Assessment of Increased Desquamation of Epididymal Epithelial Cells in Semen of Men as a Predictor of Acute Epididymitis

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INTRODUCTION

Acute epididymitis is an inflammation of the epididymis sometimes diagnosed in urological practice, in men mainly aged between 18 to 50 years.[1] Usually, the sexually transmitted pathogens *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are causes of acute epididymitis in men under 35 years old, whereas in men older than the age 35, the infection is generally caused by common urinary tract pathogens, such as *Escherichia coli*.[2] Acute epididymitis is also caused by noninfectious factors, such as Behçet's disease, urethral manipulation, epididymal injury after vasectomy, and urinary reflux in the epididymis.[1]

Clinically, the diagnosis of acute epididymitis is based on careful history taking, physical examination, urine and/or semen cultures, and ultrasonography findings.

Semen analysis has been infrequently used in diagnosing acute epididymitis. In few cases in which semen specimens were explored, it has been given emphasis to the quantification of seminal leukocytes and the investigation of causative pathogen (semen culture).[2] Sometimes, the evaluation of the incidence of sperm abnormalities after the treatment has also been of particular concern, to investigate the deleterious effects of the infection on male fertility.[3] On the other hand, semen analysis does not provide any data about negative impacts of the infection on the epididymal epithelium.

This study reports a case of 24-year-old man with acute epididymitis causing exceeding desquamation of epithelial cells of the epididymis in seminal fluid. Implications of this finding are discussed.

CASE REPORT

A 24-year-old man was referred to the Center for Advanced Semen Analysis (CIPSLAB) to do semen analysis with a diagnosis of acute epididymitis made by his family urologist, based on complaints of testicular pain and swollen, somewhat tenderness of the left testis and findings in ultrasonography evaluation.

The patient had no history of genital trauma, including testicular torsion, and genital infections, such as urinary tract infections. The semen specimen was collected in the laboratory by masturbation, after four days of sexual abstinence.

TECHNIQUE

Physical properties of the ejaculate were evaluated according to methodologies reported previously,[4] whereas sperm characteristics and the leukocyte count were assessed following recommendations of the World Health Organization (2010) laboratory manual for the examination and processing human semen.[5] In CIPSLAB, the assessment of squamous epithelial cells from the urethra, prostate, seminal vesicles, and transitional epithelium is part of the semen analysis routinely, which are assessed according to methodology described elsewhere.[6] Increased desquamation of these cells is commonly found in disorders affecting epithelia of the accessory genital glands, including those caused by infections. Recently, the assessment of epididymal epithelial cells was also introduced in semen analysis routinely in the laboratory using the same methodology, which was assessed in semen of this patient.

Seminal parameters of a man with acute epididymitis and increased desquamation of epididymal epithelial cells

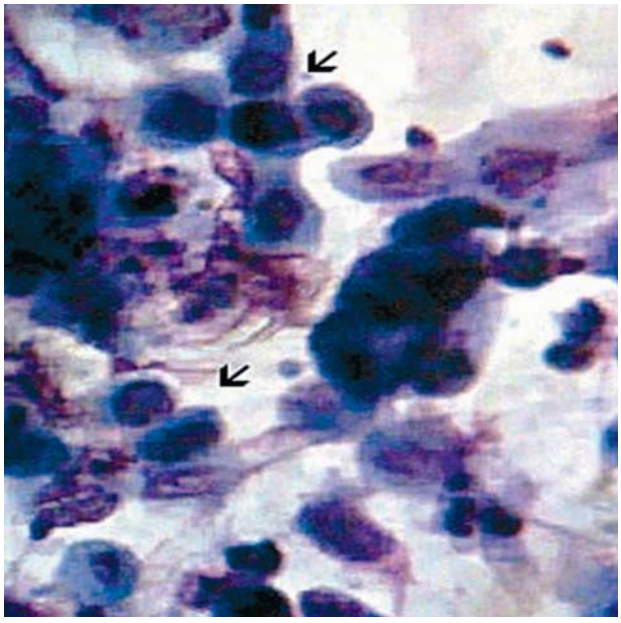
Parameter	Results	Reference value
Coagulation	Moderate	Moderate†
Liquefaction	40 min	10 to 60 min†
Volume	6.3 mL	2.0 to 5.0 mL†
Viscosity	Hyperviscosity	Normoviscosity†
pH	8.4	7.3 to 7.8†
Sperm concentration/mL	4.75 × 10^6/mL	≥15 × 10^6/mL
Vitality	62%	> 58%
Total motility	47%	> 40%
Progressive motility	46%	> 32%
Non-progressive motility	1%	1 to 18%
Immotile	53%	22 to 59%
Hypoosmotic Swelling Test	52%	> 58%
Normal morphology	4%	> 4%
Small head	18%	-
Large head	-	-
Pyriform	2%	-
Amorphous	36%	-
Round-headed	-	-
Pin-headed	5%	-
Tapered	-	-
Cytoplasmic droplet	-	-
Abnormal mid-piece	2%	-
Abnormal tail	-	-
Combined anomalies	33%	-
Leukocytes/mL	15.2 × 10^6/mL	< 1 × 10^6/mL
Urethral cells	74% ‡	> 70% §
Prostate cells	6% ‡	≤ 17% ¶
Seminal vesicles cells	-	< 10% §
Epididymal cells	20% ‡	≤ 5% §
Transitional cells	-	-

† Reference values published previously[4]
‡ Percentage of the total of squamous epithelial cells
§ Unpublished reference values
¶ Reference value published previously[6]
Other reference values – World Health Organization manual for semen analysis[5]

RESULTS

Table demonstrates evaluated semen parameters. Apart from the pronounced leukocytospermia, seminal phagocytes were also found increased at a ratio of 15 leukocytes per phagocyte.

In the assessment of the squamous epithelial cells of the accessory sex glands, no cells were found from the seminal vesicles, the transitional epithelium, and a normal concentration of the prostatic epithelial cells (6% of total of squamous epithelial cells) was found. On the other hand, an increased incidence of epididymal epithelial cells (20% of total of squamous epithelial cells) was found, usually forming clusters (Figure). This finding was considered uncommon in the routine of the laboratory, as these cells are usually found in percentage of less than 5%. Like other examinations, squamous epithelial cells were abundant in the sample (74% of total).



Microscopic examination of human semen showing increased desquamation of non-germinal epithelial cells and leukocytes (×1000). The arrows show epididymal cells. Semen smear stained by a modified Leishman's blood staining method[6]

DISCUSSION

To the best of my knowledge, this is the first report on the increased desquamation of the epididymal cells in semen in acute epididymitis. Semen analysis is infrequently performed in investigating this infection in urological practice. If any, the presence and increase of epididymal cells are not investigated routinely, because no suitable methodology is available.

Since acute epididymitis produces well-defined symptoms, the treatment is usually performed promptly, taking into account the patient's age, without using this laboratory procedure to assist diagnosis. If the patient is ≤ 35 years old, the protocol considers that the infection disease is probably caused by *Neisseria gonorrhoeae* or *Chlamydia trachomatis*. On the other hand, if the patient is > 35 years, it is assumed that the infection is probably caused by gram-negative bacilli, such as *Escherichia coli*.[7]

Indeed, semen analysis is mostly indicated in investigating male infertility. Therefore, this examination mainly focuses on the evaluation of sperm characteristics and function. As a consequence, there is a plethora of information about physiological and pathological properties of the spermatozoa in the literature on male infertility.

On the other hand, few data are available about the presence of squamous cells of the accessory sex glands in semen, including epididymal cells, which are only reported in studies about the composition of the epididymal epithelium.[8] Even the presence of the prostate cells in semen has been poorly explored; however, there are a plethora of studies reporting damage in the prostate epithelium, chiefly in patients with the prostate cancer. Ultimately, squamous epithelial cells of the genital glands are not usually investigated in laboratory practice of the semen analysis.

I could not determine whether the increase of epididymal cells in the semen is indicative of damage to the epididymal epithelium caused by the infection. However, it is thought that it will open up a new way for studying the pathophysiology of the epididymis, since it is now technically feasible to detect epididymal cells in the semen routinely, as reported herein. It is also expected that the increased desquamation of the epididymal cells in the semen may be a marker of damage to the epididymal epithelium; however, no solid proof was found. Therefore, further studies are needed to more consistently evaluate the clinical significance of this finding.

CONFLICT OF INTEREST

None declared.

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