Prenatal Evaluation of the Scrotum and Testes

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Abstract

Objective: To visualize testes in the scrotum and to determine testicular growth during late gestation.

Methods: Fetal scrotal and testicular characteristics were evaluated in 153 cases, between 28-39th gestational weeks of the singleton male fetuses. Maximum testicular diameter was measured bilaterally and the difference was calculated. The relationship between testicular growth and gestational week was assessed by correlation and regression analyses.

Results: Unilateral hydrocele was found in 11%, bilateral hydrocele in 7% and any type of hydrocele in 18% of the study group. Other fetal or maternal abnormalities were present in 13% of the cases with hydrocele. Undescended testes were found in 1.3% of the study group and especially in abnormal pregnancies. Testicular development showed a positive linear growth pattern and inequality among them resulted from the measured plan.

Conclusion: Fetal testicular growth shows linearity during late gestation. Their absences, different sonographic aspects and measurement discrepancies, or presence of fluid in the scrotum may lead to other investigations for fetal and maternal abnormalities.

Keywords: Fetus, undescended testis, hydrocele, testicular growth.

Skrotum ve testislerin prenatal değerlendirmesi

Amaç: Gebeliğin son döneminde fetus skrotumunda testislerin varlığını incelemek ve gebelik haftalarına göre testis büyümesini değerlendirmektir.

Yöntem: Gebeliğin 28-39 haftaları arasında tek erkek fetus taşıyan 153 gebede fetus skrotumu ve testislerin özellikleri incelendi, en uzun testis çapı iki taraflı olarak ölçüldü ve testis uzunlukları arası fark hesaplandı. Testis büyümesinin gebelik haftası ile ilişkisi korelasyon ve regresyon analizi yöntemleri ile değerlendirildi.

Bulgular: Normal olguların %11'inde tek taraflı, %7'sinde çift taraflı, toplamda %18 oranında hidrosel saptandı. Hidrosel saptanan olguların %13'ünde sistemik veya fetusun diğer organlarını ilgilendiren patolojiler bulundu. İnmemiş testislere özellikle sorunlu gebeliklerde rastlandı ve incelenen grupta inmemiş testis oranı %1.3 bulundu. Testislerin doğrusal bir büyüme özelliği yanında inceleme yapılan plana bağlı farklı ölçüm sonuçları gösterdikleri belirlendi.

Sonuç: Fetus testisleri gebeliğin son döneminde gelişimlerini doğrusal olarak sürdürürler. Ultrasonografi incelemelerinde skrotum içinde yokluk-ları, bariz boyut ve görüntü değişiklikleri veya sıvı ile çevrili olmaları ek anormalliklerin ve gebeliğe ait diğer sorunların araştırılmasını gerekli kılabilir.

Anahtar Sözcükler: Fetus, inmemiş testis, hidrosel, testis büyümesi.

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Introduction

Sexual differentiation of male depends on normal testis function which proceeds by secretion inhibiting testosterone canal from Leydig cells and Muller canal from Sertoli cells. Antiandrogens and estrogens from circumferential factors may affect developing male fetus by corrupting the endocrine balance with their demasculinization and feminization qualities. Especially cryptorchidism and hypospadias incidences increasing in recent years have negative effects on reproduction health.[1]

Displaying genital organs of fetus during ultrasonographic examinations is a part of routine examination and while it satisfies the curiosity of families about the sexuality of the baby, it also may be helpful for distinctive diagnosis of some rare syndromes. As there is not so much displaying difference in female fetuses except genital unsuitability, abnormalities of genital organs of male fetuses such as penis, testis and scrotum pathologies can be diagnosed more easily by ultrasonography.[2]

Existence of undescended testes qualified as an abnormal diagnosis after delivery is a case seen frequently in first two trimesters of gestation. But they may appear with some defects together.[3,4] Hydrocele is a good-natured when it is alone but it may accompany to systematic disorders in some cases.[2]

The aim of this study is to examine different abnormal diagnoses such as lack of testis in scrotum and hydrocele which may be found during fetus testes screening in last period of the gestation and to determine testicular growth as to the gestational week.

Methods

Fetus genital area, scrotum and testes were observed during routine ultrasonographic examination in between 28^{th}-39^{th} gestational weeks of 153 pregnants who knew their last menstrual period and they were compatible with their ultrasonographic measurements these pregnants having single male fetus were chosen randomly. Round-oval shaped scrotum within the existence of enough amnion fluid and testes in echogenic structure within scrotum were visualized in coronal plan, their images were recorded and saved (Figure 1). 5 mHz standard probes of Toshiba SA 140 (Japan), General Electric Logic 400 pro (USA) and Philips 4000 (USA) devices were used in the transabdominal way within examinations. Appearance of testes, surrounding fluid existence and their settlements within scrotum were noted, the longest diameter was mutually calculated in single screening plan. Average testis length was calculated as to gestational week by taking the average of calculations of both testes and the difference of average testis length was calculated as to the gestational week by taking the difference of calculations. The relationship between testicular growth and gestational week was assessed by correlation and regression analyses. Clinic characteristics of cases who were not found testis in scrotum were examined.

Results

Unilateral or bilateral hydrocele was found in 30 (19.60%) of all examined cases (Figure 2). It was observed that there was a gestational problem in four (28.57%) of cases (n:14) having bilateral hydrocele. There was empty scrotum (28th week, trisomy 18) together with multiple anomaly in one case, testes smaller than expected together with skeletal dysplasia in one case (34^{th} week, 9 and 11 mm) and unilateral undescended testis together with acid in one case (29th week, immunized Rh incompatibility) within these abnormal gestations (Figure 3 and 4). These three cases constituted 10% of all cases with hydrocele and they were exc-

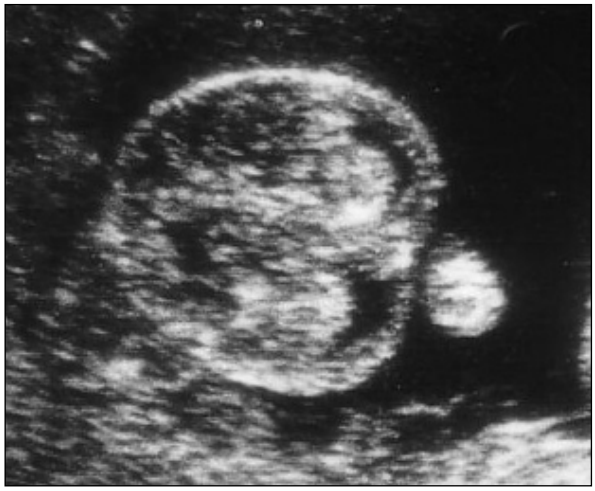

Figure 1. Round-oval shaped scrotum and testes in echogenic structure within it (coronal plan)

Figure 2. Bilateral hydrocele.

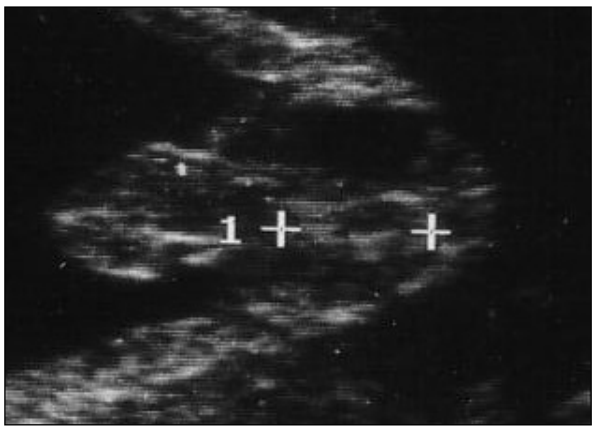

Figure 3. Undescended testis and hydrocele in one side and normal testis in the other side.

Figure 4. Undescended testis in inguinal canal and fluid display around it.

luded from the study in which averages were calculated. There were normal testes and polyhydroamnios together with bilateral hydrocele in a fourth case. This case was included to the study due to the fact that her gestational prognosis was not negative. Hydrocele was unilateral in 11% of normal cases, it was bilateral in 7% of normal cases and it was totally 18%.

Hydrocele determination week was found averagely 33.6 in unilateral cases and 32.9 in bilateral cases. Though hydrocele existence did not showed a different distribution as to the gestational week (16-22%), it was less frequent in between 38th and 39th gestational weeks (10%) ($p>0.05$).

Gestational weeks, testis lengths and difference averages of 150 cases who had bilateral testes were shown in Table 1. Average maternal age was found as 28.41±5.41, average gestational week was found as 33.97±2.69, the smallest testis length was found as 7.2 mm and the largest testis was found as 25.6 in the examined group. It was found that testis length increased linearly as gestational week proceeded and that it reached from 11.64 mm to 19.12 mm through term in between 28th and 31st weeks. A difference about 0.9-1.0 mm was found between right and left testes. Regression relation between testis length and gestational week was shown in Diagram 1. (Regression formula: Testis= 0.878 x Gestational Week – 14.852). This relation was positive and it was found significant (R:0.752, $p<0.01$).

Discussion

Fetal testes are displayed as oval or round echogenic structures within scrotum in intrauterine life. Lack of enough amnion fluid or being close of fetus legs may prevent them to be displayed. Gestational week is also effective to show their existences.[2] Thus, we preferred to perform our study in the last trimester which has high chance for displaying testes.

Congenital anomalies of male genital organ occurs either due to defects related to organogenesis period (aplasia etc.) or due to defective hormone effect (androgen insensitivity etc).[5] Anomalies like testis agenesis is rare and its rate was reported as 0.6%.[6] Suspicious genitalia may seen in various chromosomal anomalies and multiple malformation syndromes as well as diagnosis of hermaphrodites. Fetus phenotype as in androgen insensitivity

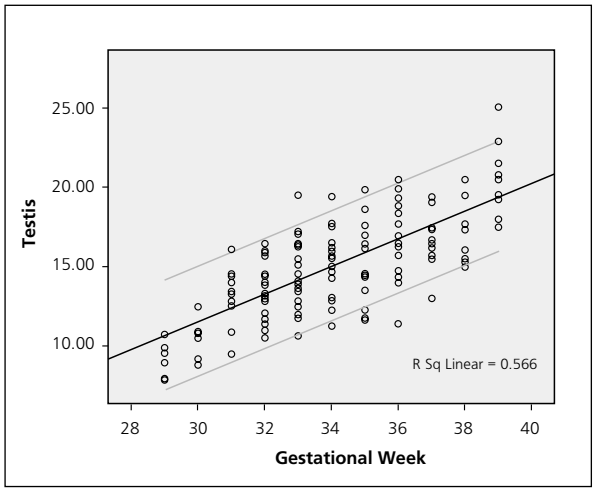

Diagram 1. Correlation between average testis length and gestational week Testis= 0.878 x Gestational Week – 14.852 R = 0.752 R2 = 0.566

syndrome may be different than fetus genotype and it may be found during prenatal diagnosis examination by chance.[7] No suspicious exterior genital organ appearance was observed in our study.

Cryptorchidism (undescended testis) is a complication mostly seen unlike examples above and it is mostly observed genital anomaly during delivery. Etiopathogenesis is still a discussion matter.[8] It may be seen in cases in which environmental factors are dominated such as exposing to pesticide by father and working in farming of mother within prematurely born and within gestational diabetes.[9,10] Malignity and infertility risks in further periods show the importance of early diagnosis and treatment of cryptorchidism.[11] Possibility of cryptorchidism is a normal situation during second trimester of gestation and while it is about 93% during 23rd week of gestation,[3] it decreases to 10% in third trimester and decreases to 0.7%-1.8% in term.[3,12] Sampaio et al[13] and Achiron et al[14] found testes in scrotum in 25th gestational week in the earliest time and Malas et al[15] found them in 27th gestational week. Testes were found as descended into the scrotum about the rate of 97%-100% after 32nd gestational week within these studies. In our study, we observed that testes were both descended into the scrotum except two cases who were on 28th and 29th gestational week respectively (98.7%).

It was showed in a study in which the localization of testes were examined in fetal life that testes were found as descended into the abdomen in the rate of 69%, into the inguinal canal in the rate of 14% and into the scrotum in the rate of 17%. But this study was performed between 10th and 35th gestational weeks and physiological descending of testes was not examined as to the gestational week.[6] Undescended or non-displayed testis rate was 1.3% in our study and there was a systematic disorder in both cases. One of them had immunized Rh incompatibility and the other one had trisomy 18.

It was noted that tumor might appear in both undescended testes and intrauterine life.[16] Thus, testes should be observed within scrotum for distinctive diagnosis of masses within abdomen. Requirement for performing a routine karyotyping is a debate when cryptorchidism is found and both opposite opinions were reported.[17] We performed karyotype analysis due to multiple anomaly existence in one of our cases who had bilateral undescended testes and trisomy 18 was found.

Gathering of fluids between tunica vaginalis layers within scrotum is called as hydrocele. It may be alone as well as with acid. There is no clinical emphasis for being isolated and it recedes within 9 months after birth naturally.[2] Pretorius et al[18] found hydrocele incidence about 15% in a series of 123

Table 1. Testis length average, distribution of length differences between testes and hydrocele existence as to the gestational weeks.

	n	Testis length (mm) Average± Standard Deviation	Difference between testes (mm) Average± Standard Deviation	Hydrocele n (%)
29-31 week	27	11.64±2.20	0.93±0.71	6 (%22.2)
32-33 week	47	14.03±1.95	1.02±0.90	10 (%21.0)
34-35 week	31	15.30±2.26	1.05±1.09	5 (%16.2)
36-37 week	25	16.71±1.20	0.93±0.72	4 (%16.0)
38-39 week	20	19.12±2.63	0.90±0.68	2 (%10.0)
Total	150	14.99±3.14	0.98±0.85	27 (%18.0)

cases examined in between 17th and 41st gestational weeks in their study and they found in 93% of cases that hydrocele was receded. Other researches claimed that hydrocele could be observed with the rate of 58% generally through third trimester or just in the beginning of that period.[2] If hydrocele gradually grows, it may mean that vaginal processus remained open and peritoneum fluid and/or its content filled into the scrotum. Meconium existence may be found in scrotum of cases with acid, hernia or meconium peritonitis.[2] Echogenic meconium existence within scrotum may be supposed as testis torsion by mistake.[19] It should be remembered that normal testis have to be seen as normal and heterogeneous appearance will be in favor of torsion.[2] Thus, it should be remembered that meconium peritonitis and ileus may accompany in these prosecutions.[19] Hydrocele incidence rate was 18% in our study and 11% of them was unilateral and 8% of them was bilateral. Pathologies related with systemic in pregnant or other organs in fetus were observed in 13% of cases with hydrocele. No significant difference was found between hydrocele and gestational week but the frequency was decreasing (from 22% to 10%) in those close to the delivery.

Rotondi et al[3] measured fetus testes in between 25th and 40th gestational weeks and they found a linear correlation between gestational week and testis diameter. Same diagnoses were found in another study.[20] We found similar relation in series we examined. But testis diameters in some cases showed differences within same gestational weeks. We think that wider series should be examined in order to get information about testis dimensions.

No difference was found between testis lengths in an anatomy series[15] performed in our country. It was found that averagely one mm difference may appear between testes within examined weeks in our ultrasonography study. But it was thought that this difference occurred that both measurements had to be performed in same plan during ultrasonographic display. Thus, it was decided to display the longest diameter separately when measuring testis lengths.

Consequently, fetal testicular growth shows linearity during late gestation. Their absences, different sonographic aspects and measurement discrepancies, or presence of fluid in the scrotum may lead to other investigations for fetal and maternal abnormalities.

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