ORIGINAL ARTICLE

Varicocele management in Tunisia: Overview of practices and comparison with latest international guidelines

Prise en charge de la varicocèle en Tunisie: Aperçu des pratiques et comparaison avec les dernières directives internationales

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Abstract

Introduction: Varicocele has a detrimental effect on testicular growth and spermatogenesis, hence the importance of its management. This management remains controversial among Tunisian urologists; diagnostic and therapeutic choices tend to vary from one urologist to another.
Aim: The aim of this survey is to evaluate the practices of Tunisian urologists regarding varicocele management compared to the latest international guidelines.
Methods: A cross-sectional study was conducted among Tunisian urologists, members of the Tunisian Association of Urology, using a computerized questionnaire available online.
Results: The response rate was 51.6%. Approximately 80% of Tunisian urologists reported that they diagnose and manage patients with varicocele at least once a week. Half of the Tunisian urologists use a grading system for classification. Over 75% of Tunisian urologists believe that scrotal ultrasound and semen analysis should be systematically requested. Half of them consider treatment starting from Dubin and Amelar grade 2, while the other half treat from Dubin and Amelar grade 3. The majority agreed that the results of varicocele repair are controversial, with 10% never performing bilateral varicocele repair. The vast majority planned surgical treatment (95%), with sub-inguinal approach and magnification used in only 16% of cases; 25% never froze sperm before varicocele repair.
Conclusion: Recent recommendations had clear messages to promote in terms of diagnosis, therapeutic indications, and modalities. This work highlights the existence of gaps between recommendations on certain aspects of varicocele management, suggesting a review of continuous medical education modalities regarding this pathology in particular.

Key words: Evaluation, Varicocele, Male infertility, Varicocele repair, Embolization, Microsurgery

Résumé

Introduction: La varicocèle a un effet délétère sur la croissance testiculaire et la spermatogenèse, justifiant son importance dans la pratique clinique. Cependant, sa prise en charge reste controversée parmi les urologues tunisiens, avec des choix diagnostiques et thérapeutiques variés.
Objectif: Cette étude vise à évaluer les pratiques des urologues tunisiens concernant la gestion de la varicocèle, en comparaison avec les directives internationales récentes.
Méthodes: Une enquête transversale a été menée auprès des urologues tunisiens membres de l'Association Tunisienne d'Urologie, via un questionnaire en ligne.
Résultats: Le taux de réponse était de 51,6%. Environ 80% des urologues diagnostiquent et prennent en charge des patients atteints de varicocèle au moins une fois par semaine. La moitié utilise une classification pour graduer la varicocèle. Plus de 75% demandent systématiquement une échographie scrotale et un spermogramme. Les avis sont partagés concernant le traitement, avec certains intervenant dès le grade 2 de Dubin et Amelar, tandis que d'autres n'agissent qu'à partir du grade 3. Bien que la majorité des urologues reconnaissent la controverse autour des résultats de la cure de varicocèle, 10% n'interviennent jamais en cas de varicocèle bilatérale. La plupart optent pour un traitement chirurgical, la voie sub-inguinale avec magnification étant utilisée dans 16% des cas. Enfin, 25% des urologues n'ont jamais pratiqué la congélation de sperme avant l'intervention.
Conclusion: Cette étude révèle des divergences entre les pratiques locales et les recommandations internationales, suggérant la nécessité de renforcer la formation continue sur la varicocèle.

Mots clés: Evaluation, Varicocèle, Infertilité masculine, Cure de varicocèle, Embolisation, Micro-chirurgie

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Introduction

Varicocele, defined as an abnormal enlargement and tortuosity of the pampiniform venous plexus of the testicle due to renal or cavo-spermatic venous reflux (1,2), is a commonly encountered condition in the clinical practice of urology. Its repercussions range from mere aesthetic discomfort or a feeling of heaviness to testicular atrophy and male fertility issues. Its epidemiology is well known. Its physiopathology is still controversial, given the fact varicocele genesis, development and repercussions are multifactorial (3).

The management of varicocele is regularly subject to recommendations from professional societies. Diagnosis is primarily clinical. The Dubin and Amelar clinical classification allows for grading of varicocele (4). Scrotal ultrasound imaging with Doppler assessment is used to evaluate varicocele (5). Therapeutic intervention is chosen based on symptoms, impact on fertility and sperm analysis, and the Dubin and Amelar clinical grade.

However, it appears that the diagnosis, indications, and therapeutic modalities for this disease do not enjoy unanimous consent among Tunisian urologists. Their approaches seem to be more influenced by individual impressions and preferences rather than standardized guidelines.

This article aims at (I) providing an overview of the practices of Tunisian urologists regarding varicocele and (II) comparing them with the latest European and American guidelines.

Methods

This is a descriptive cross-sectional study conducted from August 1 to 31, 2021, among Tunisian urologist surgeons practicing in both public and private sectors, based on an online survey conducted using a self-administered questionnaire.

Study population

Our study focused on the population of Tunisian urologist surgeons registered on the list of Tunisian urologists maintained by the Tunisian Association of Urology (ATU).

Inclusion criteria

- Practicing urological surgery specialists in Tunisia
- Urologists in public or private sectors
- Willing participants
- Registered on the ATU's list
- Involved in varicocele management

Exclusion criteria

- Urologists not meeting inclusion criteria
- Tunisian urologists practicing abroad
- Urologists withdrawing from the study
- Incomplete questionnaire responses
- Non-urology specialists managing varicocele

All urologists meeting the aforementioned criteria were included in the study: 180 Tunisian urologists.

Research tool

Data collection was based on a self-administered questionnaire assessing urologists' practices in managing varicocele. This questionnaire was the same one proposed and validated by the Committee on Andrology and Sexual Medicine of the AFU (French Association of Urology). It was developed and structured in parallel with the definitions and recommendations of the same committee.

The 16-question questionnaire is divided into 5 sections:
1. Diagnosis of varicocele (Q1-5)
2. Therapeutic indications (Q6-8)
3. Therapeutic modalities (Q9-11)
4. Therapeutic outcomes and follow-up (Q12-15)
5. Practice of sperm freezing (Q16).

The questionnaire was transcribed into a digital form using the Google Forms© platform: https://forms.gle/oobgWQvRUtqD9FGV6

Data analysis

Data collected through Google Forms were numerically recoded using Microsoft Office Excel 2010 software and then transferred to IBM SPSS Statistics 26 software.

Descriptive data were expressed using frequencies and percentages for qualitative variable

Results

Out of the 180 Tunisian urologists included in the study, 93 responded to the survey. The participation rate in the survey was 51.6%.

Diagnosis of varicocele

Frequency of varicocele management

Approximately 80% of Tunisian urologists (Fig. 1) are involved in managing a patient with varicocele at least once a month, while only 20% of urologists do so less than once a month

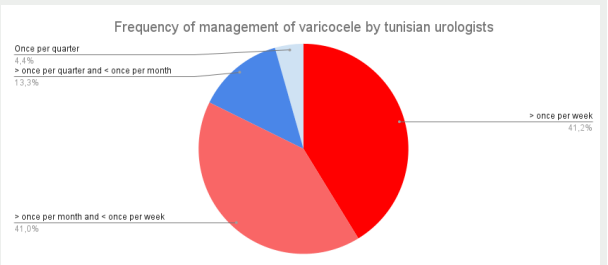

Figure 1. 1st question: "In your practice, are you involved in diagnosing and managing patients with varicocele?"

Circumstances leading to varicocele investigation

Male infertility, pain, and testicular heaviness were the most common circumstances leading Tunisian urologists to investigate varicocele (Table 1, Question 2) (reported by 100%, 91.4%, and 78.5% of urologists, respectively).

Modalities of clinical examination for varicocele

For the majority of Tunisian urologists, clinical examination of varicocele (Table 1, Question 3) was bilateral (96.8% of urologists), performed in a standing position (91.4% of urologists), lying down (81.7% of urologists), and with a Valsalva maneuver (91.4% of urologists).

Table 1. Questions 2 to 5: Diagnosis of varicocele by tunisian urologists in 2021

Q2: "What context(s) do you search for varicocele in?" (Multiples answers possible)		
Answer	Frequency	Percentage
Testicular pain	85	91.4%
Testicular heaviness	73	78.5%
Renal tumor	35	37.6%
History of STIs	3	3.2%
Testicular growth disorders in an adolescent	42	45.2%
Male infertility	93	100%
Female infertility	14	15.1%
Signs of peripheral hypogonadism	15	16.1%
Venous insufficiency of the lower limbs	21	22.6%
Number of participants	93	-
Q3: "If you suspect a varicocele, how do you conduct the clinical examination?" (Multiples answers possible)		
Answer	**Frequency**	**Percentage**
Laying down position	76	81.7%
Standing position	85	91.4%
Inspection only	6	6.5%
Without Valsalva maneuver	23	24.7%
With Valsalva maneuver	85	91.4%
With testicular volume measuring	45	48.4%
Dubin and Amelar's grading	44	47.3%
Bilateral examination	90	96.8%
Number of participants	93	-
Q4: "At what grade of the Dubin and Amelar's classification do you consider a varicocele to be clinical?"		
Answer	**Frequency**	**Percentage**
Grade 0	0	0%
Grade 1	22	23.7%
Grade 2	58	62.4%
Grade 3	13	13.9%
Number of participants	93	100%
Q5: "What first-line complementary examination should be systematically requested in case of varicocele diagnosis in adults?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
Scrotal ultrasound	72	77.4%
Abdominal ultrasound	18	19.4%
Thoracic-abdominal scan	2	2.2%
Hormonal assessment	8	8.6%
Semen analysis	79	84.9%
Number of participants	93	-

Use of Dubin and Amelar's classification (Table 1, Question 4) was reported by less than 50% of surveyed urologists. The majority of Tunisian urologists (62%) considered varicocele clinically significant from grade 2 of the Dubin and Amelar's classification. Only 23.7% of urologists regarded grade 1 as the threshold for clinically significant varicocele.

Systematic use of first-line complementary examinations (Table 1, Question 5) in varicocele diagnosis was predominant. Semen analysis and/or scrotal ultrasound were prescribed by more than three-quarters of Tunisian urologists.

Therapeutic indications

Slightly more than half (57.1%) of Tunisian urologists indicated varicocele repair starting (Table 2, Question 6) from grade 3 of the Dubin and Amelar's classification. Others indicated therapeutic intervention for grade 2, 1, or even 0 of the same classification (respectively 35%, 5%, and 2.9% of urologists).

Table 2. Questions 6 to 8: Therapeutic indications of varicocele according to tunisian urologists in 2021

Q6: "At what grade of the Dubin and Amelar's classification do you indicate varicocele repair?"		
Answer	**Frequency**	**Percentage**
Grade 0	3	3.3%
Grade 1	14	15.1%
Grade 2	51	56%
Grade 3	52	57.1%
Number of participants	91	-
Q7: "What indication(s) for varicocele repair do you consider?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
Asymptomatic clinical varicocele with normal sperm parameters	2	2.2%
Asymptomatic clinical varicocele in a man without short-term paternity plans with abnormal sperm parameters	38	40.9%
Symptomatic clinical varicocele (pain, heaviness)	72	77.4%
Clinical varicocele in adolescent with ipsilateral testicular growth delay	83	89.2%
Clinical varicocele with cosmetic concern without other impact	12	12.9%
Non-obstructive azoospermia with clinical varicocele	64	68.8%
Obstructive azoospermia with clinical varicocele	12	12.9%
Couple infertility with female issues and normal sperm parameters	7	7.5%
Number of participants	92	-
Q8: "In the context of infertility, in which case(s) do you perform bilateral varicocele repair?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
Never	10	10.9%
Bilateral clinical varicocele	82	89.1%
Unilateral clinical varicocele and contralateral subclinical varicocele	19	20.7%
Unilateral clinical varicocele and no contralateral varicocele	17	17.6%
Bilateral subclinical varicocele	5	5.4%
Number of participants	92	-

The most frequently reported indications for varicocele repair (Table 2, Question 7) were "symptomatic clinical varicocele (pain, heaviness)" (77.4%), "adolescent

varicocele with ipsilateral testicular growth delay" (89.2%), and "non-obstructive azoospermia with clinical varicocele". Cosmetic concerns were reported as a varicocele repair indication in only 12.9% of cases.
Regarding bilateral varicocele, bilateral repair was performed by the vast majority of Tunisian urologists (89.1%) (Table 2, Question 8).

Therapeutic modalities

Surgical treatment was the preferred first-line therapeutic option for Tunisian urologists (94.6%) in the management of clinical varicocele associated with infertility (Table 3, Question 9).
The two surgical techniques of choice (Table 3, Question 10) were high retroperitoneal ligation and inguinal ligation according to Ivanissevich (in 45.2% of cases). Microsurgery (or magnification) was only practiced by a minority of surveyed urologists.
The majority of Tunisian urologists (Table 3, Question 11) believe the gold standard treatment for varicocele is sub-inguinal repair, with or without magnification (32.2%).

Table 3. Questions 9 to 11: Therapeutic modalities of varicocele according to tunisian urologists in 2021

Q9: "What treatment(s) do you propose as first-line approach in case of clinical varicocele in the context of infertility?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
None of the bellow	1	1.1%
Medical treatment	24	25.8%
Surgical treatment	88	94.6%
Radiological percutaneous treatment	8	8.6%
Number of participants	93	-
Q10: "If you propose a surgical treatment, which technique(s) do you use?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
High retroperitoneal ligation (Palomo)	42	45.2%
Laparoscopic technique	19	20.4%
Ivanissevich technique without magnification	42	45.2%
Ivanissevich technique with magnification	9	9.7%
Sub-inguinal technique without magnification	18	19.4%
Sub-inguinal technique with magnification	15	16.1%
Embolization	10	10.8%
Antegrade sclerotherapy	9	9.7%
Number of participants	93	-
Q11: "In your opinion, what is the reference technique?"		
Answer	**Frequency**	**Percentage**
High retroperitoneal ligation (Palomo)	28	30.1%
Laparoscopic technique	4	4.3%
Ivanissevich technique without magnification	21	22.6%
Ivanissevich technique with magnification	14	15.1%
Sub-inguinal technique without magnification	7	7.5%
Sub-inguinal technique with magnification	23	24.7%
Embolization	11	11.8%
Antegrade sclerotherapy	4	4.3%
Number of participants	93	100%

Therapeutic outcomes and follow-up

Approximately two-thirds (69.7%) of Tunisian urologists "agreed to some extent" or "strongly agreed" that the results of varicocele repair are controversial (Table 4, Question 12), while about one-third (30.3%) "disagreed to some extent" or "strongly disagreed" with this statement.
Improvement in sperm parameters, natural pregnancy rate, rate of pregnancies through ART, and relief of pain/heaviness symptoms were the most frequently expected therapeutic consequences by Tunisian urologists (respectively 98.9%, 91.4%, 71%, and 73.1% of surveyed urologists) (Table 4, Question 13).

Table 4. Questions 12 to 15: Therapeutic outcomes and follow-up of varicocele according to tunisian urologists in 2021

Q12: "To what extent do you agree with the following statement: the results of varicocele repair are controversial?"		
Answer	**Frequency**	**Percentage**
Strongly agree	30	33.7%
Agree to some extent	32	36%
Disagree to some extent	23	25.8%
Strongly disagree	4	4.5%
Number of participants	89	100%
Q13: "In your opinion, what is (are) the expected consequence(s) of varicocele repair?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
Improvement in natural pregnancy rates	85	81.4%
Improvement in pregnancy rates through assisted reproductive technology (ART)	66	71%
Improvement in sperm parameters	92	98.9%
Improvement in DNA fragmentation index	38	40.9%
Increase in testicular volume if hypotrophy before treatment	12	12.9%
Decrease in pain/heaviness	68	73.1%
Increase in testosterone levels	10	10.8%
Number of participants	93	-
Q14: "What systematic follow-up do you perform after varicocele treatment?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
Scrotal ultrasound	19	20.4%
Hormonal assessment (testosterone, FSH)	3	3.2%
Semen analysis at 1 month	2	2.2%
Semen analysis at 3 months	57	61.3%
Semen analysis at 6 months	60	61%
Semen analysis at 9 months	17	18.3%
Semen analysis at 1 year	21	22.6%
Number of participants	93	-
Q15: "If spermogram parameters are unsatisfactory after varicocele repair, what do you do?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
A new clinical examination	0	0%
A new semen analysis	24	25.8%
A scrotal ultrasound	11	11.8%
An abdominal-pelvic CT scan	42	45.2%
A spermatic phlebography	3	3.2%
A hormonal assessment	46	49.5%
Referral to an expert center	5	5.4%
Number of participants	93	-

Systematic follow-up after varicocele repair typically includes semen analysis regardless of the timing of its performance, as reported by the majority of surveyed

urologists (Table IV, Question 14). For unsatisfactory post-operative semen analysis, 49.5% of urologists ordered a repeat analysis, 45.2% referred the patient to an expert center, 39.8% requested a scrotal ultrasound, and 38.7% performed a clinical examination or hormonal assessment. (Table 4, Question 15).

Sperm freezing before varicocele treatment

A quarter (25.8%) of Tunisian urologists never request sperm freezing before treating a varicocele. The rest of the urologists recommend this practice in cases of severe OATS (49.5% of urologists), in cases of a single testicle (45.2% of urologists), and less frequently in minors, patients with recurrent varicocele or in a context of male infertility (Table 5, Question 15).

Table 5. Question 16: Indications of sperm freezing before treatment according to tunisian urologists in 2021

Q16: "In what case would you consider sperm freezing before varicocele treatment?" (Multiple answers possible)		
Answer	**Frequency**	**Percentage**
Systematically	0	0%
Never	24	25.8%
Context of male infertility	11	11.8%
Single testicle context	42	45.2%
Minor patient	3	3.2%
Severe oligo-astheno-teratospermia (OATS)	46	49.5%
Treatment of recurrent varicocele	5	5.4%
Number of participants	93	-

Discussion

The survey highlighted that the diagnosis and management of varicocele remain contentious among Tunisian urologists, particularly when contrasted with the latest recommendations.

Significant discrepancies were observed in the clinical examination practices: only about half of the urologists use the Dubin and Amelar classification, and only 50% measure testicular volume. Additionally, opinions varied on the Dubin and Amelar grade at which a varicocele is deemed clinical.

In terms of therapeutic indications, the findings were somewhat aligned with the AFU, EAU and AUA recommendations (6–10). While 57.1% of urologists require a grade 3 to operate on a varicocele, 56% believe treatment should begin at grade 2 of the Dubin and Amelar classification. Interestingly, only 15.1% of respondents think that any clinical varicocele should be treated, regardless of the Dubin grade.

Therapeutic approaches showed significant variability. Approximately one-third of participants opt for subinguinal ligation, with a quarter preferring subinguinal ligation with magnification. Meanwhile, 22% choose the inguinal route (Ivanissevich technique), and 20% consider laparoscopy the reference technique. These variations underscore the need for a thorough literature review to standardize and objectify the diagnosis and management of varicocele.

A notable strength of this study is the response rate of 53%, making it the first national survey on this topic. However, it includes certain biases inherent to declarative data collection and potential underreporting. Despite involving only 92 urologists, we believe our study identified numerous disparities in varicocele diagnosis and management, which underlines the need to standardize urologists' approaches.

Diagnosis of Varicocele

The AUA/ASRM guidelines (9,10) advocate for a clinical diagnosis of varicocele, with ultrasonography used when the physical examination is challenging. "The EAU guidelines (7,8) recommend a physical examination as the primary diagnostic method, suggesting ultrasonography only when necessary. Ultrasonography is requested according to EAU recommendations to evaluate testicular volume in adolescent patients and for follow-up in certain cases. In contrast, the AFU guidelines (6) advise scrotal ultrasonography when varicocele is clinically diagnosed." Most Tunisian urologists followed guidelines for diagnosing varicocele, which include:

- Infertility assessment (clinical exam for men with failed fertility attempts)
- Scrotal pain or heaviness
- Testicular volume asymmetry (especially in adolescents)
- Incidental finding during a medical exam
- Aesthetic discomfort

It should be noted that incidental discovery and aesthetic discomfort were not included in the questionnaire.

Over 80% of Tunisian urologists perform varicocele assessments with the patient lying down and then standing, using the Valsalva maneuver bilaterally. This approach aligns with literature recommendations, as the Valsalva maneuver enhances sensitivity and can reveal a varicocele not palpable at rest.

Only half of those questioned measure the testicular volume during the clinical examination. It is recommended to measure testicular volume in all cases because it is correlated with testicular function in men who are infertile and/or have a varicocele.

Half of Tunisian urologists use the Dubin and Amelar classification for grading, with 62% considering a clinical varicocele from grade 2, 33% from grade 3, and 23.7% from grade1.

Therapeutic Indications

Tunisian urologists' therapeutic indications generally align with the recommended guidelines. The majority of them agreed on three indications:

- Clinical varicocele in adolescents with ipsilateral testicular growth retardation (89.2%).
- Symptomatic clinical varicocele (pain, heaviness) (77.4%).
- Non-obstructive azoospermia with clinical varicocele (68.8%).

The AUA/ASRM guidelines (9,10) recommend varicocele repair in cases of infertility and palpable varicocele with abnormal semen parameters, excluding azoospermic men. The EAU guidelines (8) support repair for men

with OAT and suggest that couples with otherwise unexplained subfertility may benefit from varicocele repair. The AFU guidelines (6) recommend repair in several scenarios, including male infertility with palpable varicocele, symptomatic varicocele, ipsilateral testicular growth delay in adolescents, and cosmetic concerns.

Therapeutic Modalities

International guidelines (AUA, EAU, and AFU) consistently highlight surgical varicocelectomy as the gold standard, particularly the microsurgical subinguinal technique. This method requires an operating microscope and mastery of microsurgical techniques. In the absence of these resources, surgeons are advised to use the technique they are most comfortable with. Other techniques, such as laparoscopic varicocelectomy or percutaneous embolization, may be considered in specific cases.

Therapeutic Outcomes and Follow-Up

The vast majority of Tunisian urologists expect an improvement in sperm parameters and spontaneous or MAR pregnancy rates, which are the main objectives of varicocele treatment.
Recent studies suggest that varicocele repair is associated with (3,11–14):

- Semen parameters improvement
- Testosterone level increase in men with prior low testosterone levels
- Improvement in spontaneous and ART pregnancy rates
- Testicular volume increase in men with initial testicular hypotrophy.

Post-operative spermogram
2/3 of Tunisian urologists recommend a post-operative spermogram at 3 and 6 months. One-quarter perform a spermogram at one year, and only 2.2% do not recommend a spermogram at all.

Unsatisfactory post-operative spermogram
In the situation of an unsatisfactory post-operative spermogram, opinions differ: 50% recommend a new spermogram, 45% refer the patient to an expert center, 40% complete with a scrotal ultrasound, 38% perform a new clinical examination or hormonal assessment, 7.5% perform a sperm phlebography, and 1.1% recommend an abdominopelvic CT.

Post-operative hormonal assessment and scrotal ultrasound
A scrotal ultrasound is performed by 20% of Tunisian urologists and a hormonal assessment only by 3.2%.
Postoperative follow-up, according to AUA and EAU guidelines, typically includes clinical evaluation and semen analysis to assess changes in sperm parameters and evaluate treatment outcomes. Improvement in spermatic parameters is expected within 3 to 6 months, with semen testing recommended every 3 months up to one year. Routine postoperative ultrasonography is not recommended unless there is no improvement in semen parameters after varicocelectomy.

Sperm Freezing Before Varicocele Treatment

About 25% of Tunisian urologists never recommend sperm freezing before varicocele treatment. However, half of them recommend it in cases of severe OATS or in patients with a single testicle. Sperm freezing is advised by learned societies in these situations to preserve fertility potential (6,810).

Conclusion

This study highlights significant disparities in varicocele management among Tunisian urologists, with deviations from new recommendations that could lead to suboptimal care and increased costs. Continuous training and further education are essential to align practices with guidelines and improve patient outcomes.

Abbreviations list
ART: Assisted reproductive technology
ATU : Association Tunisienne d'Urologie (Tunisian Association of Urology)
AUA: American Urological Association
AFU: Association Française d'Urologie (French Association of Urology)
DNA: Desoxyribonucleic Acid
OATS: oligo-astheno-teratospermia
MAR: Medically Assisted Reproduction

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