Evaluation and Treatment of Hematospermia

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Hematospermia can be a distressing symptom for patients, but most cases are effectively managed by a primary care physician. Although the condition is usually benign, significant underlying pathology must be excluded by history, physical examination, laboratory evaluation, and, in select cases, other diagnostic modalities. In men younger than 40 years without risk factors (e.g., history of cancer, known urogenital malformation, bleeding disorders) and in men with no associated symptoms, hematospermia is often self-limited and requires no further evaluation or treatment other than patient reassurance. Many cases are attributable to sexually transmitted infections or other urogenital infections in men younger than 40 years who present with hematospermia associated with lower urinary tract symptoms. Workup in these patients can be limited to urinalysis and testing for sexually transmitted infections, with treatment as indicated. In men 40 years and older, iatrogenic hematospermia from urogenital instrumentation or prostate biopsy is the most common cause of blood in the semen. However, recurrent or persistent hematospermia or associated symptoms (e.g., fever, chills, weight loss, bone pain) should prompt further investigation, starting with a prostate examination and prostate-specific antigen testing to evaluate for prostate cancer. Other etiologies to consider in those 40 years and older include genitourinary infections, inflammations, vascular malformations, stones, tumors, and systemic disorders that increase bleeding risk. (*Am Fam Physician.* 2009;80(12):1421-1427, 1428. Copyright © 2009 American Academy of Family Physicians.)

▶ **Patient information:** A handout on hematospermia, written by the authors of this article, is provided on page 1428.

Presence of blood in the semen, known as hematospermia or hemospermia, is often a frightening finding for patients. The incidence of hematospermia is difficult to quantify because most men do not observe their semen.[1,2] Prevalence in clinical settings is highest in men younger than 40 years.[3] Most cases of hematospermia can be appropriately managed by primary care physicians. Hematospermia is commonly benign and self-limited, especially in men younger than 40 years without risk factors and in men with no associated symptoms. These patients need minimal investigation, and they can be reassured if workup findings are negative, or treated if indicated. Patients with risk factors or associated symptoms, patients 40 years and older, and patients with persistent or recurrent hematospermia need more extensive evaluation and may need to be referred to a urologist.

Etiology

Until recent decades, hematospermia was not considered clinically significant, and it was mostly attributed to prolonged sexual abstinence or intense sexual experiences because a precise etiology could not be determined in as many as 70 percent of patients who presented with it.[3-5] Although prolonged sexual abstinence, excessive masturbation, and rigorous sexual intercourse are still considered causes of hematospermia,[1] advancements in medical imaging and laboratory techniques have allowed physicians to determine a more precise cause in up to 85 percent of hematospermia cases, many of which are benign.[6] Of specific etiologies, infectious conditions are the most common, accounting for approximately 40 percent of hematospermia cases.[3,4] Other etiologies include inflammatory, neoplastic (e.g., prostate cancer, testicular cancer),[7,8] iatrogenic (e.g., prostate biopsy [most common], prostate surgery, urologic instrumentation, radiation therapy, hemorrhoid injections),[9] structural, systemic, and vascular causes *(Table 1[7-21])*.

Evaluation

The goal of clinical assessment is to identify significant or treatable underlying causes of hematospermia.[1] The foundation for a comprehensive evaluation includes a thorough patient history and physical examination. *Figure 1* presents an algorithm for the evaluation of hematospermia.[7,8]

Table 1. Etiologies of Hematospermia and Their Typical Presentations

Etiology	*Typical presentation*
Behavioral*	
Excessive sex or masturbation	Isolated hematospermia episode triggered by particular sexual behavior
Interrupted sex	
Prolonged sexual abstinence	
Infectious*	
Echinococcus (rare)	Irritative genitourinary symptoms; urinalysis positive for inflammation; positive microbiology findings
Gram-positive and gram-negative uropathogens	
Mycobacterium tuberculosis (rare)	
Schistosoma (rare)	
Sexually transmitted infections: *Chlamydia trachomatis; Neisseria gonorrhoeae;* herpes simplex virus types 1 and 2 urethritis; urethral human papillomavirus	
Inflammatory	
Chemical epididymitis	Irritative genitourinary symptoms; urinalysis positive for inflammation; negative microbiology findings
Interstitial, eosinophilic, proliferative cystitis	
Prostatitis	
Seminal vesiculitis	
Neoplastic	
Benign and malignant tumors of the bladder, urethra, prostate, seminal vesicles, spermatic cord, epididymis, and testes	Abnormal findings on examination or imaging
Structural	
Ectopic prostatic tissue or prostatic polyps	Voiding problems
Intraprostatic Müllerian duct remnants	
Prostatic stones, cysts, benign prostatic hyperplasia	
Urethral stricture, fistula, diverticula	
Systemic	
Amyloidosis	Hematospermia associated with systemic disease without other explanations
Bleeding disorders	
Chronic liver disease	
Severe uncontrolled hypertension	
Trauma (iatrogenic)*	
Hemorrhoid injections	Temporary hematospermia related to trauma
Penile injections	
Prostate biopsy, radiation therapy, brachytherapy, microwave therapy, transurethral resection of the prostate	
Urethral instrumentation	
Urethral stent migration	
Vascular	
Arteriovenous malformations	Isolated hematospermia episode, or hematospermia associated with hematuria
Bladder neck and prostatic varices, submucosal bleeding, hemangiomas, telangiectasias	

**—Most common causes of hematospermia.*

Information from references 7 through 21.

HISTORY

The first step of the history is to rule out pseudo-hematospermia *(Table 2)* by determining if hematuria is being misinterpreted as hematospermia or if the blood may have been from the patient's sexual partner (e.g., ask about his partner's possible menstruation or genitourinary infection, and about intense sexual behavior).[1,4]

Once true hematospermia has been confirmed, three key factors help guide further evaluation: age of the patient, duration of symptoms, and presence of associated symptoms or risk factors *(Tables 3 and 4)*. In men younger than 40 years, risk factors of behavior-related hematospermia or infectious etiologies should be assessed. In men 40 years and older, neoplasia or structural abnormalities should be more strongly considered. Hematospermia that is limited to a few episodes usually has an identifiable etiology (e.g., infection, intense sexual experiences) and is less concerning than persistent or recurring hematospermia, which can indicate a pathologic condition.

Relevant associated symptoms include genitourinary pain or voiding symptoms. Pain with urination may suggest urethritis, cystitis, or prostatitis, whereas pain with bladder distention usually indicates cystitis. Pain with ejaculation may be associated with prostatitis or obstruction of an ejaculatory duct. Voiding symptoms may indicate primary or secondary involvement of the bladder or bladder outlet, such as dysfunctional conditions or morphologic abnormalities. Ascertaining the patient's sexual history and history of iatrogenic injury is important because sexually transmitted infections (STIs) and instrumentation, biopsy, or other procedures are leading causes of hematospermia.

Systemic diseases that may be associated with hematospermia include bleeding disorders; liver disease, which can affect clotting factor production; and severe uncontrolled hypertension (demonstrated in a limited case-control study[22]), which is attributed to interference with clotting.[22,23] Constitutional symptoms (e.g., weight loss, night sweats, fever, chills, bone pain) may indicate a neoplastic or infectious source. Travel and

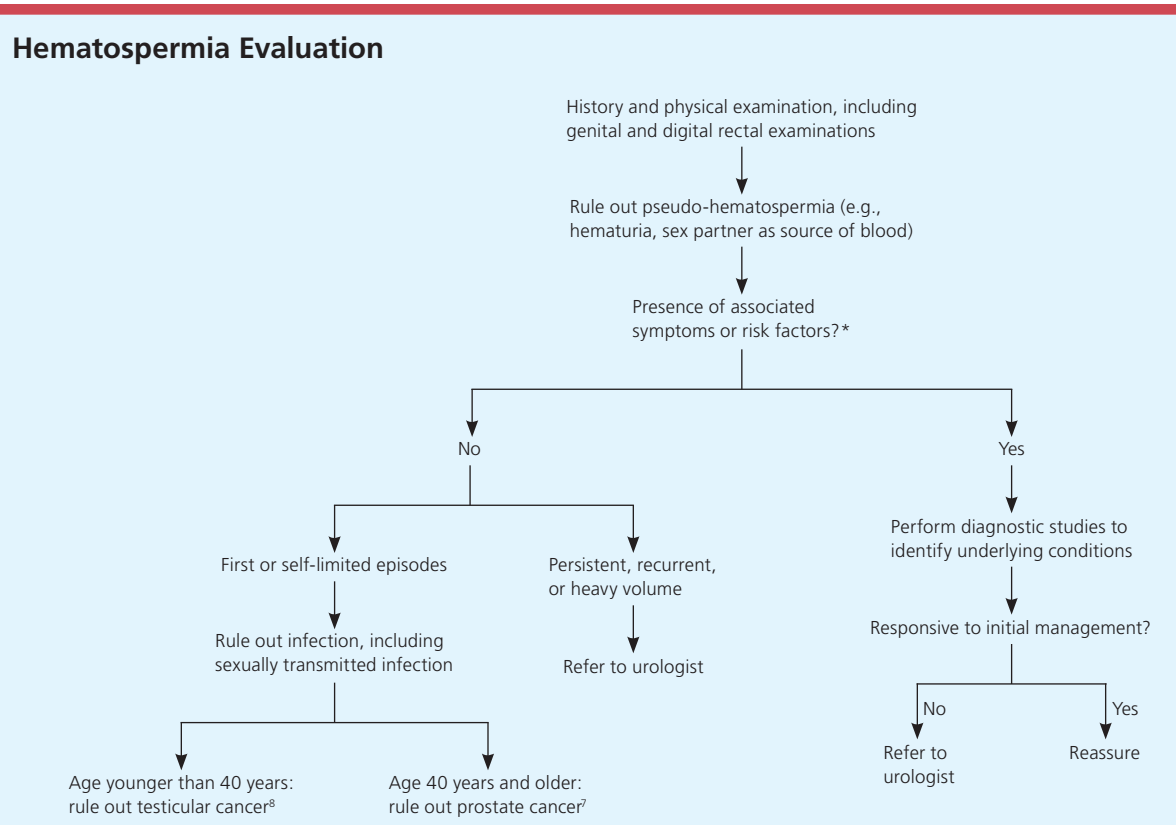

Figure 1. Algorithm for the evaluation of hematospermia.

Information from references 7 and 8.

medication history also may point to a source (e.g., tuberculosis exposure, *Schistosoma* infection, warfarin [Coumadin] use).[13]

PHYSICAL EXAMINATION

Elevated blood pressure, fever, and tachycardia may indicate a systemic cause, such as severe uncontrolled hypertension, infection, or malignancy. Detailed abdominal and genitourinary examinations should be performed to assess for trauma, inflammation, discharge, and lymphadenopathy. Full scrotal examination is important to evaluate for inflammation; infection; and masses of the testes, epididymis, and spermatic cords.[14] Rectal examination is needed to check the prostate for size, tenderness, fluctuation, symmetry, firmness, and nodularity.[1,3]

Table 2. Possible Causes of Pseudo-Hematospermia

Cause	*Diagnostic studies*	*Initial management*
Hematuria	Urinalysis, computed tomography–intravenous pyelogram	Treat if indicated versus urology or nephrology referral
Sexual partner source	Condom test or sperm sample from self-stimulation, if needed	Patient reassurance, if negative
Melanospermia (melanoma metastasis to prostate; very rare)	Skin examination; semen analysis with or without chromatography, if suspected	Oncology referral

Table 3. Evaluation and Initial Management of Isolated Hematospermia

Differential diagnosis	*Diagnostic studies*	*Initial management*
First episode of hematospermia*		
Excessive sex or masturbation; interrupted sex; prolonged sexual abstinence	Urinalysis	Patient reassurance, education
STI	STI testing based on risk stratification	Treat as indicated, patient education
Urinary tract infection	Urinalysis and culture	Treat as indicated, patient education
Benign prostate hyperplasia†	American Urological Association symptom index, postvoid residual	Monitoring versus pharmacologic treatment
Prostate cancer†	Prostate-specific antigen	Urology referral for prostate biopsy
Persistent, recurrent, or high-volume hematospermia		
Vascular (prostate or urethral varices, hemangioma)	Urinalysis	Urology referral for fulguration
Tumors (bladder, urethra, prostate, seminal vesicles, spermatic cord, epididymis, testes)	Urinalysis, urine cytology	Urology referral
Bleeding diathesis	Prothrombin time, partial thromboplastin time, complete blood count	Treat as indicated

NOTE: *Isolated hematospermia is hematospermia with no associated symptoms or obvious etiology.*

STI = sexually transmitted infection.

**—Blood in fewer than 10 consecutive ejaculations or for less than 12 weeks.*

†—*In patients 40 years and older.*

FURTHER TESTING

Usually, hematospermia has resolved by the time a patient sees his physician. If the patient has no risk factors or associated symptoms, he should be reassured that such self-limited hematospermia needs no further evaluation or treatment. However, in most patients with ongoing lower urinary tract symptoms, urinalysis should be performed and testing for genitourinary infections, including STIs, should be considered *(Table 3)*.

Minimal, directed laboratory evaluation usually leads to a diagnosis, and patients often have quick resolution with treatment. However, certain associated symptoms and laboratory findings require prompt subspecialty referral and intervention *(Table 5)*. For example, if results of the prostate examination are abnormal or if the prostate-specific antigen level is elevated, a prostate biopsy is indicated to evaluate for malignancy. Urology referral should also be considered for a patient whose history, physical examination, and initial laboratory workup do not lead to a diagnosis, yet hematospermia persists or recurs. Urologists use several additional tools to evaluate patients with hematospermia, including urethrocystoscopy, transrectal ultrasonography with or without Doppler vascular evaluation, scrotal ultrasonography, magnetic resonance imaging, and computed tomography.[1,3,19,24]

Treatment

If treatment is necessary, it should be directed at the diagnosed etiology. Appropriate antibiotics are indicated in patients with genitourinary infection. If infection is suspected, yet none is found, empiric two-week treatment with an antibiotic that penetrates the prostate-blood barrier (e.g., fluoroquinolones, doxycycline, trimethoprim, trimethoprim/sulfamethoxazole

Table 4. Evaluation and Initial Management of Hematospermia with Associated Conditions or Symptoms

Associated condition or symptom	*Differential diagnosis*	*Diagnostic studies*	*Initial management*
Trauma			
Self-inflicted	Abrasion	Urinalysis	Monitor
	Foreign body	Urinalysis; urine culture, if indicated	Urology referral for endoscopy
	Arteriovenous fistula (e.g., secondary to penile injections)	—	Urology referral for penile Doppler study
Iatrogenic*	Trauma, inflammation, or infection	Urinalysis; urine culture, if indicated	Monitor, anti-inflammatories or antibiotics if indicated, consider urology referral
Genitourinary infection or inflammation	Urinary tract infection or STI	Urinalysis, STI testing	Treat as indicated, consider urology referral
	Prostatitis	Localization studies† with or without sperm culture	
	Epididymitis	Urinalysis, urine culture with or without scrotal Doppler ultrasonography	
Voiding symptoms	Benign prostate hyperplasia	American Urological Association symptom index, post-void residual	Alpha blocker with or without 5-alpha reductase inhibitor
	Bladder neck dysfunction	Urinalysis	Alpha blocker
	Prostate cancer	Prostate-specific antigen	Urology referral
	Urethral stricture	Urinalysis, post-void residual	Urology referral
	Cystitis (interstitial or eosinophilic)	Urinalysis	Urology referral
Pain with ejaculation	Prostatitis	Localization studies† with or without sperm culture	Treat as indicated
	Obstruction of ejaculatory duct by stones, strictures, polyps, tumors, cysts	Transrectal ultrasonography or prostate magnetic resonance imaging	Urology referral
Systemic disorders	Hypertension	Blood pressure, serum creatinine, urinalysis with protein quantification	Treat underlying disorder
	Bleeding disorder	Prothrombin time, partial thromboplastin time, CBC	
	Malignancy (leukemia, lymphoma)	CBC with differential	
	HIV, immunosuppression	HIV screening, purified protein derivative	
	Liver disease	Complete metabolic panel, hepatitis panel	
Travel or exposure history	Tuberculosis	Purified protein derivative testing, urine acid-fast bacillus, chest radiography	Treat as indicated, or infectious disease referral
	Schistosomiasis	Computed tomography–intravenous pyelogram; urine, semen, and stool analysis for *Schistosoma*	

CBC = complete blood count; HIV = human immunodeficiency virus; STI = sexually transmitted infection.

**—Includes prostate biopsy (most common), prostate surgery, urologic instrumentation, radiation therapy, or hemorrhoid injections.*

†—*Localization of the site of infection requires four fluid samples: first void, midstream void, expelled prostatic secretions, and post-prostatic massage void.*

[Bactrim, Septra]) may be beneficial, with follow-up if symptoms recur or persist.[1] Iatrogenic causes of hematospermia usually resolve spontaneously within a few weeks or approximately 10 ejaculations.[4,9,25-27] Other treatments for hematospermia are usually initiated under the direction of a urologist, and include transurethral endoscopic resection, incision, fulguration, or marsupialization.[1,16,18,19,21]

Monitoring and Referral

Most men with an easily treatable cause of hematospermia do not need follow-up. Men

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
Men younger than 40 years with limited episodes of hematospermia and no risk factors or associated symptoms can be evaluated for common genitourinary diseases, treated if indicated, and reassured.	C	1
Men with hematospermia who are 40 years and older, have associated symptoms, or have persistent hematospermia need more extensive evaluation, including assessment for underlying prostate cancer.	C	4
Low-volume hematospermia associated with iatrogenic etiologies is often self-limiting; therefore, observation is the most appropriate management strategy.	C	4

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.xml.

Table 5. Indications for Hematospermia Urology Referral

Based on symptoms:
Hematospermia associated with genitourinary pain
Hematospermia associated with unexplained voiding symptoms
Recurrent, persistent, high-volume hematospermia
Based on evaluation:
Abnormal examination findings suggestive of tumor or structural problems
Abnormal prostate-specific antigen findings
Abnormal urinalysis findings (hematuria, sterile pyuria)
Suspected foreign body, stent migration
Suspected vascular malformation
Based on lack of response to initial management:
Symptoms or abnormal findings persist

with recurrent or persistent isolated hematospermia or symptomatic men in whom an etiology is not elucidated require follow-up within three to six months to reassess symptoms and potential etiologic factors. Poor response to treatment or troublesome associated symptoms or findings should prompt referral to a urologist *(Table 5)*.

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Author disclosure: Nothing to disclose.

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