employees with the presentation of souvenirs are organized on the International day of nurse. Annually, there are competitions of professional skill where a special nomination is allocated for this employee group.

In recent years the number of young specialists with secondary medical education in health care organizations significantly increased: 2011year — 8 people, 2012 year — 19 people, 2013 year — 25 people, 2014 year– 39 people. The total number of employed nursing staff for these years was 91 workers.

Thus, the existing system of work with young specialists of nursing in health care organizations provides a positive trend of increasing the number of nursing staff in "Samara city clinical hospital № 1 named after N. I. Pirogov".

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Evaluation of sperm DNA fragmentation in men with infertility in Kazakhstan

Abstract: As a result of the study the patients with male infertility had the DNA fragmentation index at the level of 40.0 % in average regardless of the cause.

Keywords: male infertility, DNA fragmentation.

Background/Aim

DNA fragmentation level evaluation of spermatozoids of males with idiopathtic infertility.

Timeliness

Semen analysis is the main type of study to assess male infertility [1; 2]. When male infertility is treated the parameters of routine semen analysis can not always predict male fertility. Currently the specialists dealing with infertility are interested in genetic studies very much. On the one hand, this is due to a progressive increase in the proportion of male factor. Over the past 20 years it has changed from 30 to 50 % and continues to grow. On the other hand, so-called idiopathic infertility [3] has a fairly large proportion (up to 30 %) among the causes of male infertility. We need to carry out more detailed studies, such as DNA fragmentation of sperm nuclei and chromatin, impairment condensation, aneuploidy in sperm nuclei [4; 5] to diagnose and predict male fertility more effectively. The above methods are more important to evaluate sperm quality resulting in an increase of prognostic and diagnostic approaches than standard semen characteristics (concentration, motility and morphology) [6].

Sperm DNA fragmentation is increasingly recognized as an important cause of infertility and widely studied. Relationship between DNA damage and reduction of reproductive functions contributed to the study of the sperm DNA integrity within the male fertility evaluation [7]. Sperm DNA integrity is necessary to transfer genetic information. Anomalies and damage in sperm nuclei chromatin can result in infertility. Such methods as SCD (sperm chromatin dispersion, TUNEL (Terminal deoxynucleotidyl transferase dUTP nick end labeling) are most commonly used to study sperm DNA integrity. Numerous studies using these methods to assess the integrity of sperm DNA revealed the presence of significant relationship between sperm DNA damage and pregnancy outcomes [8]. In addition, there are several scientific papers that investigated the correlation between clinical factors and sperm DNA damage. Among other modifiable lifestyle factors, smoking can result in deterioration in sperm quality and cause genetic damage [9; 10]. Some associations between the influence of alcohol to reduce male fertility are also shown in various studies [11]. Alcohol causes changes in the endocrine system regulating the hypothalamic-pituitary-testicular function and has direct toxic effect on the male reproductive gland [12–14].

TUNEL and SCD-test are used most of all among other tests to detect sperm DNA damage. The method is based on the principle of chromatin dispersion (SCD-test). Undamaged (fresh, frozen, thawed) sperm is immersed into an inert agarose gel on a prepared slide. Acid treatment denatures the DNA and

allows differentiating the fragmented sperm cells. Lysis solution dissolves proteins of the nucleus. The cells with normal DNA level have the DNA loops expanded resulting in fluorescence of DNA chromatin dispersion. The cells with damaged DNA have no or minimum fluorescence. It does not require to use sophisticated instrumentation and can be done with the help of light microscopes typically available in the laboratory [15; 16]. SCD-test is a simple, fast, accurate, and highly reproducible method for the analysis of sperm DNA fragmentation.

Herein we evaluated the level of sperm DNA fragmentation using the SCD-test in men with idiopathic infertility.

Materials And Methods

We examined 40 men diagnosed with infertility (the study group) and 10 apparently healthy fertile men (the control group) in the period from January 2014 to January 2015 examined in the Research Center of Urology named after B. U. Dzharbussynov. All patients signed the consent for voluntary participation in the research study. The age of the patients varied from 25 to 45 years, and was 33.06 ± 0.44 years in the study group and 32.30 ± 1.11 years in the control group in average ($p > 0.05$). We began the study with analyzes of sperm motility, concentration and morphology according to the Kruger strict criteria (WHO 2010). The evaluation of parameters, such as sperm motility, concentration and morphology, was performed with the use of the automatic program "Video-test sperm 3.2" produced by Video Test Ltd., St. Petersburg, Russia. To do it we put 10–20 μl of liquefied semen into a Makler chamber, covered it with a glass and analyzed at × 20 magnification. Sperm morphology was examined on the treated washed sperm stained with the Diff-Quick method. Asthenozoospermia and teratozoospermia were defined in the patients under the semen analysis results. Then we analyzed sperm DNA fragmentation with SCD (sperm chromatin dispersion, Spermprocessor, India) according to the manufacturer's instructions using a fluorescent microscope Axioskop 40 (Figure 1).

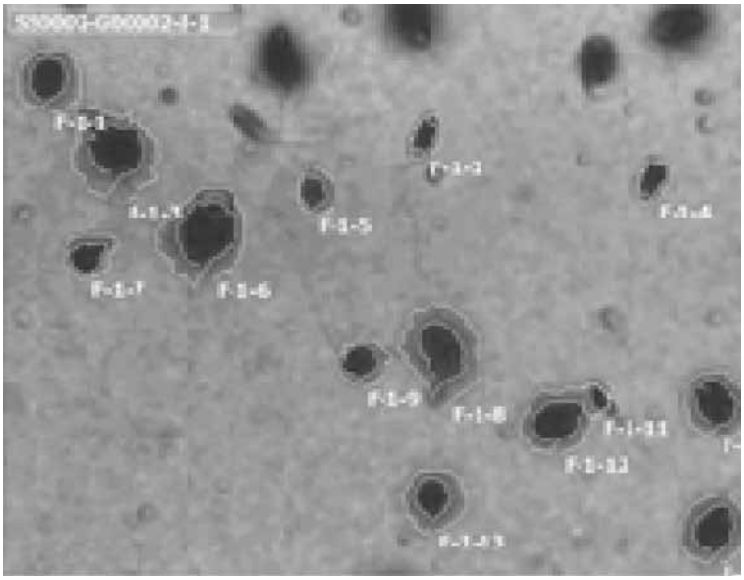

Fig. 1. Evaluation of sperm DNA fragmentation with use of DNA Fragmentation (Sperm Processor Pvt.Ltd, India) at ×100 magnification: N-sperm without DNA fragmentation, F- sperm with DNA fragmentation

The method is based on chromatin dispersion around the nucleus, thereby making it possible to distinguish sperm with different degrees of fragmented DNA, and to calculate the DNA fragmentation index that should not naturally exceed 20.0 %.

The samples were then visualized under a microscope at × 100 magnification and treated using Spermprocessor, India. We examined at least 500 sperm cells to calculate the DNA fragmentation index.

Results of the study

In the study of semen characteristics dependence from the level of sperm DNA fragmentation among the patients who had sperm with fragmented DNK above the norm we found out that the patients with asthenozoospermia had DNA fragmentation index amounted 40.0 ± 2.15, with oligozoospermia — 27.5 ± 2.31, teratozoospermia — 32.5 ± 1.50. The sperm count with fragmented DNA was 20.0 ± 2.87 in the control group of patients. The sperm count with damaged DNA was significantly ($p < 0.05$) higher in patients with low semen analysis results compared with the patients with normozoospermia. The results of the semen parameters and sperm DNA fragmentation study are shown in Table 1.

Table 1. – Results of semen parameters and level of sperm DNA fragmentation

Result of semen analysis	Sperm count with fragmented DNA
Oligozoospermia	27.5 ± 2.31*
Asthenozoospermia	40.0 ± 2.15*
Teratozoospermia	32.5 ± 1.50*
Normozoospermia	20.0 ± 2.87*

Note: * – $p < 0.001$

We compared the values of the DNA fragmentation index with the general sperm parameters, such as normal sperm morphology ($p < 0.001$), the total sperm count ($p = 0.02710$), progressive sperm motility ($p < 0.001$), active sperm motility ($p < 0.001$), total active sperm count ($p < 0.001$) and correlated them with the sperm index fragmentation.

Discussion

Herein we assessed sperm DNA fragmentation in the patients with male infertility. The average SDFI for the patients with asthenozoospermia was 40.0 %, and it was more than 20 % in all groups with patozoospermia, i. e. in 27 of 40 patients (67.5 %). Currently, there is no sufficient evidence to recommend the sperm DNA fragmentation and use it in a routine analysis and treatment of infertile couples. However, sperm DNA damage is common in the sperm of infertile men. There are several methods to test the integrity of the sperm DNA [6]. SCDt has been developed and improved by Fernandez et al. [15; 16]. In the original report Fernandez et al. reported that the percentage of sperm with fragmented DNA in the fertile group was 16.3 ± 6.0 %, in the group with normozoospermia it was 27.3 ± 11.7 %, and in the group with oligoteratozoospermia it was 47.3 ± 17.3 % [16]. Sivanarayana et al. in his works reported that the SDFI was as follows: 18.27 ± 7.19 % in patients with normozoospermia, 27.56 ± 9.96 % in patients with teratozoospermia, 36.06 ± 11.56 % in patients with asthenozoospermia, and 38.15 ± 13.91 % in patients with oligoastenoteratozoospermia. Thus, in our study, the average SDFI was measured at the level of 40.0 % that is consistent with the above data.

A significant negative correlation was established in particular between the proportion of morphologically normal sperm and DNA fragmentation [17]. Most studies have reported an inverse correlation between DNA fragmentation and sperm mobility, quality and concentration regardless of the age of the patients examined [17–25]. But at the same time more accurate and in-depth study of sperm in combination with semen analysis can play a significant role in the prevention, correction and treatment of patients with infertility [24; 25].

Conclusion

As a result of the study the patients with male infertility had the DNA fragmentation index at the level of 40.0 % in average regardless of the cause. If we use 20.0 % as the threshold value for infertility, then 27 of 40 (67.5 %) patients in this study had an increase of sperm DNA fragmentation.

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Organization and performance of the territorial Disaster Medicine Service of the Department of Healthcare in Moscow

Abstract: The article considers the structure of the territorial Disaster Medicine Service (TDMS) of Moscow, the tasks of TDMS, results of the TDMS's activity for the last year, both in on-line operation and daily activity.

Keywords: emergency situation (ES), territorial disaster medicine service, the injured, liquidation of medical consequences.

Liquidation of medical consequences of emergency situations in Moscow is laid upon the territorial disaster medicine service (TDMS) of the Department of Healthcare and its lead agency Scientific-Research Center for Emergency Medical Services — the territorial disaster medicine center (TDMC).

The territorial disaster medicine service (TDMS) of the Department of Healthcare of Moscow established in 1991 is a functional union of efforts and funds of the city healthcare attracted for the purpose of liquidation of medical consequences of emergency situations (ES) on the territory of the city. TDMS is one of the priority functional sub-systems of the Moscow system of prevention and liquidation of ES. The purpose of TDMS is the ensuring of effective and appropriate reaction of the Moscow healthcare service to crisis and emergency situations of different types and scale to satisfy the needs in emergency medical service.

The tasks of TDMS include:

– sustenance of constant readiness of the management bodies of establishments, sub-divisions and formations of the