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CASE REPORT

Fetal adrenal gland enlargement – prenatal and postnatal management

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Abstract

BACKGROUND: The enlargement of suprarenal gland is related to preterm birth and the birth weight. The ultrasound measurement of fetal adrenal gland volume may identify women at risk for impending preterm birth. The aim of our study was to investigate the newborns in the region of western Slovakia followed up due to suprarenal gland enlargement. To set the ratio of prenatally diagnosed suprarenal gland enlargment, postnatal managment and treatment and interventions. The newborns with congenital adrenal hyperplasia were excluded.

METHODS:We have analyzed 6 years of medical records of all cases from the western Slovakia region of suprarenal gland enlargement encountered to 1st Pediatric Department, Children's University Hospital Bratislava Republic in the time period of January 2010 to Janurary 2016. The diagnosis of suprarenal gland enlargement was set by ultrasound examination performed on the 4th postnatal day as an overall screening test. Newborns with positive laboratory screening on congenital adrenal hyperplasia (CAH) were excluded from our study. We analyzed the origin of surarenal gland enlargement, gestation week on the due date, the birth weight and other comorbidities and genetic pathologies in newborns with the enlarged suprarenal glands.

RESULTS: There were 6 newborns followed up due to suprarenal gland enlargement. All of the patients had diagnosed the adrenal haemorrhage. Adrenal lesions like adrenal cysts or neuroblastomas were not confirmed. All of the adrenal enlargements were benign with no need of other medical or surgical intervention. None of the newborn patients had other genetic abnormalities, mineral or hormonal imbalances, problems with arterial pressure or haemodynamic instability. All of the patients underwent at least 5 prenatal ultrasound tests and at least 2 postnatal ultrasound measurements. The avarage birth weight was 3030 grams (2700 grams - to 3750 grams). The avarage birth lenght was 50 cm (47 centimeter to 53 cm).The average gestation week (gw) on due date was 39 gw. 85% from the patients were born on 40 gw, 15% on 39 gw.

CONCLUSION: We didn't confirm the relation between the suprarenal gland enlargement and the preterm birth (≤ 34 weeks' gestation). In the period of 6 years

we didn't find a newborn patient with the prenatal diagnosis of suprarenal gland enlargement. The adrenal gland enlargement didn't have a relation with the low gestation birth, weight, length or the preterm birth.

INTRODUCTION

Improvements in prenatal imaging and widespread use of fetal ultrasonography have led to an increased rate of prenatal diagnosis of suprarenal enlargement. The main differential diagnosis in tumorous masses are neuroblastoma: range from cystic, mixed solid and cystic, and completely solid with or without calcification (Rubenstein *et al.* 1995). Adrenal haemorrhage which is the most common cause of adrenal mass during the perinatal period with an incidence of 1, 9/1000 live births. It is important to differentiate benign adrenal lesions like adrenal hemorrhage or adrenal cysts from neuroblastoma (Maki *et al.* 2014). The activation of the fetal hypothalamic-pituitary-adrenal axis plays a crucial rule in commencement of labor. The ultrasound measurement of fetal adrenal gland volume may identify women at risk for impending preterm birth.

Magnetic resonance imaging (MRI) is the modality of choice for differentiation between these situations and to detect early metastatic complication of neuroblastoma in the perinatal period (Gocmen *et al.* 2005). Other suprarenal masses like extralobular pulmonary sequestration, adrenal abscess, adrenal nodular hyperplasia, adrenal cyst, bronchogenic cyst, and rarely adrenal carcinoma may mimic neuroblastoma, so differential diagnosis from these circumstances must be considered (Schwarzler *et al.* 1999).

Preterm birth is one of the leading causes of neonatal morbidity and mortality. Early preterm birth (≤ 34 weeks' gestation) carries a seven times increased risk of neonatal death (Zikavska & Bucknerova 2014). Following preterm birth, survivors can experience significant long term cognitive, behavioral, emotional, sensory, and motor deficits. There is growing interest in the identification of women who are at risk of spontaneous preterm birth. Many biophysical and biochemical markers have been discovered to identify those women who are at risk for spontaneous preterm birth (Revakova *et al.* 2015).

None of the various maternal and fetal biomarkers such as cytokines, CRH, C-reactive protein, fetal fibronectin, etc. are sufficiently sensitive or specific to be used alone or in combination to help decrease the rate of preterm births (Jablonska-Mestanova *et al.* 2013). Obviously, there's a need for an accurate method with high sensitivity and specificity for prediction of preterm labor. So that an appropriate management or referral to a higher center can be done to women likely to have preterm birth. The tocolytic therapy can be avoided in women who are unlikely to have preterm birth

Objectives

The enlargement of suprarenal gland is related to preterm birth and the birth weight. The aim of our study was to investigate the newborns in the region of western Slovakia followed up due to suprarenal gland enlargement. To set the ratio of prenatally diagnosticated suprarenal gland enlargement, to analyse the postnatal management and interventions.

METHODS

Retrospective cohort study. We analyzed 6 years of medical records of all cases from the western Slovakia region of suprarenal gland enlargement encountered to 1st Pediatric Department, Children's University Hospital Bratislava Republic in the time period of January 2010 to Janurary 2016. The diagnosis of suprarenal gland enlargement was set by ultrasound examination performed on the 4th postnatal day as an overall screening test. The newborns with positive laboratory screening on congenital adrenal hyperplasia (CAH) are followed up in outpatient´s department specialized on CAH. These newborns were excluded from our study.

We analyzed the origin of surarenal gland enlargement, gestation week on the due date, the birth weight and other comorbidities and genetic pathologies in newbors with the enlarged suprarenal glands.

RESULTS

In the period of six years (from January 2010 to January 2016) there were 6 newborns followed up due to suprarenal gland enlargement. All of the patients had diagnosticated the adrenal haemorrhage. All the newborn patients were born spontaneusly, with no birth trauma. Adrenal lesions like adrenal cysts from neuroblastoma were not confirmed. All of the adrenal enlargement were benign with no need to other medicamentous or surgical intervention.

None of the newborn patients had other genetic abnormalities. No mineral or hormonal imbalancies. No problems with arterial preassure nor hameodynamic instability. All of the patients underwent at least 5 prenatal ultrasound tests and at least 2 postnatal ultrasound measurements. There was no information about the suprarenal gland enlargement from the prenatal untrasound measurements in neither one of the patients. Comparing the information from the prenatal ultrasound examination we found the information about the suprarenal gland enlargement in patient with congenital adrenal hyperplasia. All of the suprarenal enlargements in followed patients were described by the first ultrasoud ot the 4th day of birth.

The avarage birth weight was 3 030 g (2 700–37 50 g) The only newborn was prenatally followed up due to diagnosis of intrauterine growth retardation, with no

other growth abnormalities. The avarage birth lenght was 50 cm (47–53 cm)

The avarage gestation week (gw) on due date was 39 gw 85% from the patients were born on 40 gw, 15% on 39 gw.

CONCLUSION

Adrenal haemorrhage which is the most common cause of adrenal mass during the perinatal period. It is important to differentiate benign adrenal lesions like adrenal hemorrhage or adrenal cysts from neuroblastoma. The activation of the fetal hypothalamic-pituitary-adrenal axis plays a crucial rule in commencement of labor. The ultrasound measurement of fetal adrenal gland volume may identify women at risk for impending preterm birth.

In our study we didn't confirm the relation between the suprarenal gland enlargement and the preterm birth (≤34 weeks' gestation). In the period of 6 years we didn't find a newborn patient with the prenatal diagnosis of suprarenal gland enlargement- the patients with congenital adrenal hyperplasia were excluded. All of the newborn patients had the diagnosis of adrenal gland enlargement set on the 4th postnatal day by the overall ultrasound measurement screening test.

The adrenal gland enlargement didn't have a relation to low gestation birth weight nor length. The adrenal gland enlargement didn't have a relation with the preterm birth.

In the followed up period we found only patients with adrenal gland enlargement with congenital adrenal hyperplasia. That's why we decided to add to our work a case report about the differential diagnosis of adrenal gland enlargement.

THE CASE REPORT

There is a lack of case reports in literature speaking about prenatally diagnosticated suprarenal tumors and the history of adrenal hyperplasia in mothers medical history. There are little works about foetal adrenal haemorrhage complicated by prolonged/assisted delivery with severe perinatal asphyxia of the newborn aswell and the complications in the postnatal adaptation due to combination of the patological clinical units.

A 22-year-old woman, gravida 1 para 1, was referred to our center for assessment of suprarenal mass in fetal abdomen at 27 weeks of gestation. In her medical history there was polycystic ovarial syndrom treated with hormonal contraceptives. In the 20 years of age there was a diferential diagnostics led due to suspection of late congenital adrenal hyperplasia (CAH). The complete laboratory and hormonal screening was performed. The slight elevation of DHEA and testosteron was observed. The ultrasonography and CT scan confirmed bilateral adrenal hyperplasia. The ACTH test didn´t confirm the diagnoses of late CAH and the patient is in endocrinological ambulatory medical care.

Due to foetal adrenal cystic mass the detailed ultrasonographic evaluation revealed suprarenal cystic mass on the right side with a diameter of 13×15.7 mm The cyst was homogenous with intracystic septations suggesting intracystic hemorrhage. Color Doppler imaging of the mass revealed peripheral vascularization, and no blood flow was seen in the cyst. The spleen and left kidney were normal in appearance. No other fetal structural abnormalities were observed. Maternal urine homovanillic acid and vanilmandelic acid levels were normal. The magnetic resonance examination was performed at 30 week of gestation. An cystic formation with a diameter of 13×10 mm above the upper pole of right suprarenal gland and under the below conture of hepar with the haemorhagic content connected with the suprarenal gland was detected. The planned follow-up sonography was not performed due to praemature delivery at 35 week of gestation.

One day before delivery the mother suffered from fever (38 °C), nausea, vomiting, diarrhoea. The maternal vomiting caused the rupture of membranes and leak the amniotic fluid. The infant was delivered preaematurely at 34 weeks 6 days of gestation, cephalic vertex presentation. The second stage of labor was complicated by the deceleration of fetal heart rate (80/bpm). During the labour the oxytocin was administered, and the foetus was delivered by forceps delivery. There was a simplex cervical umbilical cord cirumflectation. A male infant weighting 2 970 g, 51 cm was born, with Apgar scores of 6 at 1 minute and 9 at 5 minutes. There was a sharp caput succedaneum and the birth trauma after the forceps labour marked. The postnatal adapation was complicated by perinatal asphyxia, hypotonia. The severe combined metabolic acidosis (pH 6.9) and hypoglycemia (1.7 mmol/l) dominated in the laboratory screening. The newborn was resuscitated, oxygenated with postitive end-expiratory pressure with a good clinical response. Due to febrilities there was a suspition on an adnate infection, the antibiotic treatment was iniciated. Due to prolonged hypotensia the catecholamins replacement and corticotherapy (hydrocortison) was iniciated. A congenital adrenal insufficiency was supposed and the newborn was transferred to the Clinic of patological newborns, in the University Hospital Bratislava.

MAIN OUTCOME OF THE CASE REPORT

Postnatal sonographic examination confirmed the presence of an adrenal multilocular tumor content of two cystoid components, anechogenic, slightly devided with septum, avascular. With no oppression of other tissuses, 13×10×12 mm in size. There was no progression comparing with the prenatal MRI examination.

In cooperation with endocrinologist there was a complete hormonal laboratory screening performed. There was no clinical neither laboratory sign of sup-

posed congenital adrenal insufficiency. The corticosteroid treatment was sequentially reduced, with no drop of arterial pressure. The repeated laboratory hormonal profile screening without the corticosteroid treatment was normal. In a differential diagnostics of suprarenal tumors the oncologist was consulted. The suprarenal hematoma was supposed, the newborn will undergo the complete examination inculding the retroperitoneal ultrasound exmination and the oncomarkers screening. The newborn is nowadays in a good shape, with no surgical interventions needed. The baby is led in ambulatory medical care and we are waiting for the coming up results from oncological and pediatric endocrinological examinations.

RESULTS OF THE CASE REPORT

There was clinical pathology in medical history of mother (hirsutism, expressive hairiness, cranial elevation of pubic hair), the CT confirmation of bilateral adrenal hyperplasia. In laboratory screening there was the hyperandrogenous status, hormonal ACTH suppression test was negative. The diagnosis of congenital adrenal hyperplasia wasn't set. The patient was left without medication in ambulatory medical care.

In two years the patient appeared in our center for assessment of suprarenal mass in fetal abdomen at 27 weeks of gestation. An cystic formation above the upper pole of right suprarenal gland and with the haemorhagic content connected with the suprarenal gland was detected. The status of the newborn was complicated with the perinatal asphyxia, instrumental forceps premature delivery. The postnatal care included the corticosteroid and inotropic supplementation, antibiotic medication. The postnatal ultrasography confirmed the prenatally diagnosticated suprarenal mass with no calcification, no expansion with the time distance. Untill these days the endocrinological and oncological differential diagnostic runs with no specific results. With no need of medication neither surgical intervention.

As mother so the baby stays in the ambulatory medical care with no specific diagnosis, with confirmed mass in adrenal gland, with no hormonal patological laboratory screening.

CONCLUSION OF THE CASE REPORT

The accurate diagnosis of neonatal suprarenal mass depends on prenatal ultrasonography, clinical manifestations, CT and ultrasound. Dynamic observation of suprarenal mass by CT and ultrasound is an important means of differential diagnosis (Granata *et al.* 2000). Ultrasonography and MRI both accurately detect suprarenal masses. MRI complements USG in equivocal diagnoses and detects additional findings such as liver metastases in neuroblastoma (Brame *et al.* 1999). While conservative therapy is suitable for adrenal hemorrhage, adrenal tumors need surgical excision. In addition, adrenal mass that is difficult to diagnose can be followed up for 1 month without any adverse effects on the therapy and prognosis of the tumor (Lin *et al.* 1999). An appropriate initial assessment and a close follow-up in a specialized center, due to close cooperation of gynecologist/obstetrician, endocrinologist, oncologist (Hamada *et al.* 1999).

REFERENCES

1 Brame M, Masel J, Homsy Y (1999). Antenatal detection and mangement of suprarenal masses. Urology. **54**: 1097.
2 Maki E, Oh K, Rogers S, Sohaey R (2014). Imaging and differential diagnosis of suprarenal masses in the fetus. J Ultrasound Med. **33**: 895–904.
3 Gocmen R, Basaran C, Karcaaltincaba M, *et al.* (2005). Bilateral hemorrhagic adrenal cyst in an complete form of Becwith-Wiedemann syndrome: MRI and prenatal US findings. Abdominal Imaging. **30**: 786–789.
4 Granata C, Fagani AM, Gambini C, *et al.* (2000). Features and outcome of neuroblastomadetected before birth. Journal of Pediatric Surgery. **35**: 88–91.
5 Hamada Y, Ikebukuro K, Sato M, *et al.* (1999). Prenatally diagnosed cystic neuroblastoma. Pediatric Surgery International. **15**: 71–74.
6 Jablonska-Mestanova V, Sisovsky V, Danisovic L, Polak S, Varga I (2013). The normal human newborns thymus; Bratisl Med J. **114**(7): 402–408.
7 Lin JN, Lin GJ, Hung IJ, *et al.* (1999). Prenatally detected tumor mass in the adrenal gland. Journal of Pediatric Surgery. **34**: 1620–1623.
8 Revakova T, Revak O, Vasilenkova A, Behulova A, Brucknerova I (2015). Amount of folic acid in different types of nutrition used in the neonatal period. Bratisl Med J. **116**(6): 349–353.
9 Rubenstein SC, Benacarraf BR, Retik AB, Mandel J (1995). Fetal suprarenal masses: sonographic appearance and differential diagnosis. Ultrasound Obstet Gynecol. **5**(3): 164–167.
10 Schwarzler P, Bernard JP, Senat MV, Ville Y (1999). Prenatal diagnosis of fetal adrenal masses: differentiation between hemorrhage and solid tumor by color Doppler sonography. Ultrasound Obstet Gynecol. **13**: 351–355.
11 Zikavska T, Brucknerova I (2014). Extremely high concentration of folates in premature newborns. Bratis Med J. **115**(2): 103–106.