

ภาวะมีบุตรยากเนื่องจากสาเหตุฝ่ายชายในโรงพยาบาลศรีนครินทร์

สุพัชญ์ สีนิศาณ์, กนก สีจัน, ชนิดา พงษ์ศรีทัศน์, นิกร ศรีคงยำ

หน่วยชีววิทยาการเจริญพันธุ์ ภาควิชาสุติศาสตร์และรีเวชวิทยา คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น

Male Factor Infertility in Srinagarind Hospital

Supat Sinawat, Kanok Seejorn, Thanida Pongsritasana, Nikorn Sridongyang

Reproductive Biology Unit, Department of Obstetrics and Gynecology, Faculty of Medicine,
Khon Kaen University, 40002, Thailand

บทคัดย่อ

วัตถุประสงค์ : เพื่อศึกษาอุบัติการณ์ของความผิดปกติของผลการตรวจน้ำอสุจิในผู้ชายที่มารับการตรวจและรักษาที่คลินิกมีบุตรยาก โรงพยาบาลศรีนครินทร์

ชนิดของการวิจัย : การวิจัยเชิงพรรณนา

กลุ่มตัวอย่าง : ผลการตรวจน้ำอสุจิของชาย จำนวน 2245 คน ซึ่งมารับการตรวจรักษาที่คลินิกมีบุตรยากโรงพยาบาลศรีนครินทร์ ระหว่างวันที่ 1 มกราคม 2533 ถึง 31 ธันวาคม 2542

สถานที่ทำการวิจัย : คลินิกมีบุตรยาก โรงพยาบาลศรีนครินทร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น

ผลการวิจัย : ในระหว่างวันที่ 1 มกราคม พ.ศ. 2533 ถึง 31 ธันวาคม พ.ศ. 2542 มีชาย 2245 คนที่เข้ารับการตรวจน้ำอสุจิที่คลินิกมีบุตรยาก โรงพยาบาลศรีนครินทร์ อายุเฉลี่ยของชายเหล่านี้เท่ากับ 31.31 ปี ผลการตรวจน้ำอสุจิพบว่า ปริมาณเฉลี่ยของน้ำอสุจิ (mean semen volume) และความเข้มข้นเฉลี่ยของตัวอสุจิ (mean sperm concentration) มีค่าเท่ากับ 2.25 มลลิลิตร และ 54.76 ล้านตัว ต่อมิลลิลิตร ตามลำดับ อุบัติการณ์ของภาวะ oligospermia, azoospermia, asthenozoospermia และ teratozoospermia ของชายที่มารับการตรวจน้ำอสุจิที่โรงพยาบาลศรีนครินทร์ ระหว่างเวลาที่ทำการศึกษามีค่าร้อยละ 35.32, 21.47, 10.78 และ 22.29 ตามลำดับ

สรุป : อุบัติการณ์ของภาวะ oligospermia และ azoospermia ที่พบในโรงพยาบาลศรีนครินทร์มีค่าใกล้เคียงกับที่เคยมีรายงาน ในการศึกษาอื่น ๆ การศึกษาในเมืองไทยไม่พบแนวโน้มของการลดลงของความเข้มข้นเฉลี่ยของน้ำอสุจิของชายที่มารับการตรวจน้ำอสุจิที่โรงพยาบาลศรีนครินทร์ในระยะ 10 ปี ที่ผ่านมา

Introduction

Infertility clinic at Srinagarind hospital has provided its services to infertile couples in the Northeastern Thailand

for more than ten years. One of the important basic investigations that most, if not all, infertile couples have to go through in order to know the possible cause(s) of their infertility problem is semen analysis. This investigation provides the clinician a valuable information regarding the function of male reproductive systems. It has been known that 40-50 % of infertility is wholly or in part due to a male factor¹. One of the most critical causes of male infertility is azoospermia, the complete spermatozoa absence in semen sample. The incidence of azoospermia varies from 10 to 20 % in the clinical picture of male infertility². In the past azoospermia was the obstacle for infertility treatment since there were not many treatment options that the physicians could provide besides donor insemination. During the past decade, after the invention of micromanipulator, much can be done to offer the chance of having their own genetic child to some of obstructive azoospermic patients. Various micromanipulation techniques, especially intracytoplasmic sperm injection or the so-called "ICSI", have been successfully utilized to overcome infertility problems arising from the male factor abnormalities. This study is the first of its kind that describes the magnitude of male factor disorder in couples suffering from infertility in the Northeast region of Thailand.

Materials and Methods

The records of semen analysis results of the male partners attending infertility clinic at Srinagarind hospital from 1 January 1990 to 31 December 1999 were retrospectively reviewed.

In this study we concentrated on three important semen parameters which are sperm concentration, sperm motility and sperm morphology. Oligospermia is defined

as a state that sperm concentration is less than 20 million per mL. Azoospermia is the complete absence of spermatozoa in the ejaculate. Asthenozoospermia is the state that there is less than 50 % of forwardly motile sperms observed under light microscope. Teratozoospermia defines a semen sample in which there is less than 30 % of sperm population that is morphologically normal.

The incidence of azoospermia, asthenozoospermia and teratozoospermia were reported as percentage per total males requesting semen analysis during the study period while age, sperm concentration and volume of the collected semen sample were reported in form of the mean of the summated values.

Results

During the last ten years (1 January 1990 to 31 December 1999), there were 2245 people requesting semen analysis at clinical andrology laboratory, reproductive biology unit at Srinagarind hospital. The mean age of the males whose their semen samples were evaluated was 31.31 years. The overall mean value for sperm concentration during this period was 54.76 millions per mL while the mean volume of the collected semen samples was 2.25 mL (Table 1).

This study (Table 2) showed that the incidence of oligospermia in male partners requesting semen analysis at Srinagarind hospital during the study period was 35.31 % (ranged from 29.52% to 42.76% in each year). More than half of these oligospermic men were found to be azoospermic (mean 21.47 %; ranged from 17.69 % to 32.38 % in each year) The incidence of asthenozoospermia and

teratozoospermia were relatively low comparing to that of oligospermia in the same study period (10.78 % and 22.29 %, respectively).

When the volume of the collected semen sample was taken into consideration, we interestingly found that the mean volume of the collected semen sample in azoospermic males was obviously lower than that of the non-azoospermic group. The mean age of the male partners in each group, however, was within comparable range.

Discussion

It has been suggested that the average sperm concentration has been decreasing over the past 50 years ^{3,4}. Environmental toxins and specifically chemicals with estrogen-like activity (xenoestrogens), have been blamed for this change. However, other studies have failed to document this proposed decline ⁵⁻⁹.

The World Health Organization (WHO) suggests criteria for normal semen. These include the volume of 2.0 mL or more, sperm concentration of 20 million/mL or more, sperm motility of 50% or more with forward movement, and sperm morphology of 30% or more of normal forms ⁹.

The incidence of male infertility is varied from one study to the others ^{1,2}. This difference is mainly due to the variation in criteria being applied to define the lower limit of male fertility. This study represents the figure of male infertility of couples seeking for infertility treatment at Srinagarind hospital in which is the only tertiary care center in the Northeast region of Thailand that offers full ranges of infertility services.

Table 1: Demographic data and results of semen analysis during 1990-1999

Year	Number of people requesting semen analysis	Mean age (years)	Mean volume of the collected semen sample (mL)	Mean sperm concentration (million/mL)
1990	85	29.8	2.16	43.32
1991	229	30.21	1.92	56.47
1992	105	29.27	2.11	54.97
1993	283	30.52	2.19	47.39
1994	294	32.24	2.32	50.06
1995	353	30.27	2.26	43.52
1996	297	31.30	2.38	48.99
1997	208	32.22	2.30	70.32
1998	164	31.13	2.31	69.47
1999	227	34.10	2.37	72.64
Total	2,245	31.31	2.25	54.76

Table 2 : Abnormal semen parameter detected at Srinagarind hospital

Year	Total number of people requesting semen analysis	Number of people demon-strated oligospermia	Number of people demon-strated Azoospermia	Number of people demon-strated Asthenozoospermia	Number of people demon-strated teratozoospermia
1990	85	27 (31.76 %)	16 (18.82 %)	15 (21.75 %)	3 (4.35 %)
1991	229	86 (37.55 %)	68 (29.69 %)	16 (9.94 %)	14 (8.69 %)
1992	105	41 (39.05 %)	34 (32.38 %)	9 (12.68 %)	2 (2.82 %)
1993	283	121 (42.76 %)	71 (25.09 %)	35 (16.51 %)	69 (32.55 %)
1994	294	102 (34.69 %)	52 (17.69 %)	57 (23.55 %)	77 (31.82 %)
1995	353	120 (33.99 %)	64 (18.13 %)	17 (5.88 %)	64 (22.15 %)
1996	297	114 (38.38 %)	61 (20.54 %)	26 (11.02 %)	612 (25.85 %)
1997	208	64 (30.77 %)	43 (20.67 %)	6 (3.64 %)	33 (20.00 %)
1998	164	51 (31.09 %)	36 (21.95 %)	2 (1.56 %)	17 (13.28 %)
1999	227	67 (29.52 %)	37 (18.59 %)	7 (3.68 %)	53 (27.89 %)
Total	2,245	793 (35.32 %)	482 (21.47 %)	190 (10.78 %)	393 (22.29 %)

Table 3 : Age and semen volume of azoospermic patients compared to non-azoospermic cases

Year	Number of azoospermic cases	Mean semen volume (mL)	Mean age of azoospermia (years)	Number of non-azoospermic cases	Mean semen volume of non-azoospermic (mL)	Mean age of non-azoospermia (years)
1990	16	1.43	31.25	69	2.33	29.46
1991	68	1.63	31.32	161	2.05	29.75
1992	34	2.16	29.68	71	2.09	30.73
1993	71	1.66	28.49	212	2.36	31.19
1994	52	1.72	30.77	242	2.45	32.56
1995	64	1.93	30.88	289	2.34	30.13
1996	61	2.10	31.41	236	2.45	31.27
1997	43	1.62	31.37	165	2.49	32.45
1998	36	1.81	31.67	128	2.45	30.98
1999	37	2.08	24.22	190	2.43	32.50
Total	482	1.82	30.93	1763	2.37	31.24

This study showed that the number of males requesting semen analysis in our center during the last ten years was maximized in 1995 and declined after that, possibly due to the economic crisis that hit Thailand over the past few years. The number of males requesting semen analysis in the last year (1999), however, was increased.

The mean value of sperm concentration observed during the ten-year period in this study did not show a decline trend. This is contrary to the previously reported studies in Europe^{3,4,10} which suggested a decreasing sperm concentration of that region of the world over that

past 50 years. These studies pointed out that the sperm concentration in Europe has been reducing with a rate of 2.1 % per year. Our result, together with those previously reported by the groups in North America, indicate that a decline trend of sperm concentration may not be a globally affected phenomenon as previously claimed.

Regarding the volume of collected semen sample, it was demonstrated in this study that, except in 1991, the mean volume of semen sample was more than 2 mL for the whole period of the study. There was, also, no demonstrating trend of either decreasing or increasing semen volume of males attending our infertility clinic during the

past ten years.

During the ten-year period of this study, incidence of oligospermia stayed quite consistently with the range of 29.52 to 42.76 % in each year, and the overall incidence of 35.32 %. More than half of these oligospermic men exhibited the most severe form of male infertility, azoospermia, with the overall incidence of 21.47 %. There has been no published data in Northeastern Thailand regarding the hormonal profiles and testicular pathologies in such cases. A research currently undertaking by our group, however, may provide the information that will be of value in identifying the causes of oligo/azoospermia commonly found in the male population seeking infertility services in our clinic.

Several causes could result in oligo/azoospermia. These include (1) hypogonadotropic hypogonadism such as in cases of lead toxicity, congenital adrenal hyperplasia and hemochromatosis from severe Thalassemia, (2) eugonadotropic conditions such as obstruction or absence of the vasa differentia, and (3) hypergonadotropic hypogonadisms which may result from chromosome abnormalities, infections or environmental toxins ¹¹. It is worth noting that the semen volume in the azoospermic males was obviously less than that of the non-azoospermic group. This leads us to postulate that the main cause of azoospermia of infertile males attending our infertility clinic might be obstructive disorder in origin. Obstructions of either seminal vesicles or ejaculatory ducts as well as the absence of vas deferens are commonly found to be associated with decrease semen volume ¹¹. If this postulation is proved to be true, it will have a relevant clinical importance since most obstructive azoospermia can now be treated by intracytoplasmic sperm injection (ICSI) using spermatozoa obtained from epididymis or testis.

Concerning abnormality in sperm morphology, this study revealed that the incidence of morphologically abnormal sperms was dramatically increased in 1993 comparing to that found in 1990-1992. This huge difference in incidence of teratozoospermia found in our center might be attributed to the introduction to our center of the more restricted Kruger's criteria in classifying sperm morphology since 1993 after the release of the third edition of WHO laboratory manual in 1992.

When sperm motility was taken into consideration, we found that there seemed to be a decreasing incidence of asthenozoospermia found in our center, especially during

the last five years (1995-1999) with overall incidence of 10.78 %. A more detailed study using computer assisted sperm analysis (CASA) might be of use in identifying several types of sperm motility disorders.

Due to the descriptive nature of this study, several limitations did occur which prohibited us to draw any precise correlation associated with the three parameters being investigated. A prospectively, analytical study is suggested to enable the investigators to obtain more information such as factors influencing poor semen parameters.

References

1. Speroff L, Glass RH, Kase NG. Clinical Gynecologic Endocrinology and Infertility. Baltimore : Williams & Wilkins, 1999 : 1075-96.
2. Enria T, Favre M, Enria R. Epidemiological and etiological aspects of excretory azoospermia. Arch Ital Urol Androl 1996; 68(5): 343-5.
3. Carlsen E, Giwercman A, Keidan N, Skakkebaek NE. Evidence for decreasing quality of semen during past 50 years. Br Med J 1992; 305: 609-10.
4. Augor J, Kunstmann JM, Czyglik F, Jouannet P. Decline in semen quality among fertile men in Paris during the last 20 years. New Eng J Med 1995; 332: 281-3.
5. Sherins RJ. Are semen quality and male infertility changing ?. New Eng J Med 1995; 332:327-9.
6. Fisch H, Goluboff ET, Olson JH, Feldshuh J, Broder SH, Barad DH. Semen analysis in 1283 men from the United States over a 25- year period: no decline in quality. Fertil Steril 1996; 65: 1009-12.
7. Paulsen CA, Berman NG, Wang C, Data from men in greater Seattle are reveals no downward trend in semen quality: further evidence that deterioration of semen quality is not geographically uniform. Fertil steril 1996; 65: 1015-9.
8. Rasmussen PE, Erb K, Westergaard LG, Laursen ST. No evidence for decreasing semen quality in four birth cohorts of 1,055 Danish men born between 1950 and 1970. Fertil Steril 1997; 68: 1059-62.
9. World Health Organization. Laboratory Manual for the Examination of Human Semen and Sperm-Cervical mucus Interaction. Cambridge: Cambridge University Press, 1999: 60-1.
10. Brake A, Krause W. Decreasing quality of semen. Br Med J 1992; 305: 1498-1503.
11. Cunningham GR. Male factor infertility. In: Wallach EE, Zuckerman MA, eds. Reproductive Medicine and Surgery. St Louis: Mosby Year Book, 1995: 399-414.

