# CLINICAL AND SUBCLINICAL FEATURES OF 612 CASES OF HEMATOSPERMIA AT HANOI MEDICAL UNIVERSITY HOSPITAL

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*Six hundred twelve patients with hematospermia were involved in a study to investigate the clinical and subclinical features of hematospermia. The average age of the patients was 39.42 ± 11.67 years. In the episodes of hematospermia, 22.45% of patients had a history of alcohol consumption. 16.25% of patients described a pattern of postponed or interrupted sexual intercourse before ejaculation. The rate of positive tuberculosis in PCR tests was 1.27%. 1.92% of patients had elevated total PSA. Positive culture accounted for 8.94 %. The testosterone level of these patients was relatively low for their age. While 26.01% of these patients had a decreased testosterone concentration (12.1nmol/L), 2.7% had low testosterone values (12.1 - 15 nmol/L).*

**Keywords: Hematospermia, risk factors related to hematospermia.**

## I. INTRODUCTION

Hematospermia is defined as the presence of blood in the semen and might change semen color when ejaculating. Persistent and recurrent hematospermia may impact significantly the mental health of patients and their partners such as anxiety, stress, or even depression.

The prevalence of hematospermia in the community has not been determined. According to Polito et al, hematospermia is a rare condition, accounting for approximately 1% of outpatients diagnosed with urological and andrological diseases. It may usually be associated with young males under 40 years of age and is mostly benign.[1] A study in Japan showed that hematospermia spontaneously resolved in 168 (88.9%) of 189 patients (without inflammation, infection, or malignancy), with a mean of the self-limiting duration of 1.5 months.[2] According to a recent meta-analysis study, there were only 33 out of 931 hematospermia cases (3.5 percent) related to tumors with 25 prostate-related cases.[3] This finding suggested that the etiology of hematospermia had not been adequately assessed.

Due to a lack of concern, little research has been conducted on hematospermia in Vietnam. Furthermore, expert opinions on this subject remained controversial. Prostate cancer and tuberculous seminal vesiculitis were traditionally considered to be the two most common causes of hematospermia. Nowadays, however, inflammations of the genital tract are assumed to be the major causes, with a very low risk of genital tuberculosis. Because of this controversy, there are many difficulties in clinical practice. Expert opinions are mostly used in the diagnosis and treatment of hematospermia. Understanding the clinical and subclinical features of hematospermia may thus provide doctors with appropriate diagnostic and therapeutic assessments to avoid over-assessment and intervention, such as prostate biopsies and treatment of genital tuberculosis.

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As a result, we conducted the study with the following objectives:

- Describe the clinical and subclinical features of outpatients in the Andrology clinic at the Hanoi Medical University Hospital.

- Identify some risk factors of hematospermia based on patient's clinical and subclinical features.

## II. METHODS

### 1. Study subjects

We screened medical records of patients presenting at the Andrology clinic of Hanoi Medical University Hospital from 2014 to 2020 with the chief complaint of observing blood in their semen. Patients' self-reported symptoms varied from blood clots to changes in the color of semen (red, pink, or red-brown). Only cases confirmed by evidence of erythrocytes in semen analysis were defined as hematospermia and were included in this study. Patients who did not have evidence of blood in semen analysis (changes in semen's color, erythrocyte observed under the microscopic) were excluded.

### 2. Research Methods

***Study design:***

Case series.

***Research procedure:***

In our clinic, all patients complaining of blood in their semen were subjected to the same diagnostic protocol. Firstly, we collected the general information of patients, especially their medical and family history, marital status, and sexual life. Further questions were asked to clarify the circumstances of the hematospermia episode, including: *"How long have you abstained before the first episode of hematospermia?"* (*duration of abstinence*); "*Did you use alcohol or consume a greater amount than normal before having sex at that time?*" (*alcohol assumption*); "*Did you try any method to prolong the duration of coitus such as intermittent sexual intercourse or delayed ejaculation?*" (*intermittent sex – delayed ejaculation*).

Physical examination was performed to detect abnormalities related to the testis (tumors, varicocele), vas deferens, epididymis, penis (hypospadias). A digital rectal examination (DRE) was used to examine the prostate.

Semen analysis was required in all patients to confirm the diagnosis. In the case of hematospermia, since the presence of erythrocytes in the sample might influence the accuracy of evaluating other semen parameters, we did not show the completed result of semen analysis in this study.

In severe cases with recurrence hematospermia or unchanged - red semen across ejaculations, further investigation was performed. Post - ejaculation urine analysis and urine culture were done to detect infections of the urinary tract in suspected cases with symptoms of burning or itching in the urethra. We also examined the tumor biomarkers (αFP and hCG for testicular cancers and total PSA for prostate cancers) in patients with unusual findings during the physical examination. TTransrectal ultrasonography was prescribed for patients suspected of abnormalities of the seminal vesicles, vas deferens, or prostate gland. Total testosterone level as the most important men hormone was also evaluated. Hematologic disorders were screened by a complete blood count.

From the beginning of management and treatment of hematospermia, polymerase chain reaction (PCR) was performed to detect Tuberculosis (TB) in the semen sample. Since most hematospermia cases in our clinic were negative with TB, this PCR was no longer used after 2019.

The above information was stored in medical records. To describe the clinical and subclinical characteristics of hematospermia, we tried to retrieve all available data in patients' medical records.

**3. Data processing**

The data in this study were analyzed using R software version 4.0.2 for the Windows 10 operating system. The data is displayed in the following formats: mean, standard deviation, median, and min-max.

**4. Ethical considerations**

The study was approved by the Board of Directors of Hanoi Medical University Hospital. Information regarding study participants is kept confidential.

## III. RESULTS

**1. Clinical characteristics of participants**

**Table 1. General characteristics of all participants**

| Characteristics | n | % | Mean ± SD | Median | Min-Max |
|---|---|---|---|---|---|
| **Age (years)** | 612 | | 39.42 ± 11.67 | 38 | 17-77 |
| ≤ 40 | 365 | 59.64 | | | |
| > 40 | 247 | 40.36 | | | |
| **Height (cm)** | 612 | | 166.94 ± 5.37 | 167 | 147-187 |
| **Weight (kg)** | 612 | | 63.7 ± 9.01 | 63 | 41.8-106 |
| **BMI (kg/m2)** | 612 | | 22.8 ± 2.8 | 22.8 | 15.2-36.6 |
| < 18,5 | 21 | 3.43 | | | |
| 18,5-23 | 362 | 59.16 | | | |
| > 23 | 229 | 37.41 | | | |
| **Marital status** | 612 | | | | |
| Married | 420 | 68.63 | | | |
| Single/Widowed/Divorced | 192 | 31.37 | | | |
| **Medical history** | 612 | | | | |
| Healthy | 456 | 74.5 | | | |
| Hypertension | 26 | 4.2 | | | |
| Diabete | 15 | 2.5 | | | |
| Urogenital infection | 22 | 3.6 | | | |
| Urinary stone | 11 | 1.8 | | | |

The proportion of males under 40 years old with hematospermia represented 59.64 percent, with an average age of hematospermia of 39.42 ± 11.67. The majority of patients (74.5%) had a healthy history.

**Table 2. Characteristics of the circumstances with hematospermia**

| Characteristics of the circumstances with hematospermia | n | % |
|---|---|---|
| **Abstinence period (month)** | 597 | |
| ≥ 1 month | 20 | 3.35 |
| < 1 month | 577 | 96.65 |
| **Alcohol consumption** | 597 | |
| Yes | 134 | 22.45 |
| No | 463 | 77.55 |
| **Intermittent sex – delayed ejaculation** | 597 | |
| Yes | 97 | 16.25 |
| No | 500 | 83.75 |

There was 22.45 percent of patients who reported consuming alcohol before having sex at the time of the first hematospermia episode, and 16.25 percent of cases had discontinued or delayed sexual intercourse among those who came to the clinic for hematospermia.

**2. Subclinical characteristics of participants**

**Table 3. Subclinical characteristics**

| Characteristics | n | % | Mean ± SD | Median | Min - Max |
|---|---|---|---|---|---|
| **Complete blood count (CBC)** | | | | | |
| **Red blood cells** | 475 | | 5.3 ± 0.63 | 5.23 | 2.29 - 9.18 |
| < 2.5 T/L | 1 | 0.21 | | | |
| ≥ 2.5 T/L | 474 | 99.79 | | | |
| **White blood cells** | 475 | | 7.11 ± 2.14 | 6.79 | 3.19 - 19.1 |
| ≤ 10 G/L | 442 | 92.63 | | | |
| > 10 G/L | 35 | 7.37 | | | |
| **Platelets** | 475 | | 236.7 ± 54.6 | 235 | 79 - 528 |
| < 150 G/L | 14 | 2.94 | | | |
| ≥ 150 G/L | 461 | 97.06 | | | |
| **PSA (ng/ml)** | 520 | | 1.09 ± 0.98 | 0.83 | 0.02 - 20.35 |
| ≤ 4 | 510 | 98.08 | | | |
| 4 - 10 | 10 | 1.92 | | | |

| Characteristics | n | % | Mean ± SD | Median | Min - Max |
|---|---|---|---|---|---|
| **AFP (ng/ml)** | 316 | | | | |
| ≤ 10 | 309 | 97.78 | | | |
| > 10 | 7 | 2.22 | | | |
| **hCG (mIU/mL)** | 312 | | | | |
| ≤ 2 | 284 | 91.03 | | | |
| > 2 | 28 | 8.97 | | | |
| **CRP-hs (mg/L)** | 242 | | | | |
| ≤ 5 | 242 | 100 | | | |
| > 5 | 0 | 0 | | | |
| **Urinalysis** | 497 | | | | |
| Normal | 225 | 45.3 | | | |
| Presence of red blood cells | 242 | 48.7 | | | |
| Presence of white blood cells | 70 | 14.1 | | | |
| **Urine culture** | 179 | | | | |
| Negative | 163 | 91.06 | | | |
| Positive | 16 | 8.94 | | | |
| **Tuberculosis PCR** | 158 | | | | |
| Negative | 156 | 98.73 | | | |
| Positive | 2 | 1.27 | | | |
| **Testosterone (nmol/L)** | 519 | | 15.73 ± 6.02 | 15.07 | 2.9 -70.49 |
| < 12.1 | 135 | 26.01 | | | |
| 12.1 - 15 | 123 | 23.7 | | | |
| > 15 | 261 | 50.29 | | | |
| **Abnormalities of the seminal vesicles in Transrectal ultrasound** | | | | | |
| Normal | 208 | 53.47 | | | |
| Inflamation/infection | 70 | 17.99 | | | |
| Stone | 12 | 3.08 | | | |
| Cyst | 61 | 15.68 | | | |
| Calcification | 38 | 9.77 | | | |

PCR: Polymerase chain reaction

Only 1.27 percent of patients having blood in ejaculation were positive with *Tuberculosis bacilli*. Among 179 cases with urine culture, 16 (8.94%) were positive, with *Enterococcus* being the most prevalent agent (4 cases), followed by *Staphylococcus aureus* (2 cases), and *Pseudomonas aeruginosa* (2 cases). The majority of tumor markers were within normal limits. PSA ≤ 4 (ng/ml) accounted for 98.08%, αFP ≤ 10 (ng/ml) accounted for 97.78%, and hCG ≤ 2 (mIU/mL) accounted for 91.03%. Among the patients with abnormal FP and hCG, there was no case with both elevated FP and hCG. There were ten hematospermia individuals with PSA levels in the range of 4 to 10 (ng/ml) where the digital rectal examination revealed no evidence of prostate hardness, and the fPSA/tPSA ratio was more than 20% in all ten individuals. Low testosterone levels (12.1-15 nmol/l) accounted for 23.7 percent of patients, whereas reduced testosterone levels (12.1 nmol/l) accounted for 26.01 percent.

## IV. DISCUSSION

In our study, participants with hematospermia ranged from 17 to 77 years old (mean 39.42 ± 11.67). This finding is comparable to other studies. Li et al from China reported the age of hematospermia patients was from 21 to 77 years old (mean 39.8 ± 10.60).[4] Hematospemic patients in a study of Zargooshi et al also had the age range from 18 to 76 years old with a mean of 38 years old.[5] It shows that hematospermia can happen at any age during the man's sexual life.

According to our study, among 597 patients, we recorded 134 cases (22.45%) of hematospermia with alcohol consumption before sexual intercourse, and 97 of participants (16.25%) having interrupted sexual intercourse or delayed ejaculation. We suggest that alcohol consumption might results in vasodilation; strong and abrupt contractions of the seminal vesicles, urethral sphincter, and perineal muscles during ejaculation can cause hematospermia by increasing pressure in the veins. One similar hypothesis has already been proposed, which postulated that hematospermia is connected to a change of pressure in the cavity of the seminal vesicle caused by sudden emptying of the inflated seminal vesicle.[5] This mechanism also explains why intercourse inhibition or interruption during the ejaculating result in hematospermia.

In our research, 158 individuals had tuberculosis PCR, but only two were positive, accounting for 1.27 percent of the total population. A study at an Iranian institution found comparable outcomes when 1 case of tuberculosis was found in 157 hematospermia patients.[6] Among 520 hematospermia individuals having PSA in this study, only 10 of them had total PSA values greater than 4ng/ml, but no clinical prostate abnormalities were found and the free PSA/total PSA ratio was greater than 20%. As a result, the belief that prostate cancer and genital tuberculosis as the two most common causes of hematospermia in clinical practice is no longer supported. The fact that TB is no longer the most common cause of hematospermia may be due to the advances in TB treatment and management in Vietnam in the present.

Urine culture was done in 179 suspected subjects. The majority of them were negative, while only 16 cases were positive. The three organisms with the highest rate were *Enterococcus* (4 cases), *Staphylococcus aureus* (2 cases), and *Pseudomonas* (2 cases). Since these patients did show any serious symptoms of urinary tract infections, contamination during urine sampling procedure should be considered. Furthermore, several sexually

transmitted infections, such as *Chlamydia, Mycoplasma*, and *Ureaplasma*, which caused urethritis and genital tract infections, cannot be cultivated in standard culture conditions. Findings from this study suggest that urine culture is not necessary essential for patients complaining about hematospermia. Infections may be a critical cause of hematospermia but more advanced laboratory tests such as PCR are required to reveal the presence of bacteria in the male genital tract of hematospermic patients. Therefore, further studies need to be conducted to thoroughly and precisely analyze the bacteriological features of individuals presenting with hematospermia.

Using imaging to evaluate the ejaculatory duct, we discovered that the majority of hematospermia cases did not have any spermatic duct abnormalities. The inflammation of the genital tract accounted for the greatest proportion of pathological cases (17.99%). This finding is consistent with previous research that found a significant risk of genital infections in hematospermic individuals.[6] Similarly, ejaculatory tract abnormalities such as prostatic cysts, Muller duct cysts, or ejaculatory duct cysts have also been reported in patients with hematospermia.[7]

In our study, we evaluated the hormone levels of 519 patients with hematospermia. Testosterone levels of these patients were relatively low compared to their age, with 26.01 percent of patients having testosterone levels lower than 12.1 nmol/L and 23.7 percent having low testosterone values (12.1-15 nmol/L). This finding supports the theory that low testosterone levels are a risk factor for hematospermia. More research, however, is required to confirm these findings.

This study could not be conducted without limitations. Since we used medical records of patients, missing values could not be avoided. Updates in treatment and management algorithm and changes in laboratory tests assigned to patients is required. We tried to retrieve all available data to clarify the characteristics of this rare condition – hematospermia. Thus, further studies need to be conducted.

## V. CONCLUSION

According to the findings of our study, the majority of patients had hematospermia of idiopathic etiology. The majority of the reasons discovered are benign. Patients with tuberculosis-related hematospermia accounted for just 1.27 percent of the etiologies discovered. Since the evidence of infections through urine culture is not reliable with the low rate of positive results, we suggest to discontinue this test. .

There are some behaviours that may increase the risk of hematospermia such as prolonged abstinence period, alcohol consumption briefly before sexual intercourse, and delayed ejaculation. Low testosterone level is also found in some hematospermic patients. However, further studies are required to confirm these observations.

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