Prevalence of Prostate Cancer in Northeastern Thailand

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Background: *Prostate cancer is a major problem and the prostatic specific antigen (PSA) blood test is the most effective test for early detection. There is, however, a paucity of confirmatory prevalence data for the Thai population.*
Objective: *To determine the prevalence of prostate cancer in the northeastern region of Thailand.*
Material and Method: *This was a cross-sectional study at the Health Check-up Clinic of Srinagarind Hospital between July 2008-2009. Recruits included 129 patients > 45 years of age. Prostatic specific antigen (PSA) was measured and patients with a high PSA level were counseled to undergo a transrectal ultrasound (TRUS)-guided biopsy. The cancer detection rate was calculated and the specificity of the diagnostic test determined using the ROC curve. The Spearman correlation between the PSA level and the Gleason score was established.*
Results: *The respective mean age and PSA level was 61 and 2.3 ng/ml. Thirteen patients had a PSA level > 4 ng/ml; all of whom underwent TRUS-guided biopsy; eight were positive for prostate adenocarcinoma. The prevalence of prostate cancer was thus 6.2% (8/129 patients). The specificity of the cut-off PSA level at 4 ng/ml as per the ROC curve was 40%. There was no correlation between the PSA level and the Gleason score.*
Conclusion: *The prevalence of prostate cancer was 6.2%. According to the ROC curve, a cut-off PSA level of 4 ng/ml would be an appropriate for prostate cancer screening among Thai males.*

Keywords*: Screening, Prostatic specific antigen, Aging*

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Prostate cancer is a significant healthcare problem and one of the malignancies for which the incidence varies widely around the world[1,2]. Prostate cancer is the second leading cause of death among American men after lung cancer. Very elderly men constitute the highest percentage of detected cases[1,2]; not with standing, since the advent of PSA (Prostate Specific Antigen) testing, the incidence of prostate cancer has been rising among less elderly men[3]. In the USA, for example, Merrill et al found that the incidence was 3.8%, 9.3% and 13.1% among 60-69, 70-79 and > 80 year-olds, respectively[4]. In Thailand, the overall incidence of prostate cancer has been trending upward from 0.75% to 4.5% since the introduction of PSA testing.

The PSA blood test is considered the most effective test available for early detection of prostate cancer, but the degree of confidence placed in the test has been questioned since the prevalence of prostate cancer and the actionable PSA level vary by nation and region. For example, in the USA vs. Asia the cut-off for PSA for follow-on investigation is > 2.5 vs. > 4 ng/ml, respectively.

The regional differences in the prevalence and incidence of cholangiocarcinoma and esophageal cancer in Thailand suggest that there may be significant differences in the prevalence of prostate cancer and the effectiveness of PSA screening (age, level) in northeastern Thailand where our institution is located.

Material and Method

Male patients between 45 and 75 years of age were recruited during the screening campaign in Srinagarind Hospital between July 1, 2008 and July 31, 2009. Patients with known prostate cancer, recent prostate inflammation and/or recent prostate biopsy were excluded.

Patients with a PSA level > 4.0 ng/ml were counseled to undergo prostate biopsy. Age, PSA level and the Gleason score were obtained from patients in whom cancer was detected. The ratio of the number of cancers detected by biopsy and the number of patients who had their PSA checked was calculated as a percentage. The positive predictive value of a PSA level was calculated. The correlation between the PSA level

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Table 1. Mean age and PSA level

	Number of patients	Minimum	Maximum	Mean	SD
PSA (ng/ml)	129	0.1	43	2.3	4.9
Age (years)	129	45	82	61	7.7

Table 2. Sensitivity and Specificity for probability cut-off points

PSA level (ng/ml)	Sensitivity	Specificity
4.0	100%	40%
4.5	87%	40%
5.0	75%	50%
5.7	50%	50%

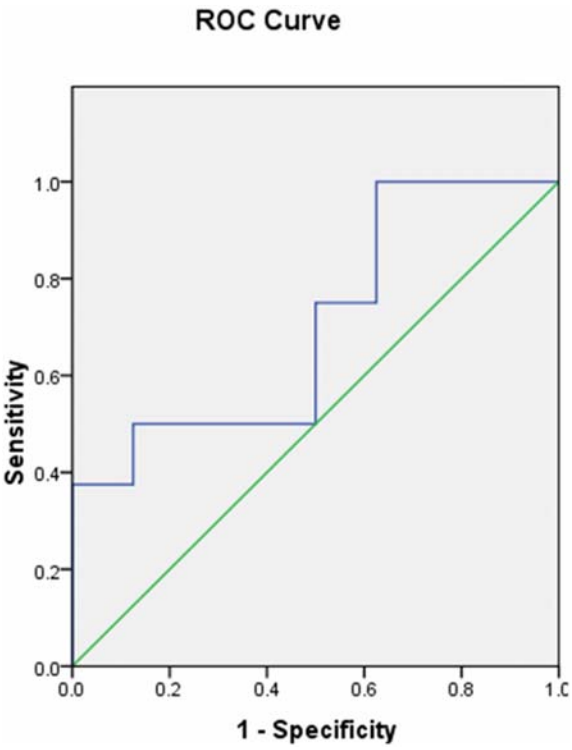

Fig. 1 ROC curve for PSA levels > 4 ng/ml

and the Gleason score was determined by the Spearman R test.

Results

Joining the study were 129 patients. Thirteen patients (10%) had a PSA > 4 ng/ml; all of whom underwent a prostate biopsy. Of these 8 (61%) were diagnosed as having prostate cancer; or 6.2% of 129 patients.

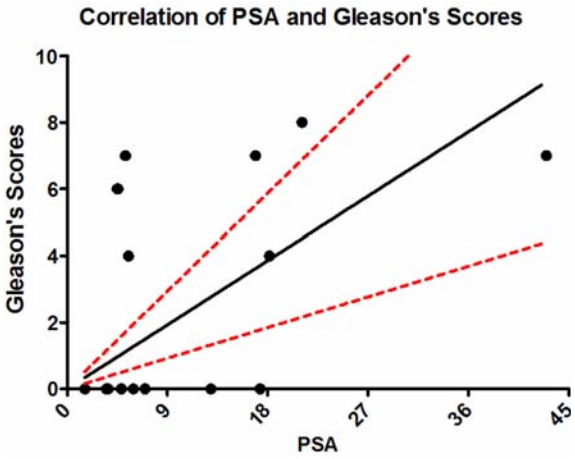

Fig. 2 Correlation of PSA and Gleason score

The relationship between the PSA level and the Gleason score was calculated using the Spearman R test, revealing no correlation (Spearman R < 0.7, 95% CI = -0.1- 0.7).

Discussion

The prostate specific antigen (PSA) is a protein produced by the cells of the prostate gland. Small quantities are present in the serum of men with healthy prostates, but the PSA level is often elevated when prostate cancer is extant, but may also be elevated in other prostate disorders. A blood test to measure PSA is, nevertheless, considered an effective alert for the early detection of prostate cancer, but diagnosed with caution.

PSA, present in prostatic tissue and semen, was discovered by various researchers independently. In 1979, Wang purified a tissue-specific antigen from the prostate: he called it 'prostate antigen'. In 1980, Papsidero et al were the first to measure PSA quantitatively in the blood and Stamey to conduct work on the clinical use of PSA as a marker of prostate cancer[5].

PSA is normally present in the blood at a very low level. A reference range of < 4 ng/mL was prescribed for the first commercial PSA test released in February

1986 (*viz*., the Hybritech Tandem-R PSA test). This level was based on a study that found 99% of 472 apparently healthy men had a total PSA level < 4 ng/ml. PSA screening, it is mooted, can lead to over-diagnosis and over-treatment of prostate cancers. Indeed, using this standard, the incidence of prostate cancer at Siriraj Hospital in Thailand increased from 1.97% in 1998 to 4.68% in 2004[6,7].

The current study revealed a prevalence of 6.2% for prostate cancer in the northeastern region of Thailand. For cancer detection, the specificity was 40% at a PSA > 4 ng/ml and 50% at a PSA > 5 ng/ml. Marbele et al reported a positive correlation between a high-grade Gleason score among surgical specimens and higher preoperative PSA, more extensive tumors, positive margins and more advanced pathologic staging. According to our study, there was no correlation between PSA level and the Gleason score, but a larger sample size is required to confirm our findings.

Conclusion

The prevalence of prostate cancer was 6.2%. From the ROC curve, a cut-off PSA level of 4 ng/ml would be appropriate for prostate cancer-screening among the Thai population.

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Potential conflicts of interest

None.

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ความชุกของมะเร็งต่อมลูกหมากในภูมิภาคตะวันออกเฉียงเหนือของประเทศไทย

เอกพงษ์ สาธิตการมณี, วิเชียร ศิริธนะพล, เอกรินทร์ โชติกวาณิชย์

ภูมิหลัง: *มะเร็งต่อมลูกหมากเป็นโรคที่เป็นปัญหาที่สำคัญในเพศชาย การตรวจ prostatic specific antigen (PSA) ในกระแสเลือดเป็นการตรวจที่มีประสิทธิภาพในการค้นหาโรคนี้ในระยะแรกๆ อย่างไรก็ตามยังมีความแตกต่างกันในเรื่องความชุกของโรคนี้ในประชากรไทย*

วัตถุประสงค์: *เพื่อศึกษาความชุกของมะเร็งต่อมลูกหมากในภูมิภาคตะวันออกเฉียงเหนือของประเทศไทย*

วัสดุและวิธีการ: *เป็นการศึกษาแบบตัดขวาง (Cross-sectional study) ในผู้ป่วยที่มาตรวจสุขภาพที่โรงพยาบาลศรีนครินทร์ตั้งแต่เดือน กรกฎาคม พ.ศ. 2551-2552 มีผู้ป่วย 129 คน ที่มีอายุมากกว่า 45 ปี ถูกนำมาศึกษาผู้ป่วยที่มีค่า PSA สูงจะได้รับการทำอัลตราซาวด์ผ่านทางทวารหนักเพื่อเจาะตรวจชิ้นเนื้อต่อมลูกหมาก ทำการคำนวณหาอัตราการตรวจพบมะเร็งและค่าความจำเพาะในการตรวจหามะเร็งต่อมลูกหมากโดยอาศัย ROC curve และใช้ Spearman correlation ในการหาความสัมพันธ์ระหว่างค่า PSA และ Gleason score*

ผลการศึกษา: *อายุเฉลี่ยของผู้ป่วยเท่ากับ 61 ปี ค่า PSA เฉลี่ยเท่ากับ 2.3 ng/ml มีผู้ป่วย 13 คน ใน 129 คน ที่มีค่า PSA สูงกว่า 4 ng/ml และได้รับการทำอัลตราซาวด์ผ่านทางทวารหนักเพื่อเจาะตรวจชิ้นเนื้อต่อมลูกหมาก มีผู้ป่วย 8 คน เป็นมะเร็งต่อมลูกหมาก ความชุกของมะเร็งต่อมลูกหมากเท่ากับ ร้อยละ 6.2 (8/129 คน) ค่าความจำเพาะของการใช้ระดับ PSA เท่ากับ 4 โดย ROC curve เท่ากับร้อยละ 40 ไม่มีความสัมพันธ์กันระหว่างระดับของค่า PSA และ Gleason score*

สรุป: *ความชุกของมะเร็งต่อมลูกหมากเท่ากับร้อยละ 6.2 และจากการใช้ ROC curve พบว่าระดับ PSA เท่ากับ 4 สามารถนำมาปรับใช้ได้ในการตรวจคัดกรองมะเร็งต่อมลูกหมากในประชากรไทย*