

The Role of Ultrasonography (US) in localization of Non Palpable Undescended testis (NPT)

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Abstract:

During a 3-years period (from October 2005 to October 2008) we saw 65 boys from 80 (NPT) on either or both sides. All were examined by the referring physician, underwent (US) examination, and were then re-examined afterwards by urologist. Finally, all boys were surgically explored for testicular position and treatment.

Ultrasonography located 64 NPT (80%), 20 (25%) within the abdomen and 44 (55%) in the inguinal canal.

we found 90% sensitivity of US for inguinal testes and 66% sensitivity for abdominal testes. When US located a testis it was also found at that site during surgery in 96% of NPT (PPV 95.6%). In our study, only two viable testes were not located correctly, being in the inguinal canal at US and within the abdomen at surgery. This can be explained by the fact that there was a patent internal inguinal ring with a mobile testis.

Ultrasonography is useful to determine localization of(NPT), which facilitates planning the surgical procedure. An inguinal exploration is called for when US identifies the testis in the inguinal canal. Because the sensitivity of US for viable abdominal testes is only 66%, we recommend to perform laparoscopic exploration when US is negative.

Keywords: Undescended testis ,cryptorchidism,Nonpalpable Testes, Ultrasonography , Children.

Introduction:

Cryptorchidism is a common finding in pediatric practice. The incidence varies from 21% in preterm infants to 1.8-4.0% in term boys(1). This drops down to 0.8% by the first birthday(2). The proportion of cryptorchid boys with impalpable testes has been reported to vary from 8-20%(3).

Failure of testicular descent is a common childhood anomaly, being seen in 0.8–2% of full-term and 18–30% of premature boys. In undescended testes(UDT) the testis fails to migrate into the processus vaginalis, failing to reach the scrotum at 35 weeks of gestation. It is unilateral in 60–70% of cases. Approximately 20% of UDT are nonpalpable on physical examination (4). There are four possible explanations for this phenomenon. First, the testis may be situated in the scrotum or inguinal canal, but is too small or there is too much subcutaneous adipose tissue. Second, the testis is located inside an open processus vaginalis in the inguinal canal and may be intermittently inguinal and abdominal in position. Third, it is in a true abdominal position; and fourth, the testis is lacking (5).

The literature reports that nearly half of viable nonpalpable testes(NPT) are in an abdominal position and 5% are in the inguinal canal. The remaining 45% are atrophic or absent, mostly as a result of in utero spermatic cord torsion and are located abdominally, inguinally or scrotally (6,7).

Experienced paediatric surgeons can accurately diagnose (UDT) by repeated and meticulous palpation of the scrotal and inguinal region. Since palpation is quite subjective, the diagnosis mostly depends on the examiner's experience and ability(5). Currently there is controversy as to the step to take when clinical examination fails to identify a testis. Further exploration might be done by means of laparoscopy or by noninvasive methods such as ultrasonography (US), CT, MRI, venography or Arteriography(6,7,8). Of these, US is the imaging method of choice in children because it is easy, noninvasive and does not use ionizing radiation. Furthermore, it is cheap and widely available (10).

When NPT is correctly diagnosed there is consensus on the need for early treatment, as this may decrease the risk of testicular cancer(8,12,14,15,16) and fertility problems. (17,18,19,20). We performed a study aimed at assessing the value of (US) in the diagnostic work-up of NPT, and to this end evaluated the relationship between preoperative (US) data and operative findings.

Materials and methods:

During a 3 years period, 65 boys referred to the private clinic & to general teaching hospital, radiology department, underwent primary surgery for (UDT). Ultrasonography was performed for all these children with 80 NPT. Prior to (US) the patients were clinically examined by a general practitioner, a pediatrician, & urologist. Clinical examination by a urologist was with the boy in the supine position, the lower half of the body undressed. The examiner placed the index finger and thumb of the right hand on either side of the inguinal canal, thus preventing testes lying distally from the inguinal canal from withdrawing into the inguinal region during palpation of the scrotum. With the examiner standing on the right side of the patient, the inguinal region was then examined with the fingertips of a warm left hand. If there seemed to be no palpable testis, an attempt was made to empty the inguinal canal by carrying out an ironing movement with the fingertips stroking in the direction of the scrotum. This may reveal a palpable testis at the level of the exit of the inguinal canal, immediately shooting back deep into the inguinal canal. If no testis could be located at all, the perineum, the base of the penis and the thigh were closely examined to exclude an ectopic testis.

Ultrasonography was performed by radiologists, using (Siemens Versa pro) ultrasound machine, with a high-frequency, (7 MHz) linear array transducer.

Subsequently, all boys underwent surgery and testicular position and other operative findings were assessed intraoperatively.

Inguinal exploration was usually performed when (US) did show an inguinal testis. When a viable testis was found, orchiopexy was performed. All US findings were compared with intraoperative findings.

Results:

In our study 65 were examined with 80 NPT. The ages of the 65 boys ranged from 1month to 15 years. 35 (43.7%) were left-sided, 30 (37.5%)right-sided and 15 (18.7%) bilateral.(fig no 1.)

Most patients were first diagnosed by a pediatrician & urologist before being referred to the radiologist. All boys were seen by urologist surgeon after the US examination for re-examination and to discuss therapy determined by the US findings.

US was able to locate 64 of 80 NPT (80%): 20 of them (25%)were found in the abdomen and 44(55%) in an inguinal position; therefore 16(20%) could not be found. (table no 1.)

On Comparison of surgical findings with that of US results, there was a 100% positive predictive value (PPV) for the 20 abdominal testes seen on US; all were indeed found abdominally. Nevertheless, 10 viable abdominally located testes were missed by US. At surgery, all these testes were found in the lower abdomen—on the iliopsoas muscle, in the pelvis, or close to the internal inguinal ring. US located 44(55%) inguinal testes, 42 of which were indeed found in the inguinal region (95.6% PPV); the other two were viable and found

intraabdominally. Six of the NPT were defined as small, atrophic or vanished at operation.(table no . 2), sensitivity of ultrasonography for inguinal NPT was (90%).

Ultimately, US failed to locate 16 NPT (20%). Nevertheless, 10 of these at surgery appeared to be viable, with 8 located intraabdominally and two in the inguinal region. Two atrophic testes were found in the abdomen. A further 3 atrophic testes were found inguinally or scrotally. Anorchia was present in one boy. (table no.3)

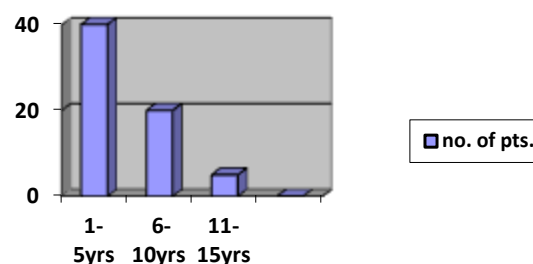


Fig 1. Distribution of patients according to age.

Table 1: Distribution of NPT according to ultrasound localization.

	Inguinal	intraabdominally	Not detected	total
Number of (NPT)	44(55%)	20(25%)	16(20%)	80(100%)

Table 2. Distribution of NPT according to site.

	Right sided	Left sided	Bilateral	total
No. of NPT	30(37.5%)	35(43.75%)	15(18.75%)	80(100%)

Table 3: Distribution of NPT ,not detected by (US).

Type of (NPT)	Intraabdominal	Inguinal	Total
Viable NPT	8	2	10
Non viable or (atrophic)NPT	2	3	5
Anorchia			1
Total	10	5	16

Discussion:

Inguinal exploration used to be the standard surgical approach for nonpalpable testes. If the testis was not found at or below the internal inguinal ring, the procedure was extended to the abdomen (20). Laparoscopy has gained greater acceptance in diagnosing and treating NPT. Cortesi et al. (21) first reported its use in 1976 in an 18-year-old adolescent. While diagnostic laparoscopy is highly sensitive in detecting NPT (4,5, 22, 23) it carries an approximately 1% risk of major or minor operative complications. Furthermore, the long-term incidence of peritoneal adhesions following laparoscopic procedures in children is approximately 10% (7,24).

The literature is far from unanimous on the usefulness of US in UDT. Some authors recommend US for its feasibility and potential to settle the subsequent operative procedure (11, 24-30). Most of the studies included only small groups of patients (27-29,31,32).

Most studies compared US results with findings during the operative procedure (6,10,24,25,29-32), others compared CT and/or MRI with US (26-28,33) .

US remains the modality of choice in our locality because we value its noninvasiveness, child-friendliness and cost-effectiveness. It also facilitates planning the correct surgical procedure

we found 90% sensitivity of US for inguinal testes and 66% sensitivity for abdominal testes. When US located a testis it was also found at that site during surgery in 96% of NPT (PPV 95.6%). In our study, only two viable testes were not located correctly, being in the inguinal canal at US and within the abdomen at surgery. This can be explained by the fact that there was a patent internal inguinal ring with a mobile testis.

Conclusion:

We recommend US for all boys with NPT diagnosed by an experienced physician. The findings would then determine the subsequent operation: diagnostic and/or therapeutic laparoscopy for all NPT with negative US, or intraabdominal testes located by US. In addition, we recommend inguinal exploration whenever US demonstrates an inguinal testis.

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دور الفحص بالامواج فوق الصوتيه في تحديد مكان الخصيه في حالات خفاء الخصيه

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الملخص

تمت الدراسة على مدة ثلاث سنوات (من تشرين اول ٢٠٠٥ حتى تشرين اول ٢٠٠٨) تم فحص ٨٠ مريض وتشخيص ٦٥ حالة من خفاء الخصيه في جانب واحد او كلا الجانبين. كل المرضى فحصوا بجهاز الامواج فوق الصوتيه ومن ثم من قبل الطبيب المختص بالمجاري البولييه وكلهم اجريت لهم العمليه الجراحيه المناسبه لتحديد مكان الخصيه وعلاجها. تمكن الفاحص بجهاز الامواج فوق الصوتيه (السونار) من تحديد مكان ٦٤ حاله من حالات خفاء الخصيه (٨٠%)، ٢٠ حاله (٢٥%) كانت في داخل البطن و ٤٤ حاله (٥٥%) وجدت في القناة المغبنيه . حساسية جهاز السونار في تحديد مكان الخصيه الخافيه كانت ٨٩,٧% في القناة المغبنيه و ٦٦,٦% في حالات البطن. في ١٦ (٢٠%) حاله لم يتمكن الجهاز من تحديد المكان. الفحص بجهاز الامواج فوق الصوتيه (السونار) ذو فائده في تحديد موقع الخصيه في حالات خفاء الخصيه، مما يسهل التخطيط لاجراء العمليه الجراحيه. ويمكن اجراء عمليه استكشاف القناة المغبنيه اعتمادا على فحص السونار ولكن في حالات الخصيه داخل البطن ينصح باجراء استكشاف البطن الناظوري قبل العمليه الجراحيه اذا عجز السونار عن تحديد مكانها.