



MRI OF THE SCROTUM FOR THE EVALUATION OF THE AZOOSPERMIC MALE

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INTRODUCTION

- Infertility is growing problem all round the world, it affects approximately 15% of couples.
- Male factor is solely responsible for infertility in 20% and is contributory in another 30-40%.
- Male infertility may be idiopathic as in 40% of cases or caused by pre-testicular, testicular or post-testicular factors.
- Ultrasonography is usually modality of choice for evaluation of the scrotum in infertile male.
- TRUS is performed if obstruction of seminal tract is suspected.

INTRODUCTION

- Azoospermia is defined as absence of spermatozoa in the ejaculate.
- It is classified as obstructive azoospermia (OA) or nonobstructive azoospermia (NOA).
- OA is caused by obstruction of sperm delivery route at any level (rete testis, efferent ducts, epididymis, vas deferens or ejaculatory duct)
- NOA is caused by testicular failure to produce sperm due to various factors.
- It is of utmost importance to distinguish OA from NOA patients because OA is characterized by normal spermatogenesis thus those patients are good candidates for microsurgical reconstruction or sperm retrieval techniques.

PURPOSE

To evaluate usefulness of scrotal MRI in distinguishing obstructive from nonobstructive azoospermia.

MATERIALS AND METHODS

- In this prospective study we included 26 azoospermic males diagnosed after at least 2 semen analyses, who were admitted to our Hospital for testicular biopsy and sperm retrieval.
- Contrast enhanced MR of the scrotum and lower pelvis was performed in every patient day before biopsy and TESE.
- On the basis of histologic results azoospermic patients were divided into two groups : obstructive (10) and nonobstructive (16).
- This study was approved by Ethics Committee of our institution, and all patients provided written informed consent before enrollment in the study.

MRI PROTOCOL

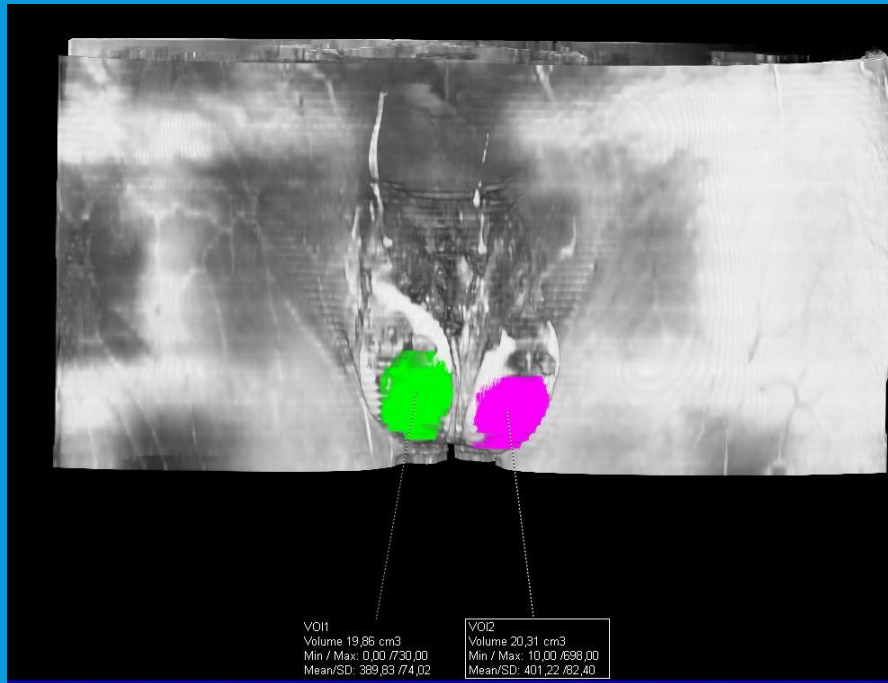
- 1.5T Siemens Magnetom Aera (Siemens)
- Body coil + spine coil
- T₁WI, T₂W and DWI

Sequence :	t2 tse sag	t2 tse cor	t1 tse cor	t2 tse tra	DWI tra	cm	t1 twist tra
TR [ms]	5660	3940	550	9600	9600		3.99
TE [ms]	75	96	19	91	68		1.56
acq time [min]	4:22	06:43	04:28	06:14	05:57		06:30
voxel [mm x mm]	0.9x0.9	0.7x0.7	1.0 x 1.0	0.7 x 0.7	2.5a x 2.5a (1.3i x 1.3i)		1.7 x 1.7
FOV [mm x mm]	280 x 280	320x26 0	320 x 300	360 x 360	400 x 400		330 x 330
slice thk [mm]	3	3	3	3	3.5		3.5
gap [mm]	0.3	0.3	0.3	0.45	0.35		----
slices	45	50	50	50	45		28
orientation	sag	cor	cor	tra	tra		tra
avarages	2	3	2	2	2		----
fat sat	----	----	----	----	on		----
number of dynamics	----	----	----	----	----		70
time resolution of dynamic [s]	----	----	----	----	----		5.5
b0	----	----	----	----	0		----
b1	----	----	----	----	100		----
b2	----	----	----	----	500		----
b3	----	----	----	----	800		----
b4	----	----	----	----	1200		----
b5	----	----	----	----	2000		----

- MR scans were analyzed by two radiologists with at least 5 years of experience in uroradiology and scrotal imaging. Readers were blinded to patients clinical data and biopsy results.
- One patient in NOA group was after unilateral orchidectomy, therefore we analyzed 31 testes in NOA group and 20 testes in OA group.
- T₁ and T₂ signal intensity ratios were calculated by dividing signal intensity measured in the center of the testis by signal intensity measured in the center of the skeletal muscle .



- ADC value of every testis was measured by placing at least 1cm² circular ROI in the midsection of the organ.
- Volume of every testis was calculated using syngo.via software by creating freehand VOIs.

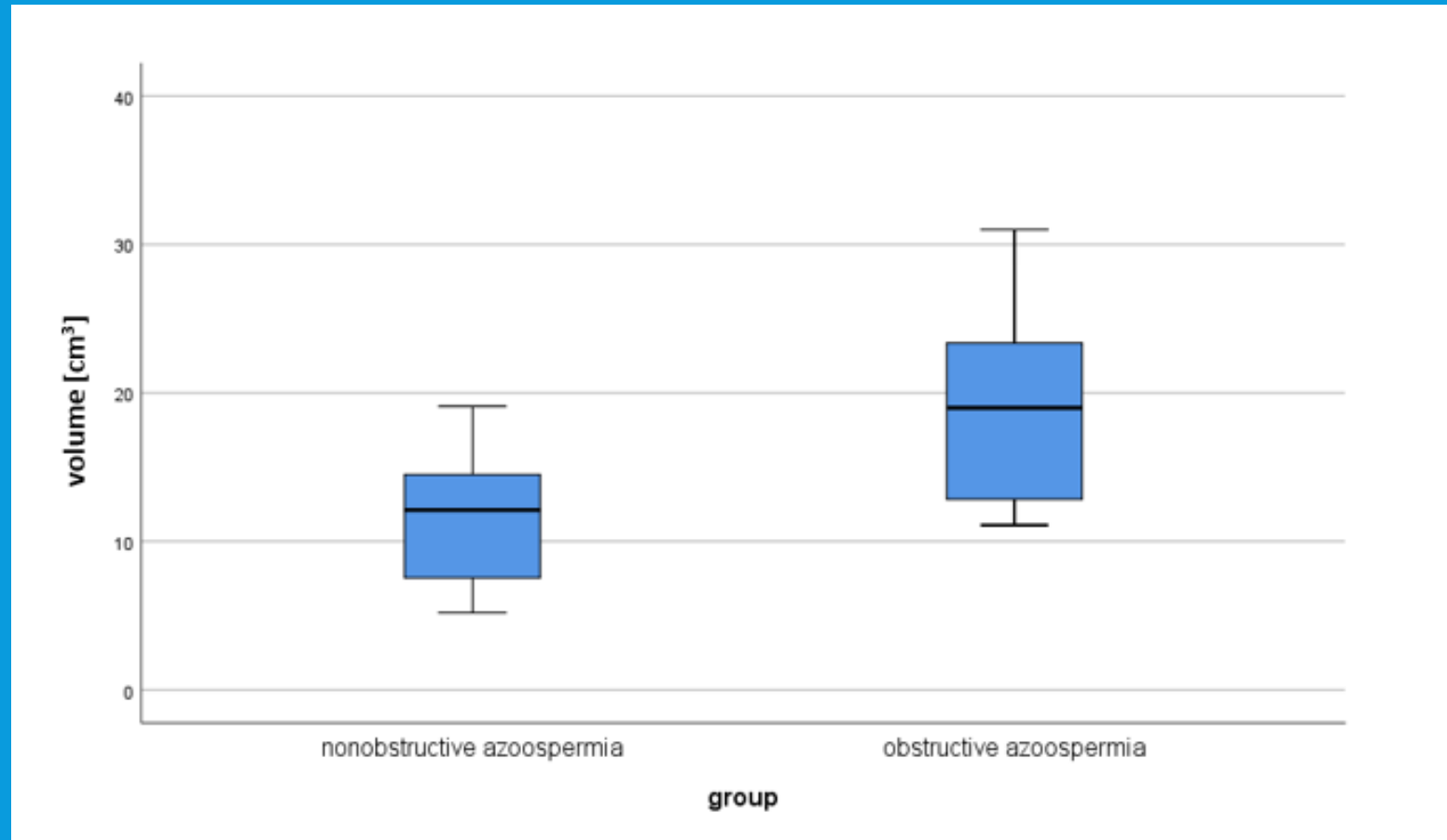


RESULTS

- ADC, T2SR and T1SR followed a normal distribution as evaluated by the Kolmogorov-Smirnov test.
- Student's T-test showed significant difference in ADC values between OA and NOA groups ($P < 0.001$).
- No significant differences were observed in T1 and T2 signal ratios.

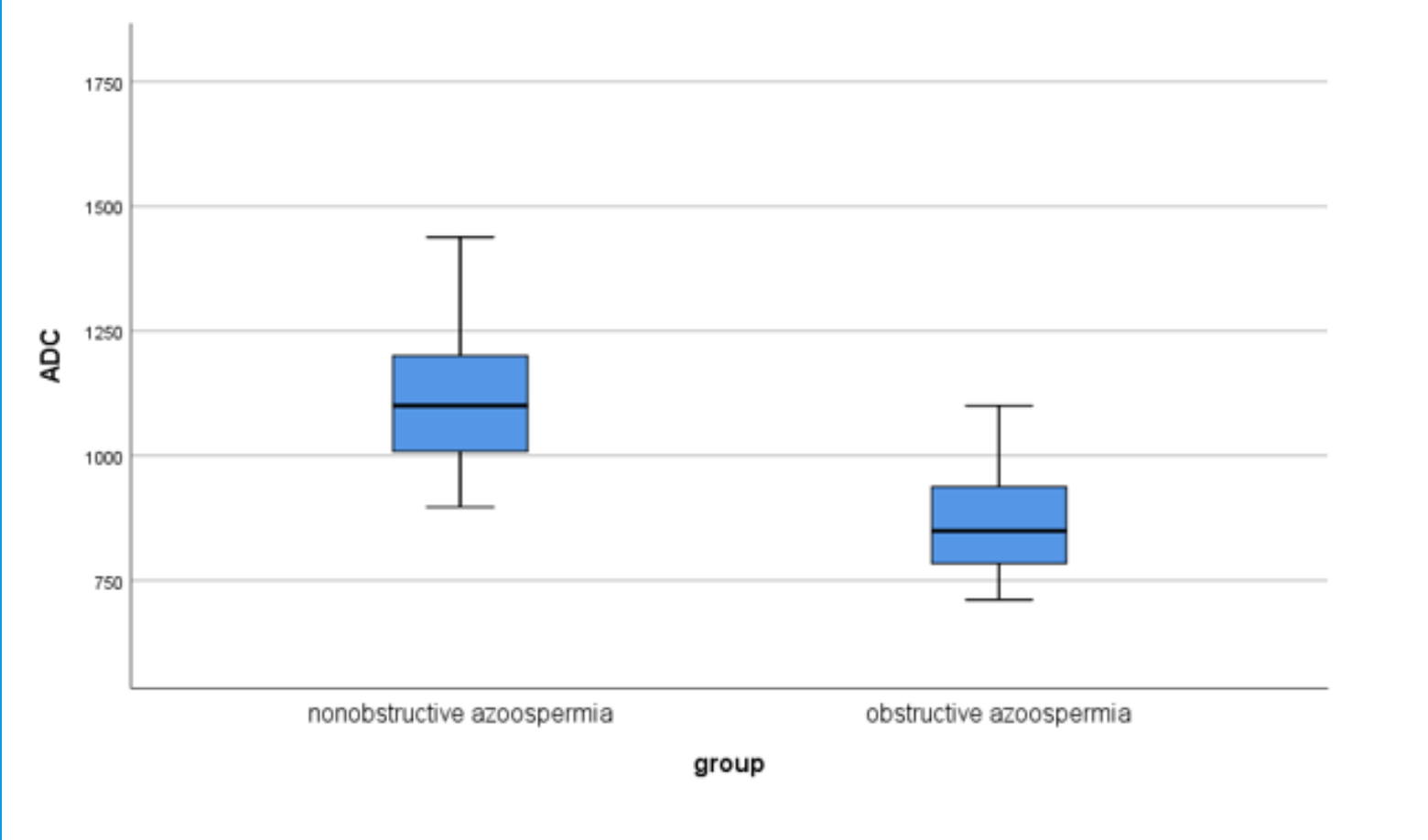
	T1 SR	T2 SR	ADC	VOLUME	AGE
OA	1.75 (0.30)	10.95 (1.42)	866 (100)	19.01 (sd 6.13)	32 (sd 6)
NOA	1.71 (0.16)	10.01 (1.77)	1119 (156)	11.88 (sd 5.49)	33 (sd 5)

Volume was significantly higher in OA group ($p < 0,001$) :



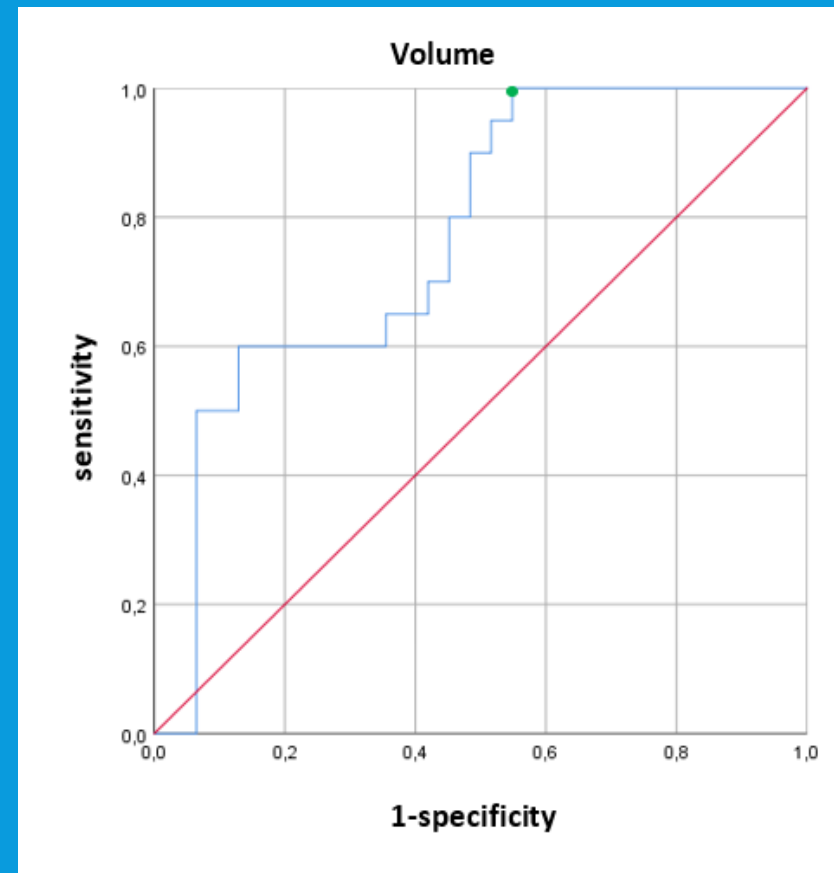
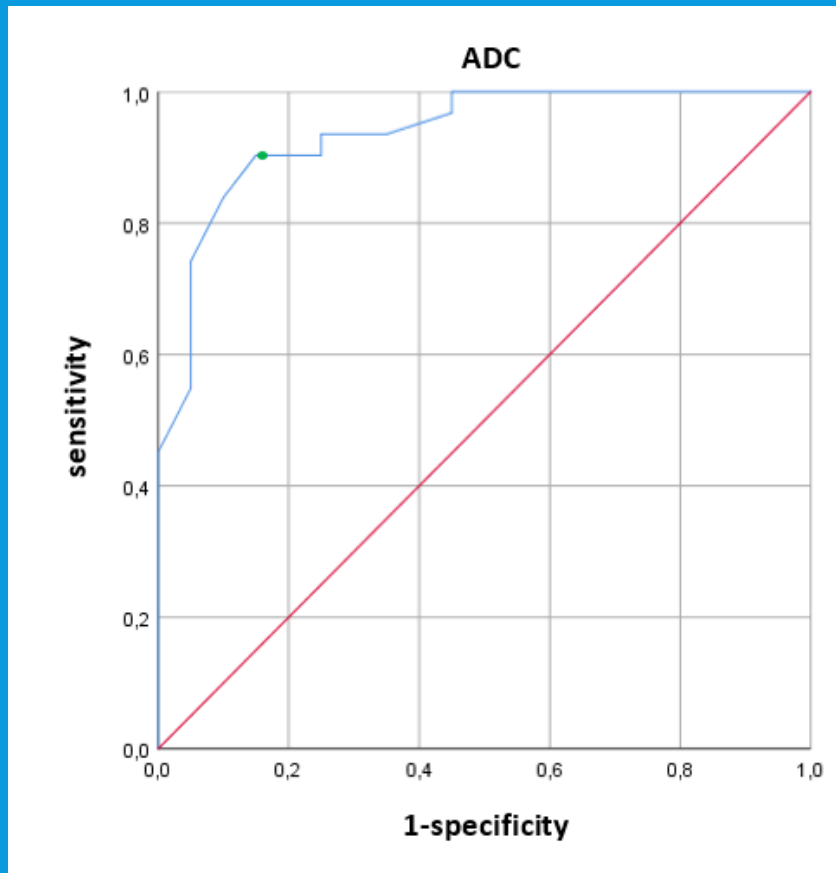
	Mean	Min	Max
OA	19.01	11.1	26.1
NOA	11.88	5.2	19.1

ADC was significantly lower in OA group ($p < 0,001$) :



	Mean	Min	Max
OA	866	711	1100
NOA	1119	897	1650

A receiver operating characteristic (ROC) curve analysis was used to determine the cutoff ADC value and cutoff testicular volume for distinguishing between OA and NOA.



Parameters	Cut-off	AUC	Sensitivity%	Specificity%
ADC	960	0,94 ←	90	85
VOLUME	10,99	0,77	100,00%	45,00%

LIMITATIONS :

- Small patient cohort
- No control group
- Scan protocol and analysis from single centre
- The etiology of NOA was not included in the statistical analysis

CONCLUSION

- Scrotal MRI is very effective in distinguishing obstructive from nonobstructive azoospermia in infertile men.
- ADC measurements exhibited better performance in distinguishing OA from NOA than volume measurements.
- ADC may be a potential indicator of spermatogenesis.



THANK YOU FOR YOUR ATTENTION



REFERENCES

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