

Evaluation of spermatic cord thickness by ultrasonography

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Abstract

Aims and Objectives: To study by ultrasonography normal thickness of spermatic cord and to determine the difference between the spermatic cord thickness on the left and right side in the Indian population.

Materials and Methods: This was a prospective study scrotal ultrasonography performed on 50 asymptomatic volunteers; optimal results were obtained with a 7-10 MHz high-frequency linear-array transducer. Discussion and Results: Normal spermatic cord thickness was less than 5mm. Mean difference between the cords on both sides was 0.2278 with maximum difference of 0.56 mm.

Conclusion: Ultrasonography is the basic modality of investigation in acute and non-acute conditions of the scrotum. Spermatic cord evaluation by ultrasound is an important component of it. There are various abnormalities of spermatic cord starting from funiculitis to primary and metastatic tumors of spermatic cord. All these conditions are said to cause thickening of the spermatic cord but till date there is no definitive cut-off given to define it. In this study we have tried to establish a normal measurement for spermatic cord thickness in various abnormalities.

Keywords: Spermatic cord, funiculitis, hematoma, lipoma, loculated hydrocele, normal thickness of spermatic cord by ultrasonography, scrotal ultrasonography

Introduction

Ultrasonography (USG) is the basic modality of investigation in acute and non-acute conditions of the scrotum. Spermatic cord evaluation by USG is an important component of it. There are various abnormalities starting from simple funiculitis to primary and metastatic tumors of the cord. All these conditions show thickened spermatic cord ^[1]. This study is done to give a definitive range to the spermatic cord thickness in order to offer reference for estimating abnormalities. Spermatic cord is seen as a smooth linear hypoechoic structure lined by a hyperechoic band on longitudinal and transverse sections ^[2]. It contains vas deferens, the cremasteric, deferential and testicular arteries, pampiniform plexus of veins; the lymphatics and the nerves of the testis. It is identified beneath the skin in the inguinal canal ^[3].

Materials and Methods

We conducted a systematic prospective study of scrotal sonogram for 50 asymptomatic volunteers. All the USG.

Results

The spermatic cord thickness has no side predominance 23 patients had left side measurement larger than the right and 24 patients had right cord larger than the left, while 3 patients had same value on both the sides. The comparison coefficient (r) between the age and the cord thickness was 0.1 establishing a weak positive correlation i.e. as the age increases, the cord thickness also increases. In the 50 asymptomatic volunteers the normal cord was less than 5mm with a mean of 2.4597 mm. Mean difference between the cords on both the sides was 0.2278 with maximum difference of 0.56 mm. One patient had incidental bilateral hydrocele but no extension into the cord was seen.

Statistically, there was a weak positive correlation between the size of the right and left spermatic cords and the age of the participants which was statistically significant. On the right side, $p=0.008115$ and on the left side $p=0.0067$ ($p<0.5$) “Fig. 2 and 3”. Had been obtained in a prospective manner to identify normal cord thickness.

A high-frequency (15 MHz) linear array transducer was used for USG of the scrotum. All the patients in supine position were scanned in both transverse and longitudinal planes while the scrotal sac was supported by layer of cloth underneath. In all the cases spermatic cord thickness was taken just over the pubic symphysis on both the sides as it is at this point it just enters the scrotal sac and it is seen as a single structure “Fig. 1”.



Fig 1: Longitudinal sonogram showing normal spermatic cord measured over the pubic symphysis (*) as a longitudinal hypoechoic structure

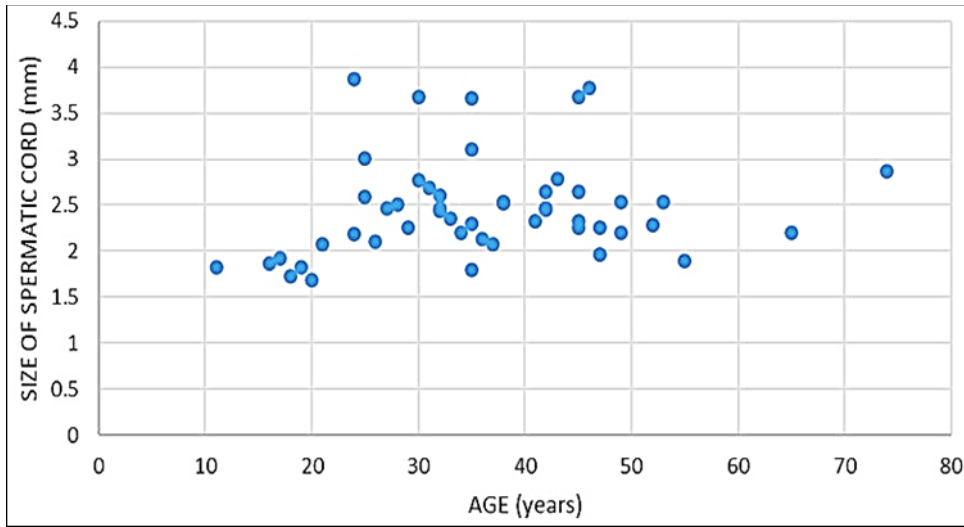


Fig 2: Scatter plot showing variation in the size of the right spermatic cord with age

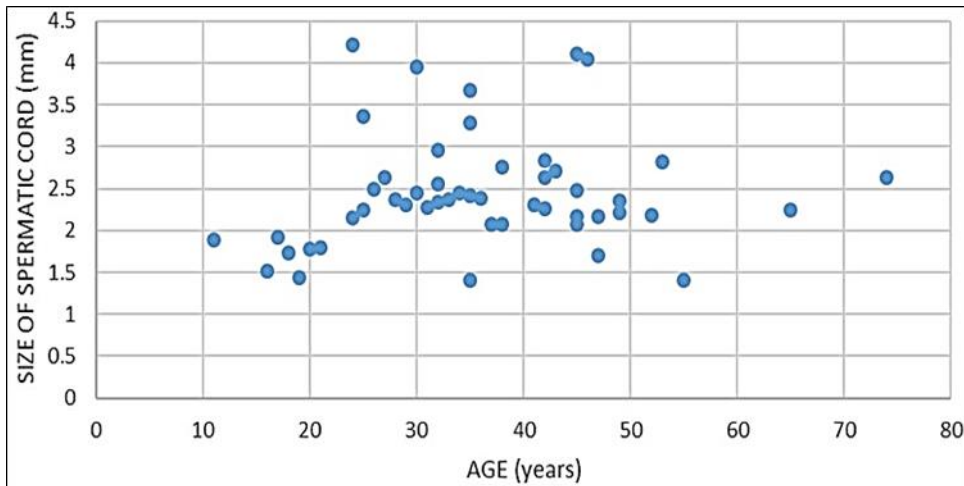


Fig 3: Scatter plot showing variation in the size of the left spermatic cord with age

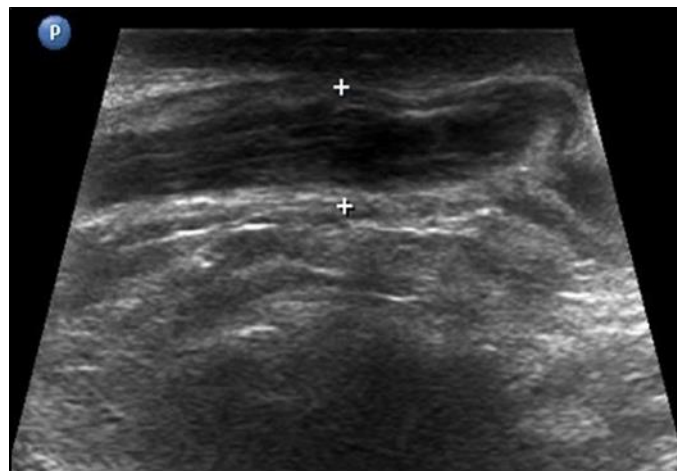


Fig 4: Funiculitis-a diffuse thickening of the left spermatic cord seen as a hypoechoic structure with associated hyperechoic fat measuring 6.9 mm in thickness. Left side cord was measuring 3.4 mm in thickness

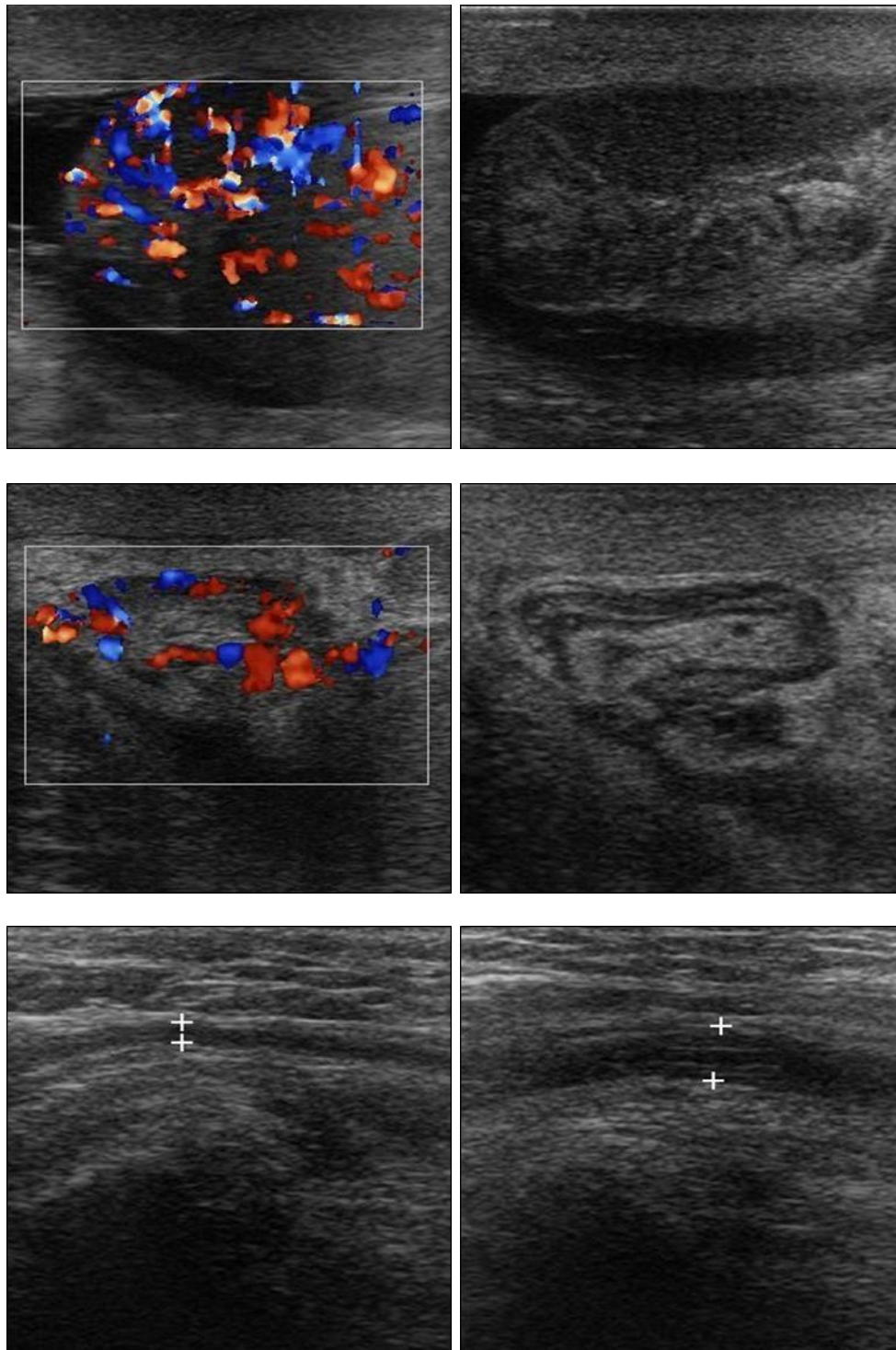


Fig 5a,b,c,d,e,f: (aandb) Enlarged right epididymis with altered echogenicity with increased vascularity. (candd) Right spermatic cord enlarged with increased vascularity. (eandf) Right and left spermatic cords

Discussion

Due to superficial location of scrotum and high-resolution USG, we could obtain a detailed anatomy of the cord contents. USG is widely accepted as the method of choice for screening and diagnosis of scrotal diseases. This study can be useful in the diagnosis of a spectrum of pathologies which are associated with spermatic cord thickening. In case of funiculitis, the

spermatic cord will be inflamed resulting in thickening which is seen as a hypoechoic structure with associated hyperechoic fat within it "Fig. 4". usually it is associated with epididymo-orchitis but it can be seen in isolation where only the spermatic cord will be abnormally thickened [4]. One of our patients who presented with acute pain in the right testis showed an enlarged right epididymis with altered echogenicity and increased vascularity on USG. The right spermatic cord was enlarged to 4.27 mm with increased vascularity and the left spermatic cord was 1.51 mm. The difference between the thickness of both the spermatic cords at the level of the pubic symphysis was 2.76 mm which had exceeded our normal limit for difference between the cords (0.6 mm) "Fig. 5". Filarial funiculitis manifests as diffuse swelling of the spermatic cord [5]. This is often mistaken for malignancy resulting in unnecessary interventions [6]. Hydrocele results from failure of the processus vaginalis to fuse completely. If the processus vaginalis remains patent in its entire extent it is known as a communicating hydrocele with fluid extending from the testes to the peritoneal cavity along the inguinal canal as seen by USG. Incomplete closure results in hydrocele of the spermatic cord. If the processus vaginalis is closed at the testicular end but remains open at the deep inguinal ring, then it is a funicular hydrocele which is seen as fluid extending from the peritoneal cavity into the inguinal canal without any bowel loop or vascularity by USG. If the processus vaginalis is closed both proximally and distally resulting in a cyst in the inguinal canal that does not communicate with the peritoneal cavity or tunica vaginalis, it's an encysted hydrocele which is seen as an anechoic cyst within the inguinal canal by USG [7]. Testicular torsion is a clinical emergency; testicular salvage is possible in patients treated within 4-6 hours after the onset of torsion. The extent of testicular ischemia depends on the degree of torsion and the duration of the torsion. It results in first venous followed by arterial flow obstruction [4]. USG shows twisting of the spermatic cord which is the most reliable sign with absent or markedly reduced testicular blood flow [8]. In case of partial torsion (< 360°), spectral Doppler may show diminished diastolic arterial flow. Twisting of the spermatic cord cranial to testis and epididymis appears as a whirlpool pattern [4]. Paratesticular tumors are very rare. Majority of them arise from the spermatic cord [6]. Most common benign spermatic cord tumor is lipoma which is seen as a focal well-defined hypoechoic mass in the cord [1]. Primary aggressive spermatic cord tumors are relatively rare. The most common one is liposarcoma, followed by leiomyosarcoma, histiocytoma and rhabdomyosarcoma [9]. These tumors are larger than 5 cm, easily palpable and painless [6]. Primary tumours of the testis may involve the spermatic cord and this is considered T3 in TNM Staging of Testicular Tumor. Metastatic carcinoma in the spermatic cord is rare and the primary is usually from the stomach, kidney or prostate [1].

Conclusion

The best place to measure the spermatic cord thickness is just above the pubic symphysis because of the bony landmark and its superficial nature. Normal thickness should be less than 5 mm and the normal difference between both the cord thickness should be less than 0.6mm. Cord thickness is unaffected by scrotal sac content pathologies unless the cord is also involved. With increase in the age there is slight increase in the spermatic cord thickness.

References

1. Gooding GA. Sonography of the spermatic cord. AJR Am J Roentgenol. 1988;151:721-724.
2. Aso C, Enríquez G, Fité M, Torán N, Piró C, Piqueras J, *et al.* Gray-scale and color Doppler sonography of scrotal disorders in children: an update 1. Radiographics. 2005;25(5):1197-1214.

3. Carol M Rumack, Stephanie R Wilson, *et al.* Diagnostic Ultrasound. 4thed. Philadelphia, USA. Elsevier mosby. 2011;21:843.
4. Tublin ME. Diagnostic Imaging: Genitourinary. Elsevier Health Sciences. 2015;9:452.
5. Smith DR, Tanagho EA, McAninch JW. Smith's general urology. Lange Medical books/McGraw Hill, 2008, 41.
6. Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA. Campbell-Walsh Urology. Expert Consult Premium Edition: Enhanced Online Features and Print, 4-Volume Set. Elsevier Health Sciences. 2011;25(34):813-815.
7. Singh AK, Kao S, D'Alessandro M, Sato Y. Case 164: Funicular Type of Spermatic Cord Hydrocele 1. Radiology. 2010;257:890-892.
8. Van Dijk R, Karthaus HF. Ultrasonography of the spermatic cord in testicular torsion. European journal of radiology. 1994;18(3):220-3.
9. Rodríguez D, Barrisford GW, Sanchez A, Preston MA, Kreydin EI, Olumi AF. Primary spermatic cord tumors: disease characteristics, prognostic factors and treatment outcomes. In Urologic Oncology: Seminars and Original Investigations Elsevier. 2014;32(1):52.