doi: 10.13241/j.cnki.pmb.2014.33.032

睾丸彩色多普勒超声在男性不育症中的临床价值

叶 攀 宋 巍 张婷婷 胡海涛 徐明松

（安徽省淮北市中医医院超声科 安徽 淮北 235000）

摘要 目的:研究睾丸彩色多普勒超声(Color Doppler ultrasound,CDU)在男性不育症(Male infertility,MI)中的临床价值。**方法:**从2012年3月到2013年3月,选择56例于我院就诊的疑似MI患者作为研究对象。全部患者均予以CDU诊断,分析所得诊断结果。另根据精索静脉曲张(Cirsocele,CIR)情况进行分组,分成亚临床型CIR组(Sub-clinical Cirsocele,SCIR)(8例)与临床型CIR组(Clinical Cirsocele,CCIR)(16例),显示出两组患者的睾丸和附睾、精索静脉、睾丸内动脉(ITA)、睾丸包膜动脉(CA);分析其收缩期峰值血流速度(PSV)、舒张末期血流速度(EDV)、阻力指数(RI)与男性不孕症精液质量及与精子数量的相关性。**结果:**56例受检者中,共计37例检出异常,占比66.07%,CCIR组的精索静脉最大内径(DR)、瓦氏试验最大内径(DV)、最大Vmax及返流的持续时间(TR)水平均显著高于SCIR组,差异均有统计学意义(均P<0.05)。根据Spearman法进行分析后发现男性不孕症精液质量及与精子数量与睾丸动脉(TA)、CA、PSV、EDV均呈正相关,与RI呈负相关;ITA、PSV、EDV与男性不孕症精液质量及与精子数量均呈负相关,与RI均呈正相关;此外,睾丸内动脉数量越多,精子数量越少。**结论:**CDU对MI疾病的诊断价值较高,结果较为准确,值得临床诊断推荐。

关键词:睾丸;彩色多普勒超声;男性;不孕症;临床价值

中图分类号:R455.1;R698.2 **文献标识码:**A **文章编号:**1673-6273(2014)33-6520-03

The Clinical Value of Color Doppler Ultrasound for Male Infertility

YE Pan, SONG Wei, ZHANG Ting-ting, HU Hai-tao, XU Ming-song

(Depertment of Ultrasonography,Huaibei traditional Chinese Medicine Hospital of Anhui Province, Huaibei, Anhui, 235000, China)

ABSTRACT Objective: To study the clinical value of color doppler ultrasound (CDU) for male infertility (MI). **Methods:** 56 cases of patients with suspected MI in our hospital administered from March 2012 to March 2013 were selected as research subjects. All patients were given CDU for diagnosis, the diagnosis resulting were analysed. Patients were divided into SCIR group (8 cases) and CCIR group (16 cases) according to CIR results. The testis and epididymis ,spermatic vein, ITA, CA and TA of the two groups of patients were showed, and the relevance between its PSV, EDV, RI and sperm count and semen quality of the male infertility were analyzed. **Results:** In 56 cases of subjects, a total of 37 cases detected presented the result of anomalies, accounting for 66.07% .The Spermatic vein maximum internal diameter (DR), Valsalva test maximum internal diameter (DV), the maximum duration of Vmax and regurgitation (TR) of CCIR group were significantly higher than those of the SCIR group, the differences were statistically significant (P<0.05). According to the Spearman method analysis, semen quality and sperm count of the male infertility were positively correlated with TA and CA, PSV, EDV and negatively correlated with RI. The ITA, PSV, EDV were negatively correlated with male infertility and semen quality and quantity of sperm, and positively correlated with RI. In addition, the greater the number of testicular artery is, the less sperms count. **Conclusion:** CDU has higher value in the diagnosis of diseases of MI,and the results are more accurate, which is worthy of clinical diagnosis and recommendation.

Key words: Testicles; Color doppler ultrasound; Males; Infertility; Clinical value

Chinese Library Classification(CLC): R445.1; R698.2 Document code: A

Article ID: 1673-6273(2014)33-6520-03

前言

男性不育症(Male infertility,MI)的病因通常较为复杂,既可能包含先天因素,如隐睾和睾丸的发育不良等,又可能含泌尿生殖道的感染,如睾丸附睾炎等,还可能和精索静脉曲张(Cirsocele,CIR)有关[1]。据统计,国外男性人群发生原发性不育的比例约为35%,而继发性不育者为75%,对育龄男性造成较为严重的影响[2]。近年来,国外有报道表明,由CIR导致的MI所占比例较大,已成为主要致病原因之一[3]。由于CIR多发于青壮年,在近年来于我国的发病率亦不断上升,因此及时进行临床诊断十分必要。以往在临床,常通过触诊或精索静脉的造影技术等方式对MI疾病进行诊断,但效果并不十分显著,甚至可能造成创伤,鉴于此,本文通过以彩色多普勒超声(Color Doppler ultrasound,CDU)对MI患者进行诊断和分析,得到了一些结论,现报道如下。

1 资料和方法

作者简介:叶攀(1970-),女,本科,副主任医师,从事高频超声在浅表组织的应用方面的研究,E-mail: 2594108089@qq.com

(收稿日期:2014-03-10 接受日期:2014-04-08)

1.1 临床资料

从 2012 年 3 月到 2013 年 3 月，选择 56 例于我院就诊的疑似 MI 患者作为研究对象。年龄在 25 至 47 岁间，平均年龄为 32.7±5.2 岁。患者经精液分析均显示有精子活力有程度各异的下降和密度降低，及精子的形态异常等相关症状。纳入标准：(1)全部患者均在婚后经历夫妻正常性生活大于 1 年而未应用避孕措施者。(2)患者均为初次就诊。(3)同意进行超声诊断者。排除标准：(1)女方不孕者；(2)有其他类似疾病史。

1.2 研究方法

全部患者均于光线充足及室温下将外生殖器予以暴露，医务人员对其阴囊形态进行观察，触诊精索和阴囊内容物。而后评估睾丸和附睾位置及大小，以及质地。并在患者站立位及瓦氏(Valsalva)试验时视诊及触诊其双侧精索区。而后通过 CDU 进行诊断，探头频率设置为 7.5MHz，取患者的平卧位，将探头放置于其阴囊皮肤的上方，在阴囊双侧分别实施纵向及横向扫查，从而显示出睾丸和附睾、精索静脉；睾丸内动脉(ITA)、睾丸包膜动脉(CA)和睾丸动脉(TA)，分析其峰值血流速度(TAMX)、收缩期峰值血流速度(PSV)、舒张末期血流速度(EDV)、阻力指数(RI)与男性不孕症精液质量及与精子数量的相关性。

1.3 诊断标准

(1)精索静脉曲张(Cirsocele，CIR)诊断标准：在静态下可自精索静脉丛内检测到一支以上精索静脉的内径大于 2 mm；亦或是患者行瓦式试验后，对血管内径进行测量，其中最大的血管内径显著增加；依照多普勒超声的血流变化信号，发现有≥ 2 个静脉发生扭曲扩张，或者是精索静脉丛内血管反流的持续时间＞1s，及瓦氏试验显示反流量上升[4]。(2)睾丸微石症(Testicular microlithiasis，TM)诊断标准[5]：各切面均可发现≥ 5 个直径＜3mm 点状回声，且后方并无声影。同时点状回声亦相对独立，较为弥散的分布在睾丸实质内。(3)其他类似附睾囊肿(Epididymal cyst，EC)和睾丸囊肿(Testicle cyst，TC)及鞘膜积液(Hydrocele testis，HT)等症状均参考有关文献进行判定[6]。精子活力分级：a 级为精子活动情况极好，以快速直线朝前运动；b 级为精子活动情况很好，直线朝前运动；c 级为精子活动情况一般，向前作曲线运动；d 级为精子活动情况差，仅在原地蠕动。

1.4 统计学方法

采用 SPSS13.0 统计软件分析，数据比较采用 x^2 检验，计量数据以($\bar{x}\pm s$)表示，实施 t 检验。以 Spearman 法进行相关性分析，P<0.05 为差异有统计学意义。

2 结果

2.1 彩色多普勒检测结果

56 例受检者中，共计 37 例检出异常，占比 66.07%，另 19 例未在临床体检中发现。其中左侧 CIR 检出者占比，均显著高于 EC、TM、右侧 CIR、HT 及 TC 检出者占比，差异均有统计学意义(x^2=18.589，18.589，21.212，16.229，18.589，P=0.000，0.000，0.000，0.000，0.000)。提示左侧 CIR 为男性不育症的主要因素。见下表 1：

表 1 彩色多普勒检测结果(例，%)

Table1 Test results of color doppler ultrasound (n,%)

病症 Disease	例数 (n)	占比 Proportion
左侧 CIR(Left CIR)	22	39.29
EC	3	5.36*
TM	3	5.36*
右侧 CIR (Right CIR)	2	3.57*
HT	4	7.14*
TC	3	5.36*
总计 (Total)	37	66.07*

注：与左侧 CIR 相比，*P＜0.05。

Note: Compared with left CIR,*P＜0.05.

2.2 SCIR 与 CCIR 两组左侧的精索静脉测值对比

CCIR 组的 DR、DV、Vmax 及 TR 水平均显著高于 SCIR 组，差异均有统计学意义(均 P＜0.05)。见下表 2。

表 2 两组左侧的精索静脉测值对比(例，$\bar{x}\pm s$)

Table 2 Comparison of left spermatic vein measured value of two groups of patients (n, $\bar{x}\pm s$)

组名 Groups	例数 (n)	DR (d/mm)	DV (d/mm)	Vmax (v/cm·s)	TR (t/s)
SCIR SCIR group	8	1.98± 0.17	2.25± 0.24	6.10± 2.33	1.59± 0.50
CCIR 组 CCIR group	16	2.97± 0.23*	3.76± 0.16*	14.42± 3.66*	6.35± 2.26*
t 值 t Value	-	10.746	18.435	5.830	5.825
P 值 P Value	-	0.000	0.000	0.000	0.000

注：与 SCIR 组相比，*P＜0.05。

Note: Compared with SCIR group,*P＜0.05.

2.3 PSV、EDV、PI 及 RI 与男性不孕症精液质量及与精子数量的相关性分析

根据 Spearman 法进行分析后发现，男性不孕症精液质量及精子数量与睾丸包膜下动脉 (CA) PSV、EDV 均呈正相关(r=0.634，0.787，0.823，0.885；P=0.034，0.001，0.000；0.002)，与 RI 呈负相关(r=-0.887，-0.868，P=0.001，0.002)，睾丸内动脉

(ITA)PSV、EDV 与男性不孕症精液质量及与精子数量均呈负相关(r=–0.823,–0.965,–0.841,–0.735,P=0.012,0.023,0.014,0.000),与 RI 均呈正相关(r=0.954,0.823,P=0.000,0.021),研究亦发现,睾丸内动脉数量越多,精子数量越少。见下表 3:

表 3 PSV、EDVI 及 RI 与男性不孕症精液质量及与精子数量的相关性分析 ($\bar{x}\pm s$)

Table 3 Correlation analysis of PSV, EDV, RI with and sperm count semen quality of the male infertility ($\bar{x}\pm s$)

组别 Groups	PSV(cm/s)			EDV(cm/s)			RI	精子密度(百万个/ml) Sperm density (one million / ml)	精子活率(%) Sperm motility(%)	活动精子总数 Total motile sperm count
	TA	CA	ITA	TA	CA	ITA				
SCIR 组 SCIR group	7.07± 2.23	6.58± 1.02	6.42± 0.56	3.06± 0.28	3.78± 0.25	3.11± 0.15	0.38± 0.11	53.92± 7.07	56.43± 3.75	92.73± 13.72
CCIR 组 CCIR group	7.92± 2.18	7.53± 0.82	7.21± 0.61	4.04± 0.76	4.06± 0.22	4.23± 0.41	0.42± 0.24	34.22± 6.31	42.84± 5.62	56.68± 13.62

3 讨论

在临床上,对于 MI 患者的阴囊内容物发生异常的诊断,通常依赖相应的体格检查。然而,由于医务人员主观感觉以及阴囊内容物有关解剖结构产生的影响,可能导致体格检查所得结果准确性相对较低,无法全面地评价出患者的 MI 症状[7]。有报道表明[8],通过 CDU 这一诊断方式则能有效避免上述问题,还可更加全面的提供影像学诊断资料,准确呈现患者待检部位解剖结构和物理性质以及血流动力学的变化,同时亦利于临床医务人员掌握阴囊内容物病理变化,为临床治疗提供更多辅助治疗依据。

MI 疾病在临床上的发生率大约在 10%左右,据统计,在育龄人群中,男方因素约 30%,剩余 20%为男女共有因素[9]。由于 MI 疾病根据患者的生育能力还可划分成绝对不育及相对不育,依据临床表现又可划分成原发型不育及继发型不育,因此病因较为复杂,为患者及时诊断并进行针对性治疗显得尤为必要[10]。

本文通过研究后发现,56 例受检者中左侧 CIR 检出者占比最高,且均显著高于 EC、TM、右侧 CIR、HT 及 TC 检出者占比。CCIR 组的 DR、DV、Vmax 及 TR 水平均显著高于 SCIR 组。与 Gamidov CI 等人[11]报道一致,表明 MI 疾病以左侧 CIR 检出比率最高, 同时 CCIR 组左侧的精索静脉测值高于 SCIR 组。而男性不孕症精液质量及与精子数量与睾丸动脉(TA)、睾丸包膜下动脉 TAMX、EDV 与均呈正相关,与 RI 呈负相关,与睾丸内动脉 TAMX、PSV、EDV、与男性不孕症精液质量及与精子数量均呈负相关,与 RI 均呈正相关,研究亦发现,睾丸内动脉数量越多,精子数量越少。究其原因,笔者认为主要有以下方面有关:(1)CIR 是导致男性不育的一种常见性原因,其发病机制目前仍欠清楚,但国外 Eiss D 等人[12-14]报道表明,CIR 多发于左侧,具体原因可能和睾丸内血管数量越多,产生热量高,散热越差至温度的升高。Abarikwu SO 也认为瘀血缺氧、毒素返流以及性腺激素等作用以及睾丸内部的血流动力学改变和精子的活性等因素有关[15]。因此本文左侧 CIR 检出率相对较高。(2)通过彩色多普勒的超声技术对 MI 患者进行诊断,既避免了触诊的主观性及敏感性较低,又使患者无需忍受精索静脉造影时进行的创伤性操作[16]。加之其呈现的图像更为清晰和直观,因此可对临床诊断提供客观指标,特别是对于 CIR 的诊断价值较大。

值得一提的是,对于 CIR 的彩色多普勒声像图,通常可表现持续性的红、蓝交替双向血流,并呈蜂窝状和条索状分布[17]。当患者为站立位亦或是 Valsava 试验时, 相应管腔中血流的颜色变亮,且充盈更加饱满,而返流持续的时间又随之延长,常>1s[18]。附睾囊肿则未见到血流信号的显示。若未睾丸附睾炎,则局部的血流信号则可能增多[19,20]。

综上所述,CDU 对 MI 疾病的诊断价值较高, 结果较为准确,值得临床诊断推荐。

参 考 文 献(References)

[1] 柳俊,詹维伟,周伟,等.超声探讨睾丸微石症与男性不育症病因的关系[J].医学影像学杂志, 2013, 23(4): 573-576
Liu Jun, Zhan Wei-wei, Zhou Wei, et al. Explore the relationship between ultrasound and testicular microlithiasis causes of male infertility[J]. Journal of Medical Imaging, 2013, 23(4): 573-576

[2] 李刚,雷建明,许敬华,等.彩色多普勒超声在男性不育症病因筛查中的应用[J].中国中西医结合外科杂志, 2012, 1(5): 504-505
Li Gang, Lei Jian-ming, Xu Jing-hua, et al. Color Doppler ultrasound screening in the etiology of male infertility [J]. Journal of surgery combined with traditional Chinese medicine and Western medicine Chinese, 2012, 1(5): 504-505

[3] 付昱,郝林,韩从辉,等.经皮附睾穿刺取精术在男性不育症诊疗中的应用(附 58 例报告) [J].现代生物医学进展, 2009, 9(19): 3705-3706
Fu Yu, Hao Lin, Han Cong-hui, et al. Percutaneous epididymal sperm aspiration technique in the diagnosis and treatment of male infertility (Report of 58 Cases) [J]. Progress in modern biomedicine, 2009, 9 (19): 3705-3706

[4] Raza SA, Jhaveri KS. Imaging in male infertility[J]. Radiol Clin North Am, 2012, 50(6): 1183-1200

[5] Shiraishi K, Matsuyama H, Takihara H, et al. Pathophysiology of varicocele in male infertility in the era of assisted reproductive technology[J]. Int J Urol, 2012, 19(6): 538-550

[6] Wang L, Qiao J, Li R, et al. Role of endometrial blood flow assessment with color Doppler energy in predicting pregnancy outcome of IVF-ET cycles[J]. Reprod Biol Endocrinol, 2010, 18(8): 122-123

(下转第 6495 页)

防治指南(2010 年版)[J].中华肝脏病杂志, 2011, 19(1): 13-24
Chinese Society of Hepatology,Chinese Society of Infectious Diseases Chinese Medical Association.The guideline of prevention and treatment for chronic hepatitis B (2010 version) [J]. Chin J Hepatol, 2011, 19(1): 13-24

[8] 中华人民共和国卫生部.原发性肝癌诊疗规范(2011 年版) [J].临床肿瘤学杂志, 2011, 16(10): 929-946
Ministry of Health of the People's Republic of China.Diagnosis, management,and treatment of hepatocellular carcinoma (V2011) [J]. Chin Clinical Oncology, 2011, 16(10): 929-946

[9] Fung J, Yuen MF, Yuen JC, et al. Low serum HBV DNA levels and development of hepatocellular Carcinoma in patients with chronic hepatitis B: a case control study [J]. Alimentary Pharmacology and Therapeutics, 2010, 26(3): 377-382

[10] Papatheodoridis GV, Lampertico P, Manolakopoulos S, et al. Incidence of hepatocellular carcinoma in chronic hepatitis B patients receiving nucleos (t)ide therapy:A systematic review [J]. Journal of Hepatology, 2010, 53(2): 348-356

[11] Sherman, Morris. Does Hepatitis B Treatment Reduce the Incidence of Hepatocellular Carcinoma[J]. Hepatology, 2013, 58(1): 18-20

[12] 邹传鑫,聂家艳,戴绍军,等.HBeAg 阴性与阳性原发性肝癌临床和病毒相关因素分析[J]. 世界华人消化杂志,2008,16(32):3696-3699
Zou Chuan-xin, Nie Jia-yan, Dai Shao-jun, et al. A correlation factor analysis of clinical and virologyical characteristics on HBeAg negative and HBeAg positive primary hepatic cancer [J]. World Chine- se Journal of Digestology, 2008, 16(32): 3696-3699

[13] 杨斌,占劲松,宋建新.核苷类似物抗病毒治疗后 HBeAg(-)/(+)患者肝癌发生的临床观察[J]. 重庆医学, 2013, 42(12): 1350-1354
Yang Bin, Zhan Jing-song, Song Jian-xin. Clinical observation of the incidence of hepatocellular carcinoma in HBeAg (-)/ (+)chronic hepatitis B patients with nucleoside analogue therapy [J]. Chongqing Medicine, 2013, 42(12): 1350-1354

[14] Davila JA, Morgan RO, Shaib Y, et al. Diabetes increases the risk of hepatocellular carcinoma in the United States:a population based case control study[J]. Gut, 2013, 54(4): 533-539

[15] Wang CG, Wang XL, Gong GQ, et al. Increased risk of hepatocellular carcinoma in patients with diabetes mellitus: a systematic review and meta-analysis of cohort studies [J]. International Journal of Cancer, 2012, 130 (7): 1639-1648

[16] 郭秀平.高血压病与乙肝肝硬化及肝癌的关系探讨 [J].中西医结合心脑血管病杂志, 2013, 10(12): 1522-1523
Guo Xiu-ping. To investigate the relationship between hypertension and liver cirrhosis and heaptocellular carcinoma [J]. Chinese Journal of Integrative Medicine on Cardio/Cerebrovascular Disease, 2013, 10 (12): 1522-1523

[17] Wong GLH, Chan HLY, Yiu KKL, et al. Meta analysis:the association of hepatitis B virus genotypes and hepatocellular carcinoma [J]. Alimentary Pharmacology and Therapeutics, 2013, 37 (5): 517-526

[18] Liao Y, Hu X, Chen J, et al. Precore Mutation of Hepatitis B Virus May Contribute to Hepatocellular Carcinoma Risk: Evidence from an Updated Meta-Analysis[J]. Plos One, 2012, 7(6): 1-9

[19] 李岩,高歌,王江滨,等.饮酒与原发性肝癌关系的调查 - 附吉林省 1057 例原发性肝癌病因学分析 [J]. 现代肝脏病学, 2003, 19(3): 140-142
Li Yan, Gao Ge, Wang Jiang-bin, et al. To investigate the relationship of alcohol intake and primary hepatocellular carcino- ma (The etiologic factor of 1057 PHC in JILIN province) [J]. Chin J of C Hepatol, 2003, 19(3): 140-142

[20] Singal AK, Salameh H, Kuo YF, et al. Meta analysis: the impact of oral antiviral agents on the incidence of hea-ptocellular carcinoma in chronic hepatitis B [J]. Alimentary Pharmacology and Therapeutics, 2013, 38(2): 98-106

(上接第 6522 页)

[7] Singh N, Bahadur A, Mittal S, et al. Comparative analysis of endometrial blood flow on the day of hCG by 2D Doppler in two groups of women with or without genital tuberculosis undergoing IVF-ET in a developing country [J]. Arch Gynecol Obstet, 2011, 283 (1): 115-120

[8] Fang Y, Zhao L, Yan F, et al. Escin improves sperm quality in male patients with varicocele-associated infertility [J]. Phytomedicine, 2010, 17(3): 192-196

[9] Schurich M, Aigner F, Frauscher F, et al. The role of ultrasound in assessment of male fertility [J]. Eur J Obstet Gynecol Reprod Biol, 2009, 144(1): 192-198

[10] Lotti F, Corona G, Mondaini N, et al. Seminal, clinical and colour-Doppler ultrasound correlations of prostatitis-like symptoms in males of infertile couples[J]. Andrology, 2014, 2(1): 30-41

[11] Gamidov CI. Current approach to therapy for male infertility in patients with varicocele[J]. Ter Arkh, 2012, 84(10): 56-61

[12] Eiss D, Cornud F, Thiounn N, et al. Imaging of male infertility: techniques and results[J]. Gynecol Obstet Fertil, 2012, 40(9):481-489

[13] Fang Y, Zhao L, Yan F, et al. Escin improves sperm quality in male patients with varicocele-associated infertility[J]. Phytomedicine,2010, 17(3): 192-196

[14] Schurich M. The role of ultrasound in assessment of male fertility[J]. Eur J Obstet Gynecol Reprod Biol, 2009, 144(1): 192-198

[15] Abarikwu SO. Causes and risk factors for male-factor infertility in Nigeria: a review[J]. Afr J Reprod Health, 2013, 17(4): 150-166

[16] Aydos SE. Association of CYP1A1 and glutathione S-transferase polymorphisms with male factor infertility [J]. Fertil Steril, 2009, 92 (2): 541-547

[17] Komiya A. Analysis of inter-examination differences in sperm nuclear vacuoles among male patients with infertility [J]. Syst Biol Reprod Med, 2014, 60(1): 35-42

[18] Takasaki N. A heterozygous mutation of GALNTL5 affects male infertility with impairment of sperm motility[J]. Proc Natl Acad Sci U S A, 2014, 111(3): 1120-1125

[19] Kopitovi V. The role and contribution of transvaginal endoscopy to diagnostics and treatment of infertility [J]. Srp Arh Celok Lek,2013, 141(11): 830-834

[20] Kaproth-Joslin K. Imaging of female infertility: a pictorial guide to the hysterosalpingography, ultrasonography, and magnetic resonance imaging findings of the congenital and acquired causes of female infertility[J]. Radiol Clin North Am, 2013, 51(6): 967-981