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DIAGNOSTIC VALUE OF TRANSRECTAL ULTRASONOGRAPHY IN MALE INFERTILITY

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ABSTRACT

Thirty infertile men were selected for this study. Their ages ranged from 22–45 years. They were either azoospermic with low semen volume (less than 1.5ml), azoospermic with normal semen volume or severe oligospermic men. The patients were subjected to history taking, general medical & genital examinations and semen analysis. For azoospermic men, post-ejaculate urine analysis (for exclusion of retrograde ejaculation), serum FSH and testicular biopsy by open surgical technique were done. Transrectal ultrasonography (TRUS) was done for all patients using transrectal endfire probe with high frequency (6.5 MHz).

Results of serum FSH levels. In azospermic patients were normal in 12 patients (54.6%), elevated but less

than 3 folds of normal levels (<3X) in 5 patients (22.7%) and highly elevated (> 3X) in 5 patients (22.7%). Results of testicular biopsy in these patients revealed; normal spermatogenesis in 6 patients (27.2%), arrest at primary spermatocyte in 4 patients (18.2%), arrest at spermatid in 3 patients (13.6%), Sertoli cell only synd. in 4 patients (18.2%), mixed Sertoli cell in 3 patients (13.6%), hypospermatogenesis in one patient (4.6%) and tubular hyalinization in one patients (4.6%).

Results of TRUS revealed; congenital bilateral absent vas in 3 cases (10%), unilateral absent vas in 1 case (3.3%), bilateral vasal hypoplasia in 1 case (3.3%), congenital cyst of the distal duct system in 3 cases (10%), acquired cystic dilatation of the semi-

nal vesicle in 1 case (3.3%), and finding suggesting prostatitis and/or seminal vesiculitis in 14 cases (46.7%). The remaining 7 cases (23.4%) showed no abnormalities on TRUS examination.

In conclusion, TRUS is an ideal method for evaluation of infertile men specially those with azoospermia, low semen volume or severe oligospermia. It helps to identify abnormalities in a high percentage of such patients.

INTRODUCTION

Although most couples achieve conception within one year after marriage, approximately 15% of couple are unable to do so. About 20% of these cases are entirely due to male factor and additional 30% of cases involve both male and female (1).

Adequate management of male infertility depends on the accurate identification and diagnosis of the causative condition. Obstructive processes involving the sperm transport system at any level of the proximal or distal duct system are not uncommon. The clinical evaluation of male infertility was limited until recently by the inability to directly and non invasively visualize the distal parts of the vas defer-

ens, seminal vesicles, ejaculatory ducts and prostate (2).

Different imaging studies are used to visualize the male genital duct system. These include CT, MR imaging and vasography. Vasography has always been regarded as the best method for imaging these structures but it is an invasive technique and may lead to iatrogenic scarring and obstruction of the vas deferens. MR imaging with endorectal coil can be used to demonstrate the distal duct system, but its use is limited by high cost and less availability (3). CT imaging has not been to be helpful due poor visualization of the distal duct system (2).

Transrectal ultrasound is now considered the initial diagnostic modality of the distal duct system (4). Because of its lower cost, wider availability and excellent visualization of the distal parts of the vas deferens, seminal vesicles, ejaculatory ducts and prostate, Transrectal ultrasound is an important diagnostic tool in the evaluation of the infertile men (5)

The aim of the present study is to assess the value of transrectal ultrasound in the diagnosis of different le-

sions in the distal male duct system including congenital anomalies and potentially obstructive conditions which may be responsible for male infertility.

SUBJECTS AND METHODS

The present study comprised thirty infertile men attending the Outpatient Andrology Clinic of Mansoura University Hospital. We tried to select infertile men with possible obstructive lesions of the distal duct systems i.e azoospermic patients, severe oligospermic patients (sperm count less than 2 milion/ml) or those with low semen volume (less than 1.5 ml). All of them were subjected to the following:

- Thorough history taking.
- Clinical examination of the genital organ with stress on testicular size and palpation of the vas deferens.
- Semen analysis for volume, PH, sperm density, motility and morphology
- For azoospermic men we did post ejaculate urine analysis for exclusion of retrograde ejaculation, serum FSH, and testicular biopsy by open surgical technique.
- Transabdominal ultrasound was performed to evaluate the upper urinary tract including both kidneys, and lower genital tract to overview the

prostate, seminal vesicle and testicles. Abdominal ultrasound was done with the sector probe 3.5 MHz of the medison, sono-Ace 8800 Digital Gia.

- Transrectal ultrasound (TRUS) examination was done by the transrectal probe 6.5 MHz, of the medison, sono-Ace 8800 Digital Gia. The patients were placed in the left lateral decubitus position after being prepared by a cleansing enema one hour prior to examination. The high frequency transrectal transducer probe was covered by a condom sheath as a cover, then inserted into the rectum and images were obtained for the prostate, seminal vesicles, distal part of the vas deferens and ejaculatory ducts in the sagital and coronal planes. The size and echogenic pattern of these structures were carefully documented.

RESULTS

Thirty infertile men with their ages ranged from 22 to 45 years old were classified according to results of semen analysis into 3 groups:-

- Group I : 10 azoospermic patients with low semen volume (< 1.5 ml)
- Group II:12 azoospermic patients with normal semen volume(>1.5 ml)
- Group III : 8 oligospermic patients.

Table (1) showed ages and duration of infertility in the three groups of patients. In azospermic patients serum FSH levels were normal in 12 patients (54.6%), elevated but less than 3 folds of normal levels (<3X) in 5 patients (22.7%) and highly elevated (> 3X) in 5 patients (22.7%) Results of testicular biopsy in these patients revealed; normal spermatogenesis in 6 patients (27.2%), arrest at primary spermatocyte in 4 patients (18.2%), arrest at spermatid in 3 patients (13.6%), Sertoli cell only synd. In 4 patients (18.2%), mixed Sertoli cell in 3 patients (13.6%), hypospermatogenesis in one patient (4.6%) and tubular hyalinization in one patients (4.6%).

Results of TRUS revealed; congenital bilateral absent vas in 3 cases (10%), unilateral absent vas in 1 case (3.3%), bilateral vasal hypoplasia in 1 case (3.3%), congenital cyst of the distal duct system in 3 cases (10%),

acquired cystic dilatation of the seminal vesicle in 1 cases (3.3%), and finding suggesting prostatitis and/or seminal vesiculitis in 14 cases (46.7%). The remaining 7 cases (23.4%) showed no abnormalities on TRUS examination (table-2). Table (3) showed vasal abnormalities, while table (4) showed seminal vesicle abnormalities in the three groups of patients.

As regards cystic changes, 4 patients (13.3%) showed cysts of the distal duct; prostatic cyst in 2 cases (6.7%), ejaculatory duct cyst in one case (3.3%) and acquired cystic dilatation of the seminal vesicle in one case (3.3%) (table-5).

TRUS finding of accessory sex gland infection revealed; prostatitis in 5 cases (16.7%), seminal vesiculitis in one case (3.3%) and combined prostatitis and seminal vesiculitis in 8 cases (26.7%) (table-6).

Table (1): Clinical and laboratory findings of infertile men:-

	Group I	Group II	Group III
<i>Number</i>	10	12	8
<i>Age (years)</i>	33.4 ± 9.2	35.2 ± 10.3	36.3 ± 9.5
<i>Duration (years)</i>	3.45 ± 2.25	4.20 ± 2.62	3.85 ± 2.40
<u><i>FSH levels:</i></u>			
- Normal	5 (50%)	7 (58.3%)	
- Elevated (< 3X)	2 (20%)	3 (25.0%)	
- Highly elevated (>3X)	3 (30%)	2 (16.7%)	
<u><i>Testicular biopsy findings:</i></u>			
- Normal spermatogenesis	2 (20%)	4 (33.3%)	
- Arrest at 1ry spermatocyte	2 (20%)	2 (16.7%)	
- Arrest at spermatid	1 (10%)	2 (16.7%)	
- Sertoli cell only synd.	2 (20%)	2 (16.7%)	
- Mixed Sertoli cell	2 (20%)	1 (8.3%)	
- Hypospermatogenesis	0 (0%)	1 (8.3%)	
- Tubular hyalinization	1 (10%)	0 (0%)	

Table(2): Findings of transrectal ultrasound (TRUS) in infertile men:

TRUS findings	No.	%
Bilateral absent vas	3	10
Unilateral absent vas	1	3.3
Bilateral vasal hypoplasia	1	3.3
Cong. Cyst of the distal duct sys.	3	10
Acq. Cystic dil. of the seminal ves.	1	3.3
Prostatitis and/or seminal vesiculitis	14	46.7
Normal	7	23.4
Total	30	100

Table (3) : Vasal abnormalities in the three groups of infertile men:

<i>Vasal TRUS</i>	<i>Group I</i>		<i>Group II</i>		<i>Group III</i>		<i>Total</i>	
	No.	%	No.	%	No.	%	No.	%
Bilateral absent	3	30	-	-	-	-	3	10
Unilateral absent	-	-	1	8.3	-	-	1	3.3
Bil. Vassl hypoplasia	-	-	1	8.3	-	-	1	3.3
Normal	7	70	10	83.4	8	100	25	83.4
Total	10	100	12	100	8	100	30	100

Table (4) : Seminal vesicle abnormalities in the three groups of infertile men:

<i>S.V. TRUS</i>	<i>Group I</i>		<i>Group II</i>		<i>Group III</i>		<i>Total</i>	
	No.	%	No.	%	No.	%	No.	%
Congenital hypoplasia	3	30	-	-	-	-	3	10
Unilateral absent	-	-	2	16.6	-	-	2	6.6
Normal	7	70	10	83.4	8	100	25	83.4
Total	10	100	12	100	8	100	30	100

Table (5) : Location of different cysts in the three groups of patients:

<i>Cystic dil. Of Duct system</i>	<i>Group I</i>		<i>Group II</i>		<i>Group III</i>		<i>Total</i>	
	No.	%	No.	%	No.	%	No.	%
Prostatic cyst	-	-	-	-	2	25	2	6.7
Ejaculatory duct cyst	1	10	-	-	-	-	1	3.3
Acq. cystic dil. Of S. V.	1	10	-	-	-	-	1	3.3
Normal	8	80	12	100	6	75	26	86.7
Total	10	100	12	100	8	100	30	100

Table (6) : Inflammation of the prostate and/or seminal vesicles in the three groups of infertile men:

<i>Infections</i>	<i>Group I</i>		<i>Group II</i>		<i>Group III</i>		<i>Total</i>	
	No.	%	No.	%	No.	%	No.	%
Prostatitis	2	20	2	16.6	1	12.5	5	16.7
S. vesiculitis	-	-	-	-	1	12.5	1	3.3
Prostatitis & S. vesiculitis	2	20	4	33.3	2	25	8	26.7
Total	4	40	6	50	4	50	14	46.7

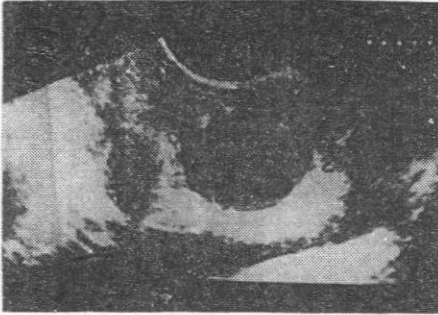


Fig. (1): Medium sized cyst (measuring about 2 cm) in the middle zone of the prostate.

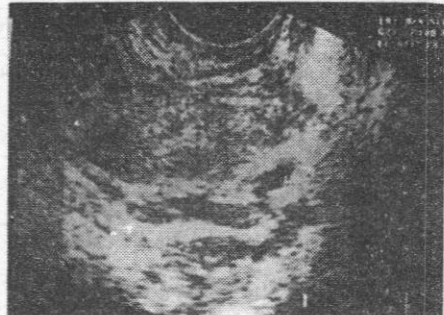


Fig. (3): Absent right seminal vesicle and vas. The left seminal vesicle is atrophied (0.98 x 0.35 cm) with areas of calcification.

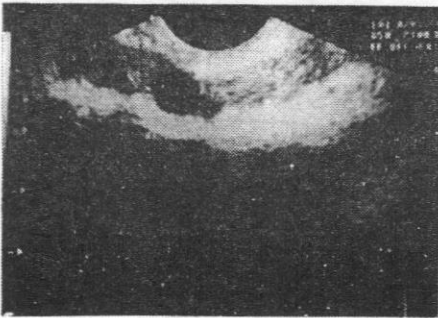


Fig. (2): Small sized cyst (measuring about 6.3 mm) at the periphery of the prostate to the right with dilatation of the right vas behind.

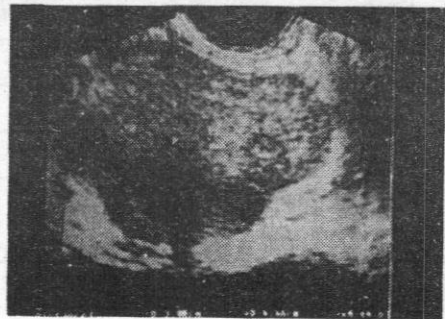


Fig. (4): Oedematous prostate (3 x 4.5 x 5.5cm) with mild echogenicity and irregular outlines.

DISCUSSION

Patients with demonstrable distal ductal abnormalities represent only a small fraction (1 – 2%) of all men who come to medical advise because of infertility (1 & 6). It is crucial however to identify this group of patients because most of these condition are potentially correctable and to avoid further unnecessary investigations and intervention in these patients(7). In the absence of retrograde ejaculation, neurological dysfunction or diabetes mellitus, patients with azoospermia and low ejaculate volume should be examined for congenital defects or obstructive disorders of the distal genital tract (8 & 9).

In the present study congenital anomalies of the vas deferens were found in 5 cases (16.7%) of the examined patients ranged from the complete unilateral or bilateral absence of the vas deferens to vasal hypoplasia. The prevalence of vasal agenesis in our patients is consistent with that reported by other investigators who had documented vasal agenesis in 4.4% - 17% of azoospermic men (10 & 11).

In our study, patients with vasal agenesis were almost always associated with seminal vesicle abnormali-

ties. This complex association can be explained by the communal embryological derivation of the distal two-thirds of the epididymis, vas deferens, seminal vesicle and ejaculatory ducts from the mesonephric duct (12).

Although cysts of the distal duct system are rare, they are most commonly identified on TRUS scanning. Midline cysts without spermatozoa are utricular cyst and considered embryologic remnants of an incompletely regressed Mullerian duct cyst. Cysts containing sperms are of Wolfian duct origin and known as ejaculatory duct cysts. Midline prostatic cysts are usually congenital, but more peripherally located degenerative prostatic cysts rarely reach sufficient size to compress the adjacent ejaculatory ducts and rarely cause infertility (13). Seminal vesicle cysts are rare and frequently associated with renal anomalies including ipsilateral renal dysgenesis, duplication of renal collecting system or ectopic location of the kidney (14).

In this work, 4 patients (13.3%) were found to have cysts of the distal duct system on TRUS examination, two were of midline prostatic cyst, one at the periphery of the prostate which

is appeared to be of ejaculatory duct origin and the last one is a seminal duct cyst which is classified as an acquired cystic dilatation of the seminal vesicle due to absence of associated congenital anomalies of the ipsilateral kidney. It is most probably due to previous infection and fibrosis.

In this study, 14 patients had inflamed accessory sex glands i.e. prostaticitis and/or seminal vesiculitis. Inflammatory condition of the prostate and seminal vesicles are usually diagnosed by clinical symptomatology and physical examination. Imaging studies are often complementary. In acute prostaticitis, the gland is edematous and diffusely enlarged. In chronic prostaticitis, however, it is either diffusely or focally involved⁽¹⁵⁾. Seminal vesiculitis is usually associated with prostaticitis. Inflammation of seminal vesicles in the absence of prostaticitis is unusual, although it can occur⁽¹⁶⁾. This agreed with our results where 5 cases showed prostaticitis, 8 cases showed combined prostaticitis and seminal vesiculitis and only one case showed seminal vesiculitis.

The inflammatory process by itself i.e. the effect of bacterial infection and

change in the pH of the semen or the sequela of infection as obstruction by fibrosis or calcification can lead to infertility.

Results of testicular biopsy in azoospermic patients of the present study revealed; normal spermatogenesis in (27.2%), maturation arrest (31.8%), Sertoli cell only syndrome in (18.2%), mixed Sertoli cell in (13.6%), hypospermatogenesis in (4.6%) and tubular hyalinization in (4.6%). These results are in agreement with El-Domyati and El-Manawaty⁽¹⁷⁾ who found that the main testicular pattern in azoospermic patients was normal spermatogenesis in (28%), maturation arrest (42%), Sertoli cell only synd. In (16%), mixed Sertoli cell in (8%) and tubular hyalinization in (6%).

In general, distal ductal anomalies can be classified as surgically correctable, or non surgically correctable depending on the location of obstruction or occlusion. Surgically correctable causes are confined to lesions involving the distal 2/3 of the ejaculatory ducts, including the ejaculatory duct cysts, calculi, fibrosis and calcification. Agenesis, obstruction or occlusion of the duct system above this level are surgically uncorrectable and

treatment of such cases could be achieved by epididymal aspiration followed by IVF or ICSIs (18).

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القيمة التشخيصية لأشعة الموجات فوق الصوتية عن طريق المستقيم فى حالات العقم عند الرجال

د. أحمد عبد الحبير ، أ.د. مجدى الرخاوى

د. راضى ورده ، د. حمزه بركات

من أقسام الأمراض الجلدية والتناسلية والأشعة التشخيصية - كلية طب المنصورة

أجريت هذه الدراسة على ثلاثين رجلاً يعانون من عدم القدره على الانجاب تراوحت أعمارهم من ٢٢ - ٤٥ عاماً وقد تم تصنيف المرضى حسب نتيجة تحليل السائل المنوى الى مجموعات ثلاثه .

١- المجموعه الأولى وتشمل المرضى عديمى الحيوانات المنويه مع قله حجم السائل المنوى بقيمه أقل من ١.٥ سنتيمتر مكعب (١٠ مرضى)

٢- المجموعه الثانيه تشمل المرضى عديمى الحيوانات المنويه وحجم السائل طبيعياً (١٢ مريض).

٣- المجموعه الثالثه فقد شملت المرضى قليلى عدد الحيوانات المنويه بقيمه أقل من ٢ مليون لكل سم (٨ مرضى)

وقد تم أخذ التاريخ المرضى لكل حاله مع الفحص الاكلينيكي وعمل تحليل سائل منوى وبالنسبه للمرضى عديمى الحيوانات المنويه فى السائل المنوى فقد تم عمل تحليل بول بعد الجماع وتحليل الهرمون المنشط للحويصلات فى الدم (إف.إس.إتش) وكذلك تم أخذ عينه من الخصيه لهؤلاء المرضى. وقد اجريت للمرضى جميعاً أشعة موجات فوق صوتيه من خلال المستقيم وقد جاءت نتائج الفحص بالموجات فوق الصوتية من خلال المستقيم على النحو التالى:

- خمسہ رجال يعانون من عيوب خلقية فى تكوين القناه الدافقه مثل عدم وجودها على الجانبين أو جانب واحد .

- أربعة رجال يعانون من وجود تكيسات خلقية أو مكتسبه سواء فى البروستات أو الحويصلات المنويه.

- أربعة عشر حاله بها التهابات بالبروستات أو الحويصلات المنويه أو كلاهما .

- سبعة حالات لم نجد بها تغيرات تزكر

مما سبق نجد أن الموجات فوق الصوتيه عن طريق المستقيم لها قيمه تشخيصيه هامه فى حالات العقم عند الرجال خصوصاً فى حاله انعدام الحيوانات المنويه أو قله حجم السائل المنوى حيث يمكن تحديد سبب المشكله فى نسبة كبيره من الحالات .

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