



Original Article

## The Prevalence of SIRS following intrarectal Povidone-Iodine and Xylocaine transrectal ultrasound guided prostate biopsy in Rajavithi hospital

Chatchai Krailaksanawarapar, Chawawat Gosrisirikul

Division of urology, Department of surgery, Rajavithi hospital, Bangkok, Thailand

### Keywords:

Transrectal ultrasound-guided biopsy, TRUS, intrarectal Povidone-Iodine and Xylocaine, infection

### Abstract

**Objective:** To evaluate the prevalence of SIRS following intrarectal Povidone-Iodine and Xylocaine transrectal ultrasound-guided prostate biopsy in Rajavithi hospital.

**Material and Method:** The data was collected from the operative record for patient who undergoing transrectal ultrasound-guided prostate biopsy in Rajavithi hospital from 1<sup>st</sup> April 2014 to 30<sup>th</sup> September 2018. The medical recorders were inspected from the operative date to the appointment date for collect data including age, body weight, height, underlying disease, serum PSA, SIRS, complication during admission and length of stay.

**Result:** From 637 males, the SIRS after intrarectal Povidone-Iodine and Xylocaine transrectal ultrasound-guided prostate biopsy was found in 6 patients and all of 6 patients had infection (0.9% of all patient). The patients who have higher BMI have greater risk for developed SIRS (24.98±3.75 vs 23.35±3.49 [p=0.258]). The most common organism in this study is E. coli (hemoculture 1 specimen, urine culture 2 specimens).

**Conclusion:** The patient preparation of transrectal ultrasound-guided prostate biopsy with intrarectal Povidone-Iodine and Xylocaine may be one of the methods that can reduce SIRS and infection rate from TRUS Bx of the prostate.

**Corresponding author:** Chatchai Krailaksanawarapar

**Address:** Division of urology, Department of surgery, Rajavithi hospital, Bangkok, Thailand

**E-mail:** asurada\_001@hotmail.com

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## Introduction

The prostate cancer is the 4<sup>th</sup> most common cancer that found in Thai male with incidence 7.5 per 100,000 per year<sup>1</sup>. The diagnosis of prostate cancer generally made with multiple components including history, physical examination, serum PSA, imaging study, pathological tissue. The serum PSA 4-10 ng/l is the criteria for get pathological tissue<sup>2</sup>.

The prostate tissue biopsy can made with multiple approach including transanal, transperineum, transurethral<sup>3</sup>. The common approach is transrectal approach. The 12-core TRUS prostate biopsy is considered the preferred and current standard of care technique<sup>4</sup>.

The transrectal prostate biopsy technique can made with A spring-driven 18-gauge needle core biopsy device or biopsy gun that can be passed through the needle guide attached to the US probe is most often used. In general, the rectum has some nonpathogenic bacteria. When the prostate biopsy was done the rectal mucosal and prostat injury happened. Jan Krzysztof Rudzinski found the admission rate after prostate biopsy due to its complication was 6.32% and 2.2% was sepsis<sup>5</sup>.

Jose Maria Gil-Vernet Sedo et al prospectively studied a total of 530 patients who were given 30 g of 10% povidone-iodine intrarectally before TRUS-BX. The study found 1 patient (0.2%) presented with an *E. coli* acute bacterial epididymitis after biopsy<sup>6</sup>.

Nowaday, the patient preparation for transrectal ultrasound-guided prostate biopsy in each institute does not have the definite conclusion in term of different lubricant (KY-jelly, Lidocaine gel, Povidine with lidocaine gel), bowel preparation (unison enema, polyethylene glycol-electrolyte solution (PEG)<sup>7</sup> that make the patients and medical provider confused. Some patient may mistrustful with the diagnosis and the future treatment. From these reasons, we made the study for find the method that was most appropriate and safest patient preparation.

## Material and Method

### Study design

We retrospectively reviewed medical record of patient undergoing for TRUS prostate biopsy at Rajavithi hospital from 1<sup>st</sup> April 2014 to 30<sup>th</sup> September 2018. The data was collected from 637 patients. This research was approved by Rajavithi hospital Ethic committee.

### Definition

SIRS criteria were defined as equal or more than 2 parameters.

- body temperature  $<36^{\circ}\text{C}$  or  $>38.3^{\circ}\text{C}$
- heart rate  $>90$  bpm
- respiratory rate  $>0$  bpm or  $\text{PaCO}_2 <32$  mmHg
- white blood cell count  $<4,000$   $\text{mm}^3$  or  $>12,000$   $\text{mm}^3$  or  $>10\%$  band

Sepsis was defined as a SIRS due to an infection (clinical suspicion or microbiologic evidence)<sup>8</sup>.

Periprostatic nerve block was done with injecting 5 mL 1% to 2% lidocaine, a long spinal needle (7-inch, 22-gauge), and TRUS guidance along the biopsy channel of the transducer. The injection site is at the level of the Seminal vesicle near the bladder base at the hyperechoic fat pad that demarcates the junction of the Seminal vesicle and the prostate bilaterally<sup>9</sup>.

Transrectal ultrasound guided prostate biopsy was done with a spring-driven 18-gauge needle core biopsy device or biopsy gun that can be passed through the needle guide attached to the Ultrasound probe. Biopsy needle path has the best visualization in the sagittal plane; with the advent of biplanar ultrasound technologies, simultaneous transverse and sagittal imaging is possible and can be helpful in needle localization and placement. The biopsy gun advances the needle 0.5 cm and samples the subsequent 1.5-2 cm of tissue with the tip extending 0.5 cm beyond the area sampled<sup>10</sup>.

### Inclusion criteria

- serum PSA >4 ng/ml
- abnormal digital rectal examination
- undergoing for TRUS prostate biopsy at

Rajavithi hospital from 1<sup>st</sup> April 2014 to 30<sup>th</sup> September 2018

### Exclusion criteria

- coagulopathy
- prior infection before prostate biopsy
- povidone-iodine or xylocaine allergy

### Patient preparation

All patients were prescribed to take ciprofloxacin 500 mg oral and irrigated rectum with unison enema 100 ml at last night before and in the morning of operative date.

At the operating room, the patient's rectums were infused with the mixture of 2% Xylocaine jelly 5 ml and 10% Povidone-Iodine 5 ml for 5 minutes before the procedure.

### Procedure

All patients were performed TRUS Bx of the prostate with 12-core biopsy technique that is considered the preferred and current standard of care technique<sup>4</sup>.

### Postoperative medication

All patients were prescribed postoperative ciprofloxacin for 5day if no drug allergy.

### Data collection

Demographic data of patient were recorded such as body weight, height, underlying disease, serum PSA. In case of patient with SIRS, the data were recorded additionally such as sepsis, culture result, admission status, complication during admission and length of stay.

### Statistical analysis

Data were analyzed using SPSS version 17.0 (SPSS Inc., Chicago, Illinois, USA). Baseline characteristics were analyzed using descriptive statistics such as number, percentage, mean and standard deviation, minimum and maximum. Chi-square or Fisher Exact test were used to compare the categorical variables and frequency differences. A p-value of less than 0.05 was considered statistically significant.

### Result

From 637 patients, the demographic data of patient was shown in Table 1. The most portion of patient were equal or more than 70 years old (N=369, 57.9%). The SIRS after intrarectal Povidone-Iodine and Xylocaine transrectal ultrasound-guided prostate biopsy was found in 6 patients and all of 6 patients had infection (0.9% of all patient). The patients who have higher BMI have greater risk for developed SIRS (24.98±3.75 vs 23.35±3.49 [p=0.258]). The PSA between SIRS and no SIRS group were not statistical significantly difference as show in Table 2 (8.26 vs 11 [p=0.658]). The most common organism in this study is E. coli (hemoculture 1 specimen, urine culture 2 specimens) as show in Table 3.

### Discussion

TRUS Bx of the prostate is the procedure that frequent done as out patient procedure, so the complications especially infectious complication from this procedure should be minimize for the patient safety after discharge from the hospital. From the study of Grummet J found the rate of sepsis in the overall cohort was 1.2%<sup>11</sup>. The numerous physicians try to find the method that can decrease these complication such as prophylactic antibiotics and prebiopsy enema.

Kam SC et al found the overall complication from TRUS bx was decreased from 8.9% to 4.7% (p=0.007) by prebiopsy enema with glycerin or saline solution 1 hour before the procedure<sup>12</sup>.

Table 1. Demographic data of patient (n=637).

Condition	n	(%)
Age (mean±SD)	56.86 ± 15.18	
< 55 year	20	3.2
55-69 year	248	38.9
≥ 70 year	369	57.9
<b>Body weight</b> (mean±SD)	63.63 ± 10.70	
<b>Height</b> (mean±SD)	164.84 ± 6.24	
<b>BMI</b> (mean±SD)	23.37 ± 3.49	
<b>PSA median</b> (min-max)	11 (0.1-5000)	
<b>Underlying disease</b>		
DM	65	10.2
HT	159	25
DLP	76	11.9
CAD	21	3.3
BPH	418	65.6
CA prostate	93	14.6
CKD	35	5.5
<b>SIRS</b>		
Yes	6	0.9
No	631	99.1
<b>Sepsis</b>		
Yes	6	0.9
No	631	99.1
Admit from SIRS	5	0.8

BMI=body mass index (kg/m<sup>2</sup>), HT=hypertension, DLP=dyslipidemia, CAD=coronary artery disease, BPH=benign prostatic hyperplasia, CKD=chronic kidney disease, SIRS=systemic inflammatory response syndrome

**Table 2.** Demographic data of SIRS and no SIRS group.

Condition	SIRS (n = 6)	no SIRS (n = 631)	p-value
BMI	24.98 ± 3.75	23.35 ± 3.49	0.258
Age			0.190
< 55 year	1 (5.0)	19 (95.0)	
55 - 69 year	3 (1.2)	245 (98.8)	
≥ 70 year	2 (0.5)	367 (99.5)	
PSA	8.26 (5.55-1197)	11 (0.1-5000)	0.658

Values are represented as n (%), Mean ± SD, Median (Min-Max)

**Table 3** Culture profile of patient with SIRS (n=6).

Culture	n
H/C E. coli	1
U/C E. coli	2
U/C K. pneumoniae	1
U/C P. mirabilis	1
U/C mixed organisms	1

From the study of Yildirim ME et al. found overall urosepsis rate was 2.85% and patients that received self-administrated phosphate enema) on the morning of the prostate biopsy had lower sepsis rate than patients that received sennasoid a-b laxatives the night before the prostate biopsy (1.82% vs 3.58%)<sup>13</sup>.

From previous studies show prebiopsy enema can reduce the complication but Zhang XH et al. proposed postbiopsy infectious complications rate was least in patient received polyethylene glycol plus povidone-iodine enema compare to soapy enema group and polyethylene glycol group respectively (1.59% vs 4.25% vs 5.52%)<sup>14</sup>.

So, we search for the effect of povidone-iodine to the postbiopsy infectious complications and found various studies that support the benefits of

the prebiopsy intrarectal povidone-iodine usage shown as Table 4.

The result from our study shows SIRS and sepsis rate were 0.9% that accordant with the previous povidone-iodine studies and prebiopsy intrarectal povidone-iodine has superior effect over prebiopsy enema, laxatives, and polyethylene glycol.

### Conclusion

The patient preparation of transrectal ultrasound-guided prostate biopsy with intrarectal Povidone-Iodine and Xylocaine may be one of the methods that can reduce SIRS and infection rate from TRUS Bx of the prostate.

### Conflict of interest

The authors declare no conflict of interest.

**Table 4.** Studies showed effect of povidone-iodine to the postbiopsy infectious complications.

Study (year)	No. of patient	Outcome
Pu C, et al. (2014) <sup>15</sup>	2049	Significantly reduced fever, bacteriuria, and bacteremia compared with that for control [relative risk (RR) 0.31; 95 % confidence interval (CI) 0.21-0.45, p<0.00001]
Z. Abu Ghosh, et al. (2013) <sup>16</sup>	865	Infectious complications were observed in 31 (3.5%) patients, including 11 (2.6%) treated and 20 (4.5%) control patients (p=0.15). Sepsis was observed in 4 (1.0%) treated and 7 (1.6%) control patients (p=0.55)
Gil-Vernet Sedo JM, et al. (2012) <sup>6</sup>	530	Incidence of post-biopsy genitourinary infection was 1/530 (0.2%).
Dong Soo Park, et al. (2009) <sup>17</sup>	481	Infectious complications decreased from 6.6% to 0.3% in treated group.

## References

1. W. Imsamran, P. Adisai, S. Pongsatorn, C. Isara, N. Kiangkrai, W. Metee, K. Suwanrungrung, S. Sangrajrang, R. Buasom. Cancer in Thailand Vol. IX 2013-2015, Bangkok, 20151.
2. Benson MC, Olsson CA. Prostate specific antigen and prostate specific antigen density: roles in patient evaluation and management. *Cancer* 1994;74:1667-1673.
3. Rovner ES, Schanne FJ, Malkowicz SB, Wein AJ. Transurethral biopsy of the prostate for persistently elevated or increasing prostate specific antigen following multiple negative transrectal biopsies. *J Urol* 1997;158:138-141
4. Bjurlin MA, Carter HB, Schellhammer P, et al. Optimization of initial prostate biopsy in clinical practice: sampling, labeling and specimen processing. *J Urol* 2013;189:2039-2046.
5. Jan Krzysztof Rudzinski, Jun Kawakami, FRCSC: Incidence of infectious complications following transrectal ultrasound-guided prostate biopsy in Calgary, Alberta, Canada: A retrospective population-based analysis, *Can Urol Assoc J* 2014;8:e301-305.
6. Gil-Vernet Sedo JM, Alvarez-Vijande García R. Effect of intrarectal povidone-iodine in the incidence of infectious complications after transrectal prostatic biopsy. *Arch Esp Urol* 2012; 65:463-466.
7. De Nunzio C, Lombardo R, Presicce F, Bellangino M, Finazzi Agro E, Gambrosier MB, Trucchi A, Petta S, Tubaro A. Transrectal-ultrasound prostatic biopsy preparation: rectal enema vs. mechanical bowel preparation. *Cent European J Urol* 2015;68:223-228.
8. Bone RC, Balk RA, Cerra FB, Dellinger RP, Fein AM, Knaus WA, Schein RM, Sibbald WJ. Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. The ACCP/SCCM Consensus Conference Committee. American College of Chest Physicians/Society of Critical Care Medicine. *Chest* 1992;101:1644-1655.
9. Kumar A, Griwan MS, Singh SK, Sen J, Pawar DS. Is periprostatic nerve block a gold standard in case of transrectal ultrasound-guided prostate biopsy? *Urol Ann* 2013;5:152-156.



10. Kaye KW. Prostate biopsy using automatic gun. Technique for determination of precise biopsy site. *Urology* 1989;34:111-112.
11. Grummet J. How to Biopsy: Transperineal Versus Transrectal, Saturation Versus Targeted, What's the Evidence? *Urol Clin North Am* 2017; 44:525-534.
12. Kam SC, Choi SM, Yoon S, Choi JH, Lee SH, Hwa JS, Chung KH, Hyun JS. Complications of transrectal ultrasound-guided prostate biopsy: impact of prebiopsy enema. *Korean J Urol* 2014;55:732-736.
13. Yildirim ME, Badem H, Cavis M, Karatas OF, Cimentepe E, Unal D, Incebay IB. The comparison of the influence between two different bowel preparation methods on sepsis after prostate biopsies. *Cent European J Urol* 2015;68:91-94. doi:10.5173/ceju.2015.01.424.
14. Zhang XH, Jia Y, Guo WH, Ma YR, Yang J, Zhang Y, Hou SC, Zhang CC. Clinical comparison of the efficacy of three different bowel preparation methods on the infectious complications following transrectal ultrasonography-guided prostate biopsy in nursing practice. *J Clin Nurs* 2018;27:2583-2589.
15. Pu C, Bai Y, Yuan H, Li J, Tang Y, Wang J, Wei Q, Han P. Reducing the risk of infection for transrectal prostate biopsy with povidone-iodine: a systematic review and meta-analysis. *Int Urol Nephrol* 2014;46:1691-1698.
16. Goh YS, Law ZW, Tiong HY. Re: A prospective randomized trial of povidone-iodine prophylactic cleansing of the rectum before transrectal ultrasound guided prostate biopsy: Z. AbuGhosh, J. Margolick, S. L. Goldenberg, S. A. Taylor, K. Afshar, R. Bell, D. Lange, W. R. Bowie, D. Roscoe, L. Machan and P. C. Black *J Urol* 2013; 189: 1326-1331. *J Urol* 2013;190:2309-2310.
17. Park DS, Oh JJ, Lee JH, Jang WK, Hong YK, Hong SK. Simple use of the suppository type povidone-iodine can prevent infectious complications in transrectal ultrasound-guided prostate biopsy. *Adv Urol* 2009;750598. doi:10.1155/2009/750598