Abnormal Semen in Male Partners of Infertile Couples at HRH Maha Chakri Sirindhorn Medical Center

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Objective: *To determine the pattern of abnormal semen and its associate factor in male partners of infertile couples.*
Material and Method: *This research was a descriptive study. The men who attended our infertility clinic during January 2008 through December 2008 were included in the present study. All of the semen samples were analysed with standard technique using the World Health Organization (1999) protocol. The associate factors for abnormal semen were collected and analyzed.*
Results: *A total of 75 men who had official semen report, sixty-four men (85.3%) were referred for primary infertility. The mean patients' age was 35.6±5.8 years. The mean duration of infertility of couples was 3.6±2.6 years. All of these subjects had abnormal semen analysis; the most common finding was astheno-teratozoospermia in 84%. Eight men (10.7%) had oligo-astheno-teratozoospermia. Three men (4%) had teratozoospermia alone. The two most common associated factors were heavy exercise and alcoholic drinking.*
Conclusion: *Male factor infertility shares a pivotal role in infertile couples. Combine abnormal sperm motility and morphology group was very common. Further studies need to be carried out to explore the cause of this abnormality.*

Keywords: *Infertile, Male factor, Semen analysis*

J Med Assoc Thai 2015; 98 (Suppl. 10): S8-S12
Full text. e-Journal: *http://www.jmatonline.com*

To date, fertility function is an interesting issue with a rising problems for both men and women. Focusing on men, the prevalence of male infertility varies from area to area[1,2]. Semen analysis is the basic investigation and become a standard tool for male partner fertility assessment[3]. It may influence by several factors such as life style, medical history, environment, culture, geographic variation, habit, occupation and toxic exposure[4]. Researchers have proposed various methods to predict the fertility function of men[5,6]. Semen analysis is a simple way to assess of male reproductive potential. There are some different of abnormal semen patterns between Asian, Caucasian and African men[7-9]. In view of these differences, it may influence by varying causes or risk factors of male infertility. This recognition can lead to prevent male fertility function. Moreover, the early diagnosis and treatment of male infertility can increase the chance of pregnancy in certain condition.

In Thailand, there are few studies in this topic. Most of those focused on sperm preparation[10] or sperm freezing technique[11], not the pattern of semen abnormality. The authors aim to determine the type of abnormal semen in male partners of infertile couples in our setting.

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Material and Method

This study conducted in the infertility clinic between January 2008 and December 2008. Every male partner of infertile couples who seek fertility treatment was enrolled in this study. Inclusion criteria were as following; Thai men who had a complete semen analysis report and had written consent form. The exclusion criteria were men who had a history of testicular cancer, vasectomy, had a history of bilateral orchidectomy, received hormonal treatment, failed to collect the semen, got the second semen report from the same subject during the study period and could not communicate with interviewer. The participants had to answer all the questions about their demographics and clinical characteristics in data record form. The study protocol was approved by the Human Ethics Committee of the

Faculty of Medicine, Srinakharinwirot University.

Semen analysis

All of semen samples were obtained aseptically by masturbation in the semen collecting room after 3-5 days of abstinence. Then, the samples were placed in the 37°C incubator until it liquefied. Semen analysis was performed by two substantial experience scientists within 1 hour after the collection. The physical parameters analyzed were semen volume, viscosity, pH, sperm count, sperm motility and sperm morphology. Seminal fluid volume was measured with a 5 mL calibrated syringe. Sperm concentration was determined by using the Makler® counting chamber with a grid cover slip. Sperm motility was counted by direct observation under a bright-field light microscope. Sperm morphology was assessed by two senior medical scientists after using Papanicolaou staining technique. The standard sperm morphologic study was carried out according to World Health Organization laboratory manual. Normal morphology was counted when all of the following parameters were normal looking; acrosome, sperm head, mid-piece and tail. Azoospermic samples were centrifuged and re-examined in the centrifuged pellet. All semen parameters were measured according to the 1999 World Health Organization guideline[12].

Abnormal semen in the present study was defined as followings: azoospermia when there was no sperm in the ejaculation, oligozoospermia when the sperm count less than 20 million per milliliter, asthenozoospermia when motile sperm less than 50% and teratozoospermia when normal sperm morphology less than 15%.

Baseline characteristics and sperm parameters were presented using descriptive statistics.

Results

After setting up our protocol, a total of 80 men were included in this study. Three men were excluded because of incomplete data and two men failed to collect their semen sample. Patients' characteristics were shown in Table 1. Seventy-five men were analyzed; their mean age was 35.6±5.8 years, ranging from 27 to 39 years. Sixty-four men were primary infertility, while eleven men were secondary infertility. The mean duration of infertility was 3.6 years with a standard deviation of 2.6 years. The mean semen volume was 3.0±1.4 mL (range, 0.5-7 mL). The mean sperm count was 50.3±28.9 million per mL, while percentage of sperm motility and percentage of normal sperm morphology observed were 33.1±7.5% and 5.1±1.5% respectively. Table 2 demonstrated the number of participants in each group classified by sperm parameters. All of participants had semen abnormality. Astheno-teratozoospermia was found in 84%, while oligo-astheno-teratozoospermia was 10.7% as shown in Table 3. There was no azoospermia in this study.

For the patients' history associated with abnormal semen analysis results, 38.7% of the participants had heavy exercise, 37.3% had history of alcohol drinking, while only 14.7% had history of current smoking. Some participants had more than one associate factor as presented in Fig. 1.

Table 1. Basic characteristic of participants (n = 75)

Parameters	
Age (years ± SD)	35.6±5.8
Type of infertility, number (%)	
Primary	64 (85.3)
Secondary	11 (14.7)
Duration of infertility (years ± SD)	3.6±2.6
Occupation, number (%)	
Government officer	33 (44.0)
Merchant	29 (38.7)
Office worker	9 (12.0)
Laborer	2 (2.7)
Farmer	2 (2.7)
Education, number (%)	
Primary school	3 (4.0)
Secondary school	18 (24.0)
Junior college	11 (14.7)
Bachelor's degree	31 (41.3)
Master/PhD's degree	12 (16.0)

Table 2. Number of participants classified by sperm parameter (n = 75)

Sperm parameters	Number of case (%)
Sperm concentration, number (%)	
≥20x10⁶/mL	66 (88)
<20x10⁶/mL	9 (12)
Sperm motility	
≥50%	4 (5.3)
<50%	71 (94.7)
Sperm morphology	
≥15%	0
<15%	75 (100)

Table 3. Pattern of semen analysis result (n = 75)

Type of semen	Number of case (%)
Teratozoospermia	3 (4)
Oligo-teratozoospermia	1 (1.3)
Aztheno-teratozoospermia	63 (84)
Oligo-aztheno-teratozoospermia	8 (10.7)

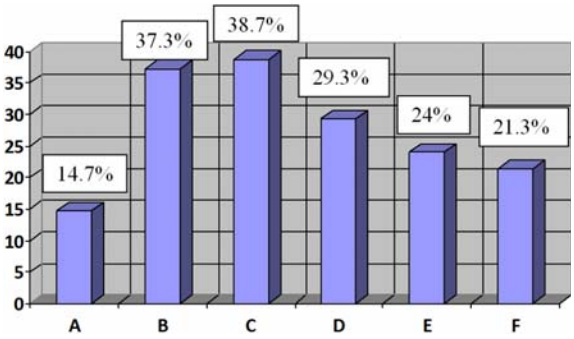

Fig. 1 Histogram shows percentage of each factor found in participants (n = 75). A) smoking; B) alcohol intake; C) heavy exercise; D) chemical exposure; E) stress; F) current medication, respectively.

Discussion

This study on semen analysis is an example of increasing fertility concern in developing country. All of the semen analysis results were abnormal. When looking at each sperm parameters, the majority of the participants had normal sperm count but decrease sperm motility and increase abnormal sperm morphology. This findings are inconsistent with those reported by Mehta RH, et al[1] and Bayasgalan G, et al[7] that they found high number of azoospermia and oligozoospermia. This different may comes from various populations, laboratory protocols and experience of medical personals. This suggesting that there is a trend of decreasing semen quality including Thai men. Semen analysis should be included in preconception testing for Thai new marriage couples. Public awareness of fertility problem, health education and fertility care is urgently needed in Thai population.

The prevalence of abnormal semen in this study is one hundred percent, much higher than another report[2,9]. The cause for this high prevalence of teratozoospermia is not clear. There could be several potential causes, may be related to environmental toxicants especially pesticide in agriculture system[4] or a modern lifestyle[13] of Thai men. Another reason could be a positive selection bias towards patient referral system to our infertility center may increase the percentage of abnormal results. The new 2010 WHO criteria for semen analysis have included lower reference value than the 1999 manual, approximately 15% of infertile men being reclassified as fertile men[14]. This change will not affect our results due to high prevalence of abnormal semen results as mention above. There is no true fertile or infertile regarding normal semen analysis cutoffs set up for reproduction potential[5]. Even in the cases of severe oligozoospermia, their wives can get pregnant.

For minimized the human errors from manual semen analysis, technicians have to standardized their protocol and used the quality control system in the andrology lab[15].

Regarding the patients' history and abnormal semen results, this finding can occur as coincident event, not the association between each other. However, the preventive measures by eating healthy food, avoiding toxic substance and keeping yourself fit can improve your heath and may improve the semen results in male infertility.

The limitations of this study are a small sample size, a descriptive study design, hospital-based data, and data from single institute that not represents the scale of problems. During study period, the authors still used the 1999 WHO cut-off level of normal semen. But, the latest version of laboratory manual for semen analysis was published in 2010. So, further study should be carried out with the new reference laboratory value.

Conclusion

The prevalence of abnormal semen in male partners who attended our infertile clinic was high especially abnormal sperm motility and morphology. Further study with larger sample size needs to be carried out to determine the cause of abnormal semen.

What is already known on this topic ?

There is no data on prevalence of male factor infertility in Thai men. Fertility problems become a health concern in last decade. Semen analysis is still a standard tool for infertile investigations. Common abnormal semen results were low sperm concentration, low sperm motility and high abnormal sperm morphology.

What this study adds ?

This study shows that all Thai men who seek

fertility treatment have abnormal semen results. Fertility assessment should be performed in every cases of preconception counseling class.

Acknowledgement

The authors are grateful to Dr. Kittipong Kongsomboon for his advice and Ms. Watchadaporn Molbut, IVF nurse coordinator for her help in data collection. We also thank Ms. Jaruwan Sriwilai, Ms. Araya Pewwieng and Mr. Witthawat Katasila, the medical scientists for all their help in laboratory support. This project was granted from the Faculty of Medicine, Srinakharinwirot University, Thailand.

Potential conflicts of interest

None.

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น้ำเชื้ออสุจิที่ผิดปกติของคู่สมรสชายที่มีบุตรยากซึ่งมารับบริการที่โรงพยาบาลศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี

เมธาพันธ์ กิจพรธีรานันท์, สุมิตรา อ้มสงคราม, เกศินี ศรีชวนะ

วัตถุประสงค์: เพื่อกำหนดชนิดความผิดปกติของน้ำอสุจิและปัจจัยที่พบร่วมในคู่สมรสชายที่มีบุตรยาก

วัสดุและวิธีการ: การศึกษานี้เป็นแบบเชิงพรรณนา ผู้เข้าร่วมการศึกษาคือคู่สมรสชายที่มีบุตรยากซึ่งมารับบริการในคลินิกตั้งแต่ เดือนมกราคม พ.ศ. 2551 ถึง เดือนธันวาคม พ.ศ. 2551 ทำการตรวจวิเคราะห์ตัวอย่างน้ำอสุจิทุกรายด้วยวิธีมาตรฐานตามองค์การอนามัยโลก (พ.ศ. 2542) ทำการรวบรวมและวิเคราะห์ปัจจัยที่พบร่วม

ผลการศึกษา: *ชายทั้งหมด 75 ราย ที่มีผลตรวจน้ำเชื้ออสุจิอย่างเป็นทางการ ชาย 64 ราย (ร้อยละ 85.3) มีภาวะมีบุตรยากแบบปฐมภูมิ ผู้ป่วยมีอายุเฉลี่ย 35.6±5.8 ปี ระยะเวลาที่มีบุตรยากเฉลี่ย 3.6±2.6 ปี โดยผู้ป่วยทุกรายมีผลตรวจน้ำเชื้ออสุจิที่ผิดปกติ ชนิดที่พบบ่อยที่สุดคือ น้ำเชื้ออสุจิที่มีตัวเคลื่อนไหวและรูปร่างผิดปกติร่วมกันพบ ร้อยละ 84 มีชาย 8 ราย (ร้อยละ 10.7) ที่ผิดปกติทั้งจำนวนตัวเคลื่อนไหวและรูปร่างของอสุจิร่วมกัน มีชาย 3 ราย (ร้อยละ 4) ที่มีรูปร่างอสุจิผิดปกติอย่างเดียว ปัจจัยเสี่ยงที่พบบ่อยสองอันดับแรก คือ การออกกำลังกายหนักและดื่มสุรา*

สรุป: *ปัจจัยจากฝ่ายชายมีบทบาทสำคัญในคู่สมรสที่มีบุตรยาก ความผิดปกติของน้ำเชื้ออสุจิที่พบบ่อยคือมีตัวเชื้ออสุจิเคลื่อนไหวน้อยร่วมกับรูปร่างผิดปกติมาก อย่างไรก็ตามจำเป็นต้องศึกษาวิจัยเพิ่มเติมเพื่อหาสาเหตุต่อไป*