data in both groups were similar based on analytical statistic test using unpaired t test (p = 0.28) and the data was in normal distribution (Levene's test = p > 0.05). The group A, mean age 67.4 years, mean prostate volume 32.53 cc and mean PSA levels 29.89 ng/dl and at group B, mean age 66.7 years, mean prostate volume 30.89 cc and mean PSA levels 16.92 ng/dl. Volume based cores method in prostate biopsy have higher sensitivity and specificity compared with 6 core biopsy (97.5% vs 94.0%) and (92.2% vs 77.8%). **Conclusion:** The sensitivity and specificity of prostate biopsy was increased in volume based cores compared to 6 cores biopsy.

Keywords: Prostate biopsy, volume based.

ABSTRAK

Tujuan: Membandingkan sensitifitas dan spesifisitas kedua tipe biopsi prostat, antara biopsi 6 inti/biopsi sextant dengan biopsi prostat berdasarkan volume. **Bahan & cara:** Subyek penelitian ini adalah pasien yang dilakukan biopsi prostat di RSU Hasan Sadikin tahun 2006 – 2010. Data dibagi menjadi dua kelompok, kelompok A (sebelum tahun 2009) adalah 327 pasien yang dilakukan biopsi 6 inti, kelompok B (setelah tahun 2009), biopsi dilakukan berdasarkan volume prostat (volume < 40 cc : 8 inti, volume 40-60 cc : 10 inti dan volume > 60 cc : 12 inti). Hasil biopsi menunjukkan hasil definitif operasi, kemudian dianalisa spesifisitas dan sensitifitas antara kedua kelompok. Tes statistik analitik menggunakan unpaired T test dan tes lavene. **Hasil:** Sebanyak 654 pasien dibagi ke dalam 2 kelompok. Data pada 2 kelompok tidak jauh berbeda berdasarkan tes statistik analitik menggunakan unpaired t test (p = 0.28) dan data berdistribusi normal (tes lavene = p > 0.05). Kelompok A rerata umur 67.4 tahun, rerata volume prostat 30.89 cc, dan rerata level PSA 16.92 ng/dl. Volume berdasarkan metode inti biopsi prostat memiliki sensitifitas dan spesifisitas lebih tinggi dibandingkan dengan biopsi 6 inti (97.5% vs 94.0%) dan (92.2% vs 77.8%). **Simpulan:** Sensitifitas dan spesifisitas biopsi prostat naik pada volume berdasarkan inti dibandingkan dengan biopsi 6 inti.

Kata kunci: Biopsi prostat, berdasarkan volume.

Correspondence: Joko Pitoyo, c/o: Department of Urology, Faculty of Medicine/Padjadjaran University, Hasan Sadikin Hospital Bandung. Jl. Pasteur No. 38 Bandung. Office: (022) 2039141. Mobile phone: 081220558890. Email: jokpit_riau@yahoo.com & safriadif@yahoo.com

INTRODUCTION

Prostate cancer is currently considered as one of the serious medical problems faced by the male population. In Europe, prostate cancer is the most common solid malignancy occurs, with the incidence of 214 cases per 1000 men, outmatching the lung and colorectal cancer.[1] Prostate cancer is the

second most common cause of death in men and is the fourth most common neoplasm.[2] There were new 232.090 cases of prostate cancer in United States during 2005.[3] By the year 2004, from all cancer cases, 37% were prostate cancer cases.[4,5]

There are no definitive data in Indonesia, the GLOBOCAN 2008 data showed, that prostate cancer was ranked fifth.[6] In Indonesia, the data from the Society of Urologic Oncology (ISUO) 2011, during the period 2006-2010, there were 971 patients with prostate cancer. Average age was 68.3 year, mostly in the 70-79 year old, at 37.6%. In Hasan Sadikin Hospital Bandung, during 2004-2010 period, there were 318 cases found.[7]

The main examination in the diagnosis of prostate cancer is the course of the disease history, digital rectal examination, serum PSA, and transabdominal or transrectal ultrasound. Diagnosis depends on the outcome of prostate biopsy or surgery specimens of adenocarcinoma. Transrectal prostate biopsy with ultrasound (TRUS) is the primary diagnostic tool for malignancy of the prostate and the gold standard.[8-10]

OBJECTIVE

To compare the sensitivity and specificity of both types of prostate biopsies, between 6 core biopsy/sextant biopsy with volume based biopsy prostate.

MATERIAL & METHODS

This study is a retrospective cross sectional study on patients at the Urology clinic of Hasan Sadikin Hospital Bandung and has been undergoing TRUS prostate biopsy during 2006 to 2010 period.

During this period, the number of samples were divided into 2 groups: group A were patients who had underwent TRUS prostate biopsy between 2006 to 2008 (6 core biopsy/sextant biopsies) and group B were patients who had underwent TRUS prostate biopsy examination between 2009 and 2010 (volume based prostate).

The histopathology result of prostate biopsies from all sample is collected then compared with histopathologic results of prostate tissue specimens from definitive surgery, and then analyzed using 2x2 tables and calculating sensitivity figures, specificity, positive predictive value (PPV) and negative predictive value (NPV). Statistical analysis using unpaired t test and Levene's test.

RESULTS

The study obtained the average age for group A was 67.4 years with the lowest age of 44 years and the highest age of 94 years, while in group B (biopsy of the prostate based on prostate volume) mean age was 66.7 years with lowest age of 42 years and the highest age of 86 years. For prostate volume, in group A obtained average value of 32.53 cc prostate volume, with the smallest volume of 15.87 cc and the largest volume of 99.3 cc. While in group B, the average prostate volume is 30.89 cc, with a prostate volume of the smallest 21.3 cc and 167 cc for the largest prostate volume. Further to the PSA, in group A, the average PSA level was 29.89 ng/ml, with the lowest PSA levels of 2.72 ng/ml and the highest PSA levels over 1000 ng/ml, and group B, the average PSA levels were 16.92 ng/ml with the lowest PSA levels 4.1 ng/ml and the highest PSA levels over 500 ng/ml.

Table 1. Sample distribution by age, prostate volume, and PSA.

	Group A	Group B	p *)
Average Age	67.4	66.7	
Average Prostate Volume	32.53	30.89	0.28
Average PSA	29.89	16.92	

*) Unpaired T test

From the results of the study, in group A found that of 327 samples which underwent TRUS prostate biopsy, a total of 189 patients with BPH had the same biopsy results from the definitive surgery specimens, and as many as 28 patients with BPH, but the biopsy results from the definitive surgery were prostate carcinoma, and then a total of 12 patients with carcinoma of the prostate from the biopsy results but with the BPH results from definitive surgery biopsy, finally as many as 98 patients with the same carcinoma of the prostate result between biopsy results and the definitive surgery result.

Examination of prostate biopsy with TRUS biopsy core 6 has a of 94% sensitivity value, 77.8% specificity value and positive predictive value (PPV) of 87.1% and the negative predictive value (NPV) of 89.1%.

TRUS prostate biopsy examination with volume based prostate biopsy had a 97.5% sensitivity

Table 2. Sensitivity, specificity, PPV and NPV between 2 groups.

		Group A		Group B		p value
		BPH	CaP	BPH	CaP	
Biopsy	BPH	189	28	194	10	0.28
Result	P Ca	12	98	5	118	
Sensitivity		94.0%		97.5%		> 0.05
Specificity		77.8%		92.2%		> 0.05
PPV		87.1%		95.1%		> 0.05
NPV		89.1%		95.5%		> 0.05

value and 92.2% specificity value and positive predictive value (PPV) of 95.1% and the negative predictive value (NPV) of 95.5%.

DISCUSSION

The research data obtained that the 6 core prostate biopsy has a sensitivity of 94%, and specificity of 77.8% while the biopsy based prostate volume had a sensitivity and specificity values are higher at 97.5%, and 92.2%. Six core biopsy has a positive predictive value of 87.1% and negative predictive value of 89.1%, while the volume based prostate biopsy on the positive predictive value and negative predictive value of higher value that is equal to 95.1% and 95.5%.

Increased sensitivity, specificity, PPV and NPV based on a biopsy of prostate volume due to adequate sample of prostate tissue taken at biopsy of the prostate, compared with 6 core biopsy, the volume based biopsy of the prostate taken more samples and more evenly samples so that the biopsy results were better and more accurate to get a picture of the prostate tissue histopathology. At the 6 core biopsy, a sample of prostate tissue was not sufficient to get an idea of the actual prostate tissue histo-pathology, especially when the volume of the prostate was large.

CONCLUSION

Biopsy based on prostate volume has a higher value of sensitivity, specificity, PPV and NPV than 6 core biopsy.

REFERENCES

1. Boyle P, Ferlay J. Cancer incidence and mortality in Europe 2004. Ann Oncol. 2005 Mar; 16(3): 481-8. http://www.ncbi.nlm.nih.gov/pubmed/15718248
2. Jemal A, Siegel R, Ward E. Cancer statistics, 2008. CA Cancer J Clin. 2008 Mar; 58(2): 71-96. http://www.ncbi.nlm.nih.gov/pubmed/18287387
3. Geovanne F. Souza, A.A.C. Findings of repeated transrectal ultrasound-guided prostate biopsy. Brazilian Journal of Urology; 2001. p. 37-41.
4. Roslind I. McCoy Sibley, A.F.S. Correlation of digital rectal examination, prostate specific antigen, and transrectal ultrasound in prostate carcinoma in African Americans. Journal of The National Medical Association; 2008.
5. Eriz Özden, A.T.T., Çağatay Göğüş, Cemil Yağcı, Sadettin Küpeli. Diagnostic value of transrectal ultrasonography in patients with PSA values > 20 ng/ml. Journal of Ankara University Faculty of Medicine. 2007; 60(4): 164-6.
6. International Agency for Research on Cancer. Downloaded from www.globocan.com. August 5, 2011.
7. Indonesian Society of Urologic Oncology (ISUO) meeting; 2011. Unpublished data.
8. Heidenreich M. Bolla, S Joniau TH, Van der Kwast V Matveev, Mason N. Mottet, H-P Schmid T, Wiegel F. Zattoni. Guidelines of prostate cancer. European Association of Urology; 2010. p. 13-15.
9. Fransesco Cantiello, Vittorio Imperatore, Mariateresa Iannuzzo. Periprostatic nerve block (PNB) alone vs PNB combined with an anaesthetic-myorelaxant agent cream for prostate biopsy: A prospective, randomized double arm study. BJUI; 2008. p. 1195-9.
10. John R. Ramey, Ethan J. Halpern, Leonard G. Gomella. Ultrasonography and biopsy of the prostate. Campbell-Walsh. Urology; 2007.