FERTILITY OUTCOMES AND PREDICTORS FOR SUCCESSFUL SPERM RETRIEVAL AND PREGNANCY IN 327 AZOOSPERMIC MEN WITH A HISTORY OF CRYPTORCHIDISM WHO UNDERWENT MICRODISSECTION TESTICULAR SPERM EXTRACTION

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Cryptorchidism-Fertility outcomes

- Incidence: 2 to 8% of male infants
  - Unilateral:2/3, bilateral: 1/3
  - 20% in azoospermic infertile men
- Testicular sperm retrieval rate: 49.5-74%
- Cryptorchidism and risk factors that might predict sperm retrieval and pregnancy?

Virtanen et al, Acta Paediatrica 2007; Olesen et al, Fertil Steril 2017; Raman&Schlegel, J Urol 2003

Aims

- To investigate fertility outcomes of azoospermic men with a history of cryptorchidism who underwent microdissection testicular sperm extraction (mTESE).

- To investigate factors that might predict successful sperm retrieval and pregnancy in the same population.

Materials and Methods

- 327 azoospermic men with a history of cryptorchidism who underwent mTESE.
  - Retrospective review of prospectively collected data
  - Andrology units of tertiary university hospitals

- Before mTESE procedure
  - Physical examination and radiologic imaging for the localizations of the testes
  - Hormone evaluation (FSH, LH, prolactin, total testosterone and estradiol)
  - Semen analysis (WHO 2010)
  - Genetic tests (Karyotype analysis and Y chromosome microdeletion)

- Main Outcome Measures:
  - Fertility outcomes including sperm retrieval, fertilization rate, number of transferred embryos, pregnancy, miscarriage and live birth rates
  - A logistic regression analysis to investigate factors that might predict successful sperm retrieval and pregnancy.

Results

- Cryptorchidism $\Rightarrow$ unilateral: 157 (48%) and bilateral: 170 (52%)

- Orchidopexy: 273 (83.5%), no surgery related to undescended testis: 54 (16.5%)

	Mean ±standard deviation	Range
Male age (year)	34.28±7.29	19-55
Female age (year)	30.77±5.77	18-45
Right testis volume (ml)	8.07±5.29	0-20
Left testis volume (ml)	7.99±5	0-22
Total testis volume (ml)	15.87±8.21	2-40
FSH (mIU/ml)	25.26±14.65	0.9-77.5
LH (mIU/ml)	11.53±5.89	0.1-31.2
Total testosterone (ng/dl)	338.97±158.75	52-1140
Prolactin (ng/ml)	12.94±7.73	3.4-42.5
Estradiol (pg/ml)	24.6±16.49	5-130
Ejaculate volume (ml)	2.67±1.21	0.1-8

| Testis localization	# patients (%)
Scrotum	122 (37.3%)
High scrotum	41 (12.6%)
Inguinal canal or ectopic	144 (44%)
Vanishing or intrabdominal	20 (6.1%)
Total	327 (100%)

Results

- Testicular sperm retrieval: 172/327 (52.6%)

- The men with testis located in scrotum or high scrotum had significantly higher sperm retrieval rate (65.2%) than men with vanishing testis or testis located in intraabdominal and inguinal canal or ectopic position (33.6%) (p=0.000).
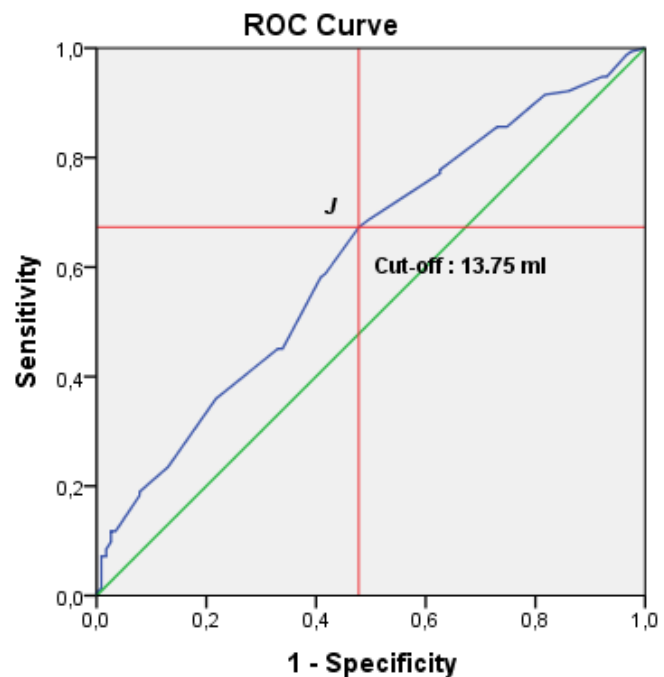
Orchidopexy age and sperm retrieval rate
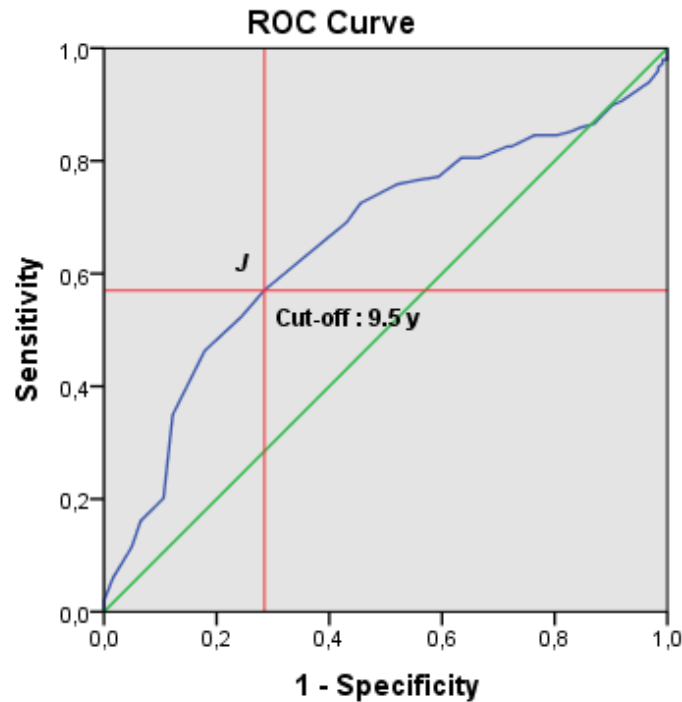
AREA UNDER THE CURVE				
Area	Std. Error	Asymptotic Sig.	Asymptotic 95% C.I.	
			Lower Bound	Upper Bound
0.657	0.033	0.000	0.592	0.723

Orchidopexy age	# Presence of sperm (%)		# Patients (%)	P value
	Negative	Positive		
>9.5 y	88 (57.9%)	64 (42.1%)	152 (100%)	0.000
<=9.5 y	35 (29.2%)	85 (70.8%)	120 (100%)	
Total	123 (45.2%)	149 (54.8%)	272 (100%)	

Total testicular volume and sperm retrieval rate

AREA UNDER THE CURVE				
Area	Std. Error	Asymptotic Sig.	Asymptotic 95% C.I.	
			Lower Bound	Upper Bound
0.617	0.034	0.001	0.550	0.685

| Total Testis Volume (ml)	# Presence of sperm (%)		# Patients (%)	P value
	Negative	Positive		
<13.75 ml	73 (54.5%)	61 (45.5%)	134 (100%)	0.001
>=13.75 ml	67 (34.7%)	126 (65.3%)	193 (100%)	
Total	140 (42.9%)	187 (57.2%)	327 (100%)	

Total testosterone level and sperm retrieval rate
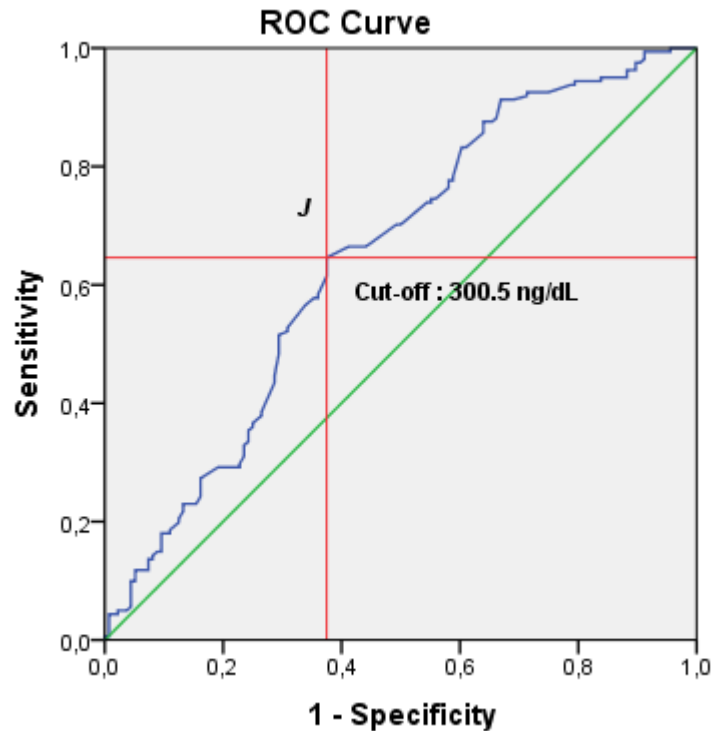
AREA UNDER THE CURVE				
Area	Std. Error	Asymptotic Sig.	Asymptotic 95% C.I.	
			Lower Bound	Upper Bound
0.645	0.032	0.000	0.582	0.708

Total testosterone level	# Presence of sperm (%)		# Patients (%)	P value
	Negative	Positive		
<300.5 ng/dl	88 (59.5%)	60 (40.5%)	148 (100%)	0.000
>=300.5 ng/dl	61 (34.1%)	118 (65.9%)	179 (100%)	
Total	149 (45.6%)	178 (54.4%)	327 (100%)	

Serum FSH level and sperm retrieval rate
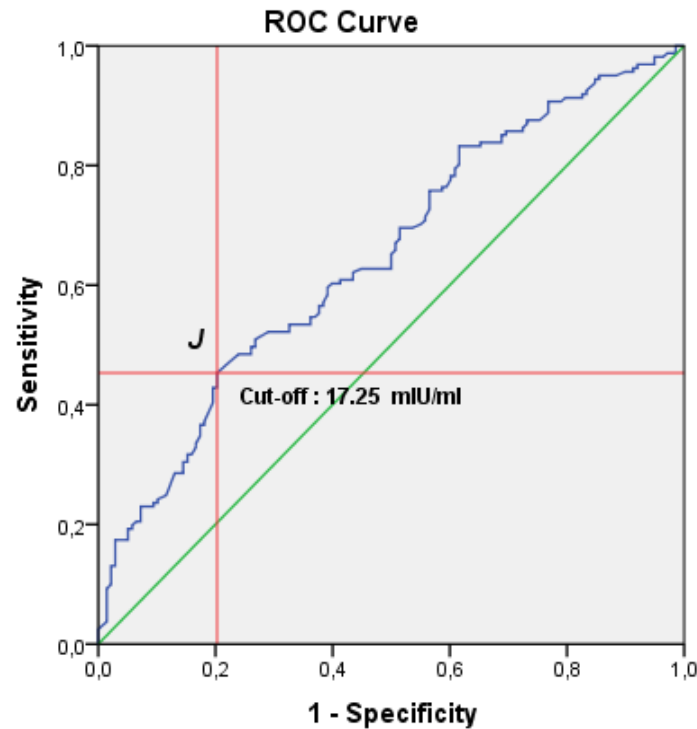
AREA UNDER THE CURVE				
Area	Std. Error	Asymptotic Sig.	Asymptotic 95% C.I.	
			Lower Bound	Upper Bound
0.647	0.032	0.000	0.585	0.709

FSH	# Presence of sperm (%)		# Patients (%)	P value
	Negative	Positive		
>17.25 mIU/ml	121 (55.7%)	96 (44.3%)	217 (100%)	0.000
<=17.25 mIU/ml	30 (27.3%)	80 (72.7%)	110 (100%)	
Total	151 (46.2%)	176 (53.8%)	327 (100.0%)	

Results-IVF outcomes

- Female partners of males who had sperm on mTESE (n: 172)
  - Mean fertilization: 55.2%±20.5
  - Mean number of metaphase II oocytes: 9.1±3.8 (1-24)
  - Mean number of transferred embryos: 1.88±0.449 (0-3).
  - Pregnancy: 53.5%
  - Live birth: 44.8%

- Logistic regression (multivariate) analysis showed that younger male (p=0.007) and female ages (p=0.003), and higher fertilization rates (p=0.000) were the parameters that might predict pregnancy.

Conclusions

- This is the largest study in the literature, investigating all parameters that might predict sperm retrieval and pregnancy in azoospermic men with a history of cryptorchidism.

- Infertile azoospermic men with a history of cryptorchidism have high sperm retrieval rate with mTESE.

- Patients who had orchidopexy at the age of ≤9.5 years, and having total testicular volumes of ≥13.75 ml with total testosterone level of >300.5 ng/dl and FSH level of ≤17.25 mIU/ml have higher success rate for sperm retrieval.

- Therefore, azoospermic patients with a history of cryptorchidism should be informed based on these findings before the mTESE procedure.