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Histomorphological changes in testicular tissue on patients with hydrocele and infertility

P. Tzvetkova, Hr. Mavrov, K. Yanev**, D. Tzvetkov****

Institute of Experimental Morphology and Anthropology with Museum, Bulgarian Academy of Sciences, Sofia
**Tokuda Hospital, Sofia*
***Department of Urology, Medical University, Sofia*
****Medical Center "Dr. Luba Tzvetkova", Rujinci, Vidin*

Spermatological and pathohistological examination is carried out in 116 male patients with hydrocele (mean age 37.85 years). Scrotal thermographs have also been conducted in these patients.

The pathohistological examination of tunica vaginalis testis sample shows moderate fibrosis with collagen deposition and hyalinization as well as desquamation of the mesothelial cells layer. Mild focal interstitial fibrosis is present in the testicular specimen. Insignificant reduction of spermatozoa number in the seminal ducts was observed, together with disorganization of the germinative epithelium in certain zones, while in others spermatogenesis has taken place at the level of spermatids. Changes in the interstitial Leydig cells were not observed.

The authors substantiate the hypothesis that hydrocele can act as a endogenous factor for deterioration of gonads function with disturbance in spermatogenesis and subsequent infertility.

Key words: hydrocele, scrotal thermography, hydrocele fluid, testis, *tunica vaginalis testis*, infertility.

Introduction

Wide range of endogenous and exogenous factors can have a substantial deleterious effect on male fertility — temperature, light, environmental toxins, physical and endocrine factors and many others. Some local pathophysiological changes in testicles, as well as accompanying pathological conditions, have a significant negative role on the reproductive function in the adult male. Hydrocele is one of this local pathological conditions of the testis.

Etiological factors that lead to the emergence of scrotal hydrocele are multiple and diverse by nature, with wide range of negative influence on the spermatogenesis, and more specifically on the spermatological parameters with subsequent infertility [2].

Dating back to 1873, Cannelogul [3] emphasizes that hydrocele even if doesn't affect the spermatogenesis, suppress spermatozoids' maturation. At present days, Politoff et al. [11] and Tzvetkov et al. [4] state that there is a marked depression of spermatogenesis with aberrations in the maturation of the primary spermatocyte (degeneration of first degree — general terminology for thermal injury on the spermatogenesis).

In this article, we present data from spematological and pathohistological examinations of tunica vaginalis testis and testicular tissue in patients with hydrocele, aiming to establish the degree of deterioration of the reproductive function in males with this condition.

Materials and Methods

The authors studied 116 postoperative unilateral hydrocele patients. The patients' ages varied between 5 and 72 years (mean age 37.85 ± 12.11), 30 of them (25.86% of the studied cases) were married without children.

We have conducted contact thermography according to Clark's method in 23 patients (mean age 27.8 years) with scrotal hydrocele and concomitant infertility [7]. Parallel we conducted thermography in control group of 13 healthy males with preserved fertility.

We use correlative analysis, based on the hydrocele's fluid volume compared to spermatological parameters (according WHO criteria, 1996) [14].

An opened testicular biopsy and biopsy of tunica vaginalis testis by Vilar's method were performed in 11 patients [12]. Two specimens of tunica vaginalis testis, fixed in a 10% solution of neutral formalin, and a piece of testicular tissue in Bouin's fixative, were taken. Both specimens underwent a routine histological treatment technique, and the prepared samples were stained with hematoxylin and eosin, and after van Giesson, for collagen presence.

Results and Discussion

From the research on the 116 patients, operated due to scrotal hydrocele, we establish:

In active reproductive age are

n = 59 → 50.85 % [Tabl. 1]

Most common age of appearance of hydrocele

age → over 26 years of age
n = 96 → 81.35 %

Table 1. Age distribution of the patients with hydrocele (n = 116)

Patients	under 14 years of age	15 – 25 y.	26 – 35 y.	36 – 46 y.	over 46 y. of age
n	9	11	35	24	37
%	7.78	9.48	30.17	20.68	31.89

Hydrocele and concomitant diseases of male reproductive system

On table 2 are illustrated several concomitant pathological conditions in patients with testicular biopsy and unfavorable fertility prognosis.

Table 2. Concomitant pathological conditions in patients with testicular biopsy and unfavorable fertility prognosis

Condition	Number of patients
Incarcerated hernia, ipsilateral	1
Kryptorchism	3
Motor and mental retardation	2
Testicular torsion	1
Varicocele Dissociation testis/epididymis	1 1

The most common concomitant condition is Kryptorchism.

Spermatological examinations, volume of scrotal fluid and hydrocele

Table 3. Sperm analysis, before and after sclerotherapy in hydrocele, compared to control group of healthy fertile males

Parameter	Hydrocele fluid volume 2.73 ml	Hydrocele fluid volume ≥ 10.00 ml	Hydrocele fluid volume ≥ 30.00 ml	Control group	PNS
Ejaculate volume (ml)	2.53 ± 1.46	2.19 ±1.22	2.45 ± 0.97	2.84 ±1.27	< 0.001
Spermatozoids count (mln/ml)	23.11 ±15.44	25.40 ± 11.01	28.86 ± 1.22	63.45 ± 15.32	< 0.001
Spermatozoids motility (%)	41.56 ± 15.84	33.20 ± 11.45	10.23 ± 23.00	74.81 ± 19.62	< 0.01

The motility of spermatozoa with 60 % forward motion is found only in 26.06% of hydrocele cases. With volume of the hydrocele fluid over 30 ml, the motility of the gametes drop out with 15%, compared to the control group of healthy subjects with normospermia. Therefore we found direct parallel inversed connection between the volume of the hydrocele fluid and the spermatozoa motility (Table 3).

Other parameters, such as ejaculate volume, pH and spermatozoa count, did not show significant differences, when compared to hydrocele fluid volume.

Thermography in scrotal hydrocele and infertility

We observed the following results, divided by groups according to the etiological factor for the hydrocele and its localization:

In the ***first group*** of patients (n=7) there is bilateral hydrocele following inflammatory process — orchiepididymitis, we found elevation of scrotal temperature with mean value of 1.5°C. In all of these patients azoospermia is found.

In the ***second group*** of patients (n=11) with unilateral hydrocele, following trauma, we found elevation of the temperature with mean value of 1.2°C and different degree of oligospermia I to III degree.

In the ***third group*** — 4 patients with unilateral hydrocele, the temperature is elevated with 0.8°C with normal scrotal parameters.

In the ***fourth group*** — healthy males with normospermia and preserved reproductive function mean the scrotal temperature is 0.46°C.

Histomorphological changes in testicular tissue on patients with hydrocele

In evaluation of the results one must take into consideration the fact that the patients were with unilateral hydrocele, duration of the disease less than 3 years, and quantity of the hydrocele fluid less than 50 ml.

The pathohistological examination of tunica vaginalis testis sample shows moderate fibrosis with collagen deposition and hyalinization as well as desquamation of the mesothelial cells layer. The small blood vessels and capillaries in the tunica wall are dilated and engorged with blood. Extensive round-cell inflammatory infiltrate is observed mostly around those vessels, but also diffusively through the entire thickness of the tunica. Lymphocytes, plasmatic cells, and fibrocytes predominate in the infiltrate (Fig. 1).

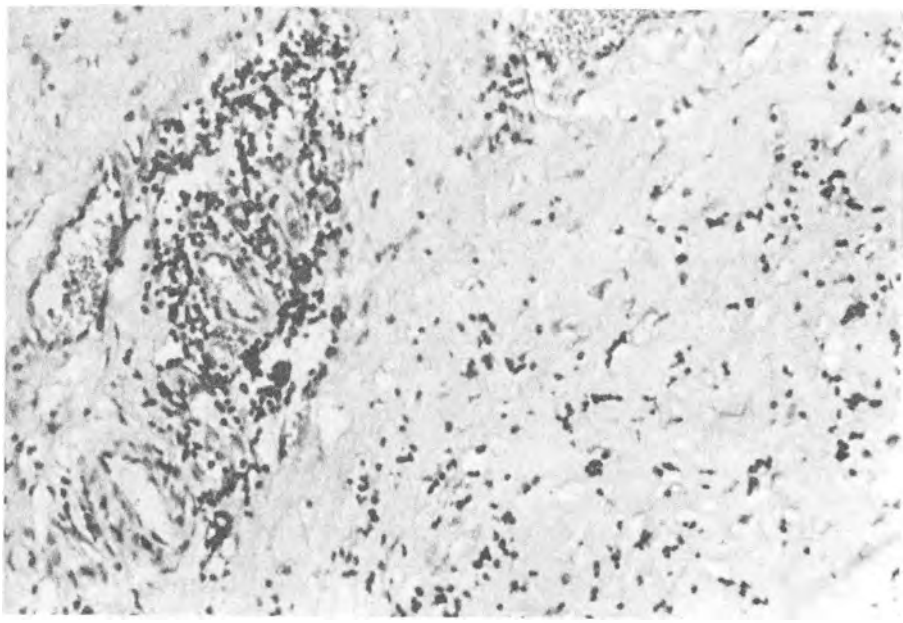

Fig. 1 Chronic nonspecific inflammatory process with collagenization of tunica vaginalis testis. The round-cell inflammatory infiltrate has a predominantly perivascular localization. HE, × 100

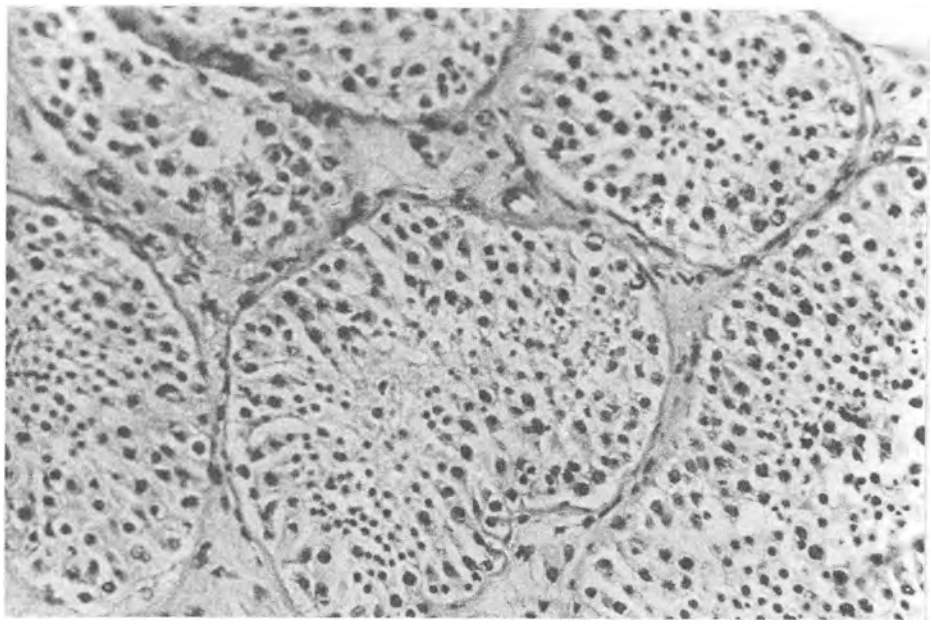

Fig. 2. Mild interstitial fibrosis of the testicular tissue, reduction of spermatozoa number, and disorganization of germinative epithelium in certain zones of the seminal ducts. HE, × 125

Mild focal interstitial fibrosis with scattered thickening of lamina propria of the seminal ducts is present in the testicular specimen. Insignificant reduction of spermatozoa number in the seminal ducts was observed, together with disorganization of the germinative epithelium in certain zones, while in others spermatogenesis has taken place at the level of spermatids (Fig. 2). Changes in the interstitial Leydig cells were not observed. No data of inflammatory process in testicle were found.

Our results, as well as those of Osegbe [9], show that the hydrocele can be a endogenous factor for injury of the gonad function and disturbances in spermatogenesis. Data point towards diminished fertilization capacity of these patients, especially if we compare sperm parameters with hydrocele fluid volume and scrotal thermography. Gannizzaro reaches similar constelations [5].

The morphological changes in tunica vaginalis testis that we have observed in patients with hydrocele have nonspecific character. An insignificant hypospermatogenesis is observed in testicular tissue, similar to that in patients with infertility due to orchitis, orchiepididymitis, testicular and paratesticular tumors. As shown by other authors [6], the testicular tissue atrophy is rare in hydrocele patients.

Different levels of inflammatory changes in tunica vaginalis testis are found in hydrocele patients. Mostly, they are chronic and nonspecific. In some cases, granulations, total or partial preservation of mesothelial layer (where the cells turn to low-cubic ones), or marked mesothelial proliferation with formation of several layers, occur on the inside wall of hydrocele sac [1, 13]. None of these changes was observed in our cases. The acquired forms of hydrocele are often due to neoplasms, inflammatory processes, and injuries of the testicle, epididymis, or other paratesticular structures [10, 8]. However, in our cases there were no data of inflammatory

process in the testicle, while there were marked chronic nonspecific inflammatory changes in the testicular tunics. Those changes appear to be the milestone of the clinically diagnosed hydrocele and its determination as symptomatic.

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