

超声检查在无精症病因诊断中的应用价值

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[摘要] 目的:探讨超声检查在无精症病因诊断中的应用价值。方法:回顾分析2015年1月1日至2021年12月31日在我院确诊为无精症的连续病例314例,总结分析其临床资料及超声检查的结果。结果:314例无精症患者中,梗阻性无精症(obstructive azoospermia, OA)患者118例(37.6%),非梗阻性无精症(non-obstructive azoospermia, NOA)患者196例(62.4%)。OA患者中,有89%(105/118)超声检查有阳性发现,包括先天性双侧输精管缺如(40例)、射精管梗阻(33例)、炎症性病变(17例)、钙化性病变(15例);NOA患者中,有40.3%(79/196)超声检查有阳性发现,包括小睾丸(45例)、隐睾(13例)、睾丸微石症(16例)、精索静脉曲张(5例)。结论:314例无精症患者中,NOA与OA之比为1.66:1,经超声检查能明确其中58.6%患者的病因,能明确89%的OA病因及40.3%的NOA病因。

关键词: 超声检查; 梗阻性无精症; 非梗阻性无精症

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Value of ultrasound in the etiological diagnosis of azoospermia

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[Abstract] **Objective:** To explore the application value of ultrasound in the etiological diagnosis of azoospermia. **Methods:** Three hundred and fourteen consecutive cases of azoospermia diagnosed in our hospital from January 1, 2015 to December 31, 2021 were retrospectively analyzed, and their clinical data and ultrasonic examination results were summarized and analyzed. **Results:** Among 314 patients, 118 (37.6%) had obstructive azoospermia (OA) and 196 (62.4%) had non-obstructive azoospermia (NOA). Among OA patients, 89% (105 cases) showed positive ultrasound findings, including congenital bilateral vas deferens absence (40 cases), ejaculatory duct obstruction (33 cases), inflammatory lesions (17 cases), and calcified lesions (15 cases); Among 196 patients with NOA, 40.3% (79 cases) had positive ultrasound findings, including small testis (45 cases), cryptorchidism (13 cases), testicular microlithiasis (16 cases), and varicocele (5 cases). **Conclusions:** Among the 314 patients with azoospermia in this study, the ratio of NOA to OA is 1.66:1. Ultrasound examination is able to identify the etiology of 58.6% of the patients, including 89% of the causes of OA and 40.3% of the causes of NOA.

Key words: Ultrasonography; Obstructive azoospermia; Non-obstructive azoospermia

目前,在我国不育不孕的夫妇中,男性不育者占40%,其中无精症占15%^[1]。无精症分为梗阻性无精症(obstructive azoospermia, OA)和非梗阻性无精症(non-obstructive azoospermia, NOA)两类,2种疾病症状相同但病因不同,治疗措施也不同。临床上一些常用的诊断无精症病因的方法,如输精管精囊造影术和睾丸、附睾穿刺或活检术,由于不能观察生殖器官的形态结构,使用时有诸多不

便^[2-3]。便捷、准确地诊断无精症患者的病因及判断OA输精管道的梗阻部位,对治疗具有重要意义^[4]。通过规范治疗,能有效提高患者的生育能力,部分过去无法自然生育的患者经体外受精、卵胞质内单精子显微注射及人工授精助孕技术可获得生育,甚至部分患者配偶可以获得自然妊娠^[5-6]。本研究拟回顾分析无精症患者的临床资料及超声检查结果,探讨超声检查在无精症病因诊断中的应用价值。

1 资料与方法

1.1 研究对象

回顾分析2015年1月1日至2021年12月31日期间,上海交通大学医学院附属国际和平妇幼保健院男科和辅助生殖科诊断为无精症的314例连续的男性不育病例。无精症的诊断符合世界卫生组织男性不育诊断标准。所有患者均行经阴囊超声及经直肠超声检查、实验室检查、诊断性或治疗性附睾和(或)睾丸穿刺活检,确诊为OA或NOA。患者年龄为20~51岁,平均年龄为30.6岁。所有纳入患者均排除不射精及逆行射精者,排除有睾丸肿瘤、急性睾丸炎及3周内行睾丸穿刺术者。

1.2 仪器与方法

1.2.1 仪器

本研究超声检查采用 Esaote MyLab ClassC 型彩色多普勒超声仪,线阵探头频率为4~13 MHz,腔内探头频率为3~9 MHz。

1.2.2 经阴囊超声检查

行经阴囊超声检查时,患者取平卧位,轻轻上提阴茎,依次对双侧睾丸、附睾、输精管阴囊段及腹股沟段行超声检查,观察其是否存在及其位置、大小形态、回声,并观察附睾管及输精管有无扩张,测量睾丸、附睾大小并计算睾丸体积。站立位检查精索静脉内径,并在睾丸上方测量其内径,采用瓦尔萨尔瓦动作判断有无静脉返流。睾丸体积计算公式为,睾丸体积=长×高×宽×0.71^[7]。最后将图像存储于电脑工作站中。

1.2.3 经直肠超声检查

行经直肠超声检查时,患者取左侧卧胸膝位,暴露肛门,探头外套上避孕套,缓慢进入直肠,对前列腺、精囊、输精管盆腔段及射精管进行检查,观察

输精管盆腔段、射精管有无扩张,测量前列腺、精囊大小。最后将图像存储于电脑工作站中。

1.3 诊断标准

附睾管扩张为附睾管最宽处内径 ≥ 0.3 mm。射精管扩张为射精管内径 > 2.3 mm。小睾丸为睾丸体积 ≤ 10 mL。精索静脉曲张定义为静息时内径 ≥ 2 mm,或乏氏动作时内径 ≥ 3 mm,且Valsalva试验返流时间 ≥ 1 s。

2 结果

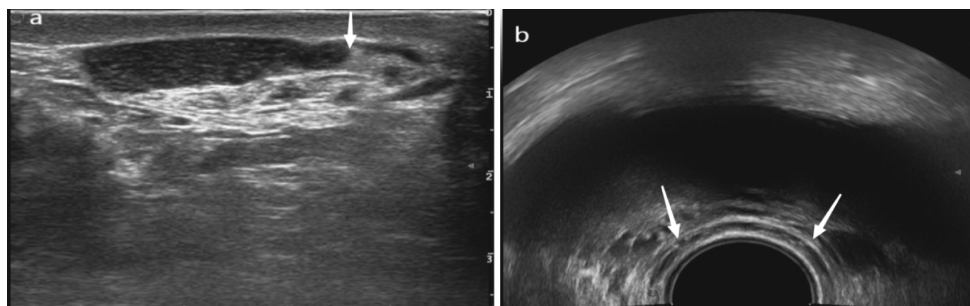
2.1 一般情况

314例患者中确诊为OA者118例(37.6%);确诊为NOA者有196例(62.4%)。118例OA患者中,有105例超声检查有阳性发现,检出率为89.0%;196例NOA患者中,有79例超声检查有阳性发现,检出率为40.3%。

2.2 超声检查阳性OA患者的超声图像分析

105例超声检查阳性的OA患者,睾丸体积为11.1~26.5 mL。附睾异常主要表现为附睾部分缺如,附睾增大、结构紊乱,附睾尾部炎性团块及附睾尾部钙化,附睾管扩张;输精管异常主要表现为输精管缺如、输精管扩张、输精管钙化;射精管异常主要表现为射精管扩张、射精管钙化及前列腺中线囊肿。

超声检查结果分为如下四类:①先天性双侧输精管缺如(congenital bilateral absence of vas deferens, CBAVD)40例,其中伴附睾部分缺如20例,伴双侧精囊缺如5例,伴双侧精囊缺如及附睾部分缺如15例;②射精管梗阻33例,其中前列腺中线囊肿23例,射精管扩张6例,射精管钙化4例;③炎症性病变,如慢性附睾炎17例;④钙化性病变15例,其中附睾钙化10例,输精管钙化5例(见表1、图1-3)。



a: Caudal epididymis and vas deferens are absent, the epididymal duct is dilated, and the arrow indicates the absence of the epididymis; b: Bilateral vas deferens and seminal vesicles are absent, and arrows show that the back of the prostate does not show vas deferens and seminal vesicles.

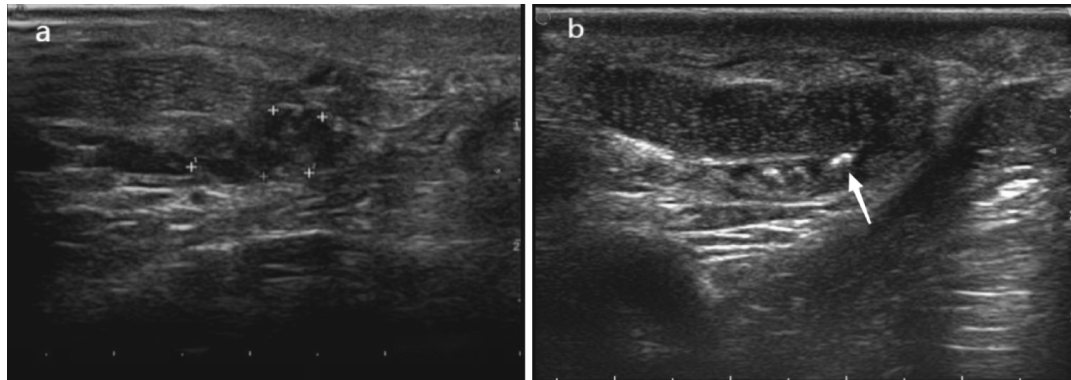
图1 CBAVD伴双侧精囊缺如及附睾部分缺如

Figure 1 CBAVD with bilateral seminal vesicle deficiency and partial epididymis deficiency

表 1 314 例无精症患者超声检查结果分析

Table 1 Analysis of ultrasonic findings in 314 cases of azoospermia

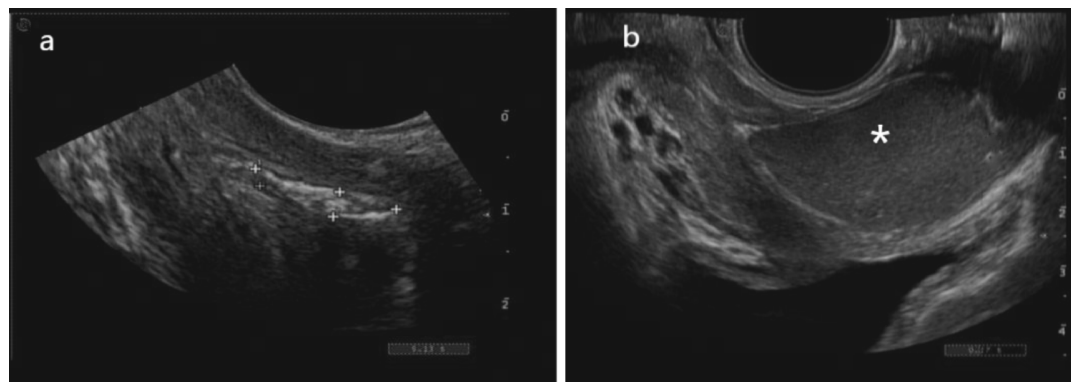
| | | Ultrasound findings | Number of cases | Percentage (%) | |
|----------------|------------------------------|---------------------------------|---|----------------|------|
| OA (n=118) | No abnormalities were found | | 13 | 11.0 | |
| | Abnormality | CBAVD | With partial epididymis deficiency | 20 | 17.0 |
| | | | With bilateral seminal vesicle deficiency | 5 | 4.2 |
| | | | With bilateral seminal vesicle deficiency and partial epididymis deficiency | 15 | 12.7 |
| | Ejaculatory duct obstruction | Midline cyst of the prostate | | 23 | 19.5 |
| | | Ejaculatory ducts dilate | | 6 | 5.1 |
| | | Ejaculatory ducts Calcification | | 4 | 3.4 |
| | Inflammatory lesions | Chronic epididymitis | 17 | 14.4 | |
| | Calcified lesions | Epididymis Calcification | 10 | 8.5 | |
| | | Vas deferens calcification | 5 | 4.2 | |
| NOA (n=196) | No abnormalities were found | | 117 | 59.7 | |
| | Abnormality | Small testis | | 45 | 23.0 |
| | | Cryptorchidism | | 13 | 6.6 |
| | | Testicular microlithiasis | | 16 | 8.2 |
| | | Varicocele | | 5 | 2.6 |



a: Inflammation of the caudal epididymis with dilation of the duct of the epididymis, “+” indicates the hypoechoic area of the caudal epididymis; b: Vas deferens calcification with dilated epididymis, arrows indicating vasectomy calcification.

图 2 炎症性和钙化性病变

Figure 2 Inflammatory and calcific lesions



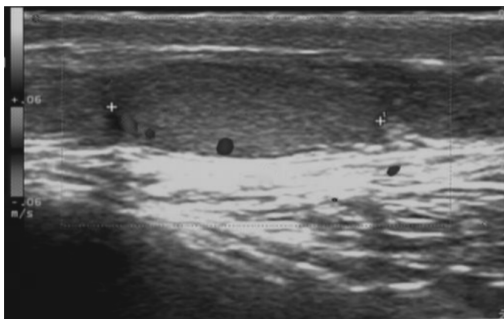
a: “+” shows ejaculatory calcification; b: “*” shows ejaculatory duct cyst

图 3 射精管梗阻

Figure 3 Ejaculatory duct obstruction

2.3 超声检查阳性NOA患者的超声图像分析

79例超声检查阳性NOA患者的睾丸体积为0.9~10.2 mL,其中小睾丸45例,隐睾13例,睾丸微石症16例,精索静脉曲张5例。睾丸异常主要表现为睾丸体积 ≤ 10 mL。NOA表现为小睾丸的病例,有克氏综合征(28例)、睾丸炎后睾丸萎缩(8例)、外伤后睾丸萎缩(4例)、低促性腺激素性腺功能低下症(5例)(见表1、图4)。



The volume of the testis is 0.9 mL, less color blood flow signal, and “+” shows the testis.

图4 克氏综合征

Figure 4 Klinefelter syndrome

2.4 超声检查无异常的无精症患者分析

有13例OA患者在超声检查中未发现异常,未能经超声检查明确其梗阻部位及确切病因。有117例NOA患者在超声检查中未发现异常,其中Y染色体AZFc区缺失34例,83例特发性NOA。

3 讨论

3.1 OA

精子在睾丸的生精小管中产生后,在附睾内进一步发育成熟,然后经输精管道排出体外。OA是指睾丸内精子产生正常,但由于先天性异常、泌尿生殖道感染或外伤等原因导致双侧输精管道任意部位发生阻塞,从而使精子不能排出体外^[8]。本研究发现,无精症患者中OA占比约37.6%,超声对OA的检出率约为89%,OA的主要病因为CBAVD、射精管梗阻、炎症性病变及钙化性病变等。CBAVD表现为双侧输精管缺如,常伴双侧附睾部分缺如及附睾管扩张、精囊缺如或发育不良。

前列腺中线囊肿、射精管扩张、射精管钙化常则是射精管梗阻患者的异常表现。前列腺中线囊肿可压迫射精管而导致梗阻,包括苗勒管囊肿和射精管囊肿,二者在超声图像上表现相似,均表现为前列腺中部的泪滴状无回声区,仅通过超声检查很

难鉴别二者^[9],但二者的治疗方式相同。

炎症性病变和钙化性病变,如慢性附睾炎、附睾及输精管钙化,既往多有泌尿生殖道感染史,多发生在附睾尾部及与输精管连接处,常伴附睾管扩张。

本研究有13例OA患者经超声检查未发现异常,未能明确梗阻部位及确切病因,其原因可能与炎症引起的精道梗阻有关,当病程较短,精道的形态结构改变如附睾管、输精管、射精管的扩张、精囊增大不明显时,超声检查常难以发现异常。

3.2 NOA

NOA是指原发性睾丸功能衰竭或下丘脑/垂体功能异常等引起的生精功能障碍,从而导致精液中无精子的一类疾病^[8]。本研究发现,无精症患者中NOA占62.4%,超声检查对NOA的检出率约为40.3%。部分NOA超声表现为小睾丸、隐睾、睾丸微石症及精索静脉曲张,但是大多数的NOA其睾丸及输精管道的形态结构无明显异常改变,其超声图像与正常人无明显区别,这类患者部分与Y染色体AZFc区缺失有关,部分诊断为特发性NOA,为不明原因导致的睾丸生精功能障碍,特发性NOA可能与遗传因素有关^[10]。小睾丸常与染色体异常如克氏综合征、内分泌异常及炎症或创伤后睾丸萎缩有关,隐睾及睾丸微石症也常伴有睾丸的体积减小,若伴有睾丸内血流信号减弱,常说明睾丸生精功能发生障碍。精索静脉曲张导致无精症的详细机制尚未完全阐明,有研究报道显示,其可能与多种机制作用下导致生精细胞广泛凋亡有关^[11]。有研究显示,少数NOA患者也会出现输精管及附睾的异常表现^[12],故输精管及附睾的异常表现并不能作为诊断OA的绝对依据,对OA和NOA的诊断需结合精液、性激素、超声等检查结果进行综合分析。

综上所述,经阴囊高频超声检查不仅能观察睾丸的位置、大小及内部回声及血流情况,还能显示附睾及近端输精管的结构异常;而经直肠超声检查能够显示末段输精管、精囊及射精管的结构异常,能为无精症的病因诊断及治疗提供有效信息和依据,是一种有效的、性价比较高的检查手段。

利益冲突说明/Conflict of Interests

所有作者声明不存在利益冲突。

伦理批准及知情同意/Ethics Approval and Patient Consent

本文不涉及伦理。

作者贡献/Authors' Contributions

姚世发、陈萍设计项目;姚世发、李亮收集数据;姚世发对数据进行了分析和解释,撰写了论文;牛建梅对论文进行了修改。

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