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The utility of prenatal ultrasonography for the detection of congenital masses

Doğuştan kitlelerin tespiti için prenatal ultrasonografinin faydası

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Özet

Amaç: Konjenital kitleler artmış perinatal komplikasyon ve ölüm riski ile ilişkilidir. Bu nedenle doğum öncesi görüntüleme çalışmaları, optimum doğum sonrası müdahaleleri belirlemek için esastır. Biz bu yazıda; konjenital kitlelerin belirlenmesinde prenatal ultrasonografinin yararlılığını değerlendirdik.

Yöntem: Kitlesi olan 19 yenidoğan bebek bu retrospektif çalışmaya alındı. Ultrasonografik tanı, tanı anındaki gebelik yaşı, hayatta kalma ve hastalığın histolojik doğrulama verileri incelendi.

Bulgular: Kitlesi olan bu 19 yenidoğan bebeğin (8 erkek ve 11 kız), 13'ünde (%68) tanı prenatal dönemde konuldu. Kitleler abdominal (n: 12), göğüs (n: 6) ve kranial (n: 1) yerleşimli idi. Abdominal ve torakal kitlelerin prenatal tanı oranları sırasıyla, 10/12 (%83), 3/6 (%50) idi. Intrakranial kitle ise prenatal dönemde tespit edilemedi. Prenatal saptanan kitlelerin kesin tanıları, 4 hastada; teratom, 2 hastada; over kistadenomu, 2 hastada; Wilms tümörü, 1 hastada; nöroblastom ve 1 hastada da; rabdomiyom idi. Kalan 3 hastada ise çeşitli (mezenter kisti, gastroenterik kist, lenfanjioma) kitleler vardı.

Sonuç: Bizim veriler abdominal ve kistik kitlelerin prenatal dönemde ultrasonografik inceleme ile daha kolay tespit edildiğini göstermektedir.

Anahtar Kelimeler: Konjenital kitle, prenatal ultrasonografi, yenidoğan.

Abstract

Objective: Congenital masses are associated with an increased risk for perinatal complications and death; therefore prenatal imagining studies are fundamental to determine the optimal postnatal interventions. Herein we evaluate the usefulness of the prenatal ultrasonography in determination of congenital masses.

Method: Nineteen newborn babies with mass were enrolled in this retrospective study. Data of the ultrasonographic diagnosis, gestational age at diagnosis, survival, and histological confirmation of the disease were reviewed.

Results: Of the 19 newborn babies (8 male and 11 female) with mass, 13 patients were diagnosed prenatally (68%). The location of the masses were abdominal (n: 12), thoracic (n: 6) and cranial (n: 1). The ratio of prenatal diagnosis of abdominal, and thoracic mass was established as 10/12 (83%), 3/6 (50%), respectively. The intracranial mass could not be detected in the prenatal period. Definitive diagnosis of the prenatally detected masses were teratoma in 4 patients, ovary cystadenoma in 2 patients, Wilms tumor in 2 patients, neuroblastoma in 1 patient, and rhabdomyoma in 1 patient. The remaining 3 patients had variety of masses (mesenteric cyst, gastroenteric cyst, lymphangioma).

Conclusion: Our data shows that abdominal and cystic masses are more easily detected during prenatal periods by ultrasonographic examination.

Keywords: Congenital mass, neonate, prenatal ultrasonography.

Introduction

Solid tumors are very rare in the neonatal period and only a few reports about these tumors were described. Malignant tumors such as teratoma, neuroblastoma, rhabdomyosarcoma, Wilms' tumor, retinoblastoma, and the other soft tissue sarcomas; and also benign tumors such as rhabdomyoma, mesenteric cyst, gastroenteric cyst, and lymphangioma had been reported in the perinatal period (1-15). Improvements of the sophistic techniques in radiological means represent a revolutionary advance in the diagnosis of the fetal masses in the prenatal period (4). Early diagnosis and determination of tumor may aware the clinicians to alter the mode of delivery and facilitate possible postnatal supportive care, and therefore affect the overall prognosis (4, 5). The aim of this study is to evaluate the usefulness of the prenatal ultrasonography in determination of neonatal masses.

Material and Methods

In this study, 19 newborns that had been referred to our center with tumor in neonatal period from January 2006 to June 2008 were

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evaluated retrospectively. The charts of these patients were reviewed retrospectively, and the following data were evaluated: location of the tumors, sex distribution, associated anomalies, gestational age at diagnosis and delivery, mode of delivery, and histopathological type, and overall prognosis as well as obstetric records and stored fetal imaging modalities, obstetric and postnatal therapeutic management were described. This study was performed after approval from the institutional review board at our institution.

Results

During thirty months, 19 newborns diagnosed with mass were enrolled in this study (Table 1). There were 11 girls and 8 boys, and the median age at the first admission to our clinic was 8 days (range 1 day to 29 days). All patients were delivered by cesarean section and the median gestation age was 38 weeks (range, 34-39 weeks). The median birth weight was 3.1 kg (range, 1.8-4.1 kg).

In 13 (8 girls and 5 boys) of these patients (68%), the mass was diagnosed prenatally. The median gestational age of the patients at the first detection time was 28 weeks (range 14 to 34 weeks). The majority of the subjects four patients (31%) two patients (15.5%) and three patients (23%) were diagnosed in the 28th, 32nd, and 34th gestational week, respectively; whereas the initial diagnosis time in the others were 14th, 22nd, 24th and 30th gestational weeks.

The locations of the masses were abdomen (n: 12), thorax (n: 6) and cranium (n: 1). The nature of the mass with prenatal diagnosis were cystic (n: 6), solid (n: 3) and solid-cystic (n: 4). Of the patients involved in this study, all newborns with cystic mass (100%) were detected by prenatal ultrasound, however four of the five newborns with solid-cystic mass (80%), three of the eight newborns with solid mass (38%) were able to be detected by prenatal sonography. The predictive value of prenatal sonography seems to be excellent when the nature of mass is cystic, poor when the nature of the mass is solid.

Table 1: Clinical features of the patients

No	Sex	Day at Radiological diagnosis	Prenatal diagnosis	Gestational age at pre-natal diag-nosis (wk)	Localization	The nature of the mass	Histological diagnosis	Out-come
1	F	21	+	28	Abdomen	Cystic	Mesenteric cyst	**Alive**
2	M	28	-	ND	Cranial	Solid	Medulloblastoma	**Exitus**
3	F	16	-	ND	Thorax	Solid	Neuroblastoma	**Exitus**
4	M	28	+	34	Abdomen	Solid	Neuroblastoma	**Exitus**
5	M	1	+	34	Abdomen	Cystic-solid	Teratoma	**Alive**
6	F	1	+	22	Abdomen	Cystic-solid	Teratoma	**Exitus**
7	F	1	+	14	Abdomen	Cystic-solid	Teratoma	**Alive**
8	F	1	+	32	Thorax	Cystic	Gastroenteric cyst	**Alive**
9	F	1	-	ND	Abdomen	Solid	Teratoma	**Alive**
10	F	1	+	28	Abdomen	Cystic-solid	Teratoma	**Alive**
11	M	29	-	ND	Abdomen	Cystic-solid	hemangioendothelioma	**Alive**
12	F	22	+	32	Abdomen	Cystic	Over cystadenoma	**Alive**
13	M	1	+	30	Thorax	Solid	Rabdomyoma	**Alive**
14	F	1	+	28	Abdomen	Cystic	Over cystadenoma	**Alive**
15	M	28	-	ND	Thorax	Solid	Rabdomyoma	**Alive**
16	M	1	+	28	Abdomen	Solid	Wilms' tumor	**Exitus**
17	F	24	+	24	Thorax	Cystic	Lymphangioma	**Alive**
18	M	15	+	34	Abdomen	Cystic	Wilms' tumor	**Alive**
19	F	15	-	ND	Thorax	Solid	Teratoma of pericardi-um	**Alive**

F: female, M: male, ND: not diagnosed.

Abdominal tumors

The most frequent diagnosis in this study was abdominal tumor (n: 12). Ten newborns with the abdominal mass (83%) were detected prenatally. Five patients had teratoma and the others were Wilms' tumor (n: 2), cystadenoma of the ovary (n: 2), neuroblastoma (n: 1), mesenteric cyst (n: 1), hepatic hemangioendothelioma (n: 1). The masses were detected at 14th (n: 1), 22nd (n: 1), 28th (n: 4), 32nd (n: 1) and 34th (n: 3), weeks of gestation. Three patients with abdominal mass whose diagnosis were neuroblastoma, teratoma and Wilms' tumor died from respiratory distress (Wilms' tumor and teratoma), and treatment related complications (neuroblastoma).

Thoracic tumors

Of the distribution of the diagnosis of the six thoracic tumors, two had cardiac tumors and both of them were rhabdomyomas, the others were neuroblastoma (n: 1), gastroenteric cyst (n: 1) and lymphangioma (n: 1), and teratoma of the pericardium (n: 1). From the six newborns whom have thoracic mass lesions, three of them (50%) were detected prenatally. The masses were detected at 24th, 30th and 32nd weeks of gestation. One of the newborns with thoracic tumors diagnosed neuroblastoma with Pepper Syndrome died from respiratory distress in the neonatal period, whereas the rest of the subjects with thoracic tumor are at complete remission without any sequel or complication.

Cranial tumors

Medulloblastoma was diagnosed in one newborn. However, this patient was not detected during prenatal period. This patient died because of progressive disease.

Discussion

Neonatal tumors are extremely rare tumors in childhood, and comprise approximately 2% of childhood malignancies (1, 2). There are only a few reports including retrospective case series and reviews, whereas case reports concerning this topic can be encountered in medical literature.

The prenatal diagnosis of the neonatal masses was established in 13 patients (68%) of total 19 patients. Albert et al had reported that thirteen patients (48%) of total 27 patients were prenatally diagnosed (6). López Almaraz and colleagues had introduced that five neonates (31.2%) of 16 patients had a prenatal diagnosis, 60% of which were made in the last 7 years of the study period (3). We believe that the high percentage of prenatal diagnosis in our study is a result of the increased prenatal screening programs in obstetric follow.

The median age at diagnosis was 8 days in the current series. When compared to another study from our country (1), the delay in some of the reported cases in the previously mentioned study had been diminished in our study and; we speculate that the timing of the diagnosis of the neonatal tumor can be closely connected with prenatal screening studies such as ultrasonographic and obstetric examination. At the distribution of the prenatal detected masses; the majority of them were germ cell tumors such as teratoma (n: 6/19, 31%), which originates from all three germinal layers, and may occur in a variety of locations. In the current study, all of the diagnosed teratomas were located in the abdomen, especially in the sacrococcygeal region; expect one which originated from pericardium. Neuroblastoma, rhabdomyoma, Wilms' tumor and ovary cystadenoma are following teratoma by 2 patients for each of the diseases. The distributions of neonatal tumors in other studies were similar to the current study (1). Perek and co-workers (7) reported that the most common diagnosis in neonatal tumors were germ cell tumours which constituted 60% of all tumors, amongst them 52% were mature teratomas. The second most common was neuroblastoma. Lee et al (4) found that teratoma was also the most common congenital neoplasm in their series followed by face and neck located lymphangioma in 5 patients (15%). In some case series, the neuroblastoma had gone in front of teratoma (3).

We did not find any associated syndromes or congenital anomalies in our patients but two of our patients were twin sisters.

Gray scale ultrasonography, an operator-dependent examination is a feasible and cheap imaging modality that does not have any contradictions or side effect make for pregnant and children. On the other hand recent advance in the imaging area had also affect the sonography, and high resolution machines with the features of color Doppler has been widely used. Color Doppler twinkling artifact may allow functional evaluation (16). Magnetic resonance imaging has an excellent value on determinate the prenatal pathologies including benign and malignant masses. But magnetic resonance studies require much time, equipment's and educated technician and naturally an expert radiologist. The comparison of different radiological modalities is out of the current study. The usefulness of ultrasonography was determined with comparison to the histological diagnosis as a gold standard.

As a limitation of the current study it must be emphasized that ultrasonography is an operator depended study. The experience of the ultrasound performer can affect the radiological diagnosis. The six patients who don't have prenatal diagnosis may have been examined by un-experienced ultrasound performers.

In conclusion, we would like to vigorously emphasize that the knowledge of the presence of a neoplasm in the fetus may alter the prenatal management of a pregnancy and the mode of delivery, and facilitates immediate postnatal supportive treatment. The early detection of a fetal neoplasm is therefore very important. Obstetric ultrasonography has a significant importance in this area. Our current study underlines that the predictive value of fetal neoplasm by ultrasonograhic examination is higher when the tumor is cystic and located in the abdomen.

References

1. Buyukpamukcu M, Varan A, Tanyel C, Senocak ME, Gogus S, Akyuz C, Kutluk T, Buyukpamukcu N. Solid tumors in the neonatal period. Clin Pediatr 2003; 42: 29-34.
2. de Bouyn-Icher C, Minard-Colin V, Isapof A, Khuong Quang DA, Redon I, Hartmann O. Malignant solid tumors in neonates: a study of 71 cases. Arch Pediatr 2006; 13: 1486-1494.
3. López Almaraz R, Villafruela Alvarez C, Rodríguez Luis J, Doménech Martínez E. Neonatal neoplasms: a single-centre experience. An Pediatr 2006; 65: 529-535.
4. Lee SH, Cho JY, Song MJ, Min JY, Han BH, Lee YH, Cho BJ, Kim SH. Prenatal ultrasound findings of fetal neoplasms. Korean J Radiol 2002; 3: 64-73.
5. Sbragia L, Paek BW, Feldstein VA, Farrell JA, Harrison MR, Albanese CT, Farmer DL. Outcome of prenatally diagnosed solid fetal tumors. J Pediatr Surg 2001; 36: 1244-1247.
6. Albert A, Cruz O, Montaner A, Vela A, Badosa J, Castañón M, Morales L. Congenital solid tumors. A thirteen-year review. Cir Pediatr 2004; 17: 133-136.
7. Perek D, Brozyna A, Dembowska-Baginska B, Stypinska M, Sojka M, Bacewicz L, Polnik D, Kalicinski P. Tumours in newborns and infants up to three months of life. One institution experience. Med Wieku Rozwoj 2006; 10: 711-723.
8. Oguzkurt P, Ince E, Temiz A, Demir S, Akabolat F, Hicsonmez A. Prenatal diagnosis of a mass in the adrenal region that proved to be a teratoma. J Pediatr Hematol Oncol 2009; 31: 350-351.
9. Koken G, Yilmazer M, Sahin FK, Cosar E, Aslan A, Sahin O, Haktanir A. Prenatal diagnosis of a fetal intracranial immature teratoma. Fetal Diagn Ther 2008; 24: 368-371.
10. Karasahin KE, Gezginc K, Ulubay M, Ergün A. Fetal ovarian cysts diagnosed during prenatal ultrasound screening. Taiwan J Obstet Gynecol 2008; 47: 215-217.
11. Saygili-Yilmaz ES, Incki KK, Turgut M, Kelekci S. Prenatal diagnosis of type I sacrococcygeal teratoma and its management. Clin Exp Obstet Gynecol 2008; 35: 153-155.
12. Koksal Y, Varan A, Akalan N, Bostanci A, Cila A, Soylemezoglu F, Buyukpamukcu M. Congenital cerebellar primitive neuroectodermal tumor in a newborn. Am J Perinatol 2006; 23: 173-176.
13. Koksal Y, Varan A, Kale G, Tanyel FC, Buyukpamukcu M. Bilateral adrenal cystic neuroblastoma with hepatic and splenic involvement in a newborn. J Pediatr Hematol Oncol 2005; 27: 670-671.
14. Koklu E, Akcakus M, Okur H, Basbug M, Patiroglu T, Yikilmaz A, Tasdemir A. Gastroenteric duplication cysts in a newborn: unusual clinical and

radiologic presentations. Pediatr Dev Pathol 2008; 11: 66-67.
15. Batukan C, Ozgun MT, Basbug M, Caglayan O, Dundar M, Murat N. Sacrococcygeal teratoma in a fetus with prenatally diagnosed partial trisomy 10q (10q24.3-->qter) and partial monosomy 17p (p13.3-->pter). Prenat Diagn 2007; 27: 365-368.
16. Davran R. The usefulness of color Doppler twinkling artifact in the diagnosis of urinary calculi. Eur J Radiol 2009; 53: 131-135.