ORIGINAL RESEARCH PAPER
Volume - 15 | Issue - 02 | February - 2026 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

MICRO-TESE AS A GAME CHANGER IN NON-OBSTRUCTIVE AZOOSPERMIA WITH Y-CHROMOSOME MICRODELETION: A CASE REPORT

Obstetrics & Gynaecology

Dr. Jyoti Pandey
Dr. Neha Rani
Dr. Mahak Jain
Dr. Prateek Maheshwari

ABSTRACT

Background: Non-obstructive azoospermia (NOA) is a severe form of male infertility and is frequently associated with genetic abnormalities such as Y-chromosome microdeletions. Advances in assisted reproductive techniques, particularly microdissection testicular sperm extraction (Micro-TESE) combined with intracytoplasmic sperm injection (ICSI), have made successful pregnancy possible even in complex cases. **Case Report:** We report a successful pregnancy outcome in a 33-year-old male with non-obstructive azoospermia and AZFc region Y-chromosome microdeletion. Clinical evaluation revealed bilaterally small testes with normal seminal tract. Hormonal analysis showed normal serum FSH and LH with low testosterone levels. Karyotype was normal (46,XY). The female partner, aged 30 years, had normal reproductive parameters with an AMH level of 3.47 ng/mL. The male partner was treated with human chorionic gonadotropin (hCG) for three months. Ovarian pick-up and Micro-TESE were performed simultaneously. Nineteen oocytes were retrieved, and few spermatozoa with minimal motility were obtained through Micro-TESE. ICSI was performed, resulting in the formation of a single good-quality blastocyst (grade 4AB). Single embryo transfer led to a positive β-hCG and ultrasound-confirmed ongoing intrauterine pregnancy. **Conclusion:** This case demonstrates that Micro-TESE combined with ICSI can lead to successful pregnancy even in patients with genetically compromised non-obstructive azoospermia. Comprehensive evaluation, optimized hormonal therapy, favorable female fertility status, and a multidisciplinary approach are crucial for achieving positive outcomes.

KEYWORDS

Non-obstructive azoospermia, Micro-TESE, ICSI, AZFc microdeletion, Male infertility

INTRODUCTION

Male infertility contributes to nearly 40–50% of infertility cases worldwide, with azoospermia affecting approximately 1% of the male population and 10–15% of infertile men.

Non-obstructive azoospermia (NOA), characterized by impaired or absent spermatogenesis, poses a significant therapeutic challenge[1]. Genetic abnormalities, particularly Y-chromosome microdeletions, are among the most important etiological factors in NOA[2].

The azoospermia factor (AZF) region of the Y chromosome is essential for spermatogenesis. Microdeletions involving AZFa, AZFb, and AZFc regions have different prognostic implications, AZFa and AZFb microdeletions are associated with germ cell aplasia and maturation arrest, resulting in very poor prognosis for sperm retrieval therefore, further management is not recommended in these patients. AZFc microdeletions have better prognosis & sperm can be retrieved in approximately 53-65% of the patients [3].

Micro-TESE has become the preferred sperm retrieval technique in NOA due to its superior retrieval rates compared to conventional techniques[4].

Recent data (2023–2025) report sperm retrieval rates ranging from 40–56% in NOA patients undergoing Micro-TESE, though outcomes remain comparatively lower in AZFc microdeletion cases[5–7].

Case Presentation

Patient Profile

A couple married for three years sought assistance at Indira IVF RDC, Ghaziabad, in April 2025 due to primary infertility. The male partner, aged 33, had a pre-existing diagnosis of azoospermia and a six-month history of well-controlled diabetes mellitus managed with medication. He reported no history of cryptorchidism, genital trauma, chemotherapy, radiation exposure, or the use of gonadotoxic drugs. The female partner, aged 30, presented with regular menstrual cycles and no reported comorbidities.

Clinical Evaluation

On physical examination by the urologist, patient had normal male phenotype with normal secondary sexual characteristics and grade 1 gynecomastia. Genital examination showed a normally developed penis. Size of bilateral testes was below average. Epididymis and vas deferens were palpable bilaterally. No varicocele was appreciated on clinical examination.

Radiological Evaluation

Scrotal ultrasonography (figure 1) showed reduced testicular volumes (left: 4.5 cc; right: 5 cc) with normal epididymis and seminal tract bilaterally, consistent with non-obstructive pathology.

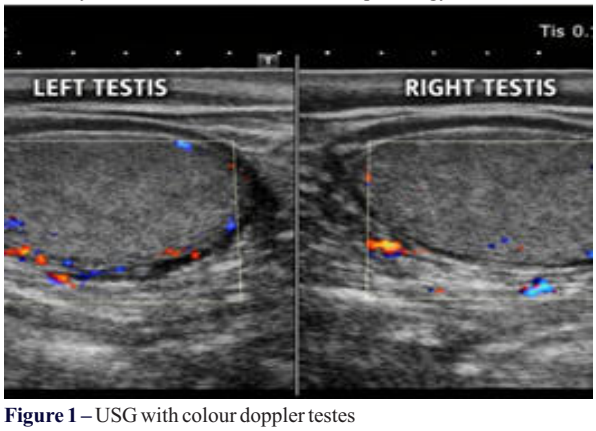

Figure 1 – USG with colour doppler testes

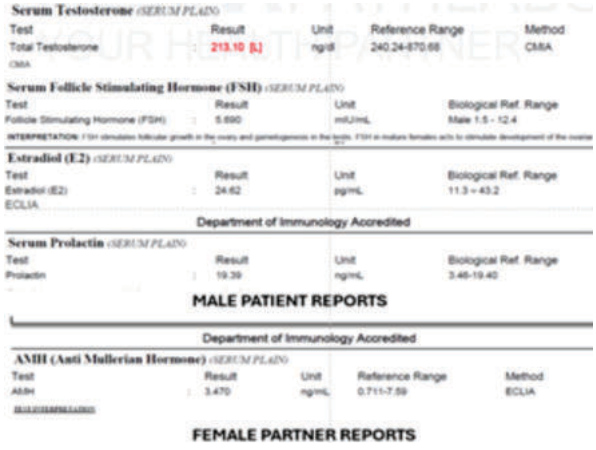

Figure 2- Investigations

Hormonal Evaluation

Initial hormonal analysis revealed normal serum FSH and LH levels with low serum testosterone, suggestive of impaired spermatogenesis with partially preserved hypothalamic-pituitary-gonadal axis function.

Female partner evaluation showed an AMH level of 3.47 ng/mL, indicating good ovarian reserve (figure 2).

Genetic Evaluation

Genetic workup demonstrated a normal male karyotype (46,XY) with Y-chromosome microdeletion involving the AZFc region (figure 3). Patients with AZFc deletions are known to have focal areas of spermatogenesis, making them potential candidates for Micro-TESE[8].

Sample Type: [redacted] Age: 33 Yrs.
Referral Reason: Azoospermia

Result: Y-Chromosome Microdeletions Detected

Analysis Summary

STS	Locus	Region	Amplicon Size(BP)	Result
sY14	SRY	Control	472	Microdeletion Not Detected
ZFX/Y	ZFX/Y	Control	495	Microdeletion Not Detected
sY81	DYS271	AZFa	209	Microdeletion Not Detected
sY86	DYS148	AZFa	320	Microdeletion Not Detected
sY182	KALY	AZFa	125	Microdeletion Not Detected
sY84	DYS273	AZFa	326	Microdeletion Not Detected
sY128	DYS219	AZFb	228	Microdeletion Not Detected
sY134	DYS224	AZFb	301	Microdeletion Not Detected
sY121	DYS212	AZFb	190	Microdeletion Not Detected
sY124	DYS215	AZFb	109	Microdeletion Not Detected
sY127	DYS218	AZFb	274	Microdeletion Not Detected
sY130	DYS221	AZFb	173	Microdeletion Not Detected
sY157	DYS240	AZFc	285	Microdeletion Detected
sY255	DAZ	AZFc	126	Microdeletion Detected
sY254	DAZ	AZFc	350	Microdeletion Detected
sY145	DYS5151	AZFd	160	Microdeletion Not Detected
sY153	DYS237	AZFd	139	Microdeletion Detected
sY152	DYS236	AZFd	125	Microdeletion Detected

Figure 3- y chromosome microdeletion report

Pre-treatment Optimization

Considering low testosterone and high estrogen levels, causing T/E2 ratio <10, the patient initially received Anastrozole 1mg qid daily for 1 month. Samples were taken again after 1 month and then human chorionic gonadotropin (hCG) 2500 IU subcutaneously twice weekly for three months was given to enhance intratesticular testosterone and optimize spermatogenesis prior to surgical sperm retrieval[9]. Hormonal optimization therapy aimed to maintain T levels >300 ng/dl and T/E2 of >10 and was continued for atleast 3 months before performing microTESE.

Hormones	At the start of treatment	After 1 month of Anastrozole	After 3 months of treatment
E2	24.62 pg/ml	19.2 pg/ml	16.3 pg/ml
Testosterone	213 ng/dl	218 ng/dl	370 ng/dl
FSH	5.69 mIU/ml	7.60 Miu/ml	7.80 Miu/ml
Prolactin	19.39 ng/ml	18.65 ng/ml	20.19 ng/ml

Treatment Protocol

Oocyte Retrieval And Micro-TESE

The female partner underwent controlled ovarian stimulation, resulting in the retrieval of 19 oocytes.

Figure 4- Experienced reproductive urologist performing microTESE under operating microscope

On the same day, Micro-TESE was conducted under general anesthesia. A scrotal incision was made over the avascular area, testis was delivered, tunica albuginea was incised, and the testis was bivalved (Figure 4). Seminiferous tubules were systematically examined at 10x magnification using microforceps, progressing from medial to lateral, superiorly and inferiorly. Relatively dilated tubules were selected with microforceps and collected in a suitable medium. Each sample was subsequently evaluated for the presence of spermatozoa. If spermatozoa were not confirmed in the tissues collected from one testis, the identical procedure was replicated for the contralateral testis. After confirmation from the laboratory, the scrotal incision was sutured with Monocryl 4-0 maintaining proper hemostasis. Skin closure was done with Monocryl 4-0 suture. Dressing done with scrotal support. The average duration for bilateral microTESE was 1.5 hours. There was no post operative scrotal hematoma, wound infection or any other complication.

Few spermatozoa with minimal motility were retrieved, consistent with reported outcomes in AZFc microdeletion-associated NOA[6–7] (figure 5).

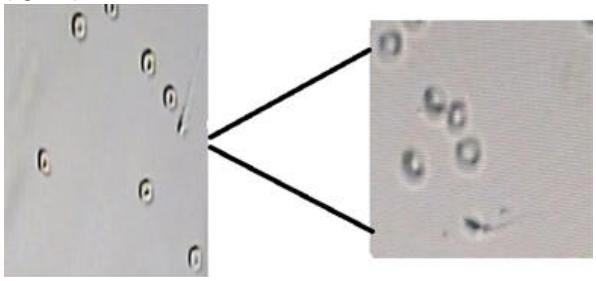

Figure 5- sperm as seen under operating microscope

Process Done In The Embryology Lab

Testicular tissue obtained following micro-TESE was immediately transferred to the embryology laboratory under sterile conditions. The seminiferous tubules were mechanically minced using sterile needles or microscissors. The processed tissue was then subjected to systematic microscopic examination under an inverted microscope at 40×–70× magnification for the identification of motile or non-motile spermatozoa. When sperm were identified, motility assessment was performed after washing the specimen with buffer media to remove red blood cells, followed by placement in pre-warmed culture media supplemented with motility-enhancing agents such as theophylline or pentoxifylline. In cases where no sperm were initially detected, further tissue dissociation was undertaken through extended mechanical processing and/or enzymatic digestion using collagenase type IV. For immotile spermatozoa, viability was assessed using mechanical tail stimulation, hypo-osmotic swelling test, or laser-assisted sperm activation. Viable spermatozoa were subsequently selected and utilized for intracytoplasmic sperm injection (ICSI).

Fertilization

ICSI was performed using the retrieved spermatozoa. Despite poor sperm motility, fertilization was achieved, and a single good-quality blastocyst (grade 4AB) was formed (figure 6)

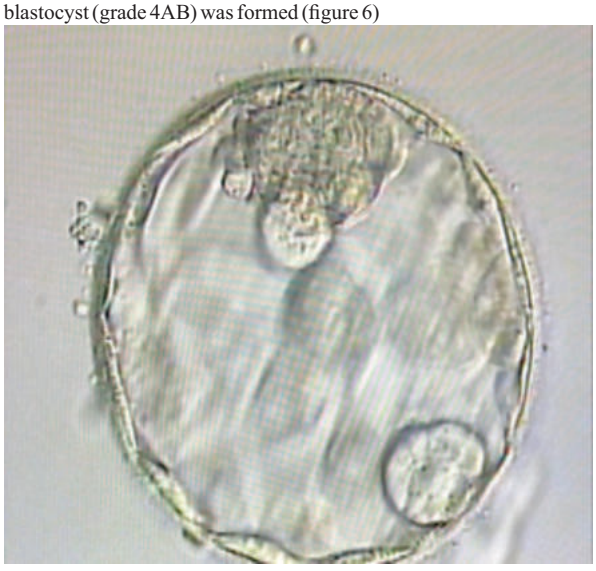

Figure 6- 4 AB blastocyst

Embryo Transfer

Single embryo transfer resulted in a positive serum β-hCG (figure 7), with ultrasound confirmation of an ongoing intrauterine pregnancy at 6, 9, and 12 weeks of gestation (figure 8).

UHID : P030525RDC0003322/1 Sample ID : 12353776

Department of Immunology Accredited

HCG *(SERUM GEL)*

Test	Result	Unit	Reference Range	Method
Beta HCG	: 1884.83 [H]	mIU/mL	Non-Pregnant Females :< 5.0 weeks of gestation 4 wk 5 - 100 5 wk 200 - 3000 6 wk 10,000 - 80,000 7- 14wk 90,000 - 500,000 15- 26 wk 5000 - 80,000 27 - 40 wk 3000-15,000	CMIA

Figure 7- B hcg report

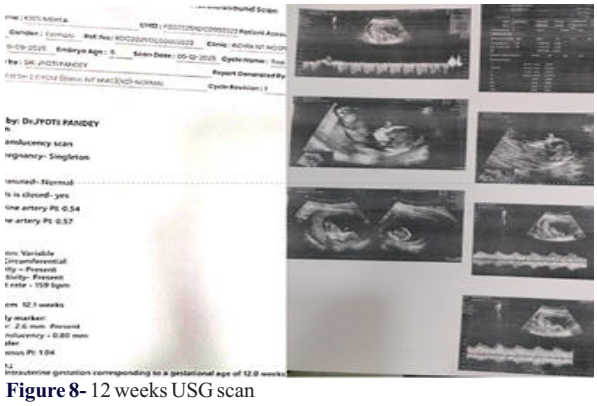

Figure 8- 12 weeks USG scan

DISCUSSION

Microdissection testicular sperm extraction (Micro-TESE) has emerged as the gold standard technique for sperm retrieval in men with non-obstructive azoospermia (NOA), owing to its superior sperm retrieval rates compared with conventional TESE and aspiration-based techniques[4–5]. This advantage is particularly critical in genetically compromised NOA, where spermatogenesis is often focal, heterogeneous, and difficult to predict.

Baseline FSH levels, presence of clinical varicocele, history of previous varicocelectomy, pre sperm retrieval hormone stimulation and testicular histopathology results are independent predictors of sperm retrieval success. Patients exhibiting biopsies indicative of hypospermatogenesis or maturation arrest have significantly higher odds of successful sperm retrieval than those with Sertoli cell only.

Y-chromosome microdeletions constitute a well-established genetic cause of NOA, with prognostic significance varying according to the specific azoospermia factor (AZF) region involved. AZFa and AZFb deletions are typically associated with Sertoli cell–only syndrome or complete maturation arrest, resulting in an extremely poor prognosis for sperm retrieval. In contrast, AZFc microdeletions retain partial spermatogenic potential due to the presence of multiple gene families, including DAZ, CDY, and BPY2, which are involved in late stages of germ cell differentiation and spermiogenesis[3,8]. This molecular heterogeneity explains the patchy distribution of active seminiferous tubules in AZFc-deleted testes and provides the biological rationale for the use of microdissection-based retrieval techniques.

Preoperative hormonal optimization has gained increasing attention as a strategy to improve intratesticular testosterone levels and promote focal spermatogenesis in selected NOA patients. Testosterone plays a central role in spermatogenesis through its synergistic action with follicle-stimulating hormone on Sertoli cells, facilitating germ cell maturation and survival. Therapeutic use of aromatase inhibitors and human chorionic gonadotropin (hCG) has been shown to improve the testosterone-to-estradiol ratio and enhance the intratesticular androgen environment, potentially increasing the likelihood of successful sperm retrieval[9,11]. In the present case, hormonal optimization for a minimum of one spermatogenic cycle likely contributed to the favorable Micro-TESE outcome, supporting existing evidence that endocrine manipulation may benefit carefully selected patients.

From a surgical perspective, Micro-TESE allows direct visualization of seminiferous tubules under high magnification, enabling selective excision of dilated, opaque tubules while preserving testicular vascular architecture. This approach has been associated with higher retrieval rates, lower complication rates, and reduced risk of long-term hypogonadism compared with conventional techniques[4,5,12]. The absence of postoperative complications in this patient is consistent with reports emphasizing the safety and efficacy of Micro-TESE when performed by experienced reproductive urologists.

Importantly, reproductive success following Micro-TESE extends beyond sperm retrieval alone and is significantly influenced by female reproductive parameters. Several studies have demonstrated that ovarian reserve, oocyte competence, and embryology laboratory expertise play pivotal roles in fertilization, blastocyst development, and implantation rates in couples undergoing ICSI following Micro-TESE[13,14]. The favorable ovarian reserve and optimal embryological outcome in the present case underscore the importance of managing NOA as a couple-based condition rather than an isolated male pathology.

The use of testicular sperm from men with AZFc microdeletions necessitates comprehensive genetic counseling. Male offspring conceived through ICSI will inherit the Y-chromosome microdeletion, potentially predisposing them to infertility in adulthood. Although current evidence does not demonstrate an increased risk of congenital anomalies or adverse perinatal outcomes, counseling regarding genetic transmission, reproductive implications, and the potential need for future fertility assistance remains essential[15,16].

Recently, structured predictive models such as the **APHRODITE criteria**[18] have been proposed to stratify infertile men based on clinical, hormonal, and genetic parameters. Incorporation of such tools may improve patient counseling, optimize surgical decision-making, and avoid unnecessary interventions in men with advanced spermatogenic failure. In the present case, integration of testicular volume, endocrine profile, genetic findings, and response to hormonal stimulation supported proceeding with Micro-TESE, reinforcing the clinical utility of stratification-based approaches[17].

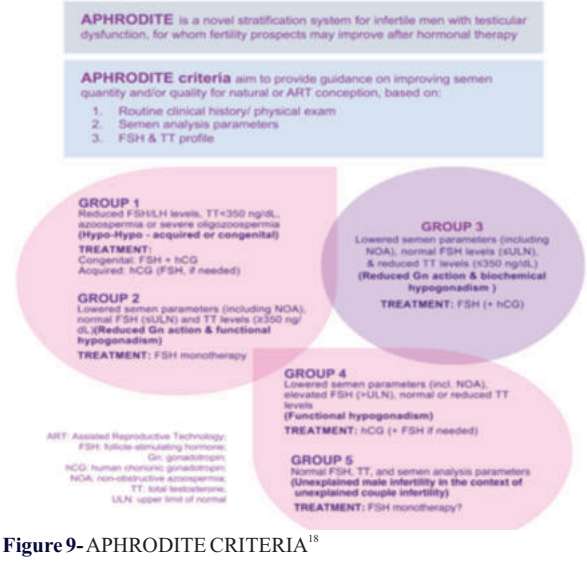

Figure 9- APHRODITE CRITERIA[18]

The limitations of this report include its single-case design and lack of long-term endocrine and offspring follow-up. Future research focusing on molecular biomarkers, testicular transcriptomics, and artificial intelligence-assisted tubule selection may further refine patient selection and improve outcomes in genetically complex NOA.

CONCLUSION

Successful pregnancy is achievable in non-obstructive azoospermia associated with AZFc microdeletion using Micro-TESE combined with ICSI. Careful patient selection, hormonal optimization, favorable female fertility status, and coordinated multidisciplinary management are key determinants of success.

REFERENCES

1. Krausz C, Casamonti E. Spermatogenic failure and the Y chromosome. Hum Genet. 2017;136(5):637–655.
2. Ferlin A, Raicu F, Gatta V, et al. Male infertility: role of genetic background. Reprod Biomed Online. 2007;14(6):734–745.
3. Vogt PH, Edelmann A, Kirsch S, et al. Human Y chromosome azoospermia factors mapped to different subregions. Hum Mol Genet. 1996;5(7):933–943.
4. Schlegel PN. Testicular sperm extraction: microdissection improves sperm yield. Hum Reprod. 1999;14(1):131–135.
5. Bernie AM, Mata DA, Ramasamy R, Schlegel PN. Comparison of sperm retrieval techniques in NOA. Fertil Steril. 2015;104(5):1099–1103.

6. Lan Y, et al. Outcomes of Micro-TESE and ICSI in non-obstructive azoospermia: impact of etiology. Hum Reprod. 2023;38(6):1021–1030.
7. Ramasamy R, et al. Clinical predictors and outcomes of Micro-TESE in NOA. J Urol. 2025;213(2):456–463.
8. Foresta C, Moro E, Ferlin A. Y chromosome microdeletions and spermatogenesis. Endocr Rev. 2001;22(2):226–239.
9. Ishikawa T. Hormonal manipulation prior to Micro-TESE in NOA. Asian J Androl. 2012;14(1):109–115.
10. Esteves SC, Miyaoka R, Orosz JE, Agarwal A. An update on sperm retrieval techniques for azoospermic males. Clinics (Sao Paulo). 2011;66(4):691–700.
11. Ramasamy R, Reifsnyder JE, Bryson C, Schlegel PN. Role of gonadotropin therapy prior to microdissection testicular sperm extraction in nonobstructive azoospermia. J Urol. 2013;190(2):628–633.
12. Okada H, Dobashi M, Yamazaki T, et al. Conventional versus microdissection testicular sperm extraction for nonobstructive azoospermia. Hum Reprod. 2002;17(6):1510–1515.
13. Tsai YR, Huang FJ, Lin PY, Kung FT. Female factors affecting pregnancy outcome following ICSI using testicular sperm. Reprod Biol Endocrinol. 2020;18:66.
14. Palermo GD, Neri QV, Rosenwaks Z. To ICSI or not to ICSI. Semin Reprod Med. 2015;33(2):92–102.
15. Krausz C, Hoefsloot L, Simoni M, Tüttelmann F. EAA/EMQN best practice guidelines for molecular diagnosis of Y-chromosomal microdeletions. Andrology. 2014;2(1):5–19.
16. van Golde RJ, Wetzels AM, de Graaf R, et al. De novo Y-chromosome microdeletions in male offspring conceived through ICSI. Hum Reprod. 2001;16(4):787–791.
17. Boeri L, Capogrosso P, Ventimiglia E, et al. Introducing the APHRODITE criteria: a novel clinical stratification system for infertile men. **Andrology**. 2023;11(5):925–934.
18. Mancebo RE, Rocha EJGC, Esteves SC. Approaching treatment of male infertility: the APHRODITE criteria. *Int Braz J Urol*. 2024