

Imaging studies for non-palpable testis: Are they at all required?

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ABSTRACT

Undescended testis is one of the common surgical disorders in childhood and twenty percent of the undescended testes are nonpalpable. Surgical management is required in almost all cases for the repositioning or removal of the undescended testes and early intervention is preferred for optimal outcome. Use of imaging studies for accurate preoperative localisation of the nonpalpable testis is a wide prevalent practice. However, available evidences have questioned the need of such studies.

Key words: Laparoscopy, magnetic resonance imaging, non-palpable testis, ultrasonography

INTRODUCTION

Undecided testis is one of the most common surgical disorders in childhood. Twenty percent of undescended testes are non-palpable. Of the non-palpable testes 50% are abdominal, 45% are atrophic secondary to *in utero* spermatic cord torsion, and 5% are in the inguinal canal. Surgery is required for repositioning or removal of undescended testes and early intervention is preferred for optimal outcome. Use of imaging studies for accurate preoperative localization of the non-palpable testis is a widely prevalent practice. However, recent evidences have questioned the need of such studies.

EVIDENCES

Role of physical examination

Focused physical examination is very essential in the

evaluation of undescended testes. Hrebinko and Bellinger found physical examination by a pediatric urologist (84%) as compared with a referring physician (53%) to be the most reliable mode of examination.^[1] Testes not detected by routine imaging studies may become palpable on careful physical examination.^[2] Lubricating the hands with soap increases the sensitivity and may be helpful in difficult cases. Applying traction on the base of the scrotum during examination may render the testis palpable due to pull on the gubernaculum. Examination under general anesthesia makes about 18% of non-palpable testes become palpable.^[3]

Role of ultrasonography

Ultrasonography (USG) remains the most common investigation ordered by a physician in a child with non-palpable testis before referring him to a pediatric urologist or pediatric surgeon. Advantages of USG include lesser cost, non-invasive modality with no risk of radiation exposure and no need of anesthesia in young children. Disadvantages include low efficacy for non-palpable testes and operator dependency. Kanemoto *et al.*, and Wolverson *et al.*, showed that USG had a sensitivity of 76-88%, specificity of 100% and an accuracy of 84-91% in the diagnosis of non-palpable testis.^[4,5] However, Pekkafali *et al.*, have shown that USG has got a very limited role and is no better than physical examination.^[6] Elder demonstrated that 61% of testes not identified by USG were palpable on physical examination.^[2] Shah and Shah showed the overall diagnostic agreement of USG with laparoscopy in only 19% of cases.^[7] A recent meta-analysis by Tasian and Copp demonstrated poor efficacy of USG in boys with non-palpable testes.^[8] Elder has described three situations where USG has some role in cryptorchid patients: (1) In obese boys where an inguinal testis can

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be difficult to palpate and diagnostic laparoscopy has an increased complication rate; (2) In boys with non-palpable testis after previous orchiopexy to demonstrate whether the testis is viable and demonstrate its position; (3) In neonates with disorder of sexual differentiation to look for enlarged adrenals, to determine whether a uterus is present and to identify whether a gonad is a testis or an ovary.^[9]

Role of computed tomography

Computed tomography (CT) is infrequently used in boys with non-palpable testes as it is unreliable and carries the risk of radiation. Wolverson *et al.*, reported similar sensitivity of CT and USG in the evaluation of non-palpable testis.^[5]

Role of magnetic resonance imaging

Conventional magnetic resonance imaging (MRI) is non-invasive, free from radiation and produces excellent multiplanar images even without a contrast agent. However, it is expensive, requires anesthesia in children and the diagnostic accuracy is comparable to that of USG.^[10] Kantarci *et al.*, showed that adding diffusion-weighted imaging (DWI) to conventional MRI improves the sensitivity and specificity of imaging and the combination of the two modalities is the most sensitive and the most accurate technique with sensitivity of 88-91% and accuracy of 86-92%.^[11] Recent studies by Lam *et al.*, and Yeung *et al.*, have shown MR angiography to be an extremely accurate imaging modality for non-palpable testes.^[12,13] However, these modified MRI protocols need further evaluation. Shah and Shah showed the overall diagnostic agreement of MRI with laparoscopy in 52% of cases.^[7] Interestingly, 9 of the 10 testes not located on MRI were detected at laparoscopy. This is very important in view of development of malignancy in undescended testes when left inside the abdomen. Leaving a testicular nubbin *in situ* is a matter of controversy since the presence of testicular tissue in nubbins has theoretical potential for malignancy in the long term. Hence many authors recommend removing them though the estimated malignancy risk in testicular nubbins is 0-1.1%.^[14] The above-mentioned studies are not reliable in diagnosing testicular nubbins. So even if CT or MRI show no testis, laparoscopy or inguinal exploration is required for definitive diagnosis of testicular agenesis or removal of testicular nubbins when present. Hence surgery is required in all patients, for orchiopexy when testis is seen on imaging and to rule out testicular agenesis or for excision of testicular nubbins in the remaining cases. So the need of preoperative imaging studies for non-palpable testis is questionable. Williams *et al.*, stated that 45% of the surgeons in a survey declined to perform any investigations for non-palpable testis.^[15] Current European Association of Urology and European Society for Pediatric Urology guidelines state that ultrasound, CT, MRI or angiography does not provide additional information apart from that obtained by physical examination.^[16]

Inguinal exploration or laparoscopy?

Choice between diagnostic laparoscopy and inguinal exploration has been a matter of debate with proponents of each claiming the superiority of one over the other. However, laparoscopy has emerged as the modality of choice and is currently regarded as the gold standard for the diagnosis of non-palpable testis.

Inguinal exploration

Snodgrass *et al.*, advocated inguinal exploration in cases of unilateral non-palpable testis.^[17] They found a viable testis in only 30% patients of unilateral cryptorchidism and the remaining 70% had testicular nubbins or vanishing testes. Elder and Belman and Rushton had previously noted that most testicular remnants are located in the upper scrotum and they can be readily approached through a scrotal incision.^[18,19] So they advocated inguinal exploration instead of laparoscopy for unilateral non-palpable testis, especially when the contralateral testis is enlarged, suggesting monorchidism. However, if the descended testis is not enlarged, there is a greater likelihood of a viable testis and one may choose either laparoscopy or inguinal exploration. Williams *et al.*, have shown that 95% of non-palpable testes can be localized through an inguinal incision with or without extension.^[15] When laparoscopic facility is not available, inguinal exploration may be done followed by abdominal exploration through the peritoneal cavity, if the testis is not visualized and subsequent scrotal exploration if the testis is not abdominal.^[20]

Laparoscopy

Diagnostic laparoscopy has now become the preferred modality in the majority of centers. It has an accuracy of 88-100% in determining the presence, position, size and structure of the testis in various series.^[21,22] Therapeutic procedures like laparoscopic orchiopexy or orchiectomy can also be performed at the same time. The European Association of Urology Guidelines on pediatric urology state that laparoscopy is the only examination that can reliably confirm or exclude non-palpable testes.^[16] In their series of 86 non-palpable testes, Godbole *et al.*, found that laparoscopy could have avoided a negative exploration in 42% of cases.^[23] Lakhoo *et al.*, studied 22 non-palpable testes in 18 boys with history of previous negative inguinal exploration in all patients and demonstrated 13 of the 22 testes to be present at laparoscopy.^[24] Perovic and Janic in their series of 126 patients, demonstrated six testes to be present laparoscopically in 12 patients with history of previous inguinal exploration.^[25] Godbole *et al.*, regarded inguinal exploration alone to be inadequate, unjustified, unnecessarily invasive and unreliable.^[17]

Disadvantages of laparoscopy include invasive nature of the procedure, need of anesthesia, high cost and limited availability due to need of special equipments like pediatric laparoscope. Lakhoo *et al.*, advocated laparoscopy to be the

initial diagnostic maneuver of choice and suggested for referral of patients to higher centers for the same, when facilities for laparoscopy are unavailable at the local level.^[24]

CONCLUSION

To conclude, available evidence questions the need of preoperative imaging studies for non-palpable testes. Diagnostic laparoscopy should be performed in all cases when the testis is non-palpable under anesthesia. Further large-scale studies are needed to reach a consensus in this regard.

REFERENCES

- Hrebinko RL, Bellinger MF. The limited role of imaging techniques in managing children with undescended testes. *J Urol* 1993;150:458-60.
- Elder JS. Ultrasonography is unnecessary in evaluating boys with a nonpalpable testis. *Pediatrics* 2002;110:748-51.
- Cisek LJ, Peters CA, Atala A, Bauer SB, Diamond DA, Retik AB. Current findings in diagnostic laparoscopic evaluation of the nonpalpable testis. *J Urol* 1998;160:1145-9.
- Kanemoto K, Hayashi Y, Kojima Y, Maruyama T, Ito M, Kohri K. Accuracy of ultrasonography and magnetic resonance imaging in the diagnosis of nonpalpable testis. *Int J Urol* 2005;12:668-72.
- Wolverson MK, Houttuin E, Heiberg E, Sundaram M, Shields JB. Comparison of computed tomography with high-resolution real-time ultrasound in the localisation of the impalpable undescended testis. *Radiology* 1983;146:133-6.
- Pekkafali MZ, Sahin C, Ilbey YO, Albayrak S, Yildirim S, Basekim CC. Comparison of ultrasonographic and Laparoscopic Findings in Adult Nonpalpable Testes Cases. *Eur Urol* 2003;44:124-7.
- Shah A, Shah A. Impalpable testes—is imaging really helpful? *Indian Pediatr* 2006;43:720-3.
- Tasian GE, Copp HL. Diagnostic performance of ultrasound in nonpalpable cryptorchidism: A systematic review and meta-analysis. *Pediatrics* 2011;127:119-28.
- Elder JS. Why Do Our Colleagues Still Image for Cryptorchidism? Ignoring the Evidence. *J Urol* 2011;185:1566-7.
- Gatti JM, Ostlie DJ. The use of laparoscopy in the management of nonpalpable undescended testes. *Curr Opin Pediatr* 2007;19:349-53.
- Kantarci M, Doganay S, Yalcin A, Aksoy Y, Yilmaz-Cankaya B, Salman B. Diagnostic Performance of Diffusion-Weighted MRI in the Detection of Nonpalpable Undescended Testes: Comparison With Conventional MRI and Surgical Findings. *AJR Am J Roentgenol* 2010;195:W268-73.
- Lam WW, Tam PK, Ai VH, Chan KL, Chan FL, Leong L. Using gadolinium-infusion MR venography to show the impalpable testis in pediatric patients. *AJR Am J Roentgenol* 2001;176:1221-6.
- Yeung CK, Tam YH, Chan YL, Lee KH, Metreweli C. A new management algorithm for impalpable undescended testis with gadolinium enhanced magnetic resonance angiography. *J Urol* 1999;162:998-1002.
- Eggenger SE, Lotan Y, Cheng EY. Magnetic resonance angiography for the nonpalpable Testis: A cost and cancer risk analysis. *J Urol* 2005;173:1745-9.
- Williams EV, Appanna T, Foster ME. Management of the impalpable testis: A six year review together with a national experience. *Postgrad Med J* 2001;77:320-2.
- Tekgul S, Riedmiller H, Gerharz E, Hoebcke P, Kocvara R, Nijman R, *et al.* Guidelines on paediatric urology. European Association of Urology Guidelines 2011:8-9. Available from: http://www.uroweb.org/gls/pdf/19_Paediatric_Urology.pdf [Last accessed on 2011 Sep 15].
- Snodgrass WT, Yucel S, Ziada A. Scrotal Exploration for Unilateral Nonpalpable Testis. *J Urol* 2007;178:1718-21.
- Elder JS. Laparoscopy for impalpable testes: Significance of the patent processus vaginalis. *J Urol* 1994;152:776-8.
- Belman AB, Rushton HG. Is the vanished testis always a scrotal event? *BJU Int* 2001;87:480-3.
- Kirsch AJ, Escala J, Duckett JW, Smith GH, Zderic SA, Canning DA, *et al.* Surgical management of the nonpalpable testis: The Children's Hospital of Philadelphia experience. *J Urol* 1998;159:1340-3.
- Bloom DA, Ayers JW, McGuire EJ. The role of laparoscopy in the management of the non-palpable testes. *J Urol* 1988;94:465-70.
- Diamond DA, Caldamone AA. The value of laparoscopy for 106 impalpable testes relative to clinical presentation. *J Urol* 1992;148:632-4.
- Godbole PP, Morecroft JA, Mackinnon AE. Laparoscopy for the impalpable testis. *Br J Surg* 1997;84:1430-2.
- Lakhoo K, Thomas DF, Najmaldin AS. Is inguinal exploration for the impalpable testis an outdated operation? *Br J Urol* 1996;77:452-4.
- Perovic S, Janic N. Laparoscopy in the diagnosis of nonpalpable testes. *Br J Urol* 1994;73:310-3.

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