

THE USE OF RIGISCAN® EXAMINATION IN DIAGNOSING PATIENTS WITH ERECTILE DYSFUNCTION IN JAKARTA

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ABSTRACT

Objective: The aim of this study is to describe the characteristic of patients with Erectile Dysfunction (ED) and results of Nocturnal penile tumescence and rigidity (NPTR) based on Rigiscan® examination in patients with ED in Jakarta. **Material & Methods:** Descriptive-prospective study of patients with ED in Cipto Mangunkusumo Referral Hospital, Bunda General Hospital Jakarta, and ASRI-Siloam Urology Hospital are recorded during 2015. Patients' age (in years), marital status (yes/no), duration of ED (in months), and International Index of Erectile Function-5 (IIEF-5) were recorded. NPTR examination were performed while patients were sleeping. Number of events, duration of each event (in minutes) as well as the rigidity (in percentage) and tumescence (in cm) were recorded. The elevation of tip and base penile circumference (in cm) during erection were also noted. **Results:** There were 34 patients who agreed to perform NPTR test. Most patients were married with the average age of 40.94 ± 10.81 years old. The duration of ED were varied from 5 to 96 months with average duration of 33.7 ± 44.34 months and IIEF-5 score was 6.38 ± 5.14 . In general number of erections was 4 ± 3 with 23.4% of them had normal erection. The comparison between organic and psychogenic ED showed that the increment of circumference was significantly less in organic ED patients. Other parameters showed insignificant difference in statistical results. **Conclusion:** NPTR examination is an objective, effective, and easy-to-use measurement in order to differentiate between organic and psychogenic ED. One third of patients who complained with ED suffered from psychogenic ED and needed referral to other specialists.

Keywords: Erectile dysfunction, impotence, Rigiscan®, penile rigidity.

ABSTRAK

Tujuan: Tujuan penelitian ini adalah untuk menjelaskan karakteristik pasien Disfungsi Ereksi (DE) dan hasil Nocturnal penile tumescence and rigidity (NPTR) berdasarkan pemeriksaan Rigiscan® pada pasien DE di Jakarta. **Bahan & Cara:** Penelitian ini adalah penelitian deskriptif-prospektif pada pasien DE di Rumah Sakit Umum Pusat Nasional Dr. Cipto Mangunkusumo, Jakarta; Rumah Sakit Bunda, Jakarta; dan Rumah Sakit Asri, Jakarta pada tahun 2015. Data yang diolah antara lain: umur pasien (dalam tahun), status pernikahan (ya/tidak), durasi DE (dalam bulan), dan hasil kuesioner International Index of Erectile Function-5 (IIEF-5). Pemeriksaan NPTR dilakukan pada saat pasien sedang tidur. Angka kejadian, durasi setiap kejadian (dalam menit), perekaman kekerasan (dalam persentase) dan pembesaran ukuran (dalam cm) penis pada malam hari (nokturnal) juga dicatat. **Hasil:** Terdapat 34 pasien yang menjalani pemeriksaan NPTR. Rerata umur subjek adalah 40.94 ± 10.81 . Durasi keluhan DE bervariasi antara 5 hingga 96 bulan dengan rerata durasi 33.7 ± 44.34 bulan serta rerata skor IIEF-5 6.38 ± 5.14 . Secara umum, jumlah ereksi per malam sebesar 4 ± 3 ereksi dengan 23.4% di antaranya memenuhi kriteria sebagai ereksi yang adekuat. Perbandingan antara DE organik dan psikogenik menunjukkan bahwa peningkatan ukuran permukaan penis saat ereksi pada pasien dengan DE organik lebih rendah secara signifikan. **Simpulan:** Pemeriksaan NPTR adalah metode pengukuran yang objektif, efektif, dan mudah digunakan untuk membedakan DE organik dan psikogenik. Satu per tiga pasien yang mengeluhkan DE mengalami DE psikogenik dan membutuhkan rujukan ke psikiater yang ahli menangani kasus seksual.

Kata kunci: Disfungsi ereksi, impotensi, Rigiscan®, rigiditas penis.

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INTRODUCTION

Erectile dysfunction (ED) is one of major male sexual problems besides premature ejaculation and infertility. Erectile dysfunction is a condition of persistent inability to achieve and maintain adequate penile erection in order to get satisfaction in sexual intercourse.¹ This circumstance should persist at least for 3 months.² In the Netherlands and USA, the incidence of erectile dysfunction is around 25-30 cases in 1000 persons annually, while in Brazil is 65.6 cases in 1000 persons annually.³⁻⁵ Another study shows that more than 50% of USA population from 40 to 70 years old suffer from erectile dysfunction.⁶ From those studies, it is known that the incidence of erectile dysfunction increases following the aging process in males.³⁻⁶ The incidence is expected to be higher in the following years since the population of elderly men is increasing.² In the 1995, it was estimated that around 152 million men suffered from erectile dysfunction globally, and double in 2025 with the highest incidence is predicted to exist in the Africa, Asia, and South America region.⁷ Around 50% of elderly stated that sex is still important.⁸

Erectile dysfunction causes a lot of burdens such as stress-related decreasing productivity, decreasing time of work, and impact to partner and family.^{2,9} In 2000, around 6.9% of men seek for help regarding to erectile dysfunction and it will be elevating in following years due to the increase of awareness and knowledge in the general population.^{2,10,11} As the needs of management and therapy are elevating, thus proper and efficient examination are needed to diagnose erectile dysfunction. Erectile dysfunction itself is classified as organic, non-organic (psychogenic), and combination of both of these classifications.⁹ More than 14% of patients have erectile dysfunction caused by organic origin such as arterial-vein disease, neurological disorder, and hormonal imbalance.^{12,13}

In order to determine the etiology of erectile dysfunction, a comprehensive history taking for both patient and his partner, physical examination, laboratory examination, and specific supporting examination are needed.¹⁴ Comprehensive history taking includes the occurrence of concomitant disease, risk factors including psychology and social factors, and therapeutic target.^{15,16} However, not all patients are brave enough to talk about erectile dysfunction, especially the elderly.¹⁷ Validated

questionnaire can be used to ease the history taking, however it cannot differentiate between organic or psychogenic erectile dysfunction.¹⁴

Physical examination should include general examination such as blood pressure, postural shape, and complete genital examination in order to search the underlying disorder such as cardiovascular disease, diabetes, and hormonal imbalance.² Laboratory examinations are for fasting blood glucose, HbA1c, lipid profile, and hormonal.² The hormonal examination such as Testosterone, FSH, LH, and prolactin level should be done in early morning before 10.00 am.^{2,15,18}

Specific supporting examination such as penile biopsy, and ultrasonography of the penile is also needed.^{19,20} However, these modalities are operator dependent. Another modality used to differentiate organic or psychogenic erectile dysfunction is based on nocturnal penile rigidity and tumescence.²¹ This type of examination is less operator-dependent, less invasive, and easy to perform. The patients only need to sleep as usual during the examination. Rigiscan® is the device used to monitor the occurrence of penile rigidity and tumescence.²¹

OBJECTIVE

The aim of this study is to describe the characteristic of patients with ED and results of penile nocturnal rigidity and tumescence based on Rigiscan® examination in patients with erectile dysfunction in Jakarta.

MATERIAL & METHODS

A descriptive-prospective study of patients with erectile dysfunction who came to Urology Clinic in Cipto Mangunkusumo Referral Hospital, Bunda General Hospital Jakarta, and ASRI-Siloam Urology Hospital were recorded during 2015-2016. Patients' age (in years), marital status (yes/no) and regarding the erectile dysfunction, duration of erectile dysfunction (in months), and International Index of Erectile Function-5 (IIEF-5) were also recorded.

Nocturnal penile rigidity and tumescence examination were performed as one-night examination recorded while patients were sleeping. Number of events, duration of each event (in minutes) as well as the rigidity (in percentage) and tumescence (in cm) were recorded. The elevation of

TIP and BASE penile circumference (in cm) during erection were also noted.

Normal results are determined by several indicators such as TIP and BASE percentage of rigidity, duration, and increment of circumference. Normal rigidity is defined as rigidity $\geq 60\%$ for both TIP and BASE. Normal duration is defined as duration for more than 10 minutes in rigidity more than $\geq 60\%$ for both TIP and BASE. Normal increment is determined by the increase of at least 2 cm and 3 cm for TIP and BASE respectively. All of the indicators should be fulfilled to be stated as normal condition.

RESULTS

Total 34 patients with complain of erectile dysfunction who came to either Urology Clinic in Cipto Mangunkusumo Referral Hospital, Bunda General Hospital Jakarta, or ASRI-Siloam Urology Hospital to undergo nocturnal penile rigidity and tumescence examination during January 2015 to October 2016 were analyzed.

Table 1. Patients' characteristics.

Parameters	N = 34
Age (years)	40.94 ± 10.81
Duration of ED (months)	33.7 ± 44.34
Marital Status	
Yes	79.4%
No	14.7%
Divorce	5.9%
IIEF -5 Score	6.38 ± 5.14

The patients who performed nocturnal penile rigidity and tumescence test were mostly married with the average age of 40.94 ± 10.81 years old. The duration of ED were varied from 5 to 192 months with average duration of 33.7 ± 44.34 months. Most of the patients came by their own accord. However, other patients come due to demand from their partner or family.

The average number of erection was around 4 ± 3 , but erection fulfilled normal criteria was only found in 29.4% patients. The results of nocturnal penile rigidity and tumescence were classified based on TIP and BASE parameters. The average TIP and BASE rigidity were quite different ($46.3\% \pm 25.3\%$ vs $50.3\% \pm 24.3\%$). The initial circumference were 5.9 ± 0.6 cm vs 6.3 ± 0.5 cm for TIP and BASE respectively. The increment of circumference for TIP and BASE were 1.6 ± 0.8 cm vs 2.1 ± 0.9 cm respectively.

In general, there were 79.4% of patients having normal TIP rigidity; this is similar to the percentage of patient with normal BASE rigidity (76.5%). However, normal duration was only found in 67.7% and 64.7% for TIP and BASE respectively. The percentage of patient with normal increment of BASE circumference was less than that with normal increment of TIP circumference (32.3% vs 55.9%). Since normal condition should have normal result for all indicators, patient with organic ED was found in 76.5% of patient, while psychogenic ED was 23.5%.

If we make comparison between organic and psychogenic ED, it is found that the organic ED is younger than psychogenic ED but it's statistically not significant. The number of erection in organic ED is also less compared to psychogenic ED, but it's also

Table 2. General erectile characteristics.

Parameters	Values (N=34)
Number Erection	4 ± 3
Number of Patient with Normal Erection	23.4%
TIP of Penile	
Average Rigidity (%)	$46.3\% \pm 25.3\%$
Initial Circumference (cm)	5.9 ± 0.6
Increment of Circumference (cm)	1.6 ± 0.8
BASE of Penile	
Average Rigidity (%)	$50.3\% \pm 24.3\%$
Initial Circumference (cm)	6.3 ± 0.5
Increment of Circumference (cm)	2.1 ± 0.9

Table 3. TIP and BASE characteristics classification based on Rigiscan® examination.

Parameters	N=34
TIP of Penile	
Normal Rigidity	79.4%
Normal Duration	67.7%
Normal Increment of Circumference	55.9%
Normal TIP Condition	53.9%
BASE of Penile	
Normal Rigidity	76.5%
Normal Duration	64.7%
Normal Increment of Circumference	32.3%
Normal BASE Condition	26.4%
Conclusion	
Organic ED	76.5%
Psychogenic ED	23.5%

Table 4. Patients' characteristics and erectile examination in organic vs psychogenic ED.

Parameter	Types of ED		
	Organic	Psychogenic	<i>p</i>
Age (years old)	39.46 ± 10.88	45.75 ± 9.66	0.153 [#]
IIEF -5 Score	4.5 (1-18)	3.0 (2-7)	0.298*
Number of Erection	4.85 ± 3.49	5.00 ± 1.51	0.861 [#]
TIP			
Average Rigidity (%)	47.0% (0-85%)	58.5% (40-70%)	0.235*
Initial Circumference (cm)	5.86 ± 0.65	6.07 ± 0.52	0.404 [#]
Increment of Circumference (cm)	1.36 ± 0.83	2.31 ± 0.62	0.005 [#]
BASE			
Average Rigidity (%)	51.50% ± 26.40%	60.75% ± 11.75%	0.168 [#]
Initial Circumference (cm)	6.27 ± 0.52	6.43 ± 0.45	0.466 [#]
Increment of Circumference (cm)	1.78 ± 0.86	3.00 ± 0.52	0.001 [#]

#Independent T-Test, *Man Whitney Test.

statistically not significant. The average rigidity in organic ED was not significantly lower compared to psychogenic ED for both TIP and BASE rigidity, 47.0% (0-85%) vs 58.5% (40-70%) and 51.50% ± 26.40% vs 60.75% ± 11.75% respectively. The initial circumference in organic ED compared with psychogenic ED for both TIP and BASE circumference were quite similar, 5.86 ± 0.65 vs 6.07 ± 0.52 cm and 6.27 ± 0.52 cm vs 6.43 ± 0.45 cm. The most prominent discrepancy was found in increment of circumference. The organic ED patients had significantly less increment of circumference while compared to psychogenic ED for both TIP and BASE parameter.

DISCUSSION

Prevalence of ED is increasing as men aging. Eight percent of men complain of ED in their forties and almost 50% of men aged 60-69 complain of ED.²² Our patients were younger compared to previous study, 40.94 ± 10.81 vs 48.26 ± 11.65 years old.²³ A previous study showed that more than 60% of patients who came for ED treatment were married which were almost similar with our study.²⁴ Our study showed that almost all of the patients were married. This is due to the social culture and religion in our country that sexual intercourse is prohibited and taboo before marriage.

Today, treatment of ED is widely developed but our understanding about the disease itself is still limited, especially the etiology of ED.¹⁵ This circumstance leading to ineffectiveness of treatment caused by the treatment given is inappropriate for the etiology.¹⁵ Carnevali et al, showed that discontinuation of medication might be caused by psychological problems.²⁴ Thus, the urologist needs to determine the etiology before approaching the treatment. The easiest way is by defining the etiologies to organic or non-organic cause (psychogenic) ED.

The flaccid penile diameter in our study is lower compared to study done in China.²⁵ However, this can't be used as reference for Indonesian flaccid penile circumference since in our study the numbers of patients were much lower compared to study in China. Regarding the rigidity of erectile penile, a study done by Burris et al showed that normal men had maximum rigidity of $77.1 \pm 1.9\%$ and $80.1 \pm 1.5\%$ for TIP and BASE respectively.²⁶

In the organic ED, our results showed very low of penile rigidity compared to the normal men from a study done by Burris et al. One of our patients with history of penile fracture only could reach penile rigidity of 0-19% for the TIP but 60-79% for the BASE. Even though psychogenic ED is considered to have normal function of erection, the result in our study is still lower compared to previous results. This might be due to diversity in term of human ethnicity and race.²⁵

In our study, most of patients suffer from organic ED. This result is similar to the previous studies.^{23,27} Those studies showed that the percentage were 34% and 66% for psychogenic and organic ED respectively.²³ Although psychogenic ED treatment is not a part of urology, comprehensive approach should be given by the urologist. Developing systematic referral system to psychology therapies is important in order to facilitate a comprehensive approach.²

CONCLUSION

Nocturnal penile rigidity and tumescence examination is an objective, effective, and easy-to-use measurement in order to differentiate between organic and psychogenic ED. One third of patients who complained with ED suffered from psychogenic ED and needed referral to other specialists. Thus, a good referral system is needed in order to solve patients' problem comprehensively. However, this

study has limited amount of patients, thus the result cannot be used as a national reference. A study with bigger sample and performed in multicenter hospital or clinic is important to give result as national view of ED and penile dimension.

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