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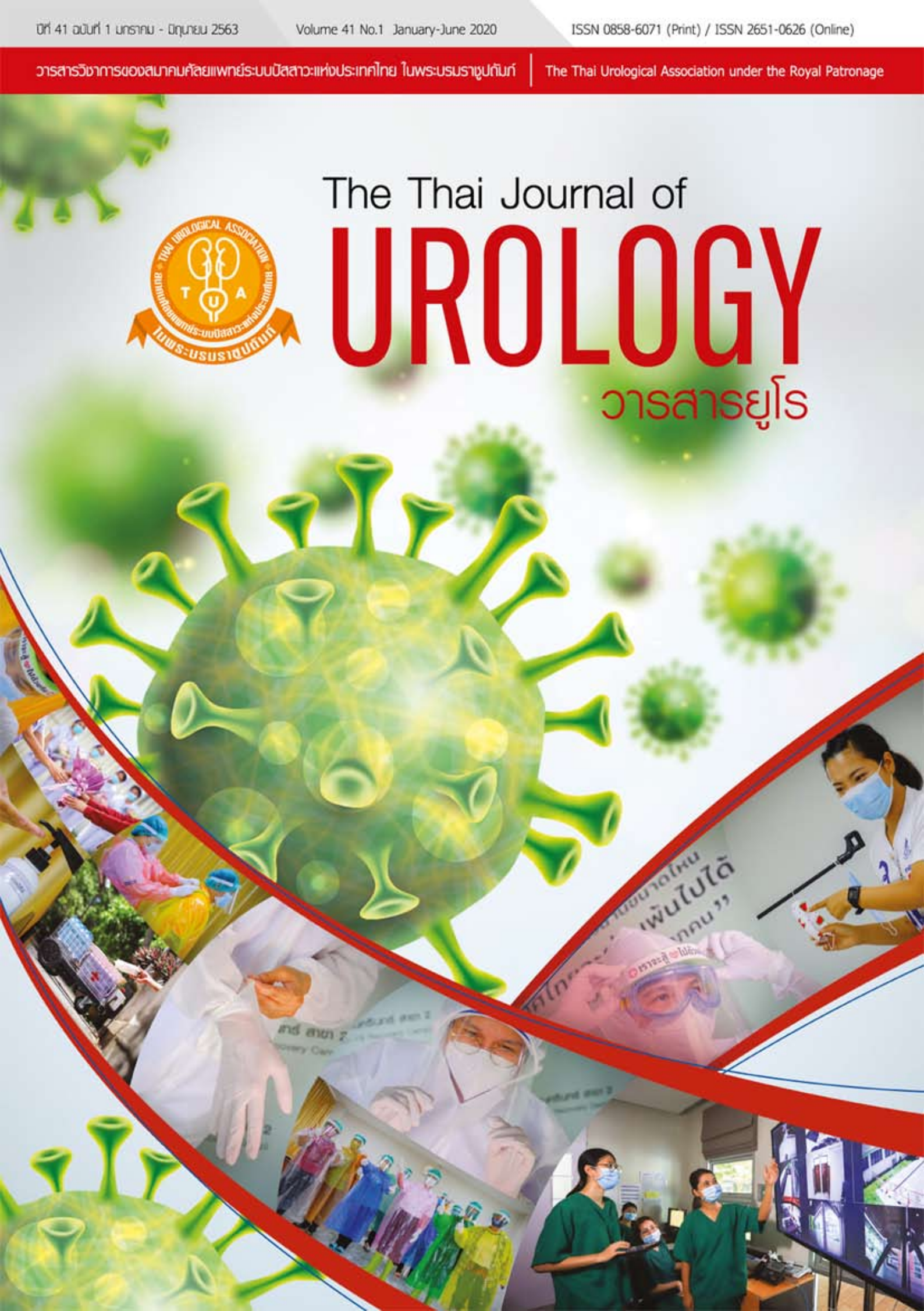

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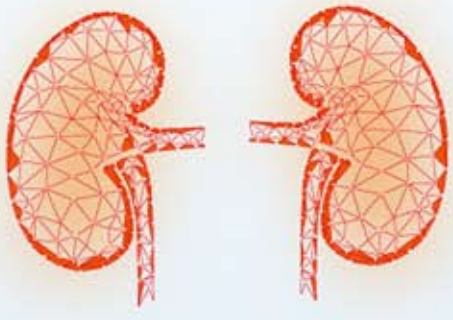

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2. To propose academic discussions in urology
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Contents

Contents

Original Article

Detection of circulation tumor cells from peripheral blood in patients with urothelial carcinoma

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Keywords:
Circulatory tumor cells, urothelial cancer

Abstract

Objective: The study was designed to detect CTC in bladder and urothelial cancer patients and find the association of CTC with the staging and grading of urothelial cancer.

Material and Method: Peripheral blood of bladder cancer patients who underwent operations from 2014 to 2015 was collected before the operations. Detection of circulating tumor cells used the quantitative reverse transcription polymerase chain reaction (qRT-PCR) method, using cytokeratin 20 (CK20) (GenBank accession number X73501).

Result: Twenty-seven patients were enrolled in the study; the CK20 gene was detected in every patient's peripheral blood. CTC was higher in >T2 stage compared to the lower stages, but not significantly (0.0056 vs 0.0107, p-value 0.057). Tumor patients who had a high-grade tumor had a higher CTC in their blood significantly compared to patients with low-grade tumors (0.0087 vs 0.0025, p-value 0.006). There was no significant difference in CTC when comparing gender and urine cytology.

Conclusion: CTC is correlated with bladder cancer. CTC of patients with high-grade tumors was found to be significantly higher than in the lower-grade group.

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Introduction

Bladder cancer has become a globally common cancer, bringing with it important causes of morbidity and mortality. The incidence of bladder cancer has been increasing, with an estimated 386,300 new cases in 2008; 430,000 new cases were diagnosed in 2012[1,2]. Transitional cell carcinoma is the most common histological type of bladder cancer. Approximately 95% of primary urothelial cell cancers arise from the bladder, and only a few cases originate from other sites within the urinary tract, such as the renal pelvis and ureter[3-5].

The unique characteristics of bladder cancer are its high recurrence rate, which is up to 80% in high-grade NIBC, and the implantation of the tumor together with the field change effects responsible for explanations[6]. Multifocal lesions are another problem, which make bladder cancer even more challenging to treat. The diagnosis and surveillance follow-up are comprised of the cystoscopy, as per the guidelines[7]. However, the procedure needs experienced hands for the detection of small, viable tumors, and the compliance of patients is problematic because of the busy cystoscopy schedule, even though ancillary equipment was launched for assistance in documenting the presence of tumors during cystoscopy[8]. Nevertheless, the availability of its use is still limited and translation of its findings also requires experienced staff. Urine cytology is one of the less invasive investigations, and is considered for additive parameters, such as the detection of the presence of any significant tumors[9] and circulating tumor cells (CTC), which have been reported as invaluable for bladder tumor detection, and may also be associated with higher stage, non-organ confined diseases[10].

Over the years, many technologies have been utilized in an attempt to identify CTC. The detection of CTC has been well demonstrated in breast, colon, prostate and several other malignancies[11-14], and a variety of methods for detecting CTC have been developed, including nested RT-PCR, which utilizes 2 pairs of PCR primers to amplify a single locus. PCR-based methods are considered highly sensitive. They are also able to demonstrate strong specificity via the design of primers that detect the mRNA expression of tumor-specific genes, such as cytokeratin (CK)-20, uroplakin (UP) II, mucin 7 (MUC7)[15] and epidermal growth factor receptors (EGFR)[16]. There is a study that determined that the expression of CK20 and mucin 7 can be correlated between histological techniques, with an RT-PCR of 95.8%[17,18]. Our purpose was to validate the evidence of CTC in urothelial cancer cases.

Material and Method

A prospective study of bladder cancer patients who underwent surgery was conducted at Songklanagarind Hospital from November 2014 to March 2015. Exclusion criteria included: patients with a history of other cancers, emergent operations, and previous treatment with chemo-radiotherapy. Patient demographic data, family history, and clinical features were collected. The peripheral blood and urine were also collected the day before surgery.

Detection of CTC used the quantitative reverse transcription polymerase chain reaction (qRT-PCR) method, using cytokeratin 20 (CK20) (GenBank accession number X73501) and mucin7 (MUC-7) (GenBank accession number NM_001145006) as marker genes, with cyber Green as the detection system. After collection, each blood sample was stored in a refrigerator in the Central Research Laboratory, Rat-Pratanratnikorn Building, Faculty of Medicine, PSU, and further processed within 24 hours. To separate plasma and cell components, each sample of un-clotted blood was centrifuged at 3,000 rpm for 5 minutes. The plasma supernatant was then aspirated and stored at -80°C. The remaining cell components were subjected to red blood cell lysis, leaving a pellet of white cells, and tumor cells (if any) at the bottom of the tube. The pellet was then re-suspended, with RNA storage media (RNA later) and frozen at -80°C until extraction.

RNA extraction was performed from pellet and plasma fractions, using a RNA extraction kit. Quantity of extracted RNA was estimated using the spectrophotometry method with a Nano-drop spectrophotometer. Quality of the mRNA was evaluated by RT-PCR, of a house keeping gene (GAPDH). An aliquot of RNA equivalent to 1 microgram was used for cDNA construction, using random hexamer and MMLV reverse transcriptase. Each 20 microliters of qRT-PCR reaction consisted of a PCR master mixture, 1 microliter of each specific primer, cyber green and 1 microliter of cDNA sample (to be optimized). The result, in terms of Ct value, was quantitated with RNA from a serial dilution of a urothelial cell carcinoma cell line, as described below.

The qRT-PCR was standardized through both copy number standardization and cancer cell number standardization. In brief, 2 standard curves were constructed. One was plotted between the log copy number and the Ct, while the other was plotted between the log cell number and the Ct value.

Urothelial cancer cell lines used in this study were RT4 and 486P (ATCC, Manassas, Va.), which represent grade 1 and grade 4, respectively. Both cells are propagated in RPMI1640 x standard mammalian cell culture condition (5% CO_2 in 37°C incubator). An amount of 108 cells of each cell line was suspended in 1mL of phosphate-buffered saline, and serially diluted 10 to 108 times. One milliliter of each diluted sample was added to 50 mL of urine, from a healthy volunteer, and subjected to the RT-PCR assay described above.

Patient demographic data and clinical features are reported as mean $\pm$ SD. Categorical variables were analyzed using a Chi-square test, and comparisons of quantitative variables between groups via the use of Student's t test. $p<0.05$ for a 2-tailed test was considered significant. The accuracy of RBG is shown in sensitivity and specificity. Statistical analysis used program R version 2.15.1.

Result

In our population of 26 patients, all had a positive detection of CK20. The surgical procedure included either TUR-BT or radical cystectomy with urinary diversion. Endoscopic surgery with TUR-BT was responsive in almost 80% of cases. Median age was 68.57 years (range from 47-86) and most were male, accounting for 84.6% of the population. Most patients were diagnosed during an early stage of the tumor (T1 or less). Patient characteristics are demonstrated in Table 1.

Positive CTC tended to be related with muscle-invasive bladder cancer (MIBC). However, there was no statistical significance (0.0056 vs 0.0107, p-value 0.057, Figure 1). Interestingly, when compared with the grading of tumors, the results showed that patients with high-grade tumors had significantly higher CTC in their blood than patients with low-grade tumors (0.0087 vs 0.0025, p-value 0.006, Figure 2). There was no significant difference in gender and urine cytology in correlation with the CTC result.

Table 1. Patient characteristics

		Patients	P value
Age (years)	<60	5	
	60-75	14	
	>75	7	
Gender	Male	22	
	Female	4	
Tumor category			0.057
	Ta/Tis/To	5	
	T1	15	
	T2/T3	6	
Tumor Grade			0.006
	Low	10	
	High	13	
Cytology	Positive	8	
	Negative	6	

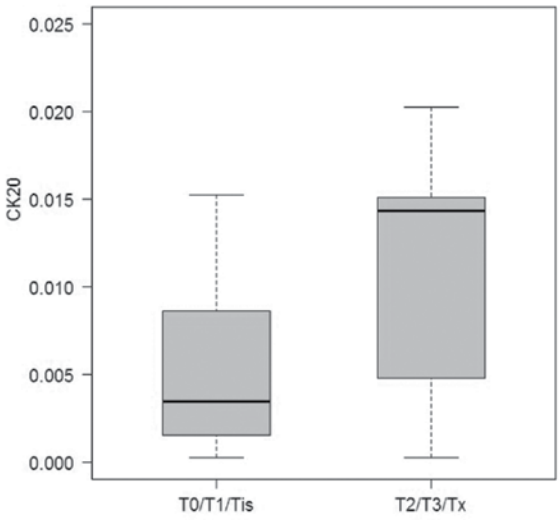

Figure 1. Determination of Circulatory Tumor Cells (CTCs), with tumor stage.

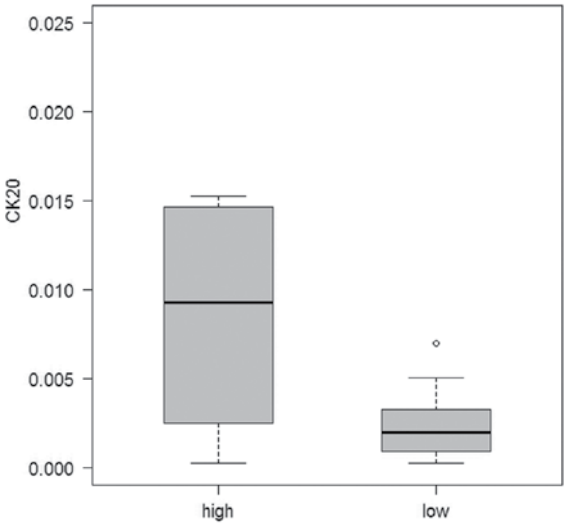

Figure 2. Determination of Circulatory Tumor Cells, (CTCs) with tumor grading.

Conclusion

Bladder cancer presents mostly with non-muscle invasive diseases and has a lower impact with cancer-specific survival. However, the risk of recurrence is high, having been reported as up to 78%. Importantly, risk of disease progression was almost 50% and later leads to cancer morbidity and mortality[19]. Early detection of the tumor will improve disease control, quality of treatment, and lead to lower morbidity. Clinical signs and symptoms always cause a delay in the diagnosis of bladder cancer, and this is always problematic. Therefore, diagnosis during the early period of the disease, coupled with the provision of providing therapeutic treatment, will increase the life expectancy of patients[20]. Urinary cytology has demonstrated a strong correlation with high-grade urothelial cancer, but there is still limited evidence of low-grade tumor detection. Yafi et al.[21] reported a sensitivity of 16% for low-grade bladder tumor, despite detection being as high as 84% for high grades of the disease.

The detection of tumor-like cells in peripheral blood was first reported in 1869 by Ashworth[22]. Additionally, reports on the detection of CTC inothers cancers may serve as prognostic factor for survival, as well as positive lymph node involvement[23-25]. CTC helps in the diagnostics of the presence of tumors, which is demonstrated clearly in breast cancer and is useful for surveillance[26]. A meta-analysis has demonstrated the correlation between the presence of positive CTC and poor prognosis of castrated-resistant prostate cancer (CRPC) patients[27]. In addition, the presence of CTC is valuable, and can be considered as a surrogate marker for micrometastasis[28]. The monitoring for treatment outcomes may therefore be better than a radiographic response[29,30]. The usefulness of this technique is its accurate staging; furthermore, it is appropriate for follow-ups, including monitoring after surgery.

CTC correlation with urothelial cancer was reported in 2007 by Naoe et al.[31], and has since become well known. Our study demonstrated the detection of CTC in all patients, which is different from other studies, which had about one-third detection[32]. Most of the studies included patients with a high grade of the disease in more than half of the populations[32-34]. Moreover, a previous study, from Miller et al.[34], demonstrated the value of CTC in terms of predicting

progression-free and overall survival when compared with the current standard of care. While the recurrence rate depends on multiplicity, tumor size and the prior recurrence rate, this progression was based on tumor grade, stage, and CIS components[32,35]. This corresponds with our findings, in that all CIS components are related to high-grade tumors. The urine cytology was positive in 75% of CIS cases. CTC is also related with the aggressiveness of the disease, which was revealed by the strong positive in high-grade urothelial cancer. The association of CTC with higher tumor stage and higher grades of the disease was demonstrated in our study, in much the same way as previously published studies[36,37].

In the future, CTC may be one of the tools that help in the diagnostic process of urothelial cancer surveillance. The test may also replace current invasive diagnostic procedures while enhancing the compliance of patients, physicians, and economy. The aggressiveness of urothelial cancer can also be predicted by this procedure.

Conflict of interest

The authors declare no conflict of interest.

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Original Article

Diagnostic value of pre-operative imaging for pheochromocytoma

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Keywords:
Pheochromocytoma, pre-operative imaging, adrenalectomy

Abstract

Objective: This study aims to investigate the predictive value of preoperative imaging findings for pathological outcomes by comparing preoperative imaging findings with pathological results.

Material and Method: From 2006-2018, 58 adrenal PCC patients underwent adrenalectomy at King Chulalongkorn Memorial Hospital (KCMH). Patients were divided into PCC and non-PCC groups by pathological results. Preoperative imaging (CT and/or MRI) was retrospectively reviewed by a uro-radiologist who classified patients into imaging suggested PPC (group 1) and imaging non-suggested PCC (group 2). Imaging criteria for suggested PCC in this study were defined as 1. hypervascularity on CECT scan: detected focus of high attenuation more than 140 HU on portovenous phase; 2. high SI on T2W as compared to adjacent renal cortex SI and 3. hypervascularity mass with uptake MIBG scan. Diagnostic value of preoperative imaging for PCC diagnosis was reported in sensitivity, specificity, PPV, NPV, and ROC area.

Result: Forty-six patients (79%) were PCC and 12 patients (21%) were non-PCC. According to imaging findings, 38 patients (66%) were group 1 and 20 patients (34%) were group 2. In group 2, 8 patients were PCC and 12 patients were non-PCC. Sensitivity of preoperative imaging to the diagnosis of PCC was 82.6% (95% CI, 0.68-0.92), specificity was 100% (95% CI, 0.73-1.0), PPV was 100% (95% CI, 0.9-1.0), NPV was 60% (95% CI, 0.36-0.8) and ROC area was 0.91% (95% CI, 0.86-0.9).

Conclusion: Preoperative imaging with a new threshold of HU offers excellent specificity and PPV to detect PCC.

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Introduction

Pheochromocytoma (PCC) is a rare catecholamine-secreting tumor derived from chromaffin cells in the adrenal medulla. Prevalence of PCC in hypertensive patients is 0.1-0.6%[1,2]. Autopsy series found an undiagnosed tumor rate of 0.05-0.1%[3-5]. Untreated PCC has high morbidity and mortality from cardiovascular events as the result of catecholamine hypersecretion.

Biochemical tests and imaging studies are the standard diagnostic tools for PCC. Biochemical test for the diagnosis of PCC is the measurement of serum and urine catecholamine and their products. After a positive biochemical test, tumor localization is performed by imaging study, mainly computed tomography (CT) scan or magnetic resonance imaging (MRI) study[6-8].

From CT scan, PCC typically has rapid enhancement after contrast injection and has variable washout pattern. However, in routine clinical practice, most PCC has a non-adenoma criteria, which is Hounsfield units (HU) >10 in unenhanced CT scan, absolute percentage washout [APW] <60% and relative percentage washout [RPW] <40%)[8-11]. From a systematic review and meta-analysis, only 35% of PCC met the criteria for adrenal adenoma[12]. A threshold criterion such as HU >110 or >130 in the venous phase has been reported for a more specific diagnosis of PCC in recent studies[12-16].

From MRI scan, PCC usually has hyposignal intensity in T1-weighted images and hypersignal intensity in T2-weighted images. However, 35% of PCC had atypical or nonspecific signals in T2-weighted images. Classical homogeneous high signal intensity, which is isointense to cerebrospinal fluid (CSF), was found in only 11%[18].

Treatment of PCC is mainly the surgical removal of the tumor, which is a minimally invasive adrenalectomy at present. Preoperative patient preparation and postoperative care are also important steps in PCC treatment[6,7].

In our practice, we have occasionally found that the pathological report was not PCC after adrenalectomy. The purpose of this study is to investigate the predictive value of preoperative imaging studies for pathological outcome by comparing imaging findings with pathological results.

Material and Method

This retrospective study was approved by the Institutional Review Board of Research Affairs, Faculty of Medicine, Chulalongkorn University. We reviewed medical data from patients who were diagnosed with adrenal PCC and underwent adrenalectomy from all surgical approaches at King Chulalongkorn Memorial Hospital (KCMH).

From 2006-2018, 68 patients were diagnosed with PCC by positive biochemical tests and imaging study. Ten patients were excluded from this study because of incomplete imaging data. Therefore, 58 patients were included in this study; 24-hrurine metanephrine and normetanephrine levels were measured by the High Performance Liquid Chromatography (HPLC) technique. All patients were well-prepared due to discontinuing the medication associated with false positive results before the test.

We divided the patients into the PCC group and the non-PCC group, according to the pathological results. Preoperative imaging (CT and/or MRI) was retrospectively reviewed by a uro-radiologist who classified patients into imaging suggested PPC (group 1) and imaging non-suggested PCC (group 2). Imaging criteria of the mass that suggested PCC in this study was defined as 1. hypervascularity on CECT scan: detected focus of high attenuation more than 140 HU on portovenous phase; 2. high SI on T2W as compared to adjacent renal cortex SI, and 3. hypervascularity mass with uptake MIBG scan.

Statistical Analysis

Continuous variables were presented by median (25^{th} percentile - 75^{th} percentile) and categorical data were presented by number (%). Wilcoxon rank sum test was used to compare the median between the groups and Chi square test or Fisher's exact was used to compare the categorical data. The sensitivity, specificity, positive predictive value (PPV), negative predictive value and area under Receiver Operating Characteristic (ROC) curve for PCC imaging diagnostics were evaluated.

Statistical significance was defined as $p<0.05$. STATA version 15.1 (Stata Corp LP, Texas 77845 USA) was used to perform all statistical analyses.

Result

Patient demographic data are presented in Table 1. There were 46 PCC patients (79%) and 12 non-PCC patients (21%) who were followed up to pathological results. The PCC group had significantly lower BMI (p=0.002) and larger tumor size (p=0.03) than the non-PCC group. There was no significant difference in level of 24-hr urine metanephrine and normetanephrine between the groups.

Pathological outcomes in the non-PCC patients are shown in Table 2. Preoperatively, CT scan was performed in 39 patients, MRI was performed in 7 patients, CT scan and MRI were performed in 4 patients, CT scan and MIBG scan were performed in 7 patients, and MRI and MIBG scan were performed in 1 patient.

According to imaging criteria, 38 patients (66%) were classified into group 1 (suggested PPC) and 20 patients (34%) were classified into group 2 (non-suggested PCC). In group 2, 8 patients were PCC and 12 patients were non-PCC (Table 3). Sensitivity of preoperative imaging findings to detect PCC was 82.6% (95% CI, 68-92), specificity was 100% (95% CI, 73-100), positive predictive value was 100% (95% CI, 90-100), negative predictive value was 60% (95% CI, 36-80), and ROC area was 0.91% (95% CI, 0.86-0.90) (Figure 1) (Table 4).

Discussion

Pheochromocytoma (PCC) has a wide range of clinical presentations, from asymptomatic disease (29-57%) to uncontrolled hypertension and hypertensive crisis[17]. Nearly 5% of PCC was detected as adrenal incidentaloma6.

Current clinical guidelines recommend all patients with suspected PCC are initially evaluated by biochemical tests. Although plasma free metanephrines and urine fractionated metanephrines have high diagnostic accuracy, these tests are strongly influenced by many factors, such as postures or medications6. Therefore, false positive biochemical results in adrenal incidentaloma will be diagnosed as PCC and lead to unnecessary surgery.

We investigated the diagnostic value of pre-operative imaging for PCC. CT and MRI scan are the first-choice imaging modality for locating tumors after biochemical test. The unenhanced CT scan and washout pattern are most commonly used for diagnosis PCC with 90-100% sensitivity and 70-80 specificity%[6]. Recent studies have reported that venous enhancement with HU greater than 110 or 130 offers more specificity than the washout criteria. For MRI scan, the overall sensitivity is 90-95% and specificity is 50-97%[15,17].

In this study, both BMI and tumor size were also related with PCC. PCC diagnosis was significantly higher in thinner patients (median BMI 23 vs 27.7) and large tumor size (5 vs 3.1 cm). Levels of metanephrines and normetanephrines were not associated with PCC diagnosis. For CT scan, we used a new level of HU>150 in the portal venous phase instead of 110 or 130. This offers 100% specificity and PPV to detect PCC but low NPV to exclude PCC (60%). These findings may lead to further prospective studies to identify the predictive factors for surgical outcomes by using the preoperative imaging data combined with other preoperative factors.

Table 1. Patient characteristics.

	Total (N=58)	PCC (N=46)	Non-PCC (N=12)	P
Median (IQR) Age	47 (36 - 57)	46 (34 - 55)	53 (39.5 - 67)	0.14
Gender		0.36		
Male	27 (46.55)	20 (43.48)	7 (58.33)	
Female	31 (53.45)	26 (56.52)	5 (41.67)	
Median (IQR) BMI	23.3 (20.8 - 25.6)	23 (20.8 - 24.5)	27.7 (24.8 - 29.4)	0.002
BMI group				0.001
• < 18.5	7 (12.07)	7 (15.22)	0 (0)	
• 18.5-22.9	18 (31.03)	16 (34.78)	2 (16.67)	
• 23-24.9	17 (29.31)	16 (34.78)	1 (8.33)	
• ≥ 25	16 (27.59)	7 (15.22)	9 (75)	
Median (IQR) Size	4.4 (3 - 7)	5 (3.4 - 7)	3.1 (1.6 - 3.9)	0.03
Side				0.86
• Right	25 (43.86)	20 (44.44)	5 (41.67)	
• Left	32 (56.14)	25 (55.56)	7 (58.33)	
Median (IQR) Metanephrine	231.2 (131.6 - 405.7)	257 (137 - 406.4)	216 (111 - 316.2)	0.20
Median (IQR) Normetanephrine	621.6 (423.61 - 987.2)	565.2 (420.51 - 1103)	738.7 (509.31 - 911)	0.75

Table 2. Pathologic outcomes in the non-PCC group.

Pathology report	N
Adrenal cortical adenoma	6
Adenomatoid tumor	2
Intra-adrenal medulla organizing hematoma	1
Adrenal medullary hyperplasia	1
Neoplasm with necrosis	1
Poorly differentiated neuroblastoma	1

Table 3. Preoperative imaging and pathological diagnosis.

Pheochromocytoma (n)	Imaging suggest PCC (n)		Total
	Yes	No	
• Yes	38	8	46
• No	0	12	12
Total	38	20	58

P-value <0.001

Table 4. Performance of imaging suggested for diagnosis of pheochromocytoma.

	%	95%CI	
Sensitivity	82.6	68.6	92.2
Specificity	100	73.5	100
Positive predictive value	100	90.7	100
Negative predictive value	60	36.1	80.9
ROC area	0.91	0.86	0.97

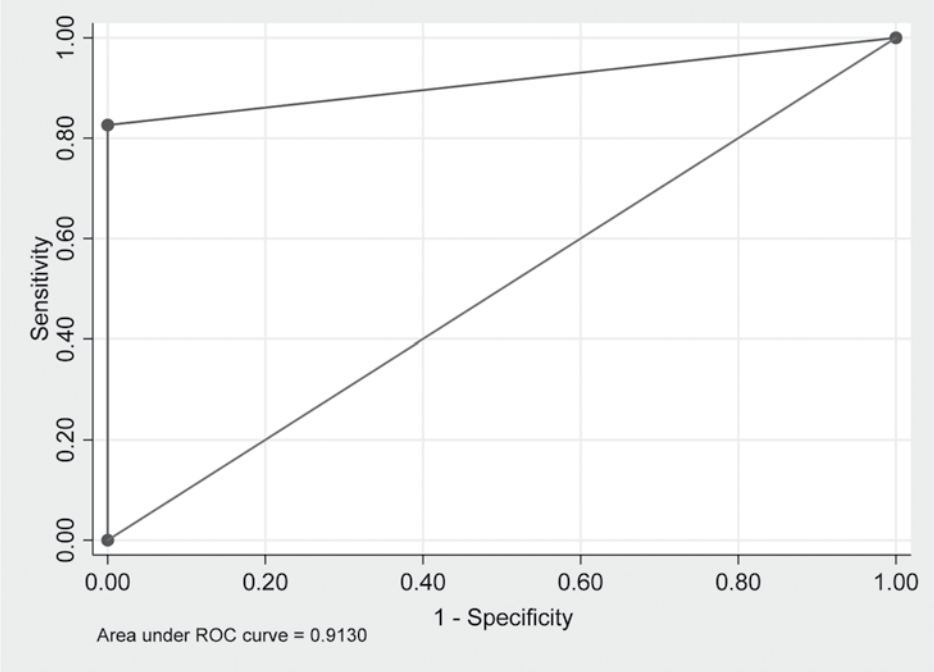

Figure 1. Shows sensitivity and area under ROC curve for the imaging suggested for pheochromocytoma diagnosis.

The limitations of this study include its retrospective design. The imaging studies were interpreted by a single uro-radiologist, resulting in a lack of interobserver reliability. Lastly, there was a small number of patients due to the low incidence of PCC. A multicenter study with a high volume of patients would have more powerful results.

Conclusion

Preoperative imaging with a new threshold of HU offers excellent specificity and PPV to detect PCC.

Conflict of interest

The authors declare no conflict of interest.

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Original Article

Is open pyeloplasty still the first choice of operation for ureteropelvic junction obstruction in children?

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Keywords:
Ureteropelvic junction obstruction, Open-dismembered pyeloplasty

Abbreviations:
UPJO = Ureteropelvic junction obstruction, OP = Open-dismembered pyeloplasty, HN = hydronephrosis, EBL = estimated blood loss

Abstract

Objective: To show the results of the treatment of childhood ureteropelvic junction obstruction (UPJO) in Ramathibodi Hospital in order to identify the best current treatment for patients with this condition.

Material and Method: We retrospectively reviewed the medical records of 28 children submitted to open-dismembered pyeloplasty (OP) between May 2006 and Sep 2015. Patient demographic characteristics, pre and postoperative degree of hydronephrosis (HN) based on the measurement of the antero-posterior (AP) diameter of the renal pelvis, success rate assessed by a change in the degree of HN or renal function and symptom relief, operative time, length of hospital stay, estimated blood loss (EBL), size (length) or site of surgical wound, and complication rate were recorded. A successful outcome was defined according to postoperative radiological improvements in HN by ultrasound, renal function by diuretic renal scintigraphy and without clinical symptoms.

Result: A total of 31 pyeloplasties in 28 patients were identified. The mean operative time was 115 ($\pm$12.12) minutes and the mean EBL was 5.83($\pm$1.91) ml. The mean hospital stay was 5.5 ($\pm$0.63) days. Postoperative ultrasound examination showed a diminished grade of HN and decreased AP diameter of the renal pelvis. The overall success rate was 93.5%.

Conclusion: Our results confirm that OP is within an acceptable range with a short learning curve. We conclude that OP is still the gold standard for the surgical treatment of childhood UPJO in this era. Other aspects, such as surgical costs and patient satisfaction, require further assessment.

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Introduction

Ureteropelvic Junction Obstruction (UPJO) is one of the most common congenital abnormalities of the urinary tract with a reported incidence of 5:100,000 annually[1]. Although the majority of cases of hydronephrosis (HN) diagnosed prenatally eventually resolve, a significant number of UPJO cases remain and thus require urologic evaluation[2].

The gold standard for treating UPJO is considered to be open-dismembered pyeloplasty (OP)[3], which has been shown to have high success rates (80-97.5%) in several studies[4]. However, with the widespread use of minimal invasive surgeries in the past two decades, endoscopic procedures for the treatment of UPJO, such as endopyelotomy and percutaneous pyelolysis, were introduced by Wickam Kellet[5], Badlani and Smith[6], and Inglis and Tolley[7] between 1980 and 1990. Success rates in patients with primary UPJO treatment with endoscopic procedures were between 62-70%[8,9]. Laparoscopic pyeloplasty was first performed by Schussler[10] in 1993, and robotic assisted laparoscopic pyeloplasty was performed by Sung in 1999[11]. The success rate of laparoscopic pyeloplasty was between 95.9-97.2%[12,13].

The aim of this review is to show the results of the treatment of childhood UPJO in Ramathibodi Hospital in order to identify the best current treatment for patients with this condition.

Material and Method

We retrospectively reviewed the medical records of 28 children submitted to OP whose medical data met our requirements between May 2006 and September 2015. Only patients with an age under 15 years old with UPJO were included in the study. Children with other associated KUB anomalies and incomplete records were excluded from this study. The indications for pyeloplasty were UPJO, with either increasing HN, progressive worsening of split renal function (split renal function <40% or a worsening of >10 percentage points) in the diuretic renal scintigraphy (DTPA or MAG3) or symptoms (recurrent urinary tract infections or flank pain). The pyeloplasty technique used was dismembered pyeloplasty. The JJ stent was removed using a cystoscope at a mean of 4 weeks after surgery. In follow-up, renal ultrasounds were performed consecutively 1, 3, 6, 12, and 24 months after surgery to evaluate the grade of renal HN and anteroposterior (AP) diameter of the renal pelvis. If the follow-up ultrasound image showed either persistent or increased HN, diuretic renal scintigraphy was used to identify whether the patients had obstructive uropathy. Patient demographic characteristics, pre and postoperative degree of HN based on the measurement of the AP diameter of the pelvis, success rate assessed by a change in the degree of HN or renal function and symptom relief, operative time, length of hospital stay, estimated blood loss, size (length) or site of surgical wound and the complication rate were recorded. A successful outcome was defined according to postoperative radiological improvements in HN by ultrasound, renal function by diuretic renal scintigraphy and without clinical symptoms.

Result

A total of 31 pyeloplasties in 28 patients were identified. Patient characteristics are summarized in Table 1. The mean operative time was 115 ($\pm$12.12) minutes and the mean EBL was 5.83 ($\pm$1.91) ml. The mean hospital stay was 5.5 ($\pm$0.63) days. Postoperative ultrasound examination showed a diminished grade of HN and a decreased AP diameter of the renal pelvis. Operation details and outcomes are summarized in Table 2 and Figure 1. Only 1 patient experienced stricture of the anastomosis after the OP. One patient who had a persistent moderate to severe degree of HN while the JJ stent was indwelled had the same renal function and t1/2 compared with prior to the operation; thus, the JJ stent was removed and the patient was followed-up. One patient had a decreased degree of HN after follow-up with ultrasound. However, this patient developed smaller kidney size after follow-up for 4 years. The overall success rate was 93.5%. The drain in 2 patients could not be removed because

of accidentally fixing it with the suture; these patients required reoperation for exploratory laparotomy with drain removal.

Discussion

For many decades UPJO was treated using the open pyeloplasty technique, which remains the standard treatment. The advantages of this operation include excellent exposure of the UPJ, familiar anatomy for essentially all urologists, the ability to tailor the renal pelvis as needed, and the performance of a watertight anastomosis. The main changes offered to minimize the invasiveness of open surgery include the reduction of bleeding during surgery, smaller surgical scars, less pain following surgery, and a faster return to normal activity. Indeed, pediatric urologists are able to correct this benign disease through a small flank incision with a low percentage of complications and a short in-hospital stay. The impact of OP in the adult population is probably different, with cosmetic results particularly relevant for young women. Concerning the preferable approach for performing pyeloplasty in pediatric patients with UPJO, a meta-analysis of comparative studies demonstrated overlapping results between laparoscopic or robot-assisted and open pyeloplasty in terms of success rates, complication rates and hospitalization. The only advantage in favor of minimally invasive pyeloplasty remains a shorter operative time than OP in adults, but not in children[14].

For the different approaches, almost all the outcomes could be influenced by the experience of the surgeons. To attempt a real equal comparison, the entire operation should be performed by 1 specified surgeon in order to adjust for the potential effects of the learning curve. But in most of the studies included, pyeloplasty was not performed by the same experienced surgeon from the same surgical team. This may have created biased results to a certain degree.

Indeed, pure laparoscopic and particular robotic approaches can be more technically complex in younger and smaller pediatric patients. Moreover, available data seems to demonstrate no significant benefit to infants and children in preschool and grade school from a laparoscopic or robotic approach over an open procedure performed through a small skin incision[15]. In addition, to minimize adverse events difficult to justify for a benign disease, these younger patients should not be treated during the learning curve period. Pediatric surgeons less exposed to laparoscopic or robotic procedures should adopt a specific training program. This is the only sure method for making laparoscopic or robot-assisted pyeloplasty safe and efficient, achieving comparable results with open surgery in children[16].

Our study reveals that a number of patients required more time for the HN to resolve than other patients. Some patients from our study had an improved degree of obstructive uropathy identified by reducing t1/2 and improving differential renal function despite persistent HN. Some patients experienced worsening renal function in spite of the decreased degree of HN; all of these patients may have had renal dysplasia before the surgery.

In Thailand, the length of hospital stay among the different types of operations, such as OP, laparoscopic pyeloplasty, and endopyelotomy, may not be different because of the culture of Thai patients who require complete recovery before hospital discharge. Furthermore, surgical costs also remain an important consideration for patients in developing countries like Thailand.

However, the present study has several limitations: First, this was a retrospective study which analyzed only a small population of patients. Some of the patients had incomplete data for analysis. Further studies should be randomized controlled trials in order to compare the different types of surgery for the correction of UPJO.

The gold standard for treating UPJO is considered to be OP. However, with widespread minimally invasive surgeries, endoscopic procedures for the treatment of UPJO, such as endopyelotomy and percutaneous pyelolysis, were performed with acceptable success rates. Laparoscopic pyeloplasty and robotic assisted

laparoscopic pyeloplasty were also performed by many urologists with high success rates. However, We found that the OP technique is still the gold standard for the surgical treatment of childhood UPJO in this era.

Conclusion

Our results confirm that OP is within an acceptable range with a short learning curve. We conclude that OP is still the gold standard for the surgical treatment of childhood UPJO in this era. Other aspects, such as surgical costs and patient satisfaction, should be assessed further.

Conflict of interest

The authors declare no conflict of interest.

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Original Article

Prevalence of erectile dysfunction among obstructive sleep apnea patients

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Keywords:
Obstructive sleep apnea, erectile dysfunction, aging

Abstract

Objective: The purpose of this study was to evaluate the prevalence of ED among OSA patients in Ramathibodi Hospital.

Material and Method: A cross-sectional study was conducted of 299 male patients who underwent diagnostic polysomnography for suspected OSA between November 2016 and April 2017. Every patient gave informed consent and completed the Thai Hospital Anxiety and Depression Scale, Epworth sleepiness scale, STOP-BANG Sleep Apnea Questionnaire, and the validated Thai version of the IIEF-5 questionnaire before undergoing polysomnography.

Result: Two hundred ninety-nine patients who underwent sleep lab polysomnography were included in the analysis. OSA was diagnosed in 93% of the patients. The overall prevalence of ED in men diagnosed by impaired IIEF-5 score was 178 patients (59.53%). Aging, diabetes, hypertension, body mass index and sleep lap parameters including apnea hypopnea index, respiratory disturbance index and arousal index were significantly increased in the ED group compared with the non-ED group ($p<0.005$). Multivariate logistic regression analysis showed aging and apnea hypopnea index were independent risk factors for ED (OR of 1.04 (95%CI 1.01-1.07) and 1.02 (95%CI 1.00-1.03), respectively).

Conclusion: These data indicate that OSA and the related intermittent hypoxia during sleep were associated with impaired erectile function. OSA can be used as a risk factor for ED.

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Introduction

Erectile dysfunction (ED) occurs when patients cannot achieve and maintain an erection sufficient to engage in sexual activity. This may lead to stress, low self-confidence, and relationship problems[1]. There are many risk factors for ED, including aging, stroke, depression, anxiety, hypertension (HT), Peyronie's disease, dyslipidemia, diabetes mellitus (DM), peripheral vascular disease, and relationship problems[2]. The prevalence is estimated at 49.69% globally[3] and 37.5% in the Thai population[4].

Obstructive sleep apnea (OSA) is a breathing disorder in which the airway is obstructed due to upper airway collapse during sleep[5]. A diagnosis of OSA requires overnight polysomnography to detect the frequency of airway obstruction events during sleep. The apnea-hypopnea index (AHI) measures the number of apnea or hypopnea events per hour. An AHI score of 5 or greater with symptoms or an AHI score of 15 or greater without symptoms denotes OSA[6]. Research has suggested that OSA may be a risk factor for stroke, DM, heart failure, and myocardial infarction[7]. It induces oxidative stress through repetitive hypoxia, which decreases nitric oxide levels[8]. Nitric oxide plays an important role in erectile function, so low nitric oxide levels may cause ED[9]. Oxidative stress can damage the microvasculature of the entire body, including that of the penis. Impaired vascular supply to the penis may also cause ED[10]. In addition, OSA can cause fatigue and depression, which may both involve ED[11]. Common comorbidities that cause both ED and OSA include DM and HT[12]. The purpose of this study was to evaluate the prevalence of ED among obstructive sleep apnea patients at Ramathibodi Hospital.

Material and Method

Subjects

All men admitted to the sleep lab of Ramathibodi Hospital at Mahidol University for polysomnography between November 2016 and April 2017 were invited to take part in this cross-sectional study. Patients received an informed consent form, the International Index of Erectile Function (IIEF-5) questionnaire, the Thai hospital anxiety and depression scale, the Epworth sleepiness scale (ESS), and STOP-BANG sleep apnea questionnaire. The Thai version of the IIEF-5 questionnaire has been validated and published, showing good reliability[13]. Demographic data recorded include age, body mass index (BMI), and neck, waist, and hip circumference; comorbidities recorded include DM, HT, history of stroke, chronic kidney disease, dyslipidemia, cardiovascular disease, and benign prostatic hyperplasia. This study was approved by the Ethics Committee at Ramathibodi Hospital before enrollment.

The International Index of Erectile Function (IIEF-5), Thai version

The IIEF-5 is a questionnaire used for screening ED patients. It is composed of 5 questions regarding erectile function and sexual satisfaction. A score of 22-25 points represents the absence of ED, 17-21 represents mild ED, 12-16 points represents mild to moderate ED, 8-11 represents moderate ED, and 5-7 points represents severe ED. It has been validated for use in the Thai language[13].

Polysomnography (PSG)

Polysomnography is used for the diagnosis of OSA[14]. Overnight polysomnography was performed on all patients. According to established criteria, mild, moderate, and severe OSA were defined by an AHI of 5-15, 16-29, and greater than or equal to 30, respectively[14].

Statistical Analysis

Statistical Package for the Social Sciences was used to analyze statistical data. We used the median to describe general measurements. Then, we used the Chi-square test to evaluate the association between non-continuous variables and the Mann Whitney U test to evaluate the association between continuous variables. To adjust for possible confounding factors, we used multivariable logistic regression analysis. Results were considered statistically significant at $p<0.05$.

Result

Patient demographic data were analyzed. The median age was 46 years and the median BMI was 28.76. Of the 299 patients, 92 (30.77%) had dyslipidemia, 95 (31.77%) had HT, 41 (13.71%) had DM, and 3 (1.00%) had cardiovascular disease. A history of stroke and/or cerebrovascular accident was identified in 5 (1.67%). In total, 19 (6.99%) patients did not fit the criteria for OSA, while 38 (13.97%) fit the criteria for mild OSA, 57 (20.96%) for moderate OSA, and 158 (58.09%) for severe OSA. The prevalence of ED was 59.53%. Of these patients, 98 (32.78%) had mild ED, 56 (18.73%) had mild to moderate ED, 15 (5.02%) had moderate ED, and 9 (3.01%) had severe ED.

Polysomnographic parameter analysis is described in Table 1. Results showed that AHI, respiratory disturbance index, and arousal index were significantly higher in the ED group than the non-ED group ($p<0.005$). Time of desaturation below 90% of oxygen saturation was also significantly higher in the ED group than the non-ED group ($p<0.005$). The median lowest desaturation was 83% and 85% in the ED group and non-ED group, respectively, and this difference was statistically significant. Participant AHI scores during non-REM sleep were significantly higher in the ED group than in the non-ED group, but this was not the case during REM sleep. The median continuous positive airway pressure (CPAP) titration was 9 cmH_2O in the ED group compared with 8 cmH_2O in the non-ED group.

Results of univariate analysis are shown in Table 2. Aging was significant and directly related to the presence of ED (OR (CI 95%) of 1.03 (1.01-1.05) at a p-value of 0.003). In addition, DM and HT were associated with ED (OR (CI 95%) of 2.34 (1.10-4.98) at a p-value of 0.027 and OR (CI 95%) of 1.74 (1.04-2.91) at a p-value 0.034, respectively). Finally, BMI and waist circumference were significantly associated with ED (OR 1.07 (1.02-1.21) and 1.03 (1.01-1.05), respectively). There was no association between dyslipidemia (p=0.569), cardiovascular disease (p>0.99), stroke and cardiovascular event (p=0.398), benign prostatic hyperplasia (p=0.06), and chronic kidney disease (p=0.65). Past smoking habits also showed no association (p=0.67). The Thai hospital anxiety and depression scale, ESS, and STOP-BANG sleep apnea questionnaire also showed no associations.

Multivariate analysis results are shown in Table 2. Age and AHI were independent risk factors for ED (OR of 1.04 (95%CI 1.01-1.07) and 1.02 (95%CI 1.00-1.03), respectively). In contrast, DM (p=0.977), HT (p=0.778), BMI (p=0.406), waist circumference (p=0.876), and lowest oxygen saturation (p=0.935) were not considered independent risk factors for ED.

Discussion

From the literature review, several studies confirmed that the prevalence of ED was higher in OSA patients than in those without OSA. Schmidt and Wise were the first to suggest a relationship between these 2 conditions[15]. Next, Guilleminault et al. suggested that 48% of men with OSA had low libido and ejaculatory dysfunction[16]. Hirshkowitz et al. and Seftel et al. also suggested this relationship[17,18.] In the present study, we found that 59.53% of OSA patients had ED, supporting most prior publications.

We found that the higher the age, the higher the prevalence of ED, and this relationship was statistically significant. Therefore, we considered this an independent risk factor, which supported previous literature. Moreover, the present data confirmed that AHI score was an independent risk factor for ED. Higher AHI scores were associated with a higher degree of OSA. Therefore, this was considered an independent risk factor for ED. In addition, ED risk increased with increasing severity of OSA, which induced more oxidative stress[19].

Univariate analysis showed that HT and diabetes were associated with ED. However, an association between these parameters was not confirmed with multivariate analysis. Aging may have been a confounding factor that caused this situation[2]. We could not find any association between dyslipidemia and ED. It is possible that the incidence

Table 1. Characteristics and sleep parameters of patients with normal and impaired erectile function.

Variables parameter	Normal IIEF = 22-25 (N = 121)	Impair IIEF = 5-21 (N = 178)	P-value
General measures (dimension): median (min, max)			
Age (years)	43 (22, 74)	49 (23, 73)	0.002*
Body mass index (BMI) (kg/m^2)	25.9 (17.7, 52.1)	27.8 (19.1, 79.7)	0.001*
Neck (cm.)	39 (34, 48)	40 (31, 109)	0.013*
Waist (cm.)	92 (77, 144)	98 (71, 183)	0.001*
Hip (cm.)	100 (82, 144)	103 (78, 194)	0.023*
HADS	6 (2, 16)	5 (2, 18)	0.7425
Sleep efficiency: median (min, max)			
AHI	29 (0.4, 102)	50 (1.1, 143)	<0.001*
RDI	37 (1.3, 102)	53 (1.1, 143)	0.001*
$\%O_2$ saturation<90	0.5 (0, 41.1)	2.1 (0, 47)	<0.000*
lowest O_2 saturation	85 (25, 96)	83 (34, 96)	0.005*
AHI rem sleep	22 (0, 80)	24 (0, 122)	0.5394
AHI non-rem sleep	26 (0, 110)	50 (0, 143)	0.001*
PLM index	0 (0, 67)	0 (0, 52)	0.5557
Arousal index	35.5 (3.4, 103)	51 (0, 128)	0.011*
CPAP	8 (0, 16)	9 (0, 18)	0.009*
General measures (dimension): mean ± standard deviation			
ESS (score)	10.8 + 4.7	11.6 + 4.8	0.241
STOP-Bang score	2.5 + 1.0	2.5 + 1.0	0.649
Smoking history: n (%)			
Nonsmokers	104 (39.4)	160 (60.6)	0.391
Current smokers (roll/day)	7.4 + 4.8	8.2 + 6.0	0.678
Comorbidities: n (%)			
Diabetes	10 (24.4)	31 (75.6)	0.024**
Dyslipidemia	35 (38.0)	57 (62.0)	0.569
Hyperetnsion	30 (31.6)	65 (68.4)	0.033**
Cardiovascular disease	1 (33.3)	2 (66.7)	>0.999
Stroke, Cerebrovascular Accident	3 (60.0)	2 (40.0)	0.398
Benign Prostatic Hyperplasia	2 (15.4)	11 (84.6)	0.060
Chronic kidney Disease	1 (25.0)	3 (75.0)	0.650

HADS: Hospital Anxiety and Depression Scale, AHI: Apnea hypopnea index, RDI: respiratory disturbance index, PLM: periodic leg movements, CPAP: Continuous Positive Airway Pressure, ESS: Epworth Sleepiness Scale.

Table 2. Result of univariate and multivariate logistic regression analyses for characteristics and sleep parameters of erectile function.

Dependent variable	Independent variable	Univariate analyses		Mult variate analyses	
		Odds ratio (95% CI)	P-value	Odds ratio (95% CI)	P-value
Age	EF	1.03 (1.01-1.05)	0.003*	1.04 (1.01-1.07)	0.006*
AHI	EF	1.02 (1.01-1.03)	0.001*	1.02 (1.00-1.03)	0.011*
Diabetes	EF	2.34 (1.10-4.98)	0.027	1.01 (0.40-2.55)	0.977
Hypertension	EF	1.74 (1.04-2.91)	0.034	1.10 (0.56-2.15)	0.778
Body mass index	EF	1.07 (1.02-1.21)	0.002*	1.04 (0.95-1.14)	0.406
Lowest sat	EF	0.97 (0.95-0.99)	0.007	1.00 (0.97-1.03)	0.935
Waist circumference	EF	1.03 (1.01-1.05)	0.003*	1.00 (0.96-1.04)	0.876

AHI: Apnea hypopnea index, EF: erectile function

* p-value denotes statistical significance ($p<0.05$).

of dyslipidemia was underestimated in our study, because we relied on patient reports rather than blood tests. We found significant associations between polysomnographic parameters, showing that an increase in AHI increased the prevalence or severity of ED. Multivariate logistic regression analysis showed that the severity of OSA increased the prevalence of ED.

This study had some limitations. This was a cross-sectional study and thus we do not know whether erectile function may improve after the treatment of OSA. However, we are working to follow up these participants in order to evaluate their erectile function after treatment with CPAP.

Conclusion

The prevalence of ED in OSA patients was 59.53%. Determinants of ED included age and degree of OSA, which constituted independent risk factors for ED. In addition, DM, HT, and BMI had statistically significant associations with ED. Avoiding OSA risk factors and treatment of OSA might improve ED. However, future prospective studies are still needed to confirm our results.

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Conflict of interest

The authors declare no conflict of interest.

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Original Article

Renal function after donor nephrectomy at a tertiary medical center in Southern Thailand

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Keywords:
Kidney transplantation, donor nephrectomy, renal function

Abstract

Objective: The aim of this study was to assess long-term renal function after living donor nephrectomy and determine the optimal follow-up period.

Material and Method: A retrospective review of living donor kidney transplantation (LDKT) patients who underwent open donor nephrectomy. Clinical chart review was performed. Kidney function was measured before and after surgery. We assessed donor kidney function using the estimated Glomerular filtration rate (eGFR) through the Cockcroft and Gault formula. The evaluation of kidney function after surgery was performed at 1 week, 1 month, 3 months, 6 months, and 12 months. Rate of renal function decline was analyzed and compared with the baseline.

Result: A total of 50 kidney donor patients were identified; the mean age of kidney donors was 39.18 (11.37) years old. The mean of eGFR before surgery was 92.4 (26.0) ml/min/1.73 m^2. After surgery eGFR at 1 week, 1 month, 3 months, 6 months and 12 months was 66.8 (18.3) ml/min/1.73 m^2, 66.8 (21.0) ml/min/1.73 m^2, 65.8 (18.6) ml/min/1.73 m^2, 69.4 (17.4) ml/min/1.73 m^2, 70.0(16.0) ml/min/1.73 m^2 respectively. Kidney function was reduced and returned to a new baseline at 6 months after surgery. The overall new baseline eGFR decreased 22.6% from eGFR at pre-donation.

Conclusion: Renal function declined after open donor nephrectomy. Change in renal function is not associated with gender. New baseline of eGFR will occur at 6 months after surgery.

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Introduction

The prevalence of patients with end-stage renal disease (ESRD) is an increasing trend. Most patients with ESRD are treated with renal replacement therapy (RRT), but the best treatment for this patient is kidney transplantation. At the same time, the waiting lists for cadaveric donor kidney transplantation continue to grow. Living donor kidneys may be an alternative for patients in order to receive kidneys for transplantation[1]. Living donor kidney transplantation has clear benefits for the recipient, including better renal function and longer patient quality of life[2]. The effect of kidney donation on the donor's physical well-being is an important issue. After nephrectomy, the remaining kidney will normally increase its filtration rate to 70% of the pre-donation level[3,4]. Knowledge in compensatory response to nephrectomy may be important data in the guidance of treatment for donor patients. In Songklanagarind Hospital, we have performed kidney transplantation for some time, but we have limited data regarding the results of renal function in donor patients after donor nephrectomy. The aim of this study was to determine the renal function and relative decrease in estimated Glomerular filtration rate (eGFR) after kidney donation.

Material and Method

Ethical approval for the study was obtained from the Institutional Review Board of Songklanagarind Hospital. The medical records of all living kidney donor patients in Songklanagarind Hospital from 1997 to 2016 were reviewed.

A total of 50 kidney donor patients were identified and met all entry criteria. All data were obtained by reviewing the patient histories, imaging studies, and operative records, as well as discharge summaries. Patients and factors which may be related to kidney function include age, weight, height, body mass index (BMI), and blood pressure; basic laboratory results were also reviewed. We assessed donor kidney function using eGFR through the Cockcroft and Gault formula. Renal recovery patterns were analyzed and compared with the rate of change postoperatively, which depended on time.

A Student's T-test was used to compare categorical data and continuous variables, with a $p<0.05$ considered to indicate statistical significance.

Result

Characteristics of the donor cohort

A total of 50 living related kidney transplantations were performed; 23 of them (46%) were male. Mean age (SD) at the time of nephrectomy was 39.18 (11.37) years old, aged between 18 to 60 years old. Mean time for follow-up was 9.7(4.3) months. Characteristic are described in Table 1. Mean BMI of patients was 24.27(4.51) kg/m^2. Five patients were identified as obese by BMI>30 kg/m^2. Male patients had higher BMI than female patients (24.6 kg/m^2 VS 23.8 kg/m^2). Forty-two of 50 patients donated Lt kidney to their relation. At the time of medical follow-up and examination, none of the donor patients was diagnosed ESRD and received RRT.

Table 1. Kidney donor preoperative characteristics.

Age (years)	39.18 ± 11.37
Sex (male:female)	23:27
BMI (kg/m^2)	24.47 ± 4.51
Baseline eGFR (ml/min/1.73 m^2)	92.4 ± 26.0
Mean time follow up (months)	9.7 ± 4.3
Operated side (right:left)	8:42
Blood loss (ml)	247.6 ± 160.4

Abbreviations

BMI for Body Mass Index, eGFR for estimated Glomerular Filtration Rate.

Baseline renal function and renal function outcome after donation

Table 2 shows the results of renal function before and after donation. Mean eGFR before donation was 92.4 (26) ml/min/1.73 m^2. Baseline GFR was higher in males than females (97.5 ml/min/1.73 m^2 VS 87.7 ml/min/1.73 m^2). After donation, Mean eGFR at 1 week, 1 month, 3 months, 6 months and 12 months was 69.0 (1.1) ml/min/1.73 m^2, 69.2 (20.8) ml/min/1.73 m^2, 71.9 (21) ml/min/1.73 m^2, 74.5 (20.9) ml/min/1.73 m^2, 70.0 (16.0) ml/min/1.73 m^2 respectively. In both men and women, eGFR was reduced by approximately 28.3% in the first week with a maximum decrease from baseline in the first month (30.3% decrease from baseline) and then gradually increased within six months, but still decreased 22.6% from baseline eGFR (shown in Table 2 and Figure 1). eGFR in males after donation was higher than females (Figure 2), but the rate of change in eGFR was not significant after surgery when comparing the sexes.

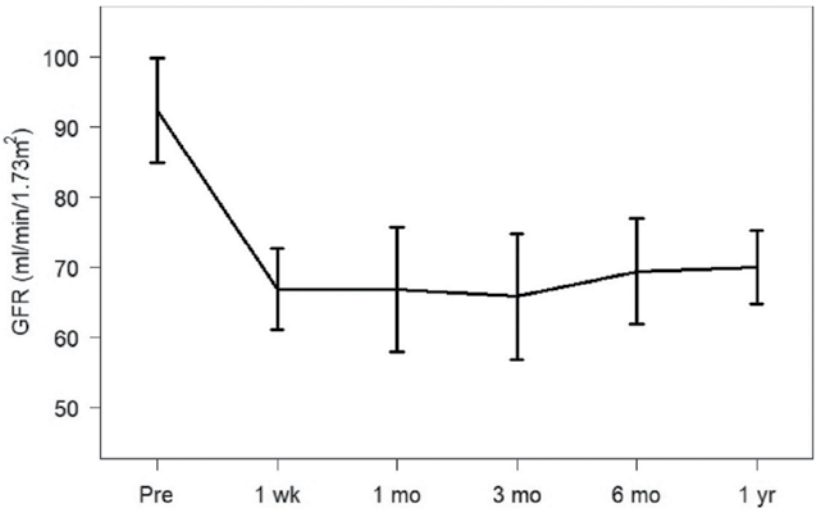

Figure 1.
Overall estimated Glomerular Filtration Rate after donation.

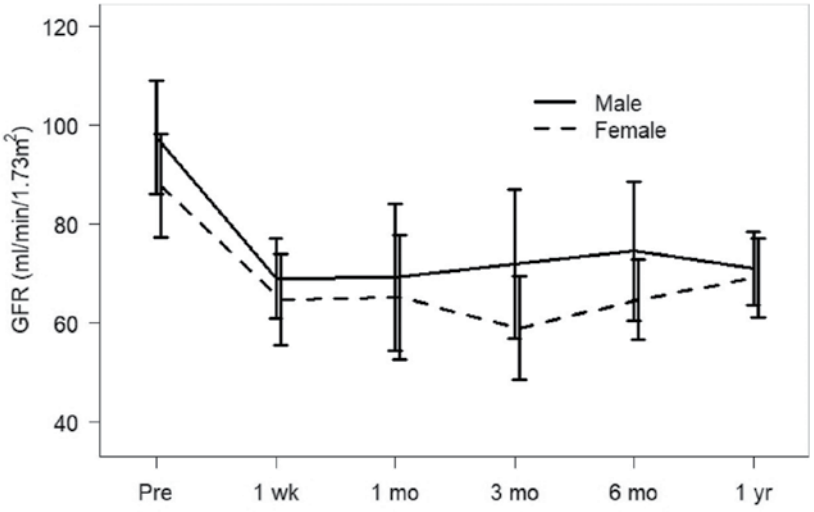

Figure 2.
Comparison of estimated Glomerular Filtration Rate after donation between males and females.

Table 2. eGFR depended on time after donation and percentage change.

	eGFR				Percentage change in eGFR from baseline			
	overall	Male	Female	P value	overall	Male	Female	P value
Baseline (SD)	92.4(26.0)	97.5(26.4)	87.7(25.2)	0.195	0	0	0	-
1 week (SD)	66.8(18.3)	69.0(17.1)	64.7(19.5)	0.466	-28.3(8.9)	-30.0(8.9)	-26.5(8.7)	0.221
1 month (SD)	66.8(21.0)	69.2(20.8)	65.1(21.8)	0.644	-30.3(8.2)	-33.1(4.3)	-28.3(9.8)	0.164
3 months (SD)	65.8(18.6)	71.9(21.0)	59.0(13.6)	0.134	-28.2(7.4)	-32.1(6.7)	-23.9(5.9)	0.012
6 months (SD)	69.4(17.4)	74.5(20.9)	64.7(12.6)	0.185	-22.6(11.9)	-26.0(5.7)	-19.2(15.5)	0.184
12 months (SD)	70.0(16.0)	71.0(14.4)	69.1(17.5)	0.726	-22.0(9.6)	-21.3(8.8)	-22.7(10.5)	0.679

Abbreviations: eGFR for estimated GlomerularFiltration Rate (ml/min/1.73 m^2).

Discussion

Renal deterioration after donor nephrectomy is a serious problem. Demonstrating the cause and risk factors is important and can prevent renal failure in donor patients. The risk for the donor to develop ESRD is 0.1-0.5%[5]. In our study there was not a significant rate of change in eGFR after surgery when comparing sexes. In the same way, most studies cannot demonstrate the effect of sex in kidney deterioration after nephrectomy[6,7]. Although in some studies it was reported that the female sex was associated with a decrease in renal function after donation[8,9]. Mjøen G et al. reported that old age, the male sex, and being overweight were associated with relative increases in serum creatinine after nephrectomy[3]. In the same way, Giessing M reported that the male sex, donor age, and African-American ethnicity are risk factors for ESRD[10].

Our study also showed the eGFR trend to decrease after donation and then slightly increase to a new baseline within 6 months. This result correlates with the result from a previous study. Fehrman-Ekholm I et al. reported that renal function improved for many years after donor nephrectomy, but slightly deteriorated in the long run[11]. Choi KH et al. also reported that renal function began to stabilize at the first month after live donor kidney transplantation[12].

There are several limitations in our study. It is retrospective and dependent on incomplete data that may affect the accuracy of the results. There is no consensus program for follow-up or imaging protocols for kidney donors after donation. The urine protein was not routinely checked or monitored in our cohort. A weakness of this study is that its duration was not long enough for observation. We believe these data could be useful in identifying risk, and determining the best treatment strategy for protecting patients who are likely to develop kidney deterioration.

Conclusion

Renal function declined after open donor nephrectomy. However, it improved over time and eGFR would reset to a new baseline 6 months after donation. Finally, the rate of change in renal function after donation is not associated with sex.

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Conflict of interest

The authors declare no conflict of interest.

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Original Article

Role of rectal swab culture in prevention of infectious complications following transrectal ultrasound guided prostate biopsy

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Keywords:
Antibiotic prophylaxis, prostate, biopsy, fluoroquinolones, drug resistance, rectal swab

Abstract

Objective: To evaluate the efficacy of targeted antimicrobial prophylaxis in decreasing infectious complications in men who underwent transrectal ultrasound guided prostate biopsy based on rectal swab culture results.

Material and Method: Between July 2016 and September 2018 we compared the incidence of infectious complications in men who received a targeted versus a standard empirical prophylaxis antibiotic before undergoing a transrectal ultrasound guided prostate biopsy. The targeted prophylaxis antibiotic was selected from the cultures of the rectal swab plated on selective media containing ciprofloxacin to identify fluoroquinolone resistant bacteria. We identified men with infectious complications within 14 days after standard transrectal ultrasound guided prostate biopsy.

Result: Sixty-two patients received targeted antimicrobial prophylaxis based on the outcome of the rectal swab culture while a comparison group of 62 patients received empirical FQ prophylaxis. Fifty out of the 62 (80.6%) men in the targeted antibiotic group harbored FQ resistant organisms. Four (6.4%) had infectious complications, but at just a low level (fever, UTI). In contrast, 7 (12%) of the 62 men who received FQ prophylaxis had infectious complications, 2 of whom (4%) had sepsis. There was no statistically significant difference in infection rate between the groups.

Conclusion: Targeted antimicrobial prophylaxis based on the findings of a rectal swab culture had a tendency to decrease post TRUSBx infectious complications, but the differences were not statistically significant.

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Introduction

Transrectal ultrasound guided prostate biopsy (TRUSBx) is a commonly performed procedure used for the detection of prostate cancer. Infectious complications following TRUSBx Bx are well-described[1]. Puncture of the rectal wall with the potential for transfer of pathogens from the rectum into the sterile prostate gland or surrounding tissue during TRUSBx appears to be the principal occurrence leading to infection. A variety of infectious complications have been reported following TRUSBx, including urinary tract infection (UTI), prostatitis, blood stream infection (BSI), and severe sepsis and death[2].

The most common pathogen implicated in post TRUSBx infectious complications is E. coli, accounting for approximately 75%-90% of cases[3]. Antibiotic prophylaxis with fluoroquinolone (FQ) before TRUSBx has been shown to significantly decrease the rates of infectious complications compared to placebo (8% vs 25%)[4]. However, recent studies have highlighted an increasing trend in infectious complications due to FQ resistant organisms among men undergoing TRUSBx[3].

Prevalence rates for colonization with FQ resistant organisms in this population have been reported to be as high as 22%[5]. Nevertheless, more than 90% of urologists continue to use FQ empirically for antimicrobial prophylaxis before TRUSBx[6]. The increasing prevalence of infections with FQ resistant bacteria in men undergoing TRUSBx suggests that empirical FQ prophylaxis may be ineffective in some patients.

Rectal swab cultures obtained before TRUSBx allow for the isolation and identification of FQ resistant organisms present in the native intestinal flora of the patient. Several retrospective studies have suggested that rectal swab cultures before biopsy can prove useful in the selection of appropriate antimicrobial agents for prophylaxis and treatment of TRUSBx associated infections[5,7,8]. Although these studies have used this method to establish prevalence rates and risk factors for FQ resistant organisms, there have been no published randomized controlled studies to evaluate the use of rectal swab cultures to target appropriate antimicrobial prophylaxis. In this study we compared rates of post-TRUSBx infection in men who received targeted vs empirical antimicrobial prophylaxis.

Material and Method

Between July 2016 and September 2018, men who underwent TRUSBx at the Department of Surgery, Maharaj Nakorn Chiang Mai Hospital, Faculty of Medicine, Chiang Mai University were recruited onto the study. Inclusion criteria were age >18 years with an elevated PSA level and/or abnormal digital rectal examination (DRE). Exclusion criteria were contraindications for TRUSBx, such as uncorrected coagulopathy, severe immunosuppression or recent UTI/prostatitis. All patients were informed about the study and written informed consents were obtained before TRUSBx. This study was approved by the Research Ethics Committee of the Faculty of Medicine, Chiang Mai University (Study code: SUR-2559-03810).

Randomization

The design of randomization used in this study was the block of four. Patients were randomized into 2 groups: receipt of standard empirical prophylaxis or targeted antimicrobial prophylaxis. Empirical prophylaxis included 500 mg of ciprofloxacin. The first dose was administered 2 hours before and the second dose 12 hours after the procedure. Targeted prophylaxis included antimicrobial choices based on rectal swab culture results.

Intervention

The swabs were cultured on McConkey agar plates containing ciprofloxacin 5 μg/ml at least 7 days before the procedure in order to enable the identification of FQ resistant organisms. All microbiological processes were conducted by the Department of Microbiology, Faculty of Medicine,

Chiang Mai University.

All patients received a Unison® enema the night before the procedure and were not obligated to fast beforehand. Biopsies were performed with the patient in the left decubital position using a biopsy gun with a disposable biopsy needle in conjunction with a medical ultrasound console. The specimens taken included 10-12 cores of needle biopsies from both the lateral and the medial part of the prostate base, middle and apex.

Following the TRUSBx procedure all patients were asked to return to the hospital if they had a fever higher than 38°C, severe pain, prolonged hematuria or exacerbation of lower urinary tract symptoms. The decision for readmission was considered in each case by a urological consultant.

Data collection

Telephone follow-up was used to identify patients who had complications within 14 days after TRUSBx. Information regarding the following symptoms and conditions was collected: hemospermia, hematuria, rectal bleeding, fever >38°C, prostatitis, epididymitis, UTI, sepsis, and other complications requiring hospitalization or ambulatory treatment. Infectious complications were defined as the secondary conditions that developed after TRUSBx, including fever, prostatitis, UTI or sepsis.

Statistical Analysis

Normally distributed continuous variables were analyzed using a Student's t test. The non-normally distributed variables were analyzed using a Mann-Whitney U test. A Chi-square test was used for the analysis of categorical data. Finally, univariable and multivariable analysis were performed by risk ratio regression to identify any correlation between the variety of risk factors and the incidence of post TRUSBx infection; $p<0.05$ was considered statistically significant. All statistical analyses were performed using standard statistical software (STATA version 12.0).

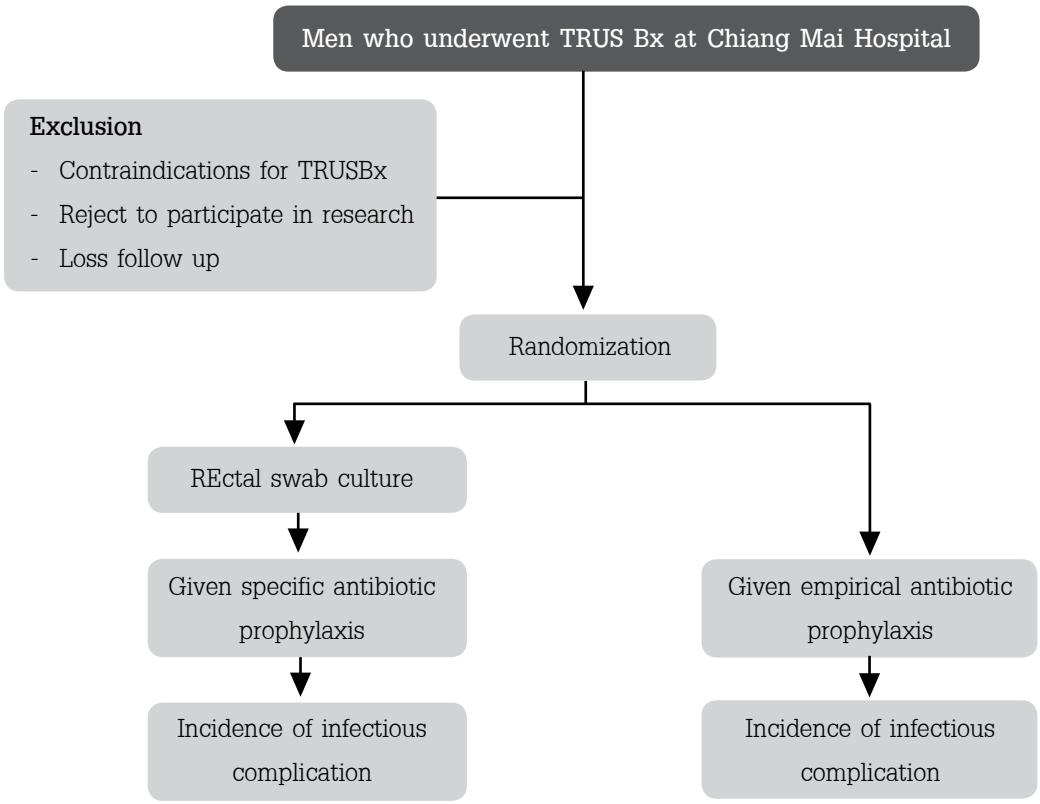

Figure 1. Flow diagram of Research.

Result

Background characteristics

A total of 124 patients who underwent TRUSBx were included in this analysis. Sixty-two patients underwent a rectal swab and 62 patients did not. Baseline characteristics are summarized in Table 1. There were no statistically significant differences between the baseline characteristics of the 2 groups.

In the group who had the rectal swabs before TRUSBx, 50 out of the 62 patients (80.6%) harbored FQ resistant organisms. All patients in this group received the targeted antimicrobial prophylaxis approach.

Post TRUSBx infection

Only 3 patients (5%) had infectious complication but just a low level (UTI). In contrast, 7 (12%) of the 62 men undergoing the procedure without culture had infectious complications; 2 of these (4%) had sepsis. Both patients had FQ resistant E.coli identified from the hemoculture.

Other complications in patients who underwent the rectal swab before TRUSBx were: 13 hematuria (21.3%), 3 hemospermia (4.9%), and 6 rectal bleeding (9.8%). In the non-rectal swab patient group, the complications were: 7 hematuria (14%), 1 hemospermia (2%), and 2 rectal bleeding (4%).

The correlation between rectal swab and post TRUSBx infection are shown in Table 2. There was no significant difference in infection rate between the 2 groups (rectal swab v.s non-rectal swab; p-value = 0.099) in both the univariate and multivariate analysis. Despite there being no statistically significant difference, a trend of preventing infectious complications in patients who received targeted antibiotics was observed.

Table 1. Clinical characteristics between rectal swab and non-rectal swab groups.

Parameter	No rectal swab N=62	Rectal swab N=62	P-value
Age, Meam ± SD	68.69 ± 7.69	66.39 ± 7.88	0.125
Prior urologic procedure, n(%)	14(22.58)	18(29.03)	0.539
Prior antibiotic in 6 mo, n(%)	14(22.58)	15(24.19)	1.000
Prior hospitalization in 6 mo, n(%)	8(12.90)	8(12.90)	1.000
Prior TRUSP, n(%)	7(11.29)	7(11.29)	1.000
No. of Core biopsy, Meam ± SD	9.97 ± 0.85	10.35 ± 1.52	0.082
Prostate volume, Meam ± SD	41.42 ± 26.02	36.89 ± 18.31	0.264
PSA level, Meam ± SD	86.65 ± 213.78	209.32 ± 738.0	0.839

Table 2. Correlation between infectious complication and additional parameters.

	Infectious complication	No infectious complication	Risk Ratio (95% CI)	p-value
Rectal swab	3 (5.08%)	59	0.33 (0.09-1.23)	0.099
Non rectal swab	7 (12.72%)	55		

Risk factors of post TRUSBx infection

Additional characteristics were analyzed in order to find any correlation with post TRUSBx infection, includ history of urologic procedure, antibiotic usage in 6 months, hospitalization in the previous 6 months, and prostate volume >30 ml. The correlation outcomes are summarized in Table 3. The only factor which had a significant correlation with post TRUSBx infectionwas a prostate volume >30 ml (0.26, CI 0.07-0.98; p-value = 0.047). The implication from this is that a prostate volume <30 ml is a significant risk factor for post TRUSBx infection.

Discussion

Previous studies have demonstrated that infectious complications in patients who underwent TRUSBx could be reduced by using targeted antimicrobial prophylaxis based on the findings from rectal swab cultures vs traditional empirical FQ prophylaxis. Symptomatic infectious complications including UTI rates of 2% - 8%[6] and sepsis of between 0.1% - 2.2% were reported among patients undergoing empirical prophylaxis with FQ[10]. In this study, the incidence of infectious complications was lower among patients undergoing targeted vs empirical prophylaxis (5% vs 12%). Sepsis, one of the most serious infectious complications, was found in the empirical FQ prophylaxis group (4%), but it was not found in the group with targeted prophylaxis based on a rectal swab culture. The overall rate of infectious complications, including sepsis, among patients undergoing empirical prophylaxis with fluoroquinolone in our study was higher than those in the published literature. That might be from the higher rate of FQ resistance in our study (50 out of 62 patients, 80.6%). Based on our findings, only 25 men needed to undergo a rectal swab culture to prevent potentially deleterious infectious complications. The benefit of carrying out a routine rectal swab before TRUSBx needs to be weighed against the cost of both the rectal swab culture and targeted prophylaxis (approximately 10 USD / case). One of disadvantages of the targeted approach is the delay required to obtain culture results (approximately 1 week), leading to a delay in the prostate biopsy.

A limitation of this study is the relatively small number of patients from a single institution. In addition, the true prevalence of FQ resistant organisms in the empirical population is unknown as these patients did not undergo rectal swab for screening.

Table 3. Correlation of rectal swab screening and post TRUSBx infections.

Parameters		Infectious complication	No infectious complication	Risk Ratio (95% CI)	p-value
Prior urologic procedure	Yes	2	30	0.57	0.475
	No	8	84	(0.12-2.62)	
Prior antibiotic used in 6 mo	Yes	3	26	1.09	0.895
	No	7	88	(0.29-4.03)	
Hospitalization in 6 mo	Yes	3	13	2.89	0.368
	No	7	101	(0.83-10.06)	
Prostate volume > 30 ml	Yes	3	66	0.26	0.047
	No	7	48	(0.07-0.98)	

Based on 80.6% of the rectal swabs in the empirical prophylaxis group being colonized with FQ resistant organisms before TRUSBx, It is reasonable to assume that there would have been infectious complications in many of these patients. However, intriguingly, only 7 patients (12%) experienced infectious complications. Possible reasons for the disparity between our observed and expected outcomes could include the differences in host immunity, procedural techniques, and bacterial inoculum. It is clear from our study and from the findings of other investigators that antimicrobial prophylaxis choice is not the only factor that determines whether infectious complications will develop after TRUSBx[11].

Conclusion

Targeted antimicrobial prophylaxis based on the outcome of rectal swab cultures was associated with a reduction in the incidence of infectious complications caused by FQ resistant organisms post TRUSBx. This suggests that the screening of rectal swab cultures before TRUSBx is beneficial and should be performed before this common procedure.

Acknowledgement

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Conflict of interest

The authors declare no conflict of interest.

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Original Article

Detection rate of transperineal template-guided prostate biopsy in patients with persistently elevated PSA and prior negative biopsies

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Keywords:
Transperineal template-guided prostate, PSA, negative biopsies

Abstract

Objective: To evaluate the cancer detection rate of transperineal template-guided biopsy in patients with persistently elevated PSA and prior negative biopsies. Moreover, the evaluation of the complication rate of this biopsy method is a secondary endpoint.

Material and Method: A retrospective review was performed of a total 35 patients with at least one prior TRUS biopsy who underwent transperineal-templated guided biopsy from 2014 to 2017. Standard template of brachytherapy material and transrectal ultrasound were fused together to confirm the accuracy of needle biopsy position. Space between the needles was 0.5 cm as a standard template.

Result: Patients had a mean 2.09 (range 1-5) prior biopsies. Average PSA was 16.02 ng/mL (range 5.57-53). Cancer was detected in 16 (45.7%) of 35 patients. Prostate cancer was found at the posterior apex of the prostate in 5 patients (31.25%), the anterior base in 4 (25%), the anterior apex of the prostate in 4 (25%), the posterior base of the prostate in 2 (12.5%), and the medial of the midgland in 1(6.25). Gleason score was 3+4 or higher in 12 patients (80%) and 3+3 or lower in 3 (20%). Average number of cores was 33.18 (range 20-45). Average PSA density in the cancer group was 0.38 ng/mL/g (range 0.15-0.62); 25 patients (71.42%) had no complications, 3 (8.57%) had urinary retention, 3 (8.57%) had UTI, 3 (8.57%) had gross hematuria, and 1 (2.86%) had epididymo-orchitis. No patient with septicemia was found. Patients in the cancer group had higher PSA density than the non-cancer group.

Conclusion: Transperineal template-guided biopsy is an effective and promising technique for the diagnosis of prostate cancer in patients with persistently elevated PSA and prior negative biopsies with a low complication rate. Most cancer cases were detected at the apex and base of the prostate.

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Introduction

Nowadays, transrectal ultrasound-guided biopsy (TRUS biopsy) is the gold standard initial biopsy strategy. However, there is a lack of high sensitivity and specificity. In repeat biopsy patients, the detection rate is lower than for first time biopsy patients. Negative TRUS biopsy does not exclude a diagnosis of prostate cancer. Undiagnosed prostate cancer may cause anxiety and mental problems for patients.

Currently, there are many strategies to approach those patients proposed by many recent guidelines, such as the transperineal approach[1-4]. We reviewed this technique and it had a lower infection rate and higher cancer detection rate compared to TRUS biopsy. However, it also had a higher urinary retention rate.

The transperineal approach is one of the strategies for prostate biopsy. In this study we aimed to evaluate its use in patients with persistently elevated prostate specific antigen (PSA) and prior negative prostate biopsies. Here, we report our experience with the use of transperineal template-guided prostate biopsy for such patients.

The first objective in this study was the cancer detection rate of saturated transperineal template-guided prostate biopsy in patients with persistently elevated PSA and prior negative biopsies. The second objective was the complication rate of transperineal template-guided prostate biopsy.

Material and Method

This study design is a retrospective review of all the patients who underwent saturated transperineal template-guided prostate biopsy in Phramongkutklao Hospital from 2014-2017. The inclusion criteria are patients who had elevated PSA (>4 ng/mL) and at least 1 prior negative TRUS biopsy. The exclusion criteria are known cases of prostate cancer, such as those on active surveillance. Electronic medical records were reviewed in order to obtain relevant clinical, laboratory, and pathological data. Prostate volume was obtained from transrectal ultrasound images at the time of saturated transperineal template-guided prostate biopsy. One-way analysis of variance (ANOVA) was used to compare the characteristics between patients with and without detection of prostate cancer. All tests were 2-sided with significance set at $p<0.05$.

Transperineal template-guided prostate biopsies were performed in the operating theater (OR) in Phramongkutklao Hospital under spinal anesthesia; prophylactic antibiotics were used. We used the standard template of brachytherapy and transrectal ultrasound; they were fused together. Prostate tissue was labeled as anterior, middle posterior, and base, mid, and apex from the other view. The tissues were sent to the pathologist for pathological results.

Result

A total of 35 patients who had a mean age of 65.9 (54-77) years underwent transperineal template-guided prostate biopsy from 2014-2017 (Table 1).

Patients had a mean 2.02 (1-5) for prior prostate biopsies. Mean PSA, PSA density, prostate volume and number of cores were 15.98 (5.57-53) ng/mL, 0.316 (0.12-0.62) ng/mL/g, 46.09 (22.5-130.2) g and 31.8 (20-45), respectively.

Prostate cancer was detected in 16 (45.7%) of the 35 patients (Table 2) and the distribution of Gleason score was as follows: 3+3 (n=3), 3+4 (n=4), 4+3 (n=3), 4+4 (n=2), 3+5 (n=2), 4+5 (n=2). Of these, 8 (50%) patients had cancer in the anterior prostate and 9 (56.25%) had cancer in the apical prostate (Table 3).

One-way analysis of variance (ANOVA) was performed to compare clinical and laboratory characteristics between patients with and without detection of cancer (Table 4 and Table 5).

After finishing the procedure, 25 (71.42%) had no complication, 3 (8.57%) had urinary tract infection (UTI), which was treated by intravenous and switched to oral antibiotics, 3 (8.57%) had gross hematuria, which was treated by continuous bladder irrigation for 1-2 days, 3 (8.57%) had urinary retention, requiring catheterization for 1 week and then they were able to void spontaneously, 1 (2.86%) had epididymo-orchitis (Table 6).

Table 1. Baseline characteristics.

	Mean	Range
Age (years)	65.9	54 - 77
No. prior biopsy	2.02	1 - 5
PSA (ng/mL)	15.98	5.57 - 53
PSA density (ng/ml/g)	0.316	0.12 - 0.62
Prostate volume (g)	46.09	22.5 - 130.2
No of core	31.8	20 - 45

Table 2. Distribution of prostate cancer stratified by Gleason score.

Gleason score	Number of patients
3+3 (grade group 1)	3
3+4 (grade group 2)	4
4+3 (grade group 3)	3
4+4 (grade group 4)	2
3+5 (grade group 4)	2
4+5 (grade group 5)	2
	Total 16/35 (45.7%)

Table 3. Location of cancer.

Location of cancer	Number
Anterior base	4
Anterior apex	4
Posterior base	2
Posterior apex	5
Middle mid	1

Table 4. Differences between patients with and without detection of cancer.

	Cancer	No Cancer	P value
Prostate volume	40.32 ± 27	52.36 ± 16.987	0.209
PSA	18.08 ± 13.48	14.19 ± 10.15	0.346
*PSA density	0.382 ± 0.14	0.236 ± 0.085	0.005
Age	67.94 ± 6.53	63.94 ± 6.39	0.08
*No. of cores	29.19 ± 5.89	36.94 ± 4.943	0.001
No.of biopsies	1.75 ± 0.856	2.17 ± 0.985	0.2

*Statistical significance.

Table 5. Number of previous biopsies with cancer detection rate.

No. previous biopsies	N	Number of positive cancer
1	8	6 (75%)
2	20	7 (35%)
3	5	3 (60%)
4	1	0 (0%)
5	1	0 (0%)

Table 6. Complication rate.

Complication	No.
No complication	25 (71.42%)
UTI	3 (8.57%)
Urinary retention	3 (8.57%)
Gross hematuria	3 (8.57%)
Epididymo-orchitis	1 (2.86%)

Discussion

Transperineal prostate biopsy has gained popularity in recent years, especially for repeated biopsy. Our study describes the use of transperineal template-guided prostate biopsy. We noted an overall cancer detection rate of 46%, similar to other published series, which range from 22%-47%. The most common locations that we found prostate cancer were the anterior-base and anterior-apex, similar to other studies. And 50% (8/16) of cancers were found at the anterior zone, which is difficult for TRUS biopsy. The difference between our study and others is that third-time biopsy had a higher detection rate than second-time biopsy, which may be due to the difference in population between the 2 groups.

We observed that PSA density is an important parameter for predicting prostate cancer. We think that PSA density should be discussed in counseling with patients before repeated biopsy.

We found that 13 of 16 cancer patients (81.25%) had a Gleason score 3+4 or greater, which is defined as significant prostate cancer.

The complication rate is about 29%. The most common complications are UTI, urinary retention, and gross hematuria. The urinary retention rate is higher (8.57%) compared with TRUS biopsy (2%). No septicemia was found. All complications were categorized as grade I-II surgical complications.

This study has a number of limitations. It is a retrospective study and there is no comparison with other biopsy techniques. The number of transperineal cores obtained at biopsy was not standardized and may have introduced procedural heterogeneity, although care was taken to adequately sample the entire prostate in each patient.

Conclusion

Transperineal template-guided biopsy is an effective and promising technique for diagnosing prostate cancer in patients with persistently elevated PSA and prior negative biopsies with a low complication rate. This biopsy technique can improve the detection rate of the cancer at the apex and base of the prostate. The use of transperineal template-guided biopsy should be encouraged.

Conflict of interest

The authors declare no conflict of interest.

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Original Article

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

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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 1st April 2014 to 30th 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.

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Introduction

The prostate cancer is the 4th most common cancer that found in Thai male with incidence 7.5 per 100,000 per yea[1]. 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[2].

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

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[5].

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[6].

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)[7] 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 1st April 2014 to 30th 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°C or >38.3°C
- heart rate >90 bpm
- respiratory rate > 0 bpm or $PaCO_2$ <32 mmHg
- white blood cell count <4,000 mm^3 or >12,000 mm^3 or >10% band

Sepsis was defined as a SIRS due to an infection (clinical suspicion or microbiologic evidence)[8].

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[9].

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[10].

Inclusion criteria

- serum PSA >4 ng/ml
- abnormal digital rectal examination
- undergoing for TRUS prostate biopsy at Rajavithi hospital from 1st April 2014 to 30th 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[4].

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$\pm$3.75 vs 23.35$\pm$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%[11]. 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[12].

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
Body weight (mean±SD)	63.63 ± 10.70	
Height (mean±SD)	164.84 ± 6.24	
BMI (mean±SD)	23.37 ± 3.49	
PSA median (min-max)	11 (0.1-5000)	
Underlying disease		
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
SIRS		
Yes	6	0.9
No	631	99.1
Sepsis		
Yes	6	0.9
No	631	99.1
Admit from SIRS	5	0.8

BMI=body mass index (kg/m^2), 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%)[13].

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%)[14].

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)[15]	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)[16]	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)[6]	530	Incidence of post-biopsy genitourinary infection was 1/530 (0.2%).
Dong Soo Park, et al, (2009)[17]	481	Infectious complications decreased from 6.6% to 0.3% in treated group.

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Review Article

Reversible male contraceptives: Current progress

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Keywords:
Reversible,
male contraception

Introduction

The current world population is 7.5 billion and growing. It is expected to be over 9.7 billion by 2050[1]. Contraception is important in controlling population. While several contraceptive methods are available, there is room for improved methods. Most are being utilized by women and few are being developed for males[2]. This review summarized the current evidence of male contraception based on contemporary clinical trials in human and animal models. We intentionally omitted a discussion of protective measures such as condoms as surgical vasectomy is already accepted in clinical practice.

Methodology

We reviewed the available evidence using a search engine from PubMed and Scopus. Unwanted pregnancy is an ideal control arm for studies regarding the effectiveness of various contraceptive methods. However, due to study designs and ethical issues in human research, either sperm concentration or serum gonadotropin is mostly used as a surrogate outcome instead of pregnancy rates. The ideal target for male contraception is “azoospermia,” in which no sperm is found in a routine semen analysis; however, in practice, a sperm concentration of less than 1 million/ml is acceptable according to a recommendation by the American Society of Andrology[3].

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1. Hormonal Contraceptives

Hormone contraceptives for males are derived from the physiology of the hypothalamic-pituitary-gonadal axis (HPG axis) where the hypothalamus secretes gonadotropins releasing hormones (GnRH) that stimulate FSH from the anterior pituitary gland, which in turn stimulates spermatogenesis. GnRH also stimulates the secretion of luteinizing hormone which promotes androgen production. Thereby, androgens, whether endogenous or exogenous, act as negative feedback stimulators to both the hypothalamus and the anterior pituitary gland, suppressing spermatogenesis and androgen production. Thus, androgens are being studied to suppress spermatogenesis in the hope of inducing infertility[4].

Injected Testosterone

Since unesterified testosterone has low oral bioavailability and rapid clearance from serum[5], injected forms of esterified testosterone are more commonly utilized in clinical practice. They include testosterone ethanoate (TE) and testosterone undecanoate (TU). Intramuscular TE 200 mg weekly was investigated in 271 healthy fertile males in a clinical trial conducted by the World Health Organization (WHO). Azoospermia was found in 65% of participants which resulted in a pregnancy rate of 0.8 per 100 person-years. Following injection withdrawal of TU, sperm concentration rose above 20 million/ml after a mean duration of 3.6 months[6]. A subsequent study, utilizing the same regimen in 399 healthy fertile males, demonstrated a pregnancy rate of 1.4 per 100 person-years[7]. However, a small sub set of non-responders, defined by a persistently high sperm concentration above 3 million/ml, were found in both studies.

Compared to TE, TU has a longer half-life and requires drug administration less often, only at every 6-8 weeks[8]. This distinct advantage might help increase patient satisfaction, since a weekly injection schedule of TE was a cause of withdrawal in some patients[7]. A study of 1,045 Chinese males with intramuscular TU 500 mg monthly for 30 months demonstrated that only 4.8% of subjects had a sperm concentration above 1 million/ml. The pregnancy rate was 1.1 per 100 subjects throughout a 24-month period of drug administration[9].

Although showing some success in male contraception, the adverse effects of high dose testosterone must be considered. The most concerning are weight gain and decline in serum HDL, which may lead to an increased risk of metabolic syndrome[6,10]. Compounds such as progestins and 5-alpha reductase inhibitors have been combined with testosterone in order to reduce the adverse effects and improve contraceptive efficacy.

One randomized controlled trial demonstrated that a combination of intramuscular TE 100 mg weekly and oral levonorgestrel (LNG) 500 mcg daily suppressed sperm concentration better than intramuscular TE 100 mg weekly alone (94% vs 61% of patients achieved a sperm concentration below 3 million/ml). The most likely explanation is that the additional gonadotropin inhibitory effect resulted from LNG[11]. Nevertheless, side effects were encountered more often in the combination group, including decreased HDL (22% vs 1.8%) and weight gain (5.3 kg vs 2.3 kg)[12]. Another study reduced the oral LNG dose to 31 and 62 mcg per day in combination with intramuscular TE 100 mg weekly. Sperm concentration was suppressed below 3 million/ml in 90% and 95% in the 31 and 62 mcg groups, respectively, and there was no significant weight gain in the 31 mcg group while there was a 2.5 kg weight gain in the 62 mcg group. HDL, however, decreased significantly in both groups: 12% and 15% respectively[13].

Levonorgestrel, in the form of implantable rods combined with intramuscular TU, has also been studied and has a slightly higher efficacy rate[14]. Other progestins have been evaluated. A double-blinded multicenter trialusing etonogestrel implant combined with intramuscular TU every 10-12 weeks resulted in sperm concentration <1 million/ml

in 89% of participants[15]. Another study in 2016 used intramuscular norethisterone 200 mg combined with TU every 8 weeks and demonstrated that 96% of participants had sperm concentrations<1 million/ml. However, this study was terminated due to a high incidence of adverse events, including mood changes, depression, and increased libido[16]. Depotme droxyprogesterone acetate (DMPA) in combination with TU has been studied. All 30 participants had sperm concentrations below 3 million/ml during the treatment period[17].

Apart from progestins, 5-alpha reductase inhibitors (5ARI) were studied. Oral dutasteride 0.5 mg daily was added to a combination of intramuscular TE 100 mg weekly plus oral LNG 125 mcg daily. When compared to TE+LNG alone, however, sperm concentration and serum gonadotropin levels were not different between the 2 groups[18,19].

Other forms of testosterone

Because of a low oral bioavailability of testosterone, most studies have been driven into intramuscular injection. Nevertheless, a study using a combination of oral testosterone in sesame oil was able to achieve therapeutic levels of serum testosterone. When oral dutasteride was added, serum testosterone levels increased due to the oral testosterone in the oil alone[20]. Its efficacy was shown by significantly suppressed levels of FSH and LH[21].

Another potential route is transdermal administration, which has been a contraception method of choice in women for years. This route of administration is simple and does not require any injection and, thus, requires fewer healthcare visits. Results of studies using transdermal testosterone vary. One study using a testosterone transdermal patch with implanted LNG, showed poor efficacy in suppressing spermatogenesis; with less than 60% of participants achieving sperm concentration <3 million/ml compared with 100% in a group using intramuscular TE with implanted LNG[22]. Another study used transdermaldi hydro testosterone with or without implanted LNG. It revealed that no participant achieved a sperm concentration of <3 million/ml[23]. In contrast, another study using a combination of transdermal testosterone and nestorone gel showed a promising result with 89% of participants achieving a sperm concentration <1 million/ml[24].

One possible disadvantage of the transdermal route is a need to avoid physical contact with females and children while the medication is on the skin. There was also a report of significant skin discomfort among dihydrotestosterone gel users[23].

2. Non-Hormonal Contraceptives

Adjudin

Adjudin is a lonidamine analogue which can disrupt adhesion between spermatids and Sertoli cells causing the premature detachment of spermatids and then infertility[25]. An animal study in 2001, using oral administration of adjudin, revealed no pregnancy in all the rats, although the males were allowed to mate with the females freely. All the rats in the control group had viable offspring[26]. Full reversibility was observed at 11 weeks after treatment withdrawal[27]. However, high doses of adjudin are nephrotoxic and may causes liver inflammation, which is a major obstacle to the use of adjudin in humans[25,28]. Several drug delivery technologies were proposed to improve intratesticular bioavailability of adjudin and to reduce its effective dose[29].

H2-Gamendazole& CDB-4022

H2-Gamendazole and CDB-4022 are also lonidamine analogues and able to induce infertility in the same way as adjudin. From a study of H2-Gamendazole in rats, a single dose of 3 mg/kg induced infertility in 67%, while a single dose of 6 mg/kg induced infertility in 100%. However, full reversibility was only observed in the 3 mg/kg group. Unspecified mortality was also observed at 200 mg/kg dose where 3 out of 5 mice died, but there was no evidence of inflammation, necrosis, hemorrhage, or tumors in doses

lower than 200 mg/kg[30]. For CDB-4022, infertility was fully achieved in rats and monkeys without any observed toxicity. CDB-4022-induced infertility was irreversible in rats, but was reversible in monkeys with unknown mechanisms[31,32].

BMS-189453

Retinoic acid is involved in various steps of spermatogenesis, including spermatogonia differentiation and meiosis[33]. Thus, using a retinoic receptor antagonist may be a potential male contraceptive. BMS-189453 is a pan-antagonist of retinoic acid receptors that was initially developed for use in dermatology. It was later found to negatively affect spermatogenesis[34]. A study in mice using oral 2.5 mg/kg of BMS-189453 for 4 weeks resulted in a disruption of spermatogenesis from testicular histopathology, a significant reduction in sperm concentration and motility, and ultimately failure to cause pregnancy. Spermatogenesis was completely restored after medication withdrawal, and no toxicity was found[35]. Subsequent studies from the same group reduced the dose to 1 mg/kg and demonstrated similar results[36].

3. Physical Occlusion of Vas Deferens

RISUG

The concept of "Reversible Inhibition of Sperm Under Guidance," also known as RISUG, has been proposed as a male contraceptive method since the 1980s. It involves an injection of styrene maleic anhydride (SMA), dissolved in dimethyl sulphoxide (DMSO), into the vas deferens on both sides through a small incision of scrotal skin. The mechanism of action of these compounds has not been discovered. However, some possible mechanisms include total occlusion of the vas deferens, a pH-lowering effect which reduces sperm motility, a change in sperm membrane electric charge balance, and even oxidative stress damage of sperm. Original studies of RISUG in rats and monkeys successfully induced infertility[37]. The phase I clinical trial was conducted in 1993 and showed an optimal dose of 60 mg of SMA to be effective and safe[38]. The phase II clinical trial was conducted in 12 healthy fertile subjects and revealed persistent azoospermia for at least 425 days with no long-term adverse effects[39]. A phase III trial is currently ongoing. Complete reversibility of RISUG was demonstrated in monkeys at 60-90 days after reversal with normal motility and viability; however, evidence of reversibility of RISUG in humans is still lacking[40].

Male contraceptives in Thailand

In Thailand, a clinical trial of male contraception was conducted at the Faculty of Medicine, Chulalongkorn University in 1996. This study administered intramuscular TE 200 mg weekly to 17 healthy Thai men and measured sperm concentration, FSH and LH level. All participants eventually developed azoospermia at a median duration of 85 days. FSH and LH were also suppressed below detectable levels. Adverse effects were found in 2 participants. One had abnormal liver function tests and the other had hypertension and weight gain, causing them to withdraw from the study[41].

Conclusion

There are several different concepts of male contraceptives currently in development. All are aiming towards a contraceptive that is effective with the least adverse effects and complete reversibility. Testosterones, either alone or in combination with other agents, are effective in spermatogenesis suppression. However, there are concerns about the drug delivery route and side effects regarding a possible increased risk of metabolic syndrome. Several agents, inhibiting various steps of spermatogenesis, show promising results in animal models, including primates in one agent, but have yet to progress to human clinical trials. Regarding vas occluding agents, which are effective in animal models and phase I and II clinical trials, we are currently awaiting the results of the phase III clinical trial.

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Case Report

An unexpected event during revision penile prosthesis: Evidence base decision making

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Keywords:
Penile prosthesis, revision

Abstract

This gentleman was implanted with Inflatable Penile Prosthesis (IPP) in 2015. After surgery, there is no complication but he felt pain when fully inflated IPP. Last year implant was completely malfunction without any sign of infection. He needed to revise IPP. Intra-op findings were one cylinder tubing was cut and ligated with silk, minimal pus at reservoir area. Revision procedure was proceeded former implant was removed, Corporal bodies were washout. New implant placed and reservoir placement at new infrapubic area. On follow up there is no infection. IPP worked well with satisfied girth and rigidity. This report is aim to present an unusual event during revision procedure and evidence base decision making to achieve surgical outcome.

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Introduction

First introduction in 1973, IPP is the gold standard for Erectile Dysfunction (ED) for medically refractory ED. Ongoing improvements have greatly improved all outcome measurements, with contemporary studies reporting consistently high satisfaction and lower complication rates. Somehow revision rate is also climbing because of infection, mechanical failure, unsatisfied etc. Currently, infection rates for primary IPPs range from 1-3% with modern devices[1,2]. Infection risk with revision surgery increases, but with widely variable reported rates ranging from 3-25%. In this case, I presented a strategy to prevent infection and some decision making to achieve goal of surgery.

Case Report

A 37 year-old man without any underlying disease presented to my clinic with non function IPP without any sign of infection. He underwent IPP in 2015 from vascular problem. It worked well but he felt pain in cylinder area when fully inflated. Last year, IPP was malfunction and he noticed that reservoir migrated down to scrotum (Figure 1). On physical exam, there is no sign of infection, both cylinders located in penile shaft, reservoir partially migrated down to scrotum. Failure to inflate cylinders after pushing pump. Plan was to remove prior implant and place a new one. On operation day, he took a shower and scrubbed whole body with Hibiscrub. Amoxiklav 1.2 mg injected pre operatively. In operating room, hair was clipped, surgical site scrubbed with povidone iodine scrub solution for 15 min. Incision was made at prior incision, penoscrotal. Right cylinder tube was cut separately from pump and ligated with silk so there was only one working cylinder. Pump also removed. Reservoir with 30 ml. of NSS partially migrated from left groin to scrotum. Pus 10 ml. found in reservoir pouch (Figure 2). Former implant was Coloplast Titan STD 18 cm. with 2 cm. RTE. I decided to proceed for revision operation even pus seen.

Figure 1. Downward migration of reservoir.

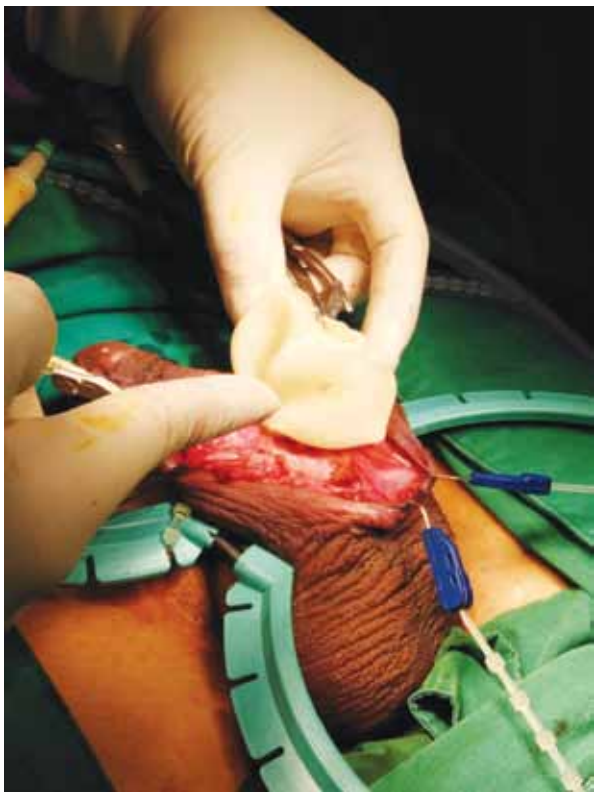

Figure 2. Pus in reservoir pocket.

All space was washout follow Mulcahy Washout Protocol (Table 1). Corporal body were measured. A new implant, Coloplast Titan STD 16 cm. with 2 cm. RTE, introduced. System and reservoir were checked. Due to he had right Herniorrhaphy

in young age. Reservoir placed at Retzius' space through transversalis fascia by opened another infrapubic incision. The circuit was connected and functional test was performed. Corpora closed, skin approximated without drain.

After operation he was discharged 24 hrs. post operatively with 7 days course of Amoxiklav. He had no fever and pain gradually reduced. On 1 month follow up there is no infection, he started inflating implant.

Discussion

After IPP served as the last resort for medicated non responders ED patients for many decades. Many reasons for implant revision are from mechanical failure8, infection, other complications from implant such as deformity, erosion, organs injury. Infection rate for new case is estimated to be between 1% and 3% and between 10% and 18% for repeat implantations[3]. Henry et al, found culture positive in uninfected IPP removed for revision. Penile Implant Infectious risk factors devided into patients related and surgical related. Infection risk was 1.88% for diabetics vs 1.53% for non-diabetics for a relative infection rate increase of 23% (p=0.0052). Active smoking was found to carry an increased infection odds ratio of 1.79. Level 3 evidence from a single-surgeon study compared with same-surgeon historical controls found that the combination of the no-touch technique with IPPs coated with infection retardant decreased their center's implant infection rate to 0.46%.

Traditionally management when IPP has infection. All components were removed, antibiotic given and let infection cleared for several months and then executed revision surgery. But this may cause corporal fibrosis, shortening. insertion of a second IPP more challenging and prone to future infections and other complications. Malcahy[4] developed a washout protocol for salvage Penile Prosthesis Infection revision (cleansing the wound and replacing the implant at the same procedure). The success rate of 'salvage' in this series of 101 patients was 84%. Kaufman *et al*.[5] reported long term infection free follow Malcahy protocol.

Utilizing a malleable as a temporary implant is another option for delayed revision surgery in severe infection case. Lao[6] reviewed utilizing malleable prosthesis (AMS Spectra or Coloplast Genesis) as a temporary space-filling corporal implant to prevent fibrosis. On mean follow up 8.4 month 69% satisfied with malleable implant, 31% proceeded to IPP revision.

Table 1. Mulcahy Salvage Protocol.

Remove all prosthetic parts and foreign materials
Washes 1 and 7: kanamycin and bacitracin
Washes 2 and 6: half-strength povidone iodine
Wash 4: water pic pressure irrigation with vancomycin 1 g and gentamicine 80 mg in normal saline 5L
Change gowns, gloves, drapse, and instruments
Implant new prosthesis
Primary wound closure without drains

In this case there is no sign of infection on physical exam. This is an unusual presentation of infected implant. Implanters must prepare for unexpected events during revision surgery. Prior to operation, no sign of infection but when situation needed for proper decision weather to proceed to revision new implant or to postpone until infection was cleared. Implanters should have evidence base decision making and weigh on outcome. Before revision operation, patients should be informed all possible results and make a decision with implanter.

Conclusion

After decades, IPP proved as the final solution for ED. Infection is the most horrified complication. Implanters should prevent infection strictly. Patients also counseled about all possible outcomes. During revision operation, we should prepare for unexpected events and select good choice for patients.

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Instructions for Authors

The Thai Journal of Urology is the official journal of Thai Urological Association under the Royal Patronage. The Editorial Board welcomes all scientific manuscripts from physicians and various specialties which are of interest and of benefit to the urological society. The submitted manuscripts must not be in the process of submission or have been previously published in any other journal.

Types of manuscripts

1. Original article

Requirements:

1.1 Abstract
- Objectives
- Patients and Methods
- Results
- Conclusion

1.2 Text
- Introduction
- Objectives
- Patients and Methods
- Results
- Discussions
- Conclusion
- References

1.3 Table(s) and explanatory note(s)

1.4 Figures and legends

2. Review article

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2.1 Interesting and pertinent

2.2 Include standard of treatment

3. Case report

Requirements:

3.1 Interesting

3.2 Not previously published

3.3 Indicates the important case aspects

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Requirements:

4.1 Questions, discussions, and opinions to published articles

4.2 Creative and beneficial to all readers.

4.3 Negative opinions must include reference(s) for the opposing opinion

5. Surgical technique

Requirements:

5.1 Reports of surgical technique

5.2 The technique provide beneficial to readers

5.3 The technique have positive treatment results after surgeries

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1. Each table should be placed on a separate page. One page for one table.

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