

شبكة المعلومات الجامعية







شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

# قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار في درجة حرارة من ١٥-٥٠ مئوية ورطوبة نسبية من ٢٠-٠٠% To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%



# بعض الوثائـــق الإصليــة تالفــة



# بالرسالة صفحات لم ترد بالإصل

# Outcome Of Patients Undergoing Procedures To Treat Obstructive Azoospermia

By

Alayman Hussein Fathy Hussein, MD
Assistant Lecturer in Urology,
El-Minia University

Supervised by

Professor, Mohamed Hamdy Aboul-Hasan, MD
Professor & Chairman of Urology Dept.,
El-Minia University

Professor, Mohamed Abdel-Malek Hasan, MD
Professor of Urology,
El-Minia University

Dr. Lotfy Mohamed Abdel-Kader, MD
Assistant Professor, Urology Dept.,
El-Minia University

Dr. Craig Niederberger, MD
Associate Professor of Urology,
Program Director,
Chief of Andrology Division, Urology Dept.,
University of Illinois at Chicago

Faculty of Medicine, El-Minia University 2001



TO MY FAMILY; MY PARENTS, MY BROTHERS AND MY SISTER, MY WIFE AND MY SONS.

Al-Ayman H. Fathy Hussein 2001

#### **ACKNOWLEDGMENT**

FIRST OF ALL, THANKS GOD.

I would like to express my profound gratitude to Prof. Dr. Mohamed Hamdy Aboul-Hassan, Professor and Chairman of Urology Department, Faculty of Medicine, El-Minia University for his fatherly guidance and encouragement. He provided me with the opportunity and arrangement to work in the Andrology Division, Urology Department, University of Illinois at Chicago. By his favor, this work was born and on his advices and constructive instructions it was integrated. Without his great endless support, forward steps could never be taken.

Real sense of gratitude, from my deep heart, to Prof. Dr. Mohamed Abdel-Malek Hasan, Professor of Urology, Faculty of Medicine, El-Minia University for his kind supervision and continuous encouragement. His eagerness to help and easy accessibility whenever needed for consultation is

highly appreciated.

l am very grateful and greatly indebted to Dr. Lotfy Mohamed Abdel-Kader, Assistant Professor of Urology, Faculty of Medicine, El-Minia

University for his constructive criticism, assistance and advice.

Real sense of gratitude, from my deep heart, to Prof. Dr. Craig Niederberger, MD, Associate Professor of Urology, Program Director, Chief of Andrology Division, Urology Department, University of Illinois at Chicago for his kind supervision and friendly assistance. His great efforts for final integration of the whole work are much obliged. His valuable views and fine touches are so clear in this work.

Special thanks and appreciation go to Prof. Dr. Lawrence Ross, Clarence C. Saelhof Professor and Head, the Department of Urology at the University of Illinois at Chicago, who not only has given me the opportunity to work as a fellow in his Department but also for providing all necessary facilities which have made this work possible.

I would like to extend my deep sense of gratitude to all staff members in the Department of Urology in the University of Illinois at Chicago and in El-Minia University who are always supportive.

> Al-Ayman Hussein, MD 2001

### **CONTENTS**

Cubicat	Page
Subject Introduction to male infertility and obstructive azoospermia	1
Review of Literature	4
Surgical and Functional Anatomy	6
1- Testicles	7
2- Spermatogenesis	9
3- Epididymis	20
4- Vas deferens	25
5- Ejaculatory duct	27
6- Prostate	28
7- Seminal vesicles	29 31
8- Bulbourethral glands and glands of Littre	31
9- Physiology of Ejaculation	31
Etiology of obstructive azoospermia	35
1- Anatomical obstruction	36
A) Obstruction of rete testis	36
B) Epididymal obstruction	40
C) Vasal obstruction	46
D) Ejaculatory ductal obstruction	48
2- Functional obstruction	52
A) Anejaculation	52
B) Retrograde ejaculation	56
Evaluation of patients with obstructive azoospermia	59
1- Algorithm	62
2- History	65
3- Physical examination	70
4- Semen analysis	72
5- Post-ejaculation urine analysis	81
6- Hormonal evaluation	82
7- Ultrasonography	84
8- Testicular biopsy	88
9-Vasography	97
9- Scrotal Exploration	103
Treatment of patients with obstructive azoospermia	104
1- Reconstructive treatment	105
A) Microsurgical treatment	105

Secretary of

<ul> <li>Vasovasostomy</li> </ul>	105
Vasoepididymostomy	130
B) Treatment of ejaculatory duct obstruction	139
TURED	140
• TUIED	141
Balloon Dilation	141
C) Treatment of anejaculation	145
Medical treatment	145
Vibratory stimulation	148
Electroejaculation	150
D) Treatment of retrograde ejaculation	154
Medical treatment	154
Sperm recovery from the bladder	156
Bladder neck reconstruction	157
Other procedures	158
5 <b>6.</b> p. 5.122 12	
2- Sperm Retrieval and Assisted Reproduction Technique	159
Sperm retrieval	159
1 In functional obstruction	159
Vibratory stimulation	159
Electroejaculation	160
Sperm recovery from the bladder	160
2. In anatomical obstruction	161
Microsurgical Epididymal Sperm Aspiration	161
Percutaneous Sperm Aspiration	162
Testicular Sperm Extraction	163
Sperm Banking	166 169
Sperm Processing Intrauterine Insemination	170
<u>IVF and Micromanipulation</u>	172
1- ZD 2- PZD	
3 -SUZI 4-ICSI	
Patients and Methods	179
Complete history Taking	182
Physical examination	184 185
Semen analysis Posteignulate urine analysis	185 186
Postejaculate urine analysis Hormonal evaluation	187
Transrectal ultrasonography	187
Testis biopsy and TESE	188
Vasography	189
Scrotal exploration	191

TAR	L.F.	OF	CONTENTS
1 A D		Vr.	COLLEGIAN

100,850 ·

, ,

Vegavarattamy	192
Vasovasostomy	195
Crossed trans-septal vasovasostomy	196
Epididymovasostomy	200
Vas-rete testis anastomosis	202
Transurethral resection of ejaculatory duct	202
Electroejaculation	202
Results	204
Discussion	249
	273
Summery and conclusion	280
References	
Arabic summery	317

数36

#### **TABLES**

Tables	Page
Table (1): Aetiology of anejaculation	55
Table (2): Causes of Retrograde Ejaculation	58
Table (3): Types of sperm motility	76
Table (4): WHO normal sperm parameters	79
Table (5): Normal ranges for TRUS imaging of ductal structures in men	
without obstruction	85
Table (6): Relation between the gross appearance of the vasal fluid and the	
microscopic findings	113
Table (7): Treatment of different etiologic categories in our study	181
Table (8): Age of our patients	204
Table: (9): Duration after vasectomy and failed vasectomy reversal	205
Table (10): Significant points in patients' past history	205
Table (11): Testis size in our study	207
Table (12): Hormonal evaluation in our study	208
Table (13): TESE parameters in our study	211
Table (14): The relation between the presence of vasal granuloma, gross	
appearance of vasal fluid and the presence of sperms in the vasal fluid	218
Table (15): The relation between epididymal dilation, gross appearance of	
epididymal fluid and the presence of sperms in the epididymal fluid	218
Table (16): Postoperative semen analysis parameters	219
Table (17): Postoperative semen analysis parameters and age of the patients	226
Table (18): TESE parameters and the age of the patients	227
Table (19): Postoperative semen analysis parameters and duration of	
obstruction	228
Table (20): TESE parameters and the duration of obstruction	228
Table (21): Correlation between testalgia and vas granuloma	230
Table (22): Correlation between patients' history and FSH, testis size,	
postoperative patency and sperm count	231
Table (23): Testis size and duration of obstruction	232
Table (24): Testis size and Hormones	232
Table (25): Testis size and postoperative semen parameters	233
Table (26): Testis size and postoperative TESE parameters	234
Table (27): Correlation between Hormones and postoperative semen and	
TESE parameters	240
Table (28): The relation between postoperative patency and intraoperative	
findings	246
Table (29): the relation between postoperative patency and the number of	
sutures used in anastomosis	. 246
Table (30): Complication of reconstructive procedures	247
Table (31): Late postoperative obstruction	248
Table (32): Postoperative patency after vasovasostomy in different studies	261
Table (33): Postoperative patency after epididymovasostomy in different	
studies	264

## **FIGURES**

Figures	Page
Figures Figure (1): The organs of the male reproductive system	6
Figure (2): The testis; showing the duct system of the seminiferous tubules,	
rete testis, epididymis and the vas deferens	9
Figure (3): The relationship between Sertoli cells (S) and various germ cells	10
Figure (4): Segments of the human spermatozoon	13
Figure (5): Hormonal Regulation of Spermatogenesis	15
Figure (6): Blood supply of the testis, epididymis and vas	23
Figure (7): The ampulla of the vas and the seminal vesicles in the back of the	
	25
bladder Figure (8): Union of the ampulla of the vasa and the ducts of the seminal	
	27
vesicles	38
Figure (9): Cystic dysplasia of rete testis.  Figure (10): Large ejaculatory duct cyst measuring 14 mm in transverse	
	86
diameter  The right comingl vericle is clearly dilated	86
Figure (11): The right seminal vesicle is clearly dilated	90
Figure (12): Percutaneous testicular gun biopsy	91
Figure (13): Testicular Fine Needle Aspiration	
Figure (14): Microscopic appearance of normal testis with active	95
spermatogenesis	96
Figure (15): Maturation arrest at spermatid stage	96
Figure (16): Atrophic testis	
Figure (17): The abdominal end of the vas is cannulated with a 24- gauge	98
angiocath	
Figure (18): Normal vasogram with Foley' catheter pulled against the bladder	98
neck	99
Figure (19): Ejaculatory duct obstruction	
Figure (20): Visualization of both vasa after injection of dye in the left side	99
only	
Figure (21): Congenital unilateral partial agenesis of the vas deferens. The	100
control of a series of the ser	100
Figure (22): Inquinal obstruction of the vas after prior nernia repair	
Figure (23): shows the epididymis dilated above the arrows and collapsed	106
below the arrows	
Figure (24): High vertical scrotal incisions for vasovasostomy allow for	109
unward extension for exploration of the inguinal vas	110
Figure (25): The convoluted vas is dissected freeing it from its attachment	116
Figure (26): Two layer vasovasostomy	110
Figure (27): The modified method of mucosal suturing that is used by	117
Arnold M Belker to overcome the dog-eared folds of mucosa	117
Figure (28): microdot technique of precision suture placement	117

T' (OO) M. Jifed one layer vasovasostomy	119
Figure (29): Modified one layer vasovasostomy	123
Figure (30): Trans-septal crossed vasovasostomy	123
Figure (31): Testicular transposition Figure (32): The abdominal end of the vas is cannulated with a 24- gauge	
•	133
angiocath	135
Figure (33): end-to-end epididymovasostomy	136
Figure (34): Side-to-end epididymovasostomy	148
Figure (35): Penile vibratory stimulation	151
Figure (36): Electroejaculation apparatus Figure (37): The three most commonly used micro -fertilization techniques:	
	173
PZD, SUZI, ICSI	183
Figure (38): Male fertility questionnaire used in our study Figure (39): Testis biopsy; testis tissue incised with curved Tenotomy scissor	189
Figure (39): Testis biopsy, testis tissue incisca with our vocal visiting in the large state of the large st	189
Figure (40): Microsurgical TESE; wide incision Figure (41): Microsurgical dissection of the seminiferous tubules	189
Figure (41): Microsurgical dissection of the sentimerous deserving	190
Figure (42): Microsurgical dissection of the vas deferens	190
Figure (43): micro-knife hemi-transection of the vas	191
Figure (44): Dilation of the vasal lumen	191
Figure (45): Insertion of angiocatheter sheath into the vas  Figure (46): The vas dissected away from the remaining connective tissue	192
Figure (46): The vas dissected away from the remaining companied to the Figure (47): Goldstein Microspike vasal approximator clamp applied to the	
T	193
vas Figure (48): Placement of 2 posterior seromuscular sutures	194
Figure (48): Placement of inner sutures	194
Figure (49): Placement of inner sutures Figure (50): Placement of the remaining outer suture	194
Figure (50): Placement of the remaining outer status.  Figure (51): Making a window in the scrotal septum to pass the right vas to	
Figure (51): Waking a window in the serotal september 1	196
the left scrotal compartment Figure (52): Dilated epididymal tubule seen in opened tunica	197
Figure (53): Outer layer sutures of the epididymovasostomy	198
rimus (64). Inner layer sutures of the enididymovasosiomy	198
Figure (54). Timer layer sutures of the epididymovasostomy	199
Figure (56): Seager/NRH Model 14 Electroejaculator	203
Figure (57): Percentage of primary and secondary infertility in our study	204
Figure (58): Type of ejaculation in our study	205
Figure (59): Percentage of testalgia in our study	206
Figure (60): Examination of the vas deferens in our study	206
Figure (61): Examination of the epididymis in our study	207
Figure (62): TRUS findings in our study	208
Figure (63): Semen Fructose in our study	209
Figure (64): Testis biopsy in our study	209
Figure (65): Diagnostic categories of our cases	210
Figure (56): Treatment procedures taken for our cases	211
Gioura (67): TESE in our study	212
Figure (68): TESE sperm concentration in different diagnostic categories	213
ringer (60): TESE sperm viability in different diagnostic categories	213
Figure (70): TESE sperm normal forms in different diagnostic categories	214

may constant to the constant of the constant o	215
Figure (71): Exploration of the vas deferens	215
Figure (72): Gross appearance of the vasal fluid	216
Figure (73): Exploration of the epididymis	216
Figure (74): Gross appearance of the epididymal fluid	217
Figure (75): Detection of sperms in vasal and epididymal fluid	219
Figure (76): Epididymal blowout and vasectomy interval	220
Figure (77): Postoperative patency	220
Figure (78): Postoperative sperm concentration in different diagnostic	221
categories	221
Figure (79): Postoperative sperm motility in different diagnostic categories	
Figure (80). Postoperative total motile count in different diagnostic categories	222
Figure (81): Postoperative sperm abnormal forms in different diagnostic	202
categories	222
Figure (82): Postoperative sperm concentration after different treatment	
procedures	223
Figure (83): Postoperative sperm motility after different treatment procedures	224
Figure (84): Postoperative total motile count after different treatment	
procedures	224
Figure (85): Postoperative sperm morphology after different treatment	
procedures	225
Figure (86): Postoperative patency and age of the patients	226
Figure (87): Postoperative Patency and duration of obstruction	227
Figure (88): Duration of obstruction and TESE sperm concentration	229
Figure (89): Relation between testalgia and vasectomy interval and	
vasectomy reversal interval	230
Figure (90): Testalgia and postoperative patency	230
Figure (91): Testalgia and postoperative sperm count	23 I
Figure (92): Presence of granuloma and segment out of the vas and	
postoperative patency	234
Figure (93): Vasal granuloma and segment out and postoperative sperm	
concentration	235
Figure (94): The presence of granuloma and segment out of the vas and	
Figure (94). The presence of grandionia and segment an	235
postoperative sperm motility Figure (95): The presence of granuloma and segment out of the vas and TESE	
Figure (95): The presence of grandionia and segment out of the variable	236
sperm concentration Figure (96): The presence of granuloma segment out of the vas and TESE	
	236
sperm viability	237
Figure (97): Epididymal examination and postoperative patency	
Figure (98): Examination of the epididymis and postoperative sperm	237
concentration	238
Figure (99): Epididymis in examination and postoperative sperm motility	238
Figure (100): TESE sperm concentration and the epididymis in examination	239
Figure (101): TESE sperm viability and epididymis in examination	24
Figure (102): Postoperative sperm concentration and level of testosterone	
Figure (103): Postoperative sperm motility, TMC and morphology and	24
Testosterone	- 1