

DOI: <https://doi.org/10.56936/18290825-4.v18.2024-122>

LETTER TO EDITOR

THE STRONG NEGATIVE IMPACT OF VARICOCELE ON SPERM MORPHOLOGY AND INFERTILITY: A CASE REPORT**ANDRADE-ROCHA F.T.¹, CARDONA MAYA W.D.^{2*}**¹ Lisa Andrology Lab, Petrópolis, Rio de Janeiro, Brazil² Department of Microbiology and Parasitology, Faculty of Medicine, Reproduction Group, University of Antioquia, Medellín, Colombia

Received 04.07.2024; Accepted for printing 10.11.2024

ABSTRACT

Introduction: Varicocele is a prevalent disorder affecting sperm quality and male fertility, with a higher incidence in infertile men. Some evidence has also indicated that varicocele may negatively impact the germinal epithelium, causing the seminal stress pattern of an increase in immature germinal cells and amorphous and tapered sperm in semen. Generally, a man must undergo a varicocelectomy to repair this disorder.

Clinical case: This case report aims to present the semen analysis of a 49-year-old man with bilateral varicocele who was diagnosed with male infertility. The patient presented with a normal sperm concentration but severe teratoasthenozoospermia, low viability and a high prevalence of tapered sperm, individually and in combination with other abnormalities.

Discussion: The present case report provides valuable information on the negative impact of varicocele on male fertility, which is highlighted by significant changes in the analyzed seminal parameters. While the patient had a normal sperm count, the reported outcomes showed severe teratoasthenozoospermia, greater impairment of sperm vitality, a greater prevalence of tapered sperm (17%), and combined abnormalities (48%). This means that approximately half of the sperm cells were tapered. Consequently, the percentage of morphologically normal sperm was low (0.07%), which indicates a strong negative impact on the patient's reproductive ability.

Conclusion: This report emphasizes the importance of comprehensive semen analysis for evaluating potential fertility limitations in varicocele patients.

This study also highlights the importance of performing a detailed semen analysis to evaluate sperm quality in patients with varicocele, which may affect their chance of pregnancy.

KEYWORDS: varicocele, sperm, fertility, teratoasthenozoospermia.**INTRODUCTION**

Varicocele is a disorder that affects countless men worldwide (15-20% of the general population). In many men, it impairs sperm quality and harms male fertility (30-40% in infertile men) [Su J *et al.*, 2021]. Generally, a man must undergo a varicocelectomy to

repair this disorder [PCASR, 2014].

Varicocele affects sperm morphology, causing damage to sperm structure, mainly in the acrosome and nucleus. This leads to male infertility and adversely affects sperm motility and vitality and, to a

CITE THIS ARTICLE AS:

Andrade-Rocha F.T., Cardona Maya W.D. (2024) The strong negative impact of varicocele on sperm morphology and infertility: A case report. The New Armenian Medical Journal, vol.18(4), 121-124; <https://doi.org/10.56936/18290825-4.v18.2024-122>

ADDRESS FOR CORRESPONDENCE:

Walter D. Cardona Maya, PhD
Department of Microbiology and Parasitology, Faculty of Medicine
Reproduction Group, University of Antioquia, 67 Street, No 53-108, Medellín, Colombia
Tel.: +57 4 2196470
E-mail: wdario.cardona@udea.edu.co

lesser extent, sperm count [Agarwal A et al., 2016]. Some evidence has also indicated that varicocele may negatively impact the germinal epithelium, causing the seminal stress pattern of an increase in immature germinal cells and amorphous and tapered sperm in sêmen [Macleod J, 1965; Andrade-Rocha F, Cardona Maya W, 2022]. Conversely, surgical varicocelectomies significantly improve semen parameters in infertile men [Agarwal A et al., 2007].

In the current case report, we report the outcomes of semen analysis from a patient with varicocele who had extremely scant morphologically normal sperm and high percentages of tapered and amorphous sperm. On the other hand, the semen tested lacked a seminal stress pattern and a normal sperm count.

CASE REPORT

A 49-year-old patient underwent semen analysis at the Lisa Andrology Laboratory to investigate male infertility. His wife had spent more than two years trying to become pregnant. They have neither children nor a history of miscarriage or tubal pregnancy. As part of this survey, the patient consulted a urologist who detected bilateral varicoceles. He then underwent color Doppler ultrasound, confirming bilateral varicocele, grade I on the right and grade III on the left; ultrasound did not detect any other problems. We assessed the sperm count, vitality, total motility and sperm progression patterns, morphology, and hypoosmotic test results according to the WHO Manual for Semen Examination guidelines (6th edition, 2021) [WHO, 2021]. The table summarizes the sperm parameter analysis results.

DISCUSSION

The present case report provides a valuable background on the negative impact of varicocele on male fertility, which is highlighted by significant changes in the analyzed seminal parameters [Agarwal A et al., 2007].

While the patient had a normal sperm count, the reported outcomes showed severe teratoasthenozoospermia, greater impairment of sperm vitality, a greater prevalence of tapered sperm (17%), and combined abnormalities (48%), as summarized in the table and figure. This means that approximately half of the sperm cells were tapered. Consequently, the percentage of morphologically normal sperm

TABLE

Semen analysis in an infertile man with severe teratoasthenozoospermia

Parameters	Results	References
Sperm count/mL	$62.5 \times 10^6/\text{mL}$	$15 - 213 \times 10^6/\text{mL}^\#$
Sperm count/ejaculate	$193.7 \times 10^6/\text{mL}$	$39 - 701 \times 10^6/\text{mL}^\#$
Vitality	28%	54-97% [#]
Total motility (a+b+c)	4%	42-90% [#]
Progressive motility (a+b)	4%	30-77% [#]
Progressive motility (a)	0	-
Slow/irregular motility (b)	3%	-
Non-progressive motility (c)	1%	1-18%
Immotile (d)	96%	22-59%
Hypoosmotic swelling test	47%	> 58% [#]
Normal morphology	0.07%	4-39% [#]
Small head	0	<5%
Large head	0	-
Pyriform	2%	-
Amorphous	5%	-
Round-headed	0	-
Multiple head	0	-
Pin-headed	3%	-
Tapered	17%	<5%
Mid-piece defects	0	-
Tail defects	0	-
Multiple anomalies*	61%	<38%
Lysed-sperm (degenerated)	11%	-
Tapered in multiple anomalies	48%	-
Immature germ cells/mL*	$2.49 \times 10^6/\text{L}$	$1.5-4.0 \times 10^6/\text{mL}^\#$
Sperm/immature germ cells index**	26/1	>20%
Volume	3.2 mL	1.6-6.8 mL [#]
Viscosity	Normal	Normal [#]
pH	7.9	7.3-7.8

NOTES: * Head + mid-piece, head + tail, mid-piece + tail, head + mid-piece + tail defects (combined), ** Index for investigating seminal stress pattern, # According to the WHO Manual for Semen Analysis (6th Edition, 2021), Confidence Intervals 5-95%

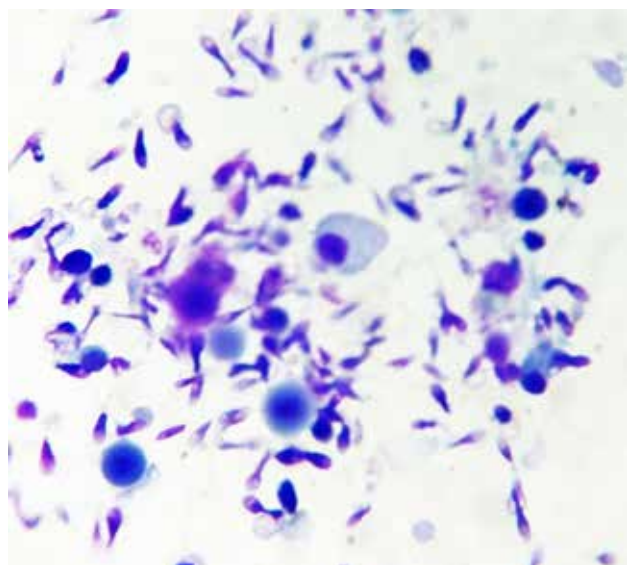


FIGURE. Representative photograph of the patient's semen sample, showing multiple spermatozoa with different abnormalities

was low (0.07%), which indicates a strong negative impact on the patient's reproductive ability.

Another exciting feature of this case report was that we investigated whether the sample had a seminal stress pattern using a technique that we recently developed. This technology detects and depicts poor outcomes, characterized by an index that the varicocele could also impact the germinal

epithelium, in addition to the sperm morphology [Andrade-Rocha F, Cardona Maya W, 2022]. In the current case report, the outcome did not indicate the occurrence of the seminal stress pattern. In this way, it became clear that the varicocele would only damage the structure of the spermatozoa (sperm morphology), causing severe teratozoospermia but not impairing spermatogenesis up to spermiogenesis [Cakiroglu B et al., 2013]. Thus, the natural cycle of spermatogenesis has not been disrupted. Whenever the varicocele affects the normal spermatogenesis cycle, it causes increased shedding of immature germ cells in the ejaculate, and seminal stress patterns can be detected. In semen analysis, we identified many varicocele patients with and without seminal stress patterns, often with increased amounts of tapered sperm. However, we have rarely detected such an intense impact on sperm morphology, as reported herein.

CONCLUSION

In conclusion, this clinical case highlights the importance of considering varicocele as a possible major cause of male infertility. This study also highlights the importance of performing a detailed semen analysis to evaluate sperm quality in patients with varicocele, which may affect their chance of pregnancy.

REFERENCES

1. Agarwal A, Deepinder F, Cocuzza M, Agarwal R, Short RA., et al (2007). Efficacy of varicocelectomy in improving semen parameters: new meta-analytical approach. *Urology*. 70(3): 532-538 DOI: 10.1016/j.urology.2007.04.011
2. Agarwal A, Sharma R, Harlev A, Esteves SC (2016). Effect of varicocele on semen characteristics according to the new 2010 World Health Organization criteria: a systematic review and meta-analysis. *Asian journal of andrology*. 18(2): 163-170 DOI: 10.4103/1008-682X.172638
3. Andrade-Rocha FT, Cardona Maya WD (2022). Increased exfoliation of immature germ cells detected in semen analysis routine and its clinical significance. *Archivio Italiano di Urologia e Andrologia*. 94(4): 519-520 DOI: 10.4081/aiua.2022.4.519
4. Cakiroglu B, Sinanoglu O, Gozukucuk R (2013). The effect of varicocelectomy on sperm parameters in subfertile men with clinical varicoceles who have asthenozoospermia or teratozoospermia with normal sperm density. *International Scholarly Research Notices*. 2013: 698351 DOI: 10.1155/2013/698351
5. Macleod J (1965). Seminal cytology in the presence of varicocele. *Fertility and sterility*. 16(6): 735-757 DOI: 10.1016/S0015-0282(16)35765-X
6. PCASR (2014). (Practice Committee of the American Society for Reproductive, Medicine and the Society for Male Reproduction and Urology). Report on varicocele and infertility: a committee opinion. *Fertility and sterility*. 102(6): 1556-1560 DOI: 10.1016/j.fertnstert.2014.10
7. Su JS, Farber NJ, Vij SC (2021). Pathophysiology and treatment options of varicocele: an overview. *Andrologia*. 53(1): e13576 DOI: 10.1111/and.13576
8. WHO (2021). WHO Laboratory Manual for the Examination and Processing of Human Semen. S.P.G. WHO Press: Geneva, Switzerland Ed. 6th ed.). Available at: <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>



The Journal is founded by
Yerevan State Medical
University after M. Heratsi.



Rector of YSMU

Armen A. Muradyan

Address for correspondence:

Yerevan State Medical University
2 Koryun Street, Yerevan 0025,
Republic of Armenia

Phones:

(+37410) 582532 YSMU

(+37493 588697 Editor-in-Chief

Fax: (+37410) 582532

E-mail: namj.ysmu@gmail.com, ysmiu@mail.ru

URL: <http://www.ysmu.am>

Our journal is registered in the databases of Scopus,
EBSCO and Thomson Reuters (in the registration process)



SCOPUS



EBSCO

REUTERS

Copy editor: Tatevik R. Movsisyan

Printed in "LAS Print" LLC
Director: Suren A. Simonyan
Armenia, 0023, Yerevan,
Acharyan St. 44 Bulding,
Phone: (+374 10) 62 76 12,
E-mail: las.print@yahoo.com

Editor-in-Chief

Arto V. Zilfyan (Yerevan, Armenia)

Deputy Editors

Hovhannes M. Manvelyan (Yerevan, Armenia)

Hamayak S. Sisakyan (Yerevan, Armenia)

Executive Secretary

Stepan A. Avagyan (Yerevan, Armenia)

Editorial Board

Armen A. Muradyan (Yerevan, Armenia)

Drastamat N. Khudaverdyan (Yerevan, Armenia)

Levon M. Mkrtchyan (Yerevan, Armenia)

Foregin Members of the Editorial Board

Carsten N. GUTT (Memmingen, Germany)

Muhammad MIFTAHUSSURUR (Indonesia)

Alexander WOODMAN (Dharhan, Saudi Arabia)

Coordinating Editor (for this number)

Hesam Adin Atashi (Tehran, Iran)

Editorial Advisory Council

Mahdi Esmaeilzadeh (Mashhad, Iran)

Ara S. Babloyan (Yerevan, Armenia)

Aram Chobanian (Boston, USA)

Luciana Dini (Lecce, Italy)

Azat A. Engibaryan (Yerevan, Armenia)

Ruben V. Fanarjyan (Yerevan, Armenia)

Gerasimos Filippatos (Athens, Greece)

Gabriele Fragasso (Milan, Italy)

Samvel G. Galstyan (Yerevan, Armenia)

Arthur A. Grigorian (Macon, Georgia, USA)

Armen Dz. Hambardzumyan (Yerevan, Armenia)

Seyran P. Kocharyan (Yerevan, Armenia)

Aleksandr S. Malayan (Yerevan, Armenia)

Mikhail Z. Narimanyan (Yerevan, Armenia)

Levon N. Nazarian (Philadelphia, USA)

Yumei Niu (Harbin, China)

Linda F. Noble-Haeusslein (San Francisco, USA)

Arthur K. Shukuryan (Yerevan, Armenia)

Suren A. Stepanyan (Yerevan, Armenia)

Gevorg N. Tamamyan (Yerevan, Armenia)

Hakob V. Topchyan (Yerevan, Armenia)

Alexander Tsiskaridze (Tbilisi, Georgia)

Konstantin B. Yenkovyan (Yerevan, Armenia)

Peijun Wang (Harbin, China)



CONTENTS

4. **ABDRAMANOV K.A., KOKOEV E.B., ABDAMANOV A.K., ARZIBAeva P.M., ALISHEROV R.T.**
DYNAMICS OF THE LEVEL OF AMINO-TERMINAL FRAGMENT OF PRO-BRAIN
NATRIURETIC PEPTIDE IN PATIENTS WITH ATRIAL SEPTAL DEFECT LIVING AT HIGH
ALTITUDE AT DIFFERENT STAGES OF DEFECT CORRECTION
12. **KIRAKOSYAN E.V., NAZARENKO T.A., TROFIMOV D.YU., PAVLOVICH S.V., SUKHIKH G.T.**
UNEXPLAINED INFERTILITY: CLINICAL CHARACTERISTICS OF COUPLES AND
EMBRYOLOGICAL FEATURES OF IN VITRO FERTILIZATION PROGRAMS
25. **HOVHANNISYAN A.H., BAGHDASARYAN E.G., BAGHDASARYAN A.G., HARUTYUNYAN L.G.,
GRIGORYAN S.V., KHAN S., PANDIT D., ASOYAN V.A.**
THE CHALLENGES OF TREATMENT OF PATIENT WITH VIRAL HEPATITIS C AND
BRUCELLOSIS:
31. **SADUAKAS A.Y., KURAKBAYEV K.K., ZHAKUBAYEV M.A., MATKERIMOV A.ZH., SHAMSHIYEV A.S.,
KHANSHI MEAD, ABILKHANOV Y.Y., MAKAMOV R.O., ERKINBAYEV N.N., KOZHAMKUL A.ZH.**
OUTCOME COMPARISON OF CAROTID ENDARTERECTOMY AND CAROTID ARTERY
STENTING IN PATIENTS WITH EXTRACRANIAL CAROTID ARTERY STENOSIS: ONE-
HOSPITAL-BASED RETROSPECTIVE STUDY
37. **SAROYAN G.E., MANUKYAN R.R., OHAN G.G., TER-STEPANYAN M.M.**
GROUP B STREPTOCOCCUS IN PREGNANCY, EPIDEMIOLOGICAL PECULIARITIES OF
EARLY AND LATE ONSET STREPTOCOCCAL INFECTIONS IN NEWBORNS
46. **TUKESHOV S.K., BAYSEKEEV T.A., CHOI E.D., KULUSHOVA G.A., NAZIR M.I., JAXYMBAYEV N.B.,
TURKMENOV A.A.**
DIAGNOSTICS, SURGICAL TREATMENT, AND REHABILITATION OF PATIENTS WITH
COMPLEX FRACTURED HAND INJURIES
55. **YAVROYAN ZH.V., HAKOBYAN N.R., HOVHANNISYAN A.G., GEVORGYAN E.S.**
CISPLATIN AND DEXAMETHASONE SEPARATE AND COMBINED ACTION ON LIPID
PEROXIDATION IN NUCLEAR FRACTIONS OF RAT BRAIN AND KIDNEY CELLS
67. **SHOJAEI S., HANAFI M.G., SARKARIAN M., FAZELINEJAD Z.**
PROGNOSTIC FACTORS FOR ENLARGED PROSTATE IN HEALTHY MEN'S ADULTS: A
CROSS-SECTIONAL STUDY
73. **BAYKOV A.V., HOVHANNISYAN H.A.**
PRIORITIZING COMMUNICATION SKILLS IN THE ARMENIAN UNDERGRADUATE
MEDICAL EDUCATION SYSTEM
84. **KARDOONI M., NIKAKHLAGH S., SALMANZADEH S., MIRMOMENI G., SADEGH ZADEH DIMAN S.**
RISING INCIDENCE OF MUCORMYCOSIS IS A NEW PANIC CHALLENGE IN SOUTHWEST
OF IRAN DURING COVID-19 PANDEMIC: ASSOCIATED RISK FACTORS AND
PREVENTIVE MEASURES
91. **MASHARIPOVA A., NURGALIYEVA N., DERBISSALINA G., BLAŽEVIČIENE A.**
EVIDENCE-BASED PRACTICE IN PALLIATIVE CARE NURSING
98. **KARRAR ALSHARIF M.H., ELAMIN A.Y., ALMASAAD J.M., BAKHIT N.M., ALARIFI A., TAHA K.M.,
HASSAN W.A., ZUMRAWI E.**
USING CHATGPT TO CREATE ENGAGING PROBLEM-BASED LEARNING SCENARIOS IN
ANATOMY: A STEP-BY-STEP GUIDE
107. **MARDIYAN M.A., DUNAMALYAN R.A., SAKANYAN G.H., SARGSYAN A.V., SAHAKYAN A.A.,
MKRTCHYAN S.A., SHUKURYAN A.K., GALSTYAN H.G.**
INTERRELATIONS BETWEEN SITUATIONAL AND PERSONAL ANXIETY AND QUALITY
OF LIFE DOMAINS
114. **VARDANYAN G.R.**
HEALTH RISKS OF SHIFT WORK FOR SERVICEMEN: PREVENTION AND REDUCTION
STRATEGIES
122. **ANDRADE-ROCHA F.T., CARDONA MAYA W.D.**
THE STRONG NEGATIVE IMPACT OF VARICOCELE ON SPERM MORPHOLOGY AND
INFERTILITY: A CASE REPORT