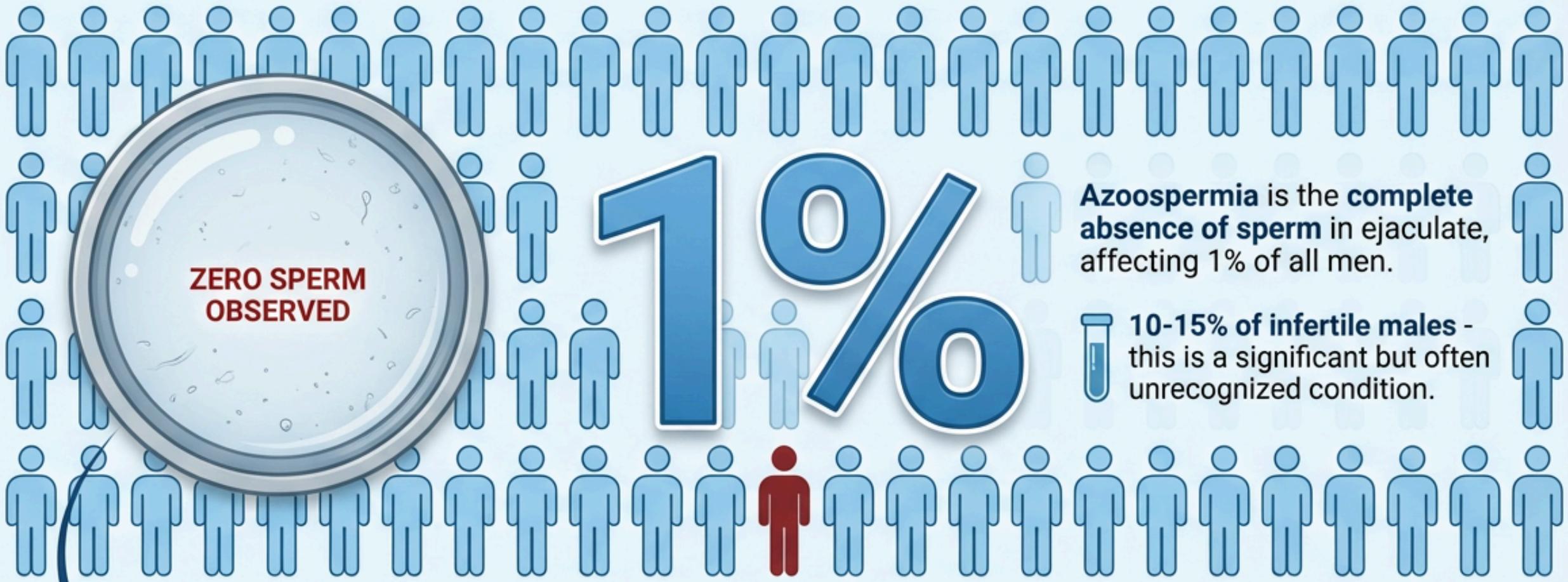


# AZOOSPERMIA

## Understanding Zero Sperm Count

Dr. Vijayant Govinda Gupta | Urologist & Reproductive Andrologist

# 1% of Men Face This Silent Condition



# 1%

**Azoospermia is the complete absence of sperm in ejaculate, affecting 1% of all men.**

 **10-15% of infertile males - this is a significant but often unrecognized condition.**

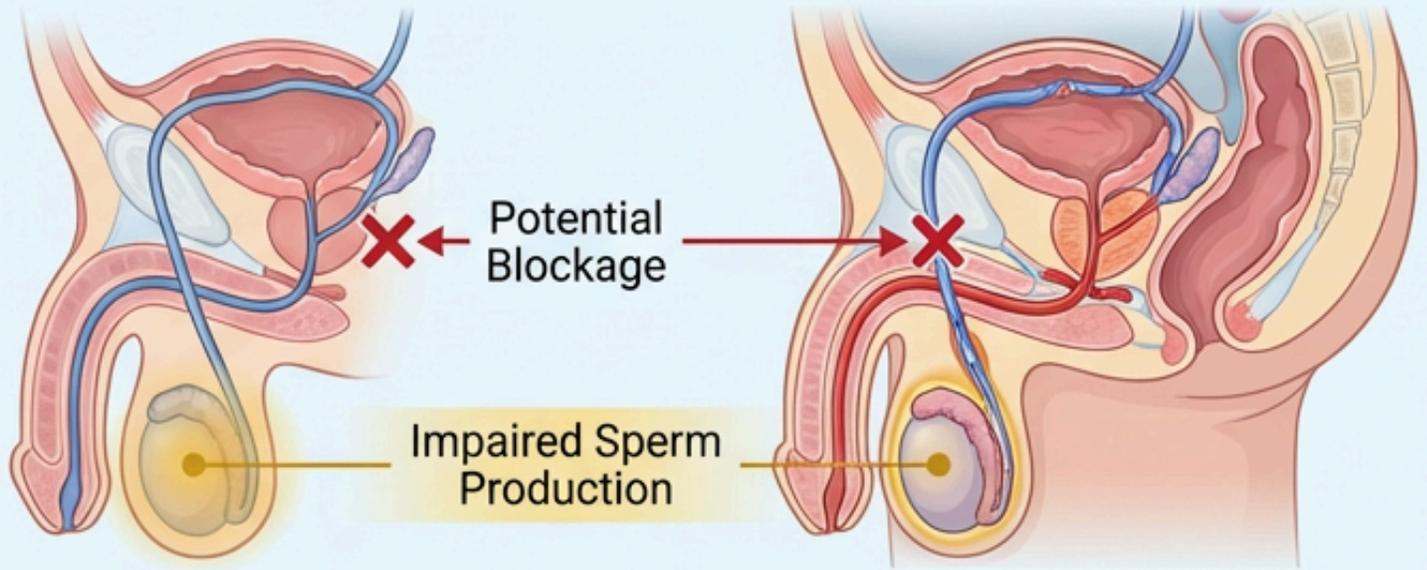
## DEFINITION



Complete absence of sperm in ejaculate



Confirmed by 2 separate semen analyses



## AZOOSPERMIA: UNDERSTANDING THE ABSENCE

Prevalence & Definition of a Silent Condition

# Two Completely Different Causes Behind the Same Problem

## OBSTRUCTIVE



Blockage in Transport

## NON-OBSTRUCTIVE



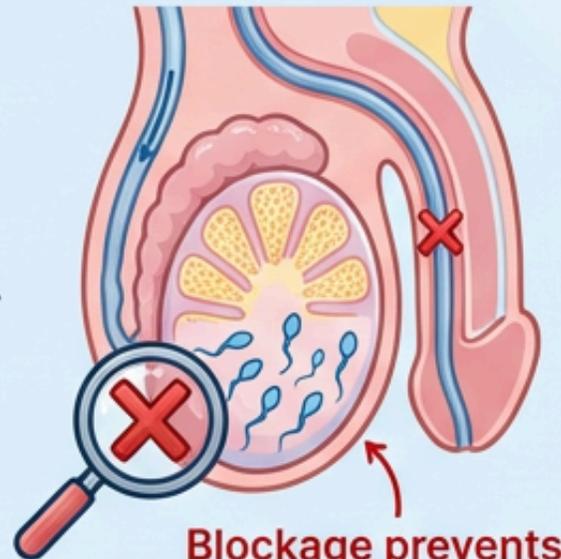
Production Failure

# VS

 Normal sperm production in testes.

 Problem is physical blockage (vas deferens, epididymis).

 Often treatable via surgery or sperm retrieval.

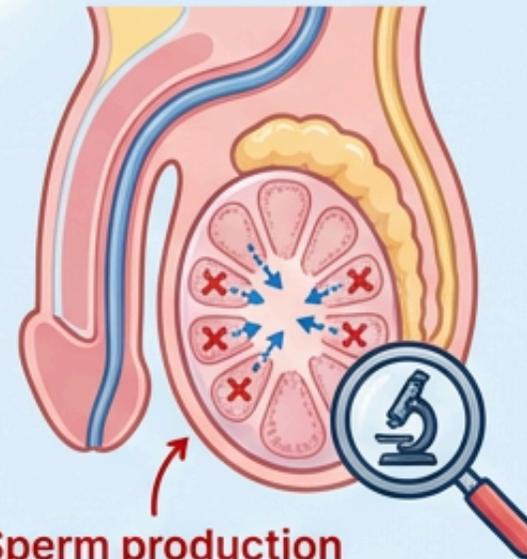


Blockage prevents sperm delivery

 Impaired or absent sperm production.

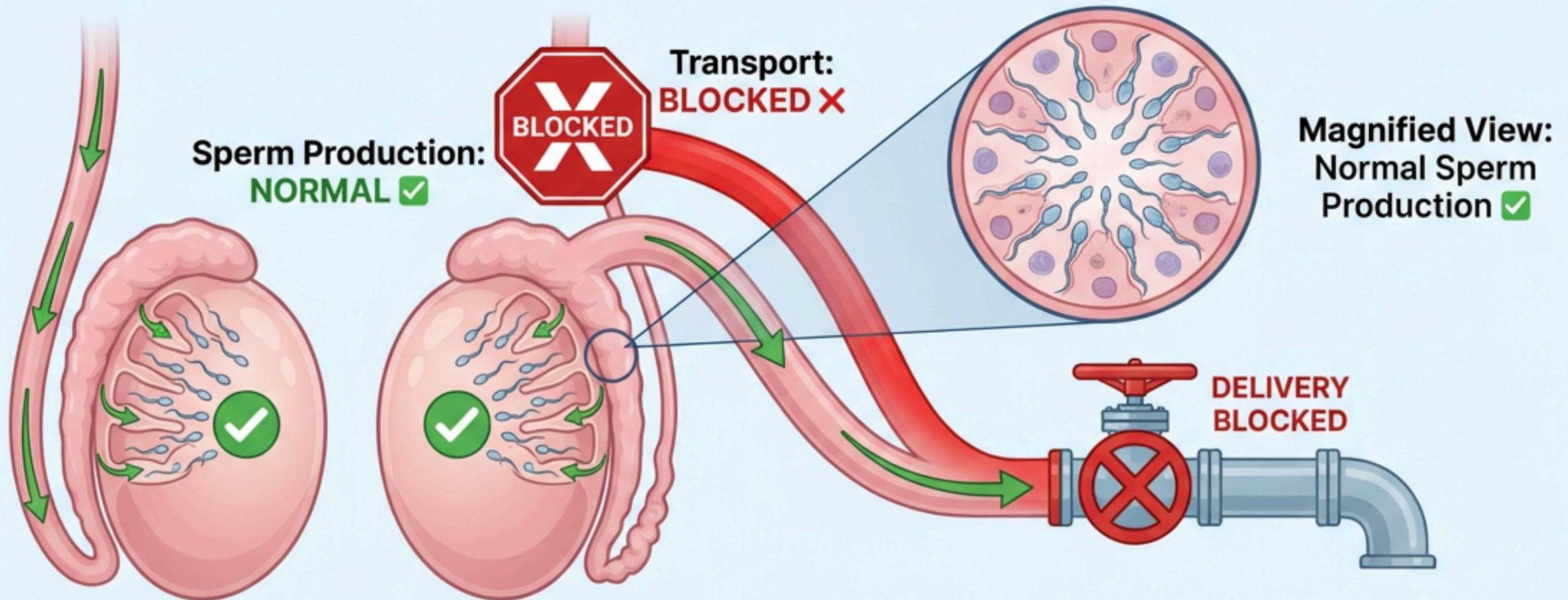
 Problem is within the testes (hormonal, genetic, testicular damage).

 Treatment options more complex; may require specialized techniques.



Sperm production severely impaired or absent

# Obstructive Azoospermia: The Factory Works, But the Pipes Are Blocked



## Diagnostic & Treatment Overview

### Key Concepts

-  Sperm production is unaffected.
-  Sperm are unable to reach the ejaculate.
-  Often treatable through surgery or sperm retrieval.

	Normal Ejaculate (Green ✓)	Obstructive Azoospermia Ejaculate (Red ✗)
		

**Diagnostic Steps** → **Treatment Options** → **Potential Outcome**

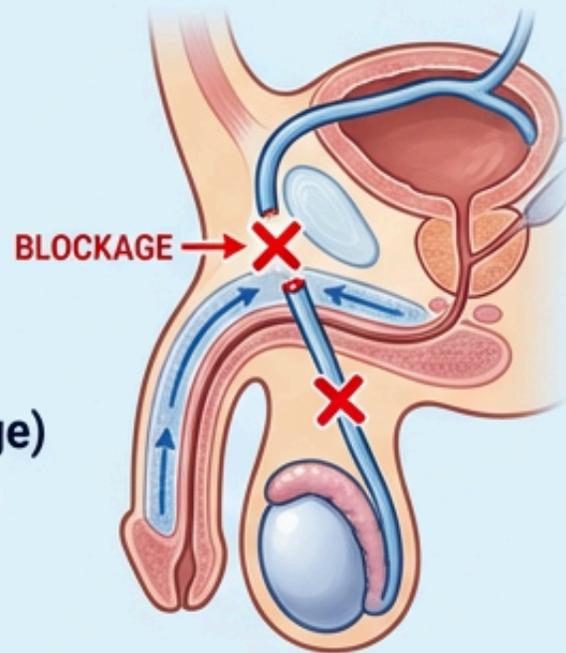
(Blue Icons: Ultrasound, Hormone Tests) (Surgical Repair, Sperm Aspiration/Retrieval (PESA, TESE), IVF-ICSI) (Pregnancy Success ✓)

# Common Causes of Blockage



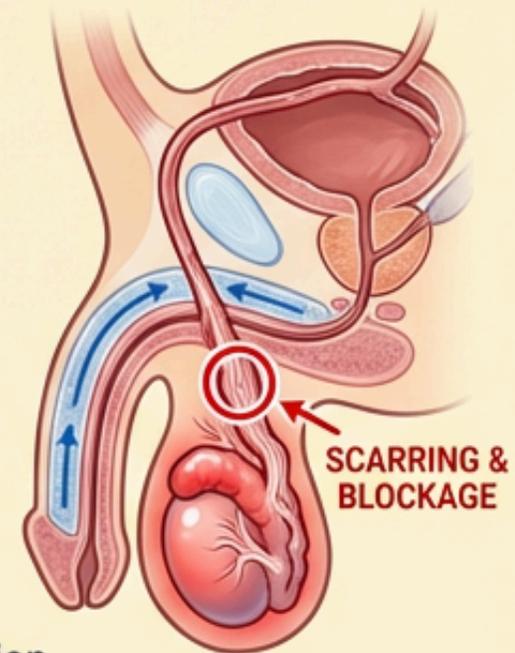
## Vasectomy (Intentional surgical blockage)

- Elective procedure to prevent sperm transport.
- Clinically induced occlusion of vas deferens.



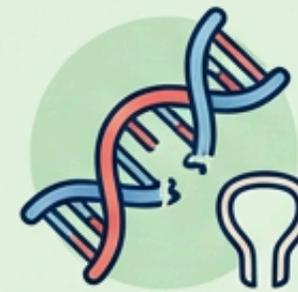
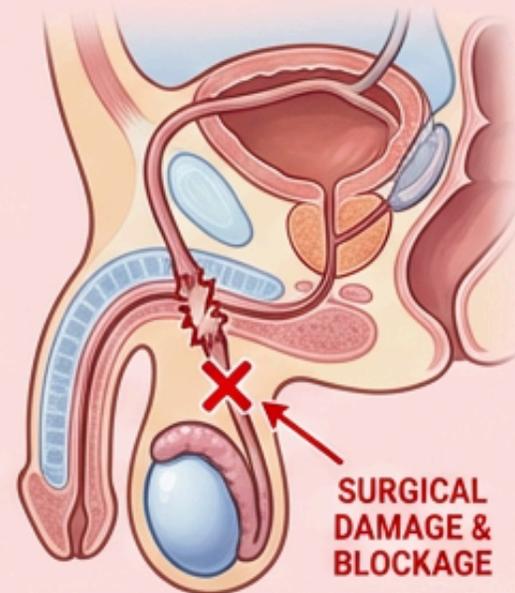
## Infection & Inflammation (Epididymitis, STIs)

- Scarring from sexually transmitted infections (STIs) or epididymitis.
- Inflammatory response leads to tissue damage and ductal obstruction.



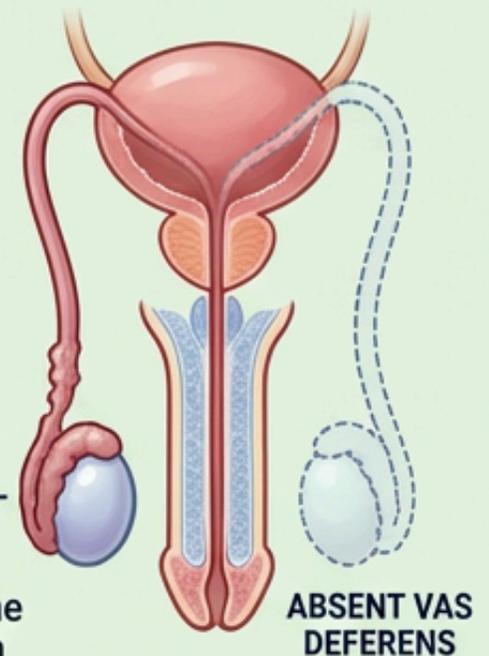
## Surgical Trauma or Injury

- Damage during pelvic, abdominal, or scrotal surgeries.
- Accidental injury or scar formation disrupting the seminal pathways.

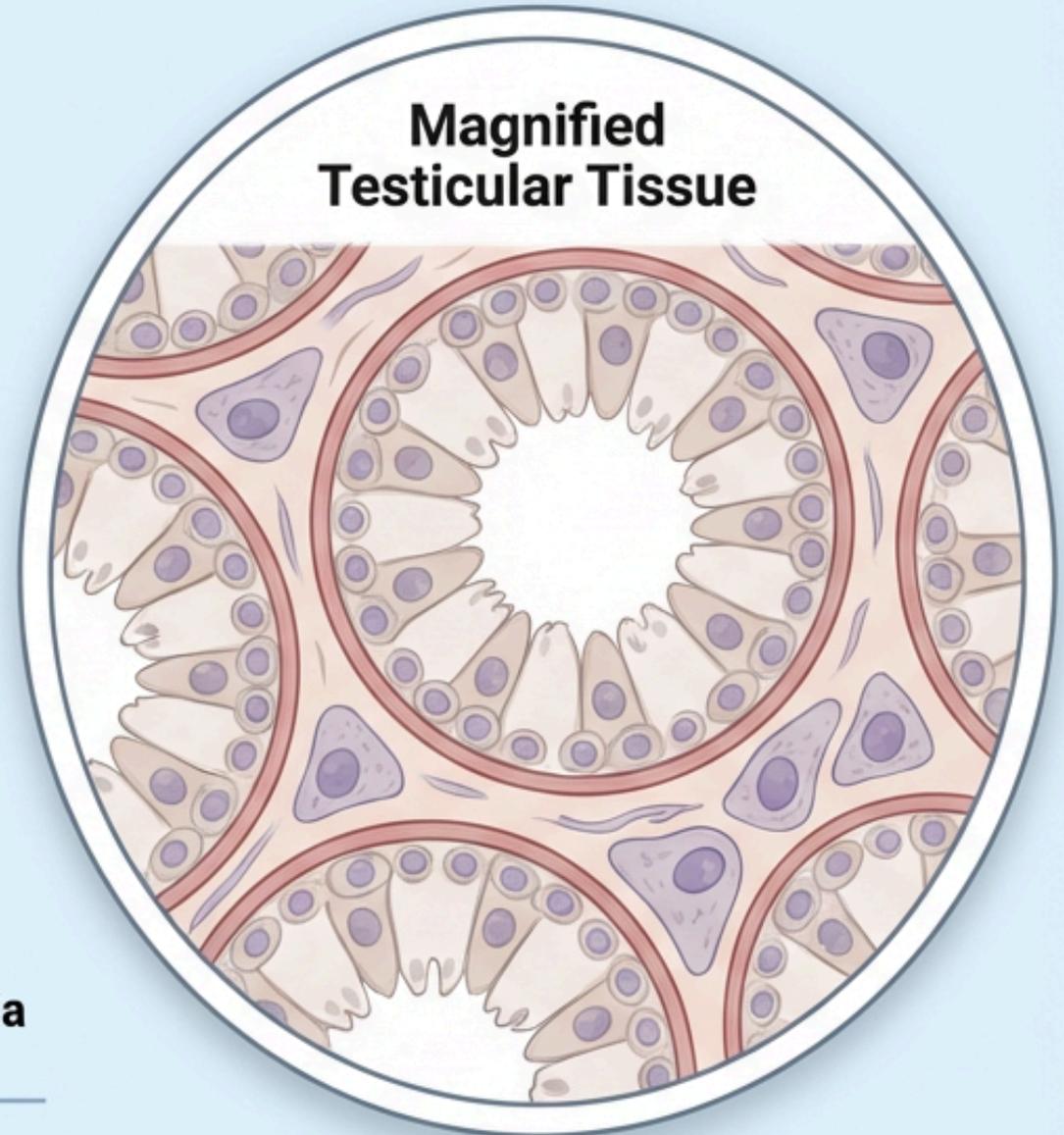
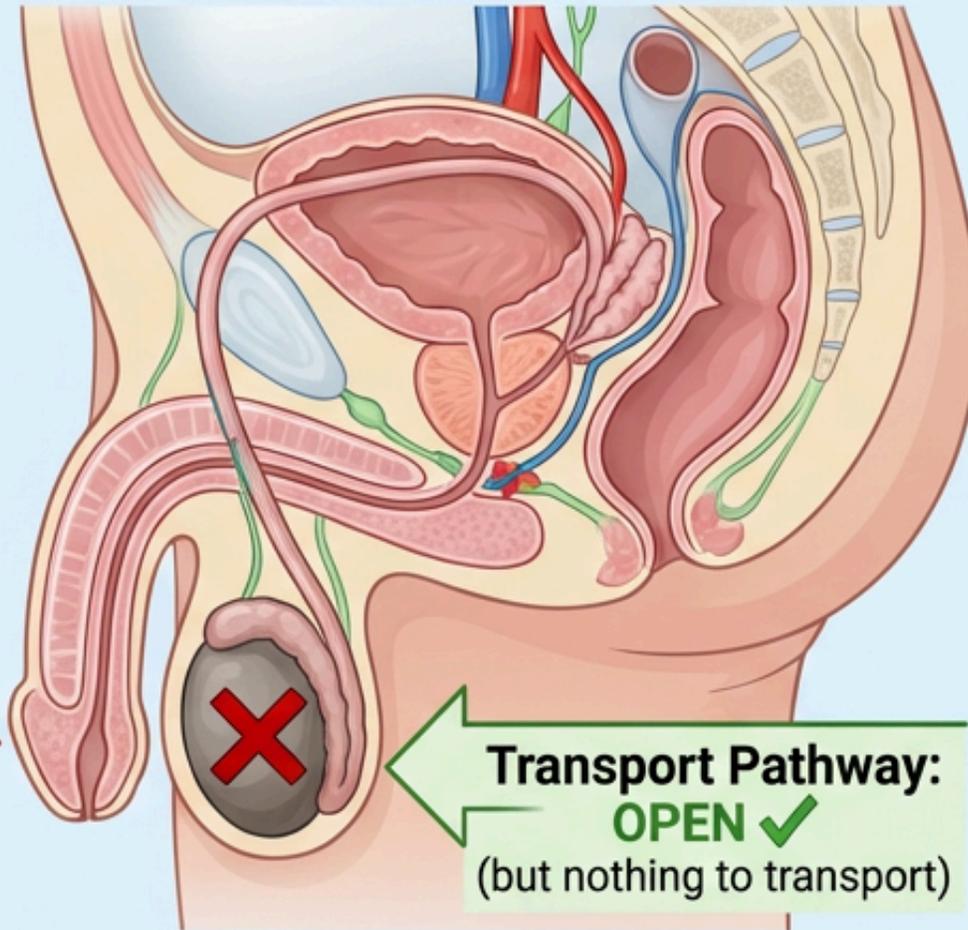


## Congenital Absence of Vas Deferens (CAVD)

- Born without one or both vas deferens.
- Genetic condition (often linked to Cystic Fibrosis gene mutations).



# Non-Obstructive Azoospermia: The Factory Itself Has Stopped Production



Normal Function (For Comparison)	Non-Obstructive Azoospermia (This Slide)
 <b>Sperm Production:</b> Active	 <b>Sperm Production:</b> Stopped / Absent
 <b>Transport:</b> Clear Pathway	 <b>Transport:</b> Pathway Remains Open
 <b>Outcome:</b> Sperm in Ejaculate	 <b>Outcome:</b> No Sperm in Ejaculate

 **Key Diagnostic Points:**

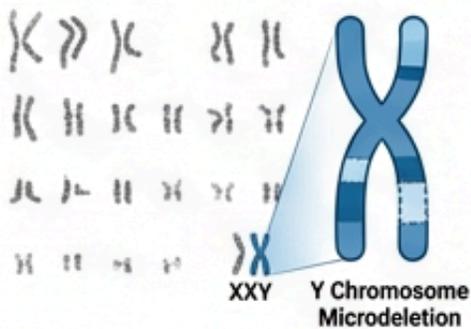
- Elevated FSH (Follicle-Stimulating Hormone)
- Small, Soft Testes
- Genetic Testing Often Required
- Biopsy Confirms Absence of Sperm

# Why Production Stops: Genetic and Hormonal Factors



## Genetic Causes:

Klinefelter Syndrome (XXY),  
Y Chromosome Deletions



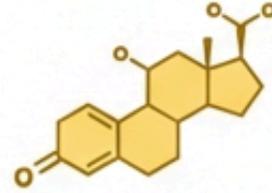
**Klinefelter Syndrome:** Presence of an extra X chromosome in men (47,XXY) leads to testicular underdevelopment and reduced sperm production.



**Y Chromosome Microdeletions:** Missing genetic material on the Y chromosome essential for sperm development.

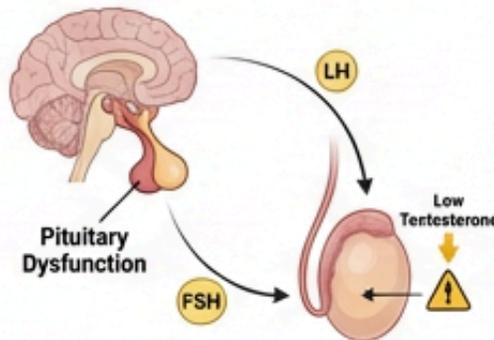


**Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) Gene Mutations:** Can cause congenital absence of the vas deferens (CAVD), though often obstructive, can relate to production issues.



## Hormonal Imbalances:

Low Testosterone,  
Pituitary Dysfunction



**Hypogonadism:** Insufficient production of testosterone by the testes.



**Pituitary Adenoma:** Noncancerous tumor in the pituitary gland affecting hormone regulation.



**Hyperprolactinemia:** Excess prolactin inhibits FSH and LH release, disrupting sperm production.

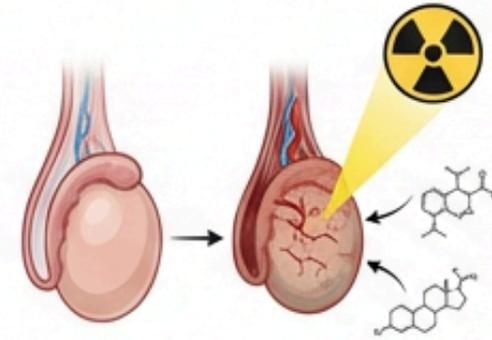


**Thyroid & Adrenal Disorders:** Imbalances can indirectly affect reproductive hormones.



## Medications & Toxins:

Chemotherapy, Radiation,  
Anabolic Steroids



**Chemotherapy:** Cancer drugs target rapidly dividing cells, including sperm-producing cells, often causing permanent damage.



**Radiation Therapy:** High-dose radiation near the testes can destroy sperm-producing tissue.



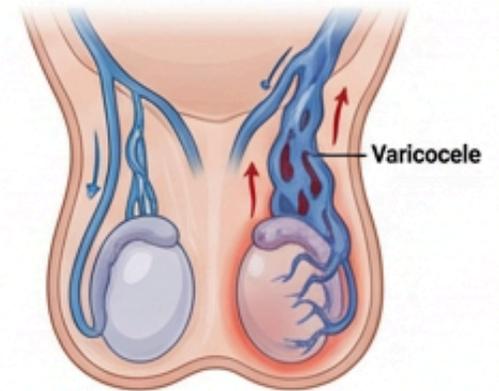
**Anabolic Steroids:** Suppress natural hormone production, leading to testicular shrinkage and reduced sperm count.



**Environmental Toxins:** Exposure to pesticides, heavy metals (lead, mercury), and certain solvents.



## Varicocele



**Varicocele:** Enlargement of the veins within the loose bag of skin that holds the testicles (scrotum).



**Increased Scrotal Temperature:** Elevated temperature from pooled blood can impair sperm production and quality.



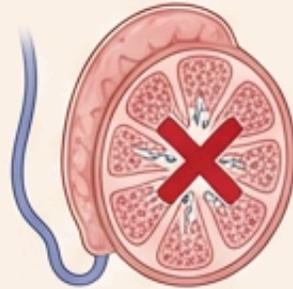
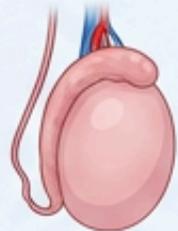
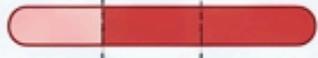
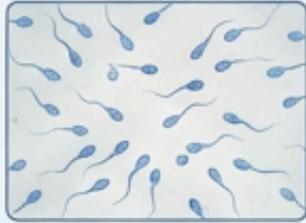
**Oxidative Stress:** Accumulation of reactive oxygen species damaging sperm cells.



**Hormonal Disruption:** May impact testosterone levels and testicular function.

Non-obstructive azoospermia results from a failure of the testes to produce sperm, often due to the interplay of genetic predispositions, hormonal irregularities, exposure to harmful substances, or structural issues like varicoceles.

# Side-by-Side: How to Tell Them Apart

	 <b>OBSTRUCTIVE</b>	 <b>NON-OBSTRUCTIVE</b>
<b>Problem Location</b> 	 <p><b>Transport pathway (Blockage) ❌</b></p>	 <p><b>Testis / Production (Impaired) ❌</b></p>
<b>Testicular Size</b> 	 <p><b>Normal ✓</b></p>	 <p><b>Often small ❌ ⌚</b></p>
<b>FSH Level</b> 	<div style="border: 1px solid gray; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Blood Results</p> <p style="color: green; text-align: center;">&lt;9 mIU/ml</p>  </div> <p><b>Normal (&lt;9 mIU/ml) ✓</b></p>	<div style="border: 1px solid gray; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Blood Results</p> <p style="color: red; text-align: center;">&gt;9 mIU/ml</p>  </div> <p><b>Elevated (&gt;9 mIU/ml) ↑</b></p>
<b>Sperm Retrieval Success</b> 	 <p><b>High ✓</b></p>	 <p><b>Variable ?</b></p>

# First Step in Diagnosis: Semen Analysis Confirms Zero Sperm



1. Sample Collection



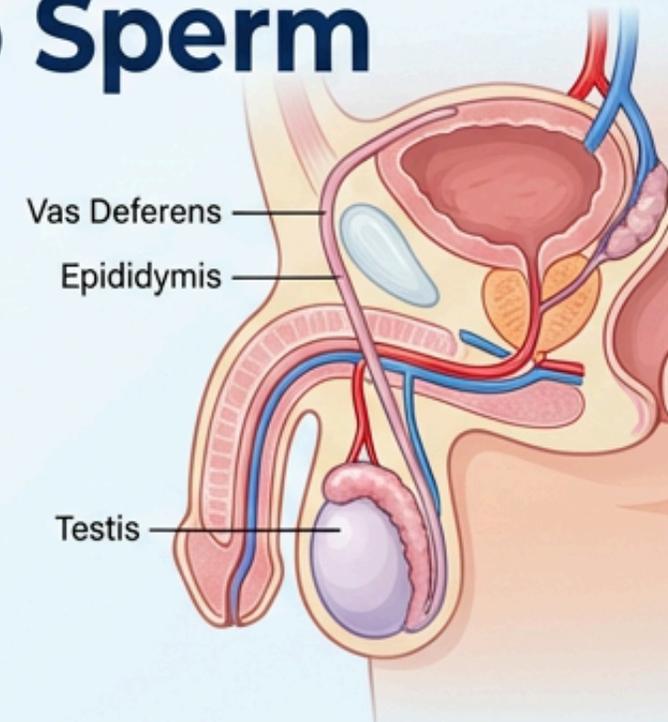
2. Centrifugation

✓ Centrifugation at 3,000g for 15 minutes



3. Microscope Examination

Azoospermia is diagnosed when **NO SPERM** are found in **TWO** separate semen samples after centrifugation - this is the definitive first diagnostic step.



Vas Deferens

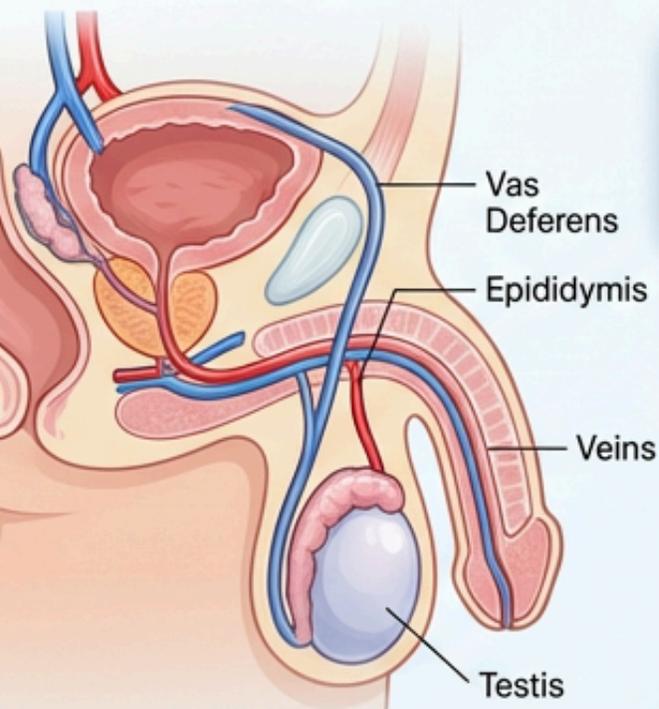
Epididymis

Testis



4. Confirmation with Second Sample

✓ 2 separate samples required



Vas Deferens

Epididymis

Veins

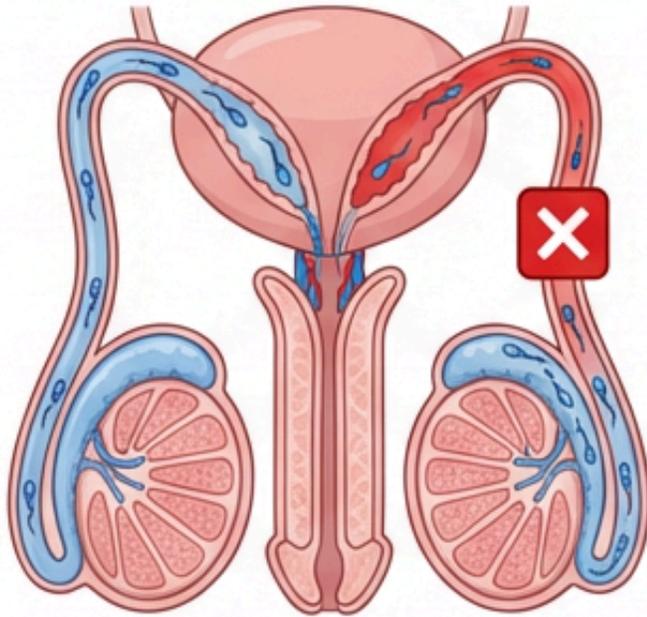
Testis

# Hormone Levels Reveal the Root Cause

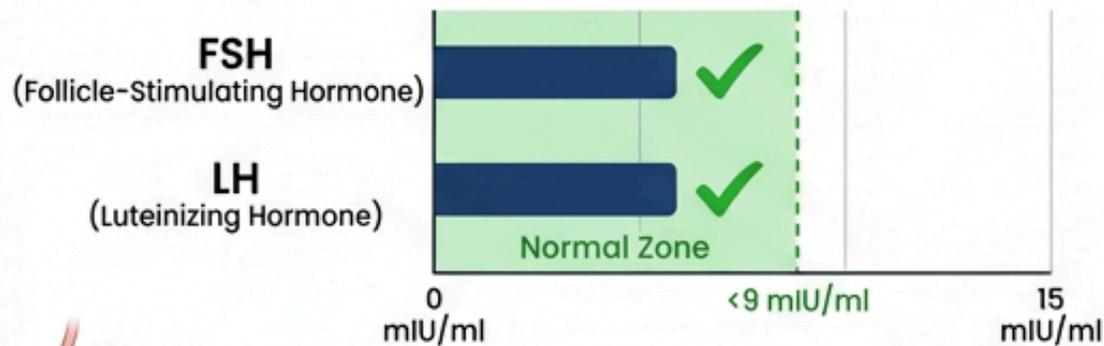
## OBSTRUCTIVE

FSH & LH blood test shows if testes are functioning

## NON-OBSTRUCTIVE

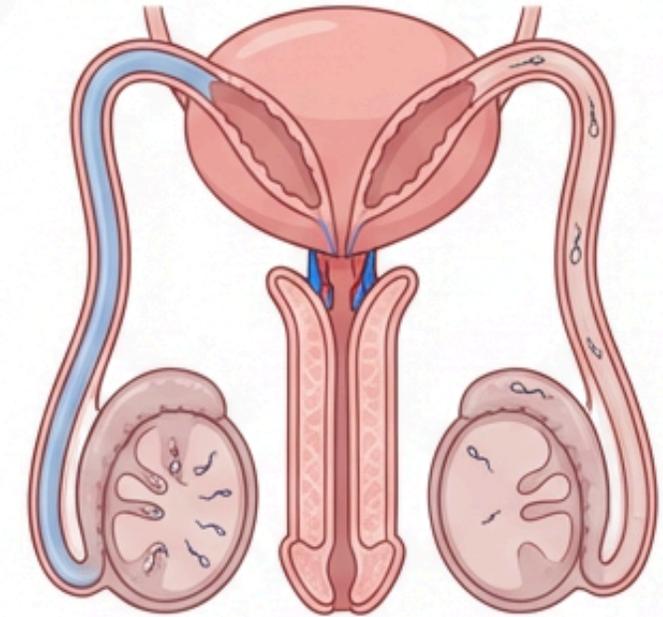


Physical blockage prevents sperm passage (testes work normally)

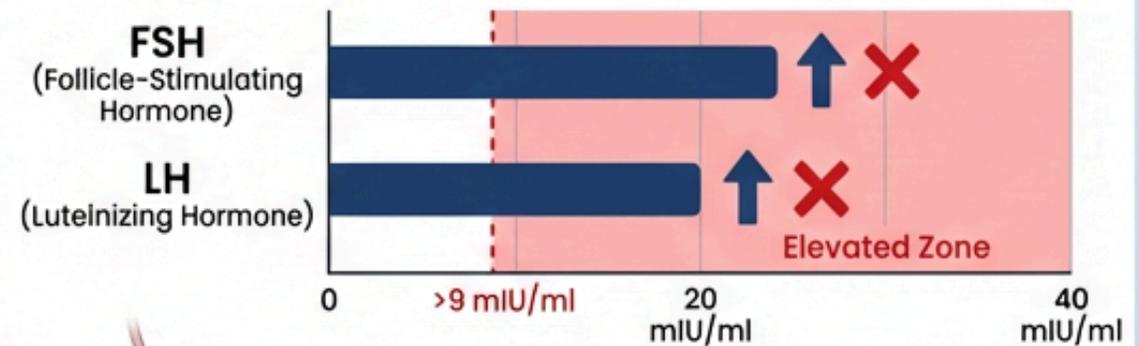


Normal FSH = Testes Working ✓

**Obstructive:** Sperm production is normal, but blockage stops exit.



Testes are unable to produce sufficient sperm (testicular failure)



Elevated FSH = Testicular Failure ✗

**Non-Obstructive:** Testes are the problem, showing failure in sperm production.



• **Key Takeaway:** Hormone testing is a simple blood test crucial for distinguishing between treatable obstruction and testicular issues.



# Your Diagnostic Roadmap

