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**Correspondence:** Rumeli Caddesi 47/606, Nişantaşı 34371 İstanbul
**Phone:** (0212) 224 68 49 • **Fax:** (0212) 296 01 50
**e-mail:** editor@perinataldergi.com
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**Original research articles** base on clinical or experimental studies. The main text should not exceed 2500 words (max. 16 pages) and there should be a maximum 6 authors

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Manuscripts should be designed in the following order: title page, abstract, main text, references, and tables, with each typeset on a separate page:

**Page 1** - Title page
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**Page 3** and next - Main text
**Next Page** - References
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This page should only include the title of the manuscript, which should be carefully chosen to better reflect the contents of the study. No anusual abbreviations should be used in the title of the manuscript. A short title as running heading not exceeding 40 characters should be given which is desired to appear on top part of continuing pages when journal is published.

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References used in the text should be directly related to the topic, as recent as possible and in enough numbers. They should be numbered in square brackets in the order in which they are mentioned in the text including Tables and Figures. Citation order should be checked carefully.

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— ***Book:*** Jones KL. Practical perinatology. New York: Springer; 1990. p. 112-9.

— ***Chapter in a book:*** Sibai BM, Frangieh AY. Eclampsia. In: Gleicher N, editors. Principles and practice of medical therapy in pregnancy. 3rd ed. New York: Appleton&Lange; 1998. p. 1022-7.

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All illustrations (photographs, graphics, and drawings) accompanying the manuscript should be referred to as "figure". All figures should be numbered consecutively and mentioned in the text. Figure legends should be added at the end of the text as a separate section. Each figure should be prepared as a separate digital file in "jpeg" format, with a minimum 300 dpi or better resolution. All illustrations should be original. Illustrations published elsewhere should be submitted with the written permission of the original copyright holder. For recognizable photographs of human subjects, written permission signed by the patient or his/her legal representative should be submitted; otherwise, patient names or eyes must be blocked out to prevent identification. Microscopic photographs should include information on staining and magnification.

Each table should be prepared on a separate page with table heading on top of the table. Table heading should be added to the main text file on a separate page when a table is submitted as a supplementary file.

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For a swift peer review, Perinatal Journal operates a web-based submission, peer review and manuscript tracking system. Authors are required to submit their articles online. Details of how to submit online can be found at www.perinataljournal.com.

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# Perinatal Journal

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# Contents

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# Iron Status Markers of Pregnant Women Receiving Iron Treatment and Iron

**Nilüfer Yiğit Çelik[1], Barış Mülayim[1], Sema Mülayim[2], Elif Durukan[3], Filiz Yanık[4]**

*[1]Başkent Üniversitesi Tıp Fakültesi, Alanya Uygulama ve Araştırma Merkezi, Kadın Hastalıkları ve Doğum Kliniği, Antalya,*
*[2]Alanya Devlet Hastanesi, Kadın Hastalıkları ve Doğum Kliniği, Antalya*
*[3]Başkent Üniversitesi Tıp Fakültesi, Biyoistatistik, Ankara*
*[4]Başkent Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Ankara*

**Abstract**

**Objective:** To investigate the effectiveness of iron treatment and iron prophylaxis in the regard of iron status markers during pregnancy.

**Methods:** Two-hundred twelve pregnant women admitted to Baskent University Alanya Medical Center included the study.The pregnant women in the hemoglobin group treated with one iron hydroxide polymaltose complex tablet (containing 100 mg of elemental iron= Fe+++) per day throughout pregnancy when hemoglobin (Hb) level was <11g/ dl. In the ferritin group, pregnant women received iron prophylaxis with one the same tablet based on ferritin values early in pregnancy.

**Results:** All Hb,hematocrit (Hct), ferritin, iron and iron binding capacity values were found significantly different between trimesters of pregnancy in both groups. And except the mean decrease of Hb values between the first and third trimester of pregnancy, the other markers were not found significant between the two groups. Differences in Hb, Hct, ferritin, iron and iron binding capacity values between first and third trimester in the hemoglobin and ferritin groups were as follows; 1.6±0.9 vs. 1.3±1.1 g/dl, 4.4±3.1 vs. 3.8±2.8%, 20.7±30.4 vs. 20.7±26.0 İg/L, 24.6±41.9 vs. 24.1±37.8 µg/ dl, -138.1± 84.4 vs. -119.1±84.4 µg/ dl.

**Conclusion:** Even iron recommended to pregnant women when only if their Hb level was less than 11g/dl during pregnancy; those have similar changes in the regard of iron status markers throughout pregnancy when compared to iron recommended according to ferritin levels early in pregnancy.

**Keywords:** Hemoglobin, hematocrit, ferritin, iron and iron binding capacity.

## *Demir tedavisi veya demir profilaksisi alan hastalarda serum demir belirteçleri*

**Amaç:** Gebelik süresince demir tedavisi veya demir profilaksisinin serumda demir durumunu gösteren belirteçlere etkisini araştırmak.

**Yöntem:** Başkent Üniversitesi Alanya Uygulama ve Araştırma Merkezinde takip edilen 212 gebe ilk başvuruda randomize olarak iki gruba ayrıldı. Birinci gruba (hemoglobin (Hb) grubu) kontrolleri sırasında Hb düzeyi <11 g /dl tespit edildiğinde günde bir tablet demir hidroksi polimaltoz kompleksi alması önerildi. İkinci gruptaki ( ferritin grubu) hastalara ise erken gebelikteki ferritin düzeylerine göre aynı demir preparatını yine tüm gebelik boyunca alması önerildi.

**Bulgular:** Grupların kendi içinde Hb, hematokrit (Hct), ferritin, demir (fe) ve demir bağlama kapasitesi değerlerinin (febk) hepsi tüm trimesterler için anlamlı ölçüde farklı bulundu. Hb seviyesinde üçüncü ve birinci trimesterler arasındaki ortalama düşüş dışındaki diğer tüm belirteçlerin farkları istatistiksel olarak anlamsızdı. Hb, hct, ferritin, demir ve demir bağlama kapasitesinin birinci ve üçüncü trimesterlerdeki değerlerinin arasındaki farklar hemoglobin ve ferritin grupları için sırasıyla: 1.6±0.9 vs. 1.3±1.1 g/dl, 4.4±3.1 vs. 3.8±2.8%, 20.7±30.4 vs. 20.7±26.0 İg/L, 24.6±41.9 vs. 24.1±37.8 µg/ dl, -138.1± 84.4 vs. -119.1±84.4 µg/ dl idi.

**Sonuç:** Gebelikte demir tedavisinin Hb seviyesi 11 g/ dl altına düştükten sonra başlanmasıyla erken gebelikteki ferritin seviyelerine göre başlanmasının serum demir durumunu gösteren belirteçler açısından benzer etkileri olmaktadır.

**Anahtar Sözcükler:** Hemoglobin, hematokrit, ferritin, demir ve demir bağlama kapasitesi.

Correspondence: Nilüfer Yiğit Çelik, Başkent Üniversitesi Alanya Uygulama ve Araştırma Merkezi Saray Mah. Yunus Emre Cad. No:1 Alanya, Antalya
e-mail: niluferyigitcelik@yahoo.com

## Introduction

Lack of convincing scientific support for choosing one or the other strategy in the regard of iron prophylaxis during pregnancy, it is generally prescribed based on selected knowledge, personal experience, tradition and economical considerations in Turkey and we believe as well as around the world. The debate concerning iron prophylaxis strategy to pregnant women has been controversial and no definite consensus has been reached. This is may be due to different prevalence of iron deficiency (ID) and iron deficiency anemia (IDA) around the world.

There are discrepancies between the recommendations from different health institutions like Food and Agriculture Organization of the United Nations,[1] The Nordic Nutrition Recommendations[2] or Department of Health in United Kingdom,[3] in the regard of iron prophylaxis during pregnancy but the common point, which they pay attention, is the iron reserves at the start of pregnancy. A ferritin concentration of 60 μg/L corresponds to iron stores of around 500 mg,[4] while iron deficiency is defined as empty iron stores with ferritin <12-15 μg/L.[5] It is possible to avoid unnecessary iron loading of women with adequate iron status, i.e., iron reserves of >500 mg as iron has a negative influence on the absorption of other essential divalent metals and causes an increase in the oxidative stress, as well.[6-12] Despite almost all pregnant women are advised for iron prophylaxis in Turkey those whom have not being taken iron prophylaxis for some reasons; encountered with low hemoglobin (Hb) levels during pregnancy and then after have to commence iron treatment. So we created the one-foot of our study with the pregnant women who received iron prophylaxis based on ferritin values early in pregnancy and the other-foot with the pregnant women who received iron only if their Hb level was less than 11g/dl during pregnancy. And then we evaluated the effectiveness of iron treatment and iron prophylaxis in the regard of iron status markers during pregnancy of Turkish women.

## Methods

This clinical trial was conducted prospectively between January 2008- June 2008 at the Obstetrics and Gynecology Department of Baskent University, Alanya Medical and Research Center, in Alanya, Turkey. All women admitted to hospital for antenatal care recruited into this study. Two hundred sixty- eight pregnant women were admitted during this time. Of these 280 women, 54 were not eligible for the study. Each eligible participant gave written informed consent.

The institutional review boards of the Baskent University approved the protocol. Inclusion criteria for recruitment were as follows: who was at first trimester of pregnancy, had not taken supplements that contained iron in the last month, had a singleton pregnancy, had not known chronic illness (such as chronic hypertension, asthma, diabetes, gastrointestinal problems like ulcerative colitis or peptic ulcus), had not complicated pregnancy ( threatened abortion history in present pregnancy etc), had not smoking. After excluding 54 women, 226 women were randomly allocated to either hemoglobin group or ferritin group by means of computer- generated number table. After randomization, fourteen women were subsequently excluded: 6 were lost to follow up, 5 women developed preeclampsia in second trimester, 3 patients did not give birth in the our hospital. Finally, the analysis was conducted on 100 women in the hemoglobin group and 112 women in the ferritin group.

The pregnant women in the hemoglobin group took one iron hydroxide polymaltose complex tablet (containing 100 mg of elemental iron= Fe+++) per day throughout pregnancy when Hb level was <11g/ dl. In the ferritin group, criteria to recommend iron supplementation were as follows: at the first prenatal visit[1]

if ferritin level was < 20 μg/L, one iron hydroxide polymaltose complex tablet per day throughout pregnancy was recommended at once to pregnant women immediately,[2] if ferritin level was 20- 60 μg/L, after 20 weeks of pregnancy women started to take one iron hydroxide polymaltose complex tablet per day,[3] if ferritin level was >60 μg/L, drug was not recommended to the pregnant women. For each woman, levels of hemoglobin, hematocrit, ferritin, serum iron and iron binding capacity were controlled in the first trimester (<14 gestational weeks), in the second trimester (20- 28 gestational weeks) and before delivery (32- 36 gestational weeks).

Administration of the drugs was in accordance with the manufacturers recommendations. A serum ferritin value of <12 μg/L was considered to indicate absent iron reserves and iron deficiency during pregnancy. The World Health Organization recommends a Hb of 11.0 g/ 100 ml as a cut off point for anemia throughout the whole pregnancy.[13] Iron deficiency anemia was defined as serum ferritin <12 μg/L in the presence of anemia. Incidence of iron deficiency and iron deficiency anemia was defined according to above criteria.

The software SPSS version 17.0 (Statistical Package for the Social Sciences, version 15.0, SPSS Inc, Chicago, Ill, USA) was used to monitor progress and analyze the data. The continuous variables (Age, BMI, gravidity of the subjects, serum hemoglobin, hematocrit, ferritin, iron levels and iron binding capacity) were presented as mean ± SD (standard deviation), and were compared with regard to study groups using independent samples t-test. Within each group, to evaluate the variation of serum hemoglobin, hematocrit, ferritin, iron levels and iron binding capacity between first, second and third trimesters repeated measures variance analysis was used and to determine which trimester was significantly different from the others, bonferoni adjusted paired samples t-test was performed. Statistically significance was set at "$p \leq 0.05$ (in bonferoni adjusted tests, "$p<0.016$" was considered as statistically significant).

## Results

In hemoglobin group 100 and in the ferritin group 112 pregnant women were followed during their pregnancies. The mean age of the pregnant women was 29.0±1.2 in the hemoglobin group and 28.7±1.3 in the ferritin group ($p>0.05$). As shown in Table 1, age, gestational age, gravidity and body mass index (BMI) of the pregnant women were not significantly different between groups. Venous blood samples were obtained on average at 7.7± 2.0 weeks and 8.0±2.2 weeks in the first trimester, 24.4±2.5 weeks and 27.0±2.8 weeks in the second trimester and 33.7±1.4 weeks and 33.5±1.7 weeks in the third trimester in hemoglobin and ferritin groups, respectively ($p >0.05$).

In Table 2, mean values of serum hemoglobin (Hb) hematocrit (Hct), ferritin, iron and iron binding capacity levels in two groups for each trimester was shown. The mean of serum

**Table 1.** Demographic characteristics of the pregnant women.

| Variable | Hemoglobin group (n= 100) | Ferritin group (s=112) | p*** |
|---|---|---|---|
| Age (year)* | 29.0±1.2 | 28.7±1.3 | >0.05 |
| Gestational age at delivery (week)* | 38.9±0.9 | 38.4±0.8 | >0.05 |
| Gravidity* | 2.1 ±1.0 | 2.1 ±1.1 | >0.05 |
| Parity** | 1 (0-1) | 1 (0-1) | >0.05 |
| Body mass index* | 22.1±5.6 | 23.2±7.8 | >0.05 |

*Data are given as mean± SD; ** Median (inter quartiles); *** Independent samples t- test

hemoglobin, hematocrit, ferritin, iron levels decreased and the iron binding capacity increased within the time in both groups (p< 0.0001). Within the hemoglobin group, the serum hemoglobin level decreased from 12.4±1.0 to 10.9±1.1 in second trimester and to 10.7±1.1 in the third; but in the ferritin group the decrease of hemoglobin level occurred significantly in second trimester (p<0.016), there was not statistically significant difference between the third and second trimester hemoglobin levels (p>0.016).

The decrease of serum hematocrit, ferritin and iron levels were significant in the second trimester in both of the groups (p<0.016). The mean of iron binding capacity increased in second trimester in both of the groups, and the increase continued also in third trimester. Mean differences between third trimester and first trimester values of the serum markers of the iron status (mean hb, htc, ferritin, iron, iron binding capacity) between the two groups were shown in Table 3. There was only in the mean decrease in Hb value was statistically different between groups, while for the all other markers, significant difference were not found. Prevalence of iron deficiency was 14%, 66%, 68% in the hemoglobin group in the first, second, third trimester, respectively while prevalence of iron deficiency anemia was 6%, 46% and 32%. In the ferritin group, prevalence of iron deficiency was 23% in the first trimester where as prevalence in the second trimester and third trimester of pregnancy were increased 68% vs. 86% in the second and third trimesters, respectively.

Prevalence of iron deficiency anemia for each trimester was as follows: 9%, 50% and 34% in the first, second and third trimester respectively in the ferritin group.

## Discussion

In our study, all Hb, Hct, ferritin, iron and iron binding capacity values were found significantly different among trimesters of pregnancy in both groups. Except the mean decrease of Hb values between the first and third trimester of pregnancy, the other markers were not found significantly different between the two groups. But the difference in Hb values between two groups was clinically insignificant (1.6 ±0.9 vs. 1.3±1.1g/dl). Our study showed that

**Table 2.** Serum levels of pregnant women with respect to iron status markers in each group.

| Variable | 1st trimester | 2nd trimester | 3rd trimester | p* |
|---|---|---|---|---|
| Hb level (g/ dl) | | | | |
| Hemoglobin group | 12.4±1.0 | 10.9±1.1 | 10.7±1.1 | <0.0001 |
| Ferritin group | 12.2±1.2 | 10.9±1.1 | 10.9±1.2 | <0.0001 |
| Hematocrit level (%) | | | | |
| Hemoglobin group | 36.7±2.5 | 32.7±2.9 | 32.2±3.0 | <0.0001 |
| Ferritin group | 37.1±3.3 | 33.5±2.9 | 33.2±3.2 | <0.0001 |
| Ferritin level (µg/ L) | | | | |
| Hemoglobin group | 39.0±28.3 | 16.1±18.1 | 18.2±22.7 | <0.0001 |
| Ferritin group | 29.0±27.2 | 11.1±8.5 | 8.3±6.0 | <0.0001 |
| Serum iron level (µg/ dl) | | | | |
| Hemoglobin group | 73.9±35.6 | 55.4±37.4 | 49.3±38.8 | <0.0001 |
| Ferritin group | 71.6±32.2 | 57.6±40.9 | 47.5±34.2 | <0.0001 |
| Serum iron binding capacity (µg/ dl) | | | | |
| Hemoglobin group | 325.8±67.1 | 421.8±74.7 | 420.6±60.5 | <0.0001 |
| Ferritin group | 283.1±75.0 | 346.6±85.6 | 393.9±84.4 | <0.0001 |

*Repeated measures variance analysis

**Table 3.** Differences in markers of iron status between first and third trimesters in each group.

| Markers of iron status | Mean difference (± SD) | p* |
|---|---|---|
| Differences in Hb | | |
| Hemoglobin group | 1.6±0.9 | <0.05 |
| Ferritin group | 1.3±1.1 | |
| Differences in Hct | | |
| Hemoglobin group | 4.4±3.1 | >0.05 |
| Ferritin group | 3.8±2.8 | |
| Differences in ferritin | | |
| Hemoglobin group | 20.7±30.4 | >0.05 |
| Ferritin group | 20.7±26.0 | |
| Differences in iron level | | |
| Hemoglobin group | 24.6±41.9 | >0.05 |
| Ferritin group | 24.1±37.8 | |
| Differences in iron binding capacity | | |
| Hemoglobin group | -138.1±84.4 | >0.05 |
| Ferritin group | -119.1±84.4 | |

*Independent samples t test.

either receiving iron when only if their Hb level was less than 11g/dl during pregnancy or receiving iron according to ferritin levels early in pregnancy had similar changes with respect to iron status markers during pregnancy. Iron deficiency prevalence was 68.0% and 86.0% in the third trimesters of pregnancy in the hemoglobin and ferritin groups, respectively.

Iron deficiency anemia prevalence was 32.0% and 34.0% in the third trimesters of pregnancy in the hemoglobin and ferritin groups, respectively. When we compared our results with Milman et al's results in the regard of ID and IDA, our results were very high. When they recommended 80-mg/day irons from 18th weeks of pregnancy, ID and IDA prevalence were found 12.3% and 0 in the 32 weeks of gestation respectively.[13] Also when we compared our study with Siega Riz et al's results, we can see this difference again, IDA was observed 10% among iron receiving group in the third trimester.[14] Prevalence of ID and IDA were high in our study, but definition of ID and IDA, prophylactic dose and duration of iron, and criteria for when prophylaxis should be given were different between these studies and our study. Factors such as socioeconomic status, lifestyle, eating habits could affect the prevalence of iron deficiency and iron deficiency anemia.[15-17] So may be every nation should have to find its own guideline for iron prophylaxis during pregnancy due to affecting reasons. To our knowledge, our study is the first one that such an evaluation has done in the literature. Gofin R et al published the one, which was similar to our study, in this study 478 pregnant women who received iron supplementation from the 4th month of pregnancy compared with 392 pregnant women who received iron treatment only if their Hb level was less than 12 g/dl, or had no supplementation.

The mean decrease of Hb and Hct levels between the second and third trimester of pregnancy was lower in the supplementation group (-0.9 g/dl Hb, -2.1% Hct) than in the treatment group (-1.1 g/dl Hb; -3.3% Hct).

The differences between the two groups were significant only for the Hct levels.[18] In another study, 429 of women who had hemoglobin levels of > or = 110 g/L and ferritin levels of > or = 40 μg/L and were assigned randomly to receive prenatal supplements with 30 mg of iron as ferrous sulfate or 0 mg of iron until 26 to 29 weeks of gestation. Daily prenatal supplements with 30 mg of iron that were given from about 12 weeks of gestation to the third trimester to initially non-anemic women with sufficient iron stores (ferritin, ≥40 μg/L) did not significantly improve iron status at the beginning of the third trimester.[14] In a randomized, double-blind, placebo-controlled trial, 244 women who had a hemoglobin concentration of 13.2 g/dl or greater and a serum ferritin level higher than 15 μg/L between the 13th and 18th week of pregnancy took either one 150-mg tablet of ferrous sulfate daily or placebo during their pregnancies. They concluded that if iron supplementation has not used, it did not cause a considerable decrease in markers of anemia in women with a hemoglobin concentration of

13.2 g/dl or greater in the second trimester of pregnancy.[19]

## Conclusion

In conclusion, our study suggests that even iron recommended to pregnant women when only if their Hb level was less than 11g/dl during pregnancy; those have similar changes in the regard of iron status markers throughout pregnancy when compared to iron recommended according to ferritin levels early in pregnancy.

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# Ultrasonographic Findings in pregnants with Down Syndrome

**Cüneyt Eftal Taner, Mustafa Oğuz Aygören, İlkan Kayar, Gülsen Derin**

*Ege Doğumevi ve Kadın Hastalıkları Eğitim ve Araştırma Hastanesi, Kadın Hastalıkları ve Doğum Kliniği, İzmir*

**Abtract**

**Objective:** Review the ultrasonographic features of down syndrome cases during pregnancy.

**Methods:** Ultrasonographic features of Down syndrome cases diagnosed with karyotype investigations due to advanced maternal age, increased risk in biochemistry tests, and structural anomalies diagnosed during ultrasonography.

**Results:** Ultrasonographic features of 19 cases with Down syndrome were reviewed in a group of 1204 karyotipe investigation. In 7 cases ultrasonographic features were normal (36.8%). In 7 cases nuchal folds were increased. In 4 cases (21.1%) pelvicaliectasis were detected. In 2 other cases there were omphalocel and cardiac anomalies, and cystic hygroma and cardiac echogenic focus was detected in one cases.

**Conclusion:** During ultrasonographic investigations structural anomalies and soft markers should carefully searched and than decision for invasive procedures were should be considered.

**Keywords:** Down syndrome, ultrasonography, prenatal diagnosis .

*Down sendromlu olgularda ultrasonografik bulgular*

**Amaç:** Gebeliklerinde Down sendromu tanısı alan olguların ultrasonografik bulguları gözden geçirildi.

**Yöntem:** Gebeliği sırasında ileri maternal yaş, tarama testlerinde yüksek risk, ultrasonografide saptanan yapısal anomaliler nedeniyle amniosentez sonrası karyotip incelemesi ile Down sendromu tanısı alan olguların ultrasonografik bulguları gözden geçirildi.

**Bulgular:** Karyotip incelemesi yapılan 1204 olgudan kesin Down sendromu tanısı alan 19 olgunun ultrasonografik bulguları incelendi. 7 olgu normal değerlendirildi (%36.8). 7 olguda ense kalınlığı yüksekti. 4 olguda (%21.1) pelvikaliektazi saptandı. İkişer olguda omfolosel ve kardiak anomali tespit edildi. Birer olguda ise kistik higroma, kardiak ekojenik odak, koroid pleksus kisti ve pes ekinovarus saptandı.

**Sonuç:** Rutin ultrasonografik incelemeler ile down sendromlu olgularda saptanan soft markerlar üzerinde dikkatle durulmalı ve yaklaşım tekrar gözden geçirilmelidir.

**Anahtar Sözcükler:** Down sendromu, ultrasonografi, prenatal tanı .

## Introduction

During ultrasonographic investigations some detected soft markers are related with Down syndrome and other aneuploidies such as increased nuchal fold thickness, echogenic bowels, short femur length, pyelectasis, hypoplastic nasal bone, choroid plexus cyst, echogenic intracardiac focus.[1] Prenatal biochemical tests are more valid than second trimester ultrasonographic investigations for diagnosis of Down Syndrome. Structural anom-

Correspondence: M. Oğuz Aygören, Ege Doğumevi ve Kadın Hastalıkları Eğitim ve Araştırma Hastanesi, Kadın Hastalıkları ve Doğum Kliniği, İzmir
e-mail: moguzaygoren@yahoo.com

alies are friquently related with chromosomal anomalies. Soft markers increases amniocentesis and this may lead to a little increase in abortion rates. In this study, ultrasonographic soft markers of fetuses diagnosed of Down Syndrome are retrospectively reviewed.

## Methods

Our study group consisted of 19 cases with Down Syndrome . Amniocentesis was indicated in 1204 women due to family history of aneuploidies, maternal age, increased risk in biochemical tests, ultrasonographic soft markers and structural anomalies in these fetuses during the years 2006 and 2007. Ultrasonographic findings of these cases detected during ultrasonographic investigations which were performed in 11-22 weeks gestations were reviewed. The fetuses without karyotype analysis or diagnosed postnatally were not taken in to the study group since their records can not be reached. Early fetal deaths were also not included. Ultrasonographic investigations were made by using a Medison 3.5 MHz probe by our hospital physicians. Amniocentesis were performed by our physians under ultrasonography by using 22 g spinal needles after two times of povidone iodine aplication to lower abdomen. Our soft markers are nuchal translucensy more than 3 mm, nuchal fold thickness more than 6 mm,[1,2] choroid plexus cysts independent of number and size, intracardiac echogenic focus, echogenic bowels, renal pyelectasis (when anteroposterior length of renal pelvis is more then 4 mm), short femur or humerus length when actual length is shorter than 85% of expected length. Since ultrasonografic investigations were made by different physicians, we couldn't reach nasal bone findings in all hospital recordings. For this reason nasal bone findings are not included in our evaluation. All structural anomalies and soft markers were recorded.

## Results

Ultrasonographic findings of 19 cases with Down syndrome diagnosed with karyotype investigations were included as the study group. Between 2006-2007 years we find out 1204 karyotypic analysis performed for advanced maternal age, increased risk in biochemical tests, structural anomalies and soft markers detected during ultrasonography and history of chromosomal anomalies in the family., Nineteen of cases were diagnosed as trisomy 21. Six patients were older than 35 years in this group. Mean maternal age of 19 cases was 30.9, average parity was 1.1, and mean gestational age was 18 weeks at the time of amniocentesis. Ultrasonographic findings of 19 cases with Down Syndrome are listed Table I. In 9 cases there were more than one ultrasonographic finding. All cases with Down Syndrome were discussed at our perinatology council. After situation was explained to the parents 16 cases were inducted by misoprostol. Three

**Table 1.** Ultrasound findings in Down syndrome cases.

| Findings | Cases | % |
|---|---|---|
| Normal anatomy | 7 | 36.84 |
| NT>3 mm (5) NF>6 mm(2) | 7 | 36.84 |
| Renal pelvicaliectasia | 4 | 21.05 |
| Nasal bone hypoplasia | 2 | 10.52 |
| Cardiac anomaly | 2 | 10.52 |
| Omphalocele | 2 | 10.52 |
| Cystic hygroma | 1 | 5.26 |
| Intracardiac echogenic foci | 1 | 5.26 |
| Plexus choroideus cyst | 1 | 5.26 |
| Pes equinovarus | 1 | 5.26 |

patients refused the council decision, 2 of those had gone cesarean section due to ablatio plasenta and fetal distress, one case was born spontaneously.

## Discussion

Down Syndrome is seen in 1.41 of 1000 live births and ıt's the one of the most important chromosomal anomalies that is investigated by perinatologists.[3] Ultrasonographic soft markers are, increased nuchal fold thickness, echogenic bowels, short femur-humerus length, pyelectasis, echogenic intracardiac focus, and choroid plexus cyst. Nasal bone aplasia and hypoplasia were added to the list afterwards. All these markers are useful clues for diagnosis of Down Syndrome.[4] Cardiac anomalies are seen at about 50 % of Down Syndrome patients.[5] In spite of different study results structural anomalies can be detected at about 30 % of Down Syndrome cases by second trimester ultrasonographic investigations.[6-8] Yıldırım reported that 12.9 % of the cases had chromosomal anomalies and 4.6 % of these cases had Down syndrome in a group of cases with fetal anomalies detected during ultrasonography. They concluded that detection of chromosomal anomalies by amniocentesis was higher in cases with fetal anomalies rather than advanced maternal age or risk in triple test.[9] Sener reported that they foud pathologic ultrasonographic features in 30 % of cases with Down syndrome.[10] Soft markers are usually found with structural anomalies.[11] Furthermore it's said that isolated soft markers such as choroid plexus cyst, echogenic bowel, short femur, short humerus are not related with Down Syndrome. In our series there was no ultrasonographic marker among 7 cases. If it would be possible; could be find any marker in these pregnants?. The main question is what shall we do when find a soft marker. These markers can be found at about 14-15 % of normal second trimester pregnancies. False positivity and fetal deaths due to invasive diagnostic procedures will increase if we prefer karyotype analysis for every soft marker detected. According to Bindman et al. İsolated soft markers are seen at 13.9 % of Down Syndrome cases and 9.3% of normal fetuses.[11] The most common anomalies are congenital cardiac defects, cerebral ventriculomegalies, cystic hygroma, hydrops, hydrotorax, omphalocel, duodenal atresia and abnormal extremities.[8,12] Boyd et al reported that soft markers, increased the detection of malformation diagnosis rate by 4 % but on the other hand false positivity increased by 12 times.[13] Because of these increased likelihood ratio was proposed to be 2.0 when evaluating the soft markers.[14] And in the abcense of soft markers the case should be removed from the high risk group.[15] Nasal bone aplasia was detected in 0.5 % of normal fetuses and 43 % of trisomy 21 cases at Bromley's study[16] and they concluded that this soft marker increased the likelihood ratio 83 times. In our study we detected one nasal bone aplasia and one nasal bone hypoplasia (10.52%). This low percentage in our study may be due to evaluations done by different physicians. Also those patients may not be evaluated with same interest and care. In our opinion this ratio will increase when evaluations were done by well educated and carefull physicians. Bromley and et al reported that nuchal fold thickness 6 mm and/or more at 15-22 weeks of gestation increases trisomy 21 risk by 17 times but noted that this is not a common finding.[13,17] In our study, in 5 cases nuchal translucency and in 2 cases nuchal fold thickness was increased. Isolated increased nuchal

fold thickness was seen at 4% of Down Syndrome cases and together with 26 % of other anomalies.[17] It's accepted that this soft marker, even in isolated form, increases Down Syndrome risk.[17-18] Hyperechogenic bowel is encountered at 15 % of trisomy 21 patients and 6.6 % of normal fetuses.[19] We have no case with this finding in our study group. It should not be forgotten that hyperechogenic bowel can be related with swallowed blood, cystic fibrosis disease and fetal infections. It's known that short femur and humerus length increases chromosomal anomaly risk.[20-21] 2.5 times increase at standard percentiles is accepted as diagnotic criteria[22] and short humerus length is more diagnostic than femur length.[16,23] So it's advised to measure humerus length during second trimester ultrasonographic investigation.[14] Choroid plexus cysts are encountered in 25-30% of cases with trisomi 18 and 1 % of normal fetuses. They vary 3-16 mm in size can be detected at 14-16 gestational weeks and disappear at 22. gestational week. They are not accepted as soft markers for trisomy 21 but their importance is; they direct to reexamine fetal structures that may be related with trisomy 18. Renal pyelectasis is seen at 17% of Down Syndrome cases. We detected this finding in 4 of our 19 patients (21%). Aneuploidy ratio is 1/300 at isolated pyelectasis and this situation may also be related with hydronephrosis or postnatal urinary reflu disease.[24-25] Isolated pyelectasis is not accepted as an increased risk factor for trisomy 21 risk.[7] Middle phalanx hypoplasia of 5th finger, sandal gap, fetal ear size, brachycephaly are the other ultrasonographic findings, but these usually take place in case reports and not accepted as soft markers.[14] Single umblical artery may also seen in aneuploidic fetuses but it is usually together with other findings.[24-26] Isolated single umblical artery is not related with increased aneuploidy risk.[14]

## Conclusion

As a conclusion when a soft marker is detected its risk accelaration should be considered than decision for invasive procedures should be evaluated Fetal structures should be reinvestigated carefully and than invasive procedures should be considered.

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# Comparing the Blood Values of the Patients Operated by Cesarean Under Spinal and General Anesthesia

Ahmet Yalınkaya[1], Ali İrfan Güzel[1], Kadir Kangal[1], Ersin Uysal[2], Selami Erdem[1]

[1]Dicle Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Diyarbakır
[2]Dicle Üniversitesi Tıp Fakültesi, Diyarbakır Meslek Yüksekokulu Teknik Programlar Bölümü, Diyarbakır

**Abstract**

**Objective:** To compare preoperative and postoperative hematocrit and hemoglobine values in patients who had cesarean section under spinal and general anesthesia.

**Methods:** The mean age of the cases operated by local and general anesthesia was 29.61±6.85 and 29.59±5.85, and there was not meaningful statistically (p>0.05). The preoperative Htc values for group 1 and group 2 were; 34.64±4.76 and 33.47±3.93 (t=1.89, p=0.06), and Hb values: 11.56±1.78 and 11.21±1.46 (t=1.51, P=0.13). The postoperative Htc values for group 1 and group 2 were; 30.21±3.92 and 29.18±3.74 (t=1.89, p=0.059), Hb values: 9.91±1.42 and Hb: 9.56±1.40 (t=1.75, P=0.081).11 cases of group 1 had 24 units of blood transfusion and 16 cases of group 2 had 43 units.

**Results:** 200 pregnant cases with low risk for bleeding who delivered with cesarean section, were divided into two groups according to their anesthesia type, as 100 spinal (group 1) and 100 general (group 2). The demographic specialities, cesarean indications, preoperative and postoperative hematocrit (Hct) and hemoglobin (Hb) values were determined. The data were evaluated with SPSS 15.0 For Windows statistics package programe and the data were evaluated as homogen. Independent Samples T-Test analyse were used as statistically analyse method.

**Conclusion:** We did not find any difference of blood loss in the patients with low risk of bleeding operated by cesarean under spinal and general anesthesia. However, the cases operated by general anesthesia had more blood transfusion. The statistically insignificant result between the groups is because of the low number of our cases. With wider and better-designed studies.

**Keywords:** Cesarean, anesthesia type, blood loss.

## *Spinal ve genel anestezi uygulanan sezaryen doğumlarında kan değerlerinin karşılaştırılması*

**Amaç:** Spinal ve genel anestezi uygulanan sezaryen doğumlarında preoperatif ve postopertif hematokrit ve hemoglobin değerlerini karşılaştırmaktır.

**Yöntem:** Sezaryen uygulanan kanama açısından düşük riskli 200 gebe, anestezi tipine göre 100 spinal (grup 1) ve 100 genel (grup 2) olmak üzere iki gruba ayrıldı. Olguların demografik özellikleri, sezaryen endikasyonları, preoperatif ve postoperatif ortalama hematokrit (Htc) ve hemoglobin (Hb) değerleri belirlendi. İki grupta postoperatif dönemde yapılan kan transfüzyonu miktarı karşılaştırıldı. Elde edilen veriler SPSS 15.0 For Windows istatistik paket programı ile değerlendirelerek verilerin homojen olduğu tespit edildi. İstatistiksel analiz yöntemi olarak Indepedent Samples T-Test analizi kullanıldı.

**Bulgular:** Spinal anestezi ve genel anestezi uygulanan grupların yaş ortalaması 29.61±6.85 ve 29.59±5.85 olarak bulundu, gruplar arasında fark saptanmadı (p>0.05). Preoperatif, grup 1 ve grup 2 Htc değerleri: 34.64±4.76 ve 33.47±3.93 (t=1.89, p=0.06), Hb de-

Correspondence: Ali İrfan Güzel, Dicle Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Diyarbakır
e-mail: alijnk@hotmail.com

ğerleri: 11.56±1.78 ve 11.21±1.46 (t=1.51, p=0.13) olarak bulundu. Postoperatif, grup 1 ve grup 2 Htc değerleri: 30.21±3.92 ve 29.18±3.74 (t=1.89, P=0.059), Hb değerleri: 9.91±1.42 ve Hb: 9.56±1.40 (t=1.75, P=0.081) olarak bulundu. Grup 1 olgularından 11 hastaya 24 ünite, grup 2 olgulardan 16 hastaya 43 ünite eritrosit süspansiyonu verildi.

**Sonuç:** Kanama açısından düşük riskli hastalara spinal ve genel anestezi uygulanarak yapılan sezaryen doğumlarında, kan kaybı bakımından karşılaştırıldığında anlamlı bir fark saptanmadı. Ancak genel anestezi uygulanan grupta postoperatif dönemde daha fazla eritrosit suspansiyonu transfüzyonu yapıldığı saptandı. Olgu sayımızın az olması nedeniyle gruplar arasında anlamlı fark bulunmadığını düşünmekteyiz. Daha kesin sonuç elde edebilmek için daha geniş çaplı çalışmalara gerek vardır.

**Anahtar Sözcükler:** Sezaryen, anestezi tipi,kan kaybı.

## Introduction

Caesarean births are the most frequently applied obstetric operations in the world . In the United States (USA) between 1965 and 1988, the caesarean rate has increased of 4.5% from, up to 25% but then a normal with the increase of vaginal birth after caesarean between 1996 and 1989, this ratio significantly decreased .Then again until 2002 caesarean rate has increased and this year reached the highest rates that were recorded.[1] In our country, there is no precise data, but with regional differences, this rate is around 23%. Obstetric hemorrhage, both in developed countries and also in developing countries is still the most important cause maternal mortality. In normal birth 300-500 ml and 900-1000 ml in caesarean is also met as normal blood loss. Bleeding is more than 1500 ml, falling more than 10% of hematocrit value and the need for blood transfusions to correct hemodynamic is defined as obstetric hemorrhage.[2] In caesarean births both regional (spinal, epidural) and general anesthesia can be used. In 1982 using general anesthesia in the United States was in half of caesarean birth. By 1998, this ratio fell below 10%. In more recent years, spinal anesthesia has began to be used much more. In the cases with hypovolemia, infection, and coagulopathy, general anesthesia may be preferred to regional anesthesia. However, gastric contents aspiration during general anesthesia, intubation difficulties, maternal hyperventilation, neonatal depression, and complications such as bleeding connected to uterine atony is to be kept in mind.[3] The purpose of this study is to compare the preoperative and postoperative hematocrit and hemoglobin values in the caesarean birth under local (spinal) and general anesthetic, and uncover the effect of anesthesia type on postoperative bleeding.

## Methods

At Dicle University Faculty of Medicine Gynecology and Obstetrics Department between January 2007 to December 2008, 200 pregnant women who had cesarean section with low risk of bleeding were divided into groups depending on the type of anesthesia as; 100 spinal anesthesia (group 1) and 100 general (group 2). Demographic characteristics of the cases, caesarean indications, preoperative and postoperative average hematocrit (HTC) and hemoglobin (Hb) values were examined.The postoperative blood samples was taken before the transfusions. Pregnant women with high-risk of bleeding such as placenta previa totalis, abruption placenta, uterus rupture were excluded from the study. During spinal anesthesia Atrocan 26 Gauche spinal needle was used. Cesarean section was performed with lower segment transverse incision. The amount of blood transfusion to the patients in the postoperative

period has been identified. The data were evaluated wirh SPSS 15.0 For Windows statistics package programme and the datas were evaluated as homogen. Indepedent Samples T-Test analyse were used as statistically analyse method.

## Results

The mean age of the cases operated by local and general anesthesia was 29.61±6.85 and 29.59±5.85, and there was not meaningful statistically (p>0.05).The perioperative Htc values for group1 and group2 were; 34.64±4.76 and 33.47±3.93 (t=1.89, p=0.06), and Hb values: 11.56±1.78 and 11.21±1.46 (t=1.51, p=0.13). The postoperative Htc values for group1 and group2 were; 30.21±3.92 and 29.18±3.74 (t=1.89, p=0.059), Hb values: 9.91±1.42 and Hb: 9.56±1.40 (t=1.75, p=0.081). 11 cases of group 1 had 24 units of blood transfusion and 16 cases of group 2 had 43 units.

**Table 1.** Demographic characteristic for two groups.

| | Group 1 (n:100) | Group 2 (n:100) | p |
|---|---|---|---|
| Age (years) | 29.61±6.85 | 29.59±5.85 | >0.05 |
| Gravida | 4.18±1.6 | 4.019±0.9 | >0.05 |
| Parity | 2.62±0.9 | 2.72±1.0 | >0.05 |
| Birth week | 37.23±1.4 | 38.11±2.5 | >0.05 |
| Birth weigt (g) | 3128±527.2 | 3022±486.1 | >0.05 |

**Table 2.** Cesarean indications for two groups.

| Indication | Grup 1 (n=100) | Grup 2 (n=100) |
|---|---|---|
| Previuse C/S | 40 | 28 |
| Fetal distres | 13 | 36 |
| Macrosomia | 11 | 2 |
| Presentation abnormalities | 10 | 10 |
| Multiple pregnancies | 6 | 4 |
| CPD* | 2 | 7 |
| Others | 18 | 13 |

*Cephalo-pelvic disproportion

## Discussion

By the years , due to increasing rates of caesarean rates alternative methods of anesthesia is more used and patients against taking the results of the awareness and expectation into a more comfortable method to anesthesia. Both spinal and general anesthesia used for cesarean section have advantages and disadvantages and there is not a method which completely ideal. The most important factors for choice of anesthetic method are; pregnant systemic problems and wishes, the urgency of the operation, the surgeon and the anesthetist's preference for the experience.[4] In our clinic in an emergency is more preferred general anesthesia. The spinal anesthesia for elective caesarean and replicated is preferred. In Caesarean birth, especially the general anesthesia, intraoperative blood loss can be increased by chancing uterine blood flow and contractions depending on the change of perfusion pressure and uterine vascular resistance. Afobi et al. found in their study that, cases operated under spinal anesthesia had lower amounts of blood loss.[5] Lertakyamanee et al. reported in their study that; cases operated by general anesthesia had more blood loss and lower postoperative hematocrit levels compared to regional anesthesia.[6] We did not found statistically significant postoperative hematocrit levels between the groups. We think that these results are related with the number of our cases and more transfusion to group 2. In the 1970s, the 4.6% rate of transfusion dependent on obstetric bleeding today has fallen until 0.9%. This is because the patients with risk of bleeding previously identified and the necessary precautions are taken.[7] The cases operated by general anesthesia had more erythrocyte transfusions in our study.

## Conclusion

In conclusion, general anesthesia has been shown as a increasing factor of bleeding in patients with caesarean section in many studies. We did not found statistically significant difference on the intraoperative maternal bleeding in our study, but in the general anesthesia group more blood transfusion were made. Because of our small number of groups, we think that results of this study were not statistically significant. To obtain more accurate results , large-scale studies are needed.

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# Maternal Serum ICAM 1 Levels at Prepartum Period in Severely Preeclamptic Pregnancies

Nebahat Bayram[1], İsmet Alkış[2], Safiye Akansu Saylık[3], Nilüfer İmamoğlu[4], Volkan Tuna[5], Yavuz Ceylan[6]

[1]*Trabzon Doğum ve Çocuk Bakımevi, Kadın Hhastalıkları ve Doğum Kliniği, Trabzon, TR*
[2]*Medical Park Hastanesi, Kadın Doğum Kliniği, Van, TR*
[3]*Güven Hastanesi, Kadın Doğum Kliniği, Van, TR*
[4]*Özel Hayat Hastanesi, Kadın Doğum Kliniği, Malatya, TR*
[5]*Nizip Devlet Hastanesi, Kadın Doğum Kliniği, Gaziantep, TR*
[6]*Bakırköy Kadın ve Çocuk Hastalıkları Hastanesi, Kadın Doğum Kliniği, İstanbul, TR*

**Abstract**

**Objective:** To determine maternal serum ICAM-1 levels at prepartum period in pregnancies complicated with severe preeclampsia.

**Methods:** When we compared serum ICAM-1 levels between two groups, there was no statistically significant difference even if serum ICAM-1 levels in severely preeclamptic group were higher than the normotensive group(p:0.069). Serum ICAM-1 levels in preeclamptic pregnants with IUGR was statistically higher than preeclamptic pregnants without IUGR (P:0.029). Neonatal birth weight at delivery was found statistically lower in pregnants with severe preeclampsia.

**Results:** In this prospective, controlled study we measured serum ICAM-1 levels of 44 severely preeclamptic and 44 normotensive pregnant women at prepartum period. All pregnant women in our study were admitted to our clinic between January 2003 and January 2004. All severely preeclamptic women were hospitalized in our perinatology service. Blood samples were collected from an antecubital vein at prepartum period when the pregnant women were fasting. We analyzed the correlations between serum ICAM-1 and neonatal birth weight at delivery, levels of serum ICAM-1 and demographic data.

**Conclusion:** There was no significant difference in prepartum maternal serum ICAM-1 levels, between severelly preeclamtic and normotensive groups. But, the level of sICAM-1 in preeclamptic women having intrauterine growth retarded fetuses has been found statistically higher than the level of sICAM-1 in preeclamptic women that do not have intrauterine growth retarded fetuses.This results corrolates with the previous studies. It is suggested that serum ICAM-1 levels are not adequate to show the activation status of preeclampsia. However, this may guide in the follow up of the preeclamptic women having intrauterine growth retarded fetuses.

**Keywords:** Severe preeclampsia, intrauterine growth restriction, intercellular adhesion molecule.

## *Ağır preeklampsili ve normal gebelerde sICAM-1 düzeyleri*

**Amaç:** Ağır preeklamptik gebelerde prepartum intersellüler adhezyon molekülü (sICAM-1) düzeylerini belirlemek.

**Yöntem:** Bu çalışma, prospektif kontrollu bir çalışma olarak planlandı. Çalışmadaki hasta ve kontrol grubu, ocak 2003 ile ocak 2004 tarihleri arasında oluşturuldu. TC Sağlık Bakanlığı Bakırköy Doğumevi Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi perinatoloji servisine ağır preeklampsi tanısı ile yatırılıp izlenen 44 tekiz gebe ile muayene ve tetkikleri sonucu sağlıklı gebelik saptanıp takip edilen 44 normotansif gebe çalışmaya alındı. Tüm gebelerden venöz kan antekübital bölgeden prepartum dönemde alındı. Bütün gebelerde demografik veriler, doğumda bebek ağırlığı ve sICAM-1 düzeylerini inceledik.

**Bulgular:** Ağır preeklamptik gebelerle kontrol grubu serum ICAM-1 açısından kıyaslandığında ağır preeklamptik gebelerde ICAM-1 düzeyleri kontrol grubuna kıyasla daha yüksek çıkmasına karşın istatistiksel olarak anlamlı fark saptanmadı (p=0.055). Ağır preeklamptik grupta intrauterin gelişme geriliği (IUGR) olan gebelerde sICAM-1 düzeyleri yine aynı grupta ancak IUGR olmayan gebelere göre anlamlı derecede yüksek bulundu (p=0.029). Ağır preeklamptik gebelerde bebek doğum ağırlığı anlamlı derecede düşük bulundu (p=0.000).

Correspondence: İsmet Alkış, İki Nisan Cad. Halil Ağa Mah. Kurtbeyoğlu Sok. Yükseliş Apt. No: 10, Van
e-mail: ismetalkis@hotmail.com

**Sonuç:** Ağır preeklamptik grupla normotansif grup arasında prepartum maternal sICAM-1 düzeyleri arasında anlamlı fark bulunmadı. Ancak IUGR'lı preeklamptik gebelerde sICAM-1 düzeyleri IUGR'lı olmayan preeklamptik gebeliklere göre anlamlı derecede yüksek bulundu. Bu durum önceki çalışmalarla uygunluk göstermektedir. sICAM-1 düzeyleri preeklampsi hastalığının aktivasyon derecesini göstermede yetersiz olabilir, ancak IUGR'lı preeklampsili gebeliklerin takibinde yol gösterici olabilir şeklinde yorumlandı.

**Anahtar Sözcükler:** Ağır preeklampsi, intrauterin gelişme geriliği, interselüler adhezyon molekülü.

## Introduction

Preeclampsia affects 5-10% of all pregnancies and it is one of the main reasons of maternal morbidity and mortality in developed countries. Its etiology is not open despite its clinical importance on mother and fetus health. Hypertension is one of its most basic attributes. However, according to the information in the literature, preeclampsia cannot be simply explained as hypertension due to pregnancy. Pathological and pathophysiological studies in preeclampsia show vasoconstriction and reduced organ perfusion together with the activation of coagulation cascade. Recent studies have been showed that abnormal placenta in pregnancies with preeclampsia release one or more factors which "may cause endothelial activation and multisystemic disorder" and may affect endothelial function. There are evidence showing that endothelium cell dysfunction in preeclampsia is effective in vascular tension, coagulation and intravascular fluid distribution.[1,2] The production of vasodilator prostacycline in endothelial cells decreased.[3] On the other hand, it was reported that the blood concentration of vasoconstrictor endothelium-1 increased. These changes very likely contribute to the vasoconstriction of arterioles, and so the development of hypertension.[4] Also the imbalance (the increase in TXA2 concentration) between thrombocyte aggregation inhibitor the prostaglandin I2 (PGI2) and its antagonist thromboxane A2 (TXA2) were shown in those with preeclampsia.[3] Most probably this thrombocyte activation causes thrombosis and vasoconstriction. This also may lead to reduced blood flow to fetus, fetal growth retardation and even fetal death.[5] Leucocytes are activated by adhering to vessel wall; they become flat and go out of vessel. All these steps occur by the release of cell surface adhesion molecules on both moving cell surface and vascular endothelium.

Adhesion molecules have a key role in cell-cell relations (endothelium cell between monocyte, smooth muscle and thrombocyte) and cell-matrix relations (extracellular matrix and leucocyte, thrombocyte and fibroblast). Adhesion molecules of immunoglobulin gene super-family, intercellular adhesion molecules 1 and 2 (ICAM-1 nd ICAM-2), vascular cell adhesion molecule and also selectin are released from activated endothelium.[6]

Serum levels of adhesion molecules can be beneficial for monitorization of disease activity. During the embryological development process, trophoblastic cells may show invasive behavior due to their differentiation characteristics. A few studies performed showed that the relationship between trophoblastic and endometrial cells depend on the controlled release of various surface adhesion molecules.[7,8] Adhesion molecules are released among desidual cells at a high level. It is acknowledged that the increased release of adhesion molecules contribute to the retention and nesting of leucocytes within tissues.[9] Pathogenesis of preeclampsia is possibly caused by placenta. Recent observation indicate that abnormal release of adhesion molecules by invasive trophoblasts are basic in the etiology of preeclampsia.[10] Increasing evidences show that adhesion molecules are not chiefly responsible only in etiological mechanism but also in the progression of preeclamptic disease. Damage

in endothelium is an indicator of disease process caused by the arrangement of neutrophile activation, increased cytokine levels and the expression of adhesion molecules.[11,12]

In our study, we aimed to research adhesion molecules (ICAM-1) which reported as having an important role for the formation of endothelium damage in preeclamptic pregnants.

## Methods

This study was planned as a controlled prospective study. It was performed after permission of ethics committee was acquired. The patient and control groups in the study were grouped up between January 2003 and January 2004. 44 pregnants diagnosed with severe preeclampsia and 44 normotensive pregnants who were found healthy after examinations who admitted to the perinatology service of Bakırköy Maternity and Children Hospital of Turkish Health Ministry and delivered were included into the study. Severe preeclamptic cases were chosen based on the severe preeclampsia criteria of American Congress of Obstetricians and Gynecologists (ACOG).[13] These cases were chosen from pregnants who were diagnosed as severely preeclamptic by laboratory examinations after being hospitalized at perinatology service. All cases included into the study had single fetus and they were at their 3rd trimester. Demographic information and histories were received from all hypertensive pregnants. All cases were chosen from non-smoker pregnants who also did not have any disease and drug use that may affect their energy metabolism. Gestational week of all cases were determined and confirmed by doing fetal biometry at ultrasonography (USG) and evaluating USG data of first trimester. Control group was formed of non-smoker pregnants with single fetus who had medical problem or drug use. All examinations applied to severe preeclamptic pregnants were also applied to the control group. This group was chosen from pregnants who were at labor in operating room. Venous blood was taken from antecubital regions of all pregnants at early prepartum period.

Blood taken for ICAM-1 study was centrifuged at 4 °C and the serum obtained was frozen immediately and then kept at -20°C until studying on it. sICAM-1 level was found by using ELISA (Enzyme Linked Immunosorbent Assay) method and sICAM-1 IM3247 (Cellular Communication Investigation) kit. Detectable minimal sICAM-1 concentration is 0.25 ng/ml.

SPSS (Statistical Package for Social Sciences) for Windows 10.0 was used for statistics. Independent student t test to compare parametric data, chi-square test to compare non-parametric data and ANOVA test to determine the relationship between other clinical parameters and sICAM-1 were used as well as to compare supplementary statistical methods (mean, standard deviation) when evaluating study data. Statistical significance was accepted as $p<0.05$.

## Results

No significant difference was found between severely preeclamptic pregnants and control group in terms of age, marriage period, delivery number, BMI, gestational week at delivery ($p>0.05$). Statistically significant difference was found between two groups in terms of systolic and diastolic tensions and baby weight at birth (despite matching as gestational week) (Table 1). When severely preeclamptic pregnants and control group were compared in terms of sICAM-1 levels, sICAM-1 levels of severely preeclamptic pregnants were higher than control group; yet, statistically no significant difference was found (p:0.055) (Figure 1). sICAM-1 levels in pregnants with intrauterine growth retardation (IUGR) was found significantly higher than pregnancies without IUGR (p:0.029) (Figure 2). No difference was observed between severely preeclamptic group and control group in terms delivery type

**Table 1.** Demographic data of severely preeclamptic and normotensive pregnant groups.

| | Severely preeclamptic pregnants (n: 44) | Normotensive pregnants (n: 44) | p |
|---|---|---|---|
| Age (year) | 27.34±5.9 | 28.3±6 | NS |
| Marriage period (year) | 5.88±5.3 | 6.5±5.5 | NS |
| Delivery number | 0.84±0.9 | 0.88±0.9 | NS |
| Systolic tension (mmHg) | 4.3±15.7 | 111.8±8.9 | p: 0.000 |
| Diastolic tension (mmHg) | 115.9±10.6 | 71.13±6.8 | p: 0.000 |
| Gestational week at delivery | 34.6±3.3 | 34.7±2.8 | NS |
| Baby weight at birth (gr) | 1938±706.7 | 2670±838.7 | p: 0.000 |
| BMI (kg/m$^2$) | 25.41±5.11 | 25.18±5.27 | AD |

**NS:** Not significant.

**Table 2.** Comparison of delivery types and sectio indications of severely preeclamptic and normotensive pregnant groups.

| NSD | | 11 | 11 | 22 |
|---|---|---|---|---|
| | Fetal distress | 20 | 3 | 23 |
| | Cord prolapse | – | 1 | 1 |
| | Presentation anomaly | – | 1 | 1 |
| | Sectio undergone | 5 | 13 | 18 |
| | Rectal presentation | 2 | 6 | 8 |
| Sectio | Decollement | 4 | – | 4 |
| Indications | Non-progressive labor | 2 | 3 | 5 |
| | Primigravida age | – | 1 | 1 |

(p:1.000). When section indications were compared, statistically significant difference was found between two groups (p:0.001) (Table 2). Neonatal morbidity was high in severely preeclamptic case group and it was statistically significant (p:0.01) (Table 3).

## Discussion

Preeclampsia is a disease peculiar to pregnancy which characterized by hypertension, proteinuira and edema gone after delivery. Though its pathogenesis has not been explained yet, it is considered that the preeclampsia is caused by general endothelium dysfunction. Frequent preeclampsia and eclampsia in first pregnancy, previous delivery and miscarriage or blood transfusion and leucocyte immunization decreasing the incidence of disease make us to consider immune reasons. Some changes occur in immune system of mother to prevent fetus rejection at normal pregnancy. Preeclampsia may arise as a result of disorders in this immune response. Characteristic vasculopathy of preeclampsia is acute athyrosis at decidua. The reason for this change is considered as immunological.[14]

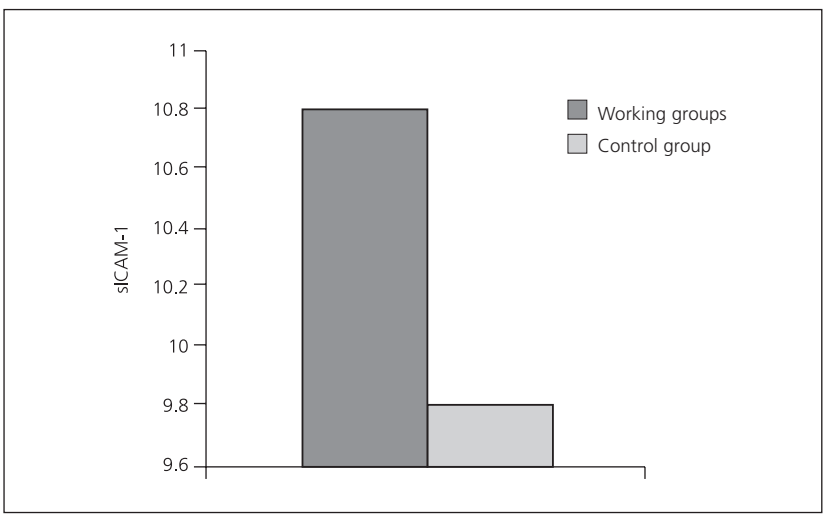


**Figure 1.** sICAM levels in severely preeclamptic and normotensive pregnants (p: 0.55).

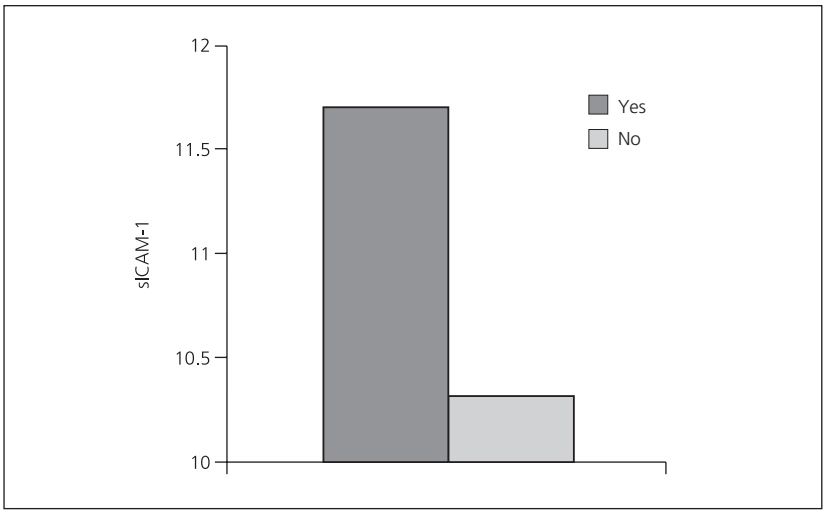


**Figure 2.** sICAM levels of pregnants who have and have not intrauterine growth retardation (p: 0.029).

In terms of clinical findings of disease (stimulation of coagulation, restriction of vessels), dysfunction of endothelium cells lies behind the preeclampsia. It was found in a study performed before that there was a factor in the serum of preeclamptic pregnants toxic for human endothelium cells.[15] As a result, the essentiality in the pathogenesis of preeclampsia is a common endothelium dysfunction; however, it is still unclear what triggers this endothelium damage. Many clinical and biochemical findings of disease support it. Coagulation is activated in preeclampsia, response to vasopressins increase and Von Willebrand factor released from biochemically activated endothelium cells, agents such as endotelin and fibronectin, and tissue plasminogen activator levels increase. Morphological proof of this endothelium damage is the glomeruloendotheliosis which is pathognomonic renal lesion. Endothelium cells have many functions arranging immune and inflammatory events. In cases where functions of these cells are corrupted, some clinical findings appear such as intravenous coagulation increase and the vasoconstriction formation by the contraction of vascular muscle cells.

Adhesion molecules stimulated by cytokines in circulation administer the movements of cells instead of inflammation and reflect the activation of endothelium cells.[16] Recent studies show that increased cell adhesion molecules

**Table 3.** Neonatal morbidity comparison in severely preeclamptic and normotensive pregnant groups.

| | | Severely preeclamptic pregnants (n:44) | Normotensive pregnants (n: 44) | Total |
|---|---|---|---|---|
| | Stillborn or death within first 12 hours | 3 | - | 3 |
| Neonatal Morbidity | Morbidity exists | 24 | 14 | 38 |
| | No morbidity | 17 | 30 | 47 |
| Total | | 44 | 44 | 88 |

*Pearson chi-square p: 0.001*

are the indicators of endothelium dysfunction in preeclampsia.[17] Cell adhesion molecules has a role in leukocye-endothelium relation and are categorized into 3 groups: selectins, integrins and immunoglobulin gene super-family. Selectins have a role in early steps of adhesion of active endothelium and leukocytes. Integrin and immunoglobulin gene super-family have a role in later steps.[18] ICAM-1 is one of the cell adhesion molecules of immunoglobulin gene super-family. ICAM-1 is important in the adhesion of lymphocytes and neutrophiles to active endothelium.[19] Dissoluble shapes of these molecules showing activation of endothelium cells can be deteced in serum or plasm by ELISA method. In this way, these molecules are accepted as an indicator of endothelium dysfunction. In the studies performed before, it was shown that the concentrations of adhesion molecules increased in the circulation in neoplastic diseases wehre endothelium cells were activated, in inflammatory cases and metabolic diseases such as diabetes.[20] Recent studies related with ICAM-1 draw attention. In future, sICAM-1 would be a new diagnosis tool for monitoring many diseases as well as an auxiliary in treatment arranging immune system in oncology. Researches performed in recent years make us to consider that leukocyte activation has a significant role in formation mechanism and continuation of endothelium damage in preeclampsia. In the studies performed, it was shown that some substances as the indicator of leukocyte activation significantly increased in blood samples of preeclamptic pregnants.[21] Mechanisms triggering endothelium damage in preeclampsia are not exactly known; however, it is considered that neutrophile activation has an important role in this formation.

Greer et al. indicated that neutrophile elastase level as the indicator of neutrophile activation increased in serums of preeclamptic pregnants and this high level was only limited with maternal serum.[22] Prieto et al. showed that defensin and lactoferrin levels significantly increased in preeclamptic pregnants compared to normal pregnants.[23] Lyall et al. found in their study that only vascular cellular adhesion molecule-1 (VCAM-1) level increased significantly in preeclampsia when compared with normal pregnants; however, E-selectin and ICAM-1 levels were not different than normal pregnants.[21] Shing-Young Kim et al. showed in their studies performed in 2004 that serum levels of ICAM-1, VCAM-1 and E-selectin were detectable in both normal and preeclamptic pregnants; however, serum levels of whole adhesion molecules were found higher in preeclamptic pregnants and they were of the opinion that especially VCAM-1 might be useful to guess preeclampsia severity.[24]

In the study of Rigmor Austgulen et al. performed in 1997, no correlation was fond between the activity of preeclampsia disease and the levels of sICAM-1, VCAM-1 and E-selectin. However, they found serum levels of all three adhesion molecules quite higher in preeclamptic pregnants than normal pregnants.[25] Djurovic et al. found sICAM-1 levels higher in preeclamptic pregnants than normal pregnants in the study they performed in 1997. This difference, however, was not statistically significant. Serum VCAM-1 levels were found significantly high in preeclamptic pregnants ($p<0.0001$). In the same study, serum VCAM-1 levels were found higher in preeclamptic pregnants with fetal growth retardation than moderate preeclamptic pregnants (p: 0.03).[26] It was shown in the study performed by Zeisler H et al. in 2001 that the expression of serum ICAM-1 and VCAM-1 increased in preeclamptic pregnants. They concluded that especially platelet/endothelium cellular adhesion molecule (sPECAM) levels might be effective to detect the possibility of severe preeclampsia development.[27] Airoldi L et al. detected lower sICAM-1 levels in preeclamptic pregnants compared to normal pregnants who had equal gestational weeks, and concluded that a different immunological event may occur at preeclamp-

sia.[28] Krauss T et al. concluded in their study performed in 1997 that increased sICAM-1 and sVCAM-1 levels were a basic risk factor for preeclampsia development and that they might have predictive value to detect preeclampsia development possibility. They claimed that increased adhesion molecules in preeclamptic pregnants were primary endothelial cellular dysfunction in the basis of disease.[29] In our study, we found sICAM-1 level in our severely preeclamptic patients quite high compared to the serum levels in normal pregnants; however, this high rate was not statistically significant. In the group having intrauterine growth retardation, we found sICAM-1 levels significantly high. In the study performed by Chaiworapongsa T et al. in 2002, serum VCAM-1 levels in preeclamptic pregnants were found as increased; on the other hand, no significant difference was found between preeclamptic and normal pregnants in terms of sICAM-1 and sPECAM-1 levels.[30]

In our study, we could not find significantly high sICAM-1 level in preeclamptic patients compared to normal pregnants in accordance with previous studies (p: 0.055). However, we detected sICAM-1 level in preeclamptic pregnants with IUGR statistically significantly higher than pregnants without IUGR (p: 0.029).

## Conclusion

No significant different was found in sICAM-1 levels between severely preeclamptic group and normotensive group. However, in severely preeclamptic pregnants with IUGR, sICAM-1 level was found significantly high. This situation also conforms to previous studies. sICAM-1 levels may be insufficient to show the activation degree of preeclampsia; however, it may be a guiding way for following up preeclamptic pregnants with IUGR. We are of the opinion that this study would contribute to the literature and more scientific studies are needed for the subject matter.

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# Giant Cystic Hygroma Complicating on One of the Twin Pregnancy: Case Report

**Mahmut Erdemoğlu, Ahmet Kale, Umur Kuyumcuğlu, Nurten Akdeniz, Ali İrfan Güzel, Kadir Kangal**

*Dicle Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Diyarbakır*

**Abtract**

**Objective:** Our aim is to report a twin pregnacy that determined a giant cystic hygromaon one of the twin after the birth.

**Case:** 38 years old woman had applied to a second step hospital with single pregnancy, on her pelvic examination complete openness had been determined and urgently she had spontaneus vaginal delivery, after her placenta couldn't be pulled out, on ultrasound examination aproximetly 20 cm of septated cyst has been explained as overian cancer and she referred to our clinic. In our clınıc on the pelvic examination we found taht she had 8 cm of openness, the uterus was 36 weeks in growth and on the ultrasound examination we found 20x24 cm of multiseptated and multicystic lesion. When we detailed our examination we understood that this lesion is a giant cystic hygroma of the other fetus of the twin pregnancy. Under ultrasound we aspirated the cysts with spinal needle and second fetus had burned. (1200g, 36 cm , APGAR 00)

**Conclusion:** In the pregnancies that have no antenatal care, both multiple pregnancy and cystic hygroma could not be diagnosed and than the cystic hygroma could grow to advanced size and causes to delay in the diagnosis and the treatment. So we have to remember cystic hygroma when we see a giant and septated cystic mass.

**Keywords:** Twin pregnancy, cystic hygroma.

## *Gebeliği Komplike Eden İkiz Eşinde Dev Kistik Higroma: Olgu Sunumu*

**Amaç:** İkiz eşinde dev kistik higroma saptanan bir olgunu klinik özelliklerinin irdelenmesi

**Olgu:** 38 yaşında miadında tekil gebelik ön tanısı ile bir ikinci basamak sağlık kuruluşuna başvuran hasta tam açıklık olarak acilen doğum odasına alınmış, acil şartlarda doğumu gerçekleştirilmiş ve plasenta retansiyonu nedeni ile yapılan obstetrik ultrasonografik incelemede yaklaşık 20 cm. çapında septalı kistik oluşum, muhtemelen over tümörü olarak değerlendirilip kliniğimize sevkedilmiştir.Hastanın kliniğimizde yapılan pelvik muayenesinde servikal açıklık 8cm ve uterus 36 haftalık gebelik cesametinde olup, obstetrik ultrasonografik incelemede yaklaşık 20x24 cm boyutlarında septalı, multikistik bir yapı izlendi. Detaylı inceleme sonrasında bu yapının ikiz gebeliğin diğer eşine ait olduğu ve ileri evre kistik higroma ile uyumlu olduğu gözlendi. Kistler ultrasonografi eşliğinde spinal iğne ile boşaltıldıktan sonra ikinci fetusun doğumu gerçekleştirildi (1200 gr., 36 cm, APGAR 00 ).

**Sonuç:** Antenatal takip yapılmayan gebeliklerde, çoğul gebelik gözden kaçabileceği gibi fetus veya fetuslarda gelişebilecek bir kistik higroma, ileri derecede büyüyerek yanlış tanı konulmasına ve tedavinin de aksamasına neden olabilir. Bu nedenle septalı kistik kitlelerde, ayırıcı tanıda kistik higroma mutlaka akılda bulundurulmalıdır.

**Anahtar Sözcükler:** İkiz gebelik, kistik higroma.

Correspondence: Ali İrfan Güzel, Dicle Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Diyarbakır
e-mail: alijnk@hotmail.com

## Introduction

Our aim is to report a twin pregnacy that determined a giant cystic hygromaon one of the twin after the birth. Cystic hygroma, also known as cystic lymphangioma, is a congenital lesion of the lymphatic system appearing most commonly in the neck region although it can arise anywhere as a result of failure of lymphatics to connect to the jugular veins and also rarely accompanies with genetic disorders.[1] In case of cystic hgyroma Turner, Noonan, Achondroplasia, Lethal multiple pterygium, Roberts, Gumming, Cowchock syndromes are important syndromes for differential diagnosis due to increased risk of incidence. Additionally, the use of alchocol, amniopterine and timetadion have been reported as teratogenic agents in ethology.[2] In this report, a case with giant cystic hygroma in one of the twin pair has been diagnosed at the time of detailed anatomy scan which was referred to our clinic for a suspected mass for ovarian cancer.

## Case Report

38 years old woman,gravidy 10 parity 8, had applied to a second step hospital with single pregnancy.On her pelvic examination complete dilatation had been determined and urgently she had spontaneous vaginal delivery, after her placenta could not be pulled out she had ultrasound examination and aproximetly 20 cm of septated cyst has been explained as overian cancer and she referred to our clinic. At our clınıc on the pelvic examination we found that she had 8 cm of dilatation, the uterus was 36 weeks in growth and on the ultrasound examination we found 20x24 cm of multiseptated and multicystic lesion. When we detailed our examination we understood that this lesion was a giant cystic hygroma of the other fetus of the twin pregnancy.There was not fetal cardiac activity. We decided that the delivery was inpossible because of the cysts ,we aspirated the cysts with spinal needle under ultrasound and second fetus had burned. (1200 g, 36 cm , APGAR 0/0). The fetus was hydrophic. When we evaluated the placenta,it was monocorionic and diamniotic.We discharged the case on day 2 of clinical follow up without any complication.

## Discussion

The most common genetic abnormality that associates with cystic hygroma is Turner syndrome.[1,2] In our case, genetic analyses couldn't be performed due to lack of parental permission. The lymphatic system develops around the fifth week and communicates with jugular vein in the seventh week. Cystic hygroma arises when this communication fails to happen untill 11-12th weeks.[4] They can be septated or nonseptated,can also reach to giant size as reported in our case. Shulam et al,reported that smaller hygromas,having better prognosis, can regress spontaneously and echocardiographical findings can detected as normal, as well as fetal karyotypes.[3] They affirmed that giant cystic and multiseptated cystic hygromas with hydrops fetalis have bad prognosis.[5] The giant cystic hygroma presented in our case, having multiple septations, had bad prognosis. Surgical resection, depending on the anatomical location, is the mainstay of therapy in early detection. The nonsurgical treatment options are radiotherapy, aspiration, administration of sclerosing agents (bleomycin, OKT-432) and CO' laser vaporisation.[6] Besides, pregnancy termination could be offered in early prenatal diagnosis. As a result antenatal follow-up is criti-

cally important.in pregnancies without antenatal care, multiple pregnancies can be overlooked as well as any cystic hygroma in fetus/fetuses may reach huge sizes that can be misdiagnosed causing a delay in treatment. Therefore, cystic hygroma should be kept in mind in the differential diagnosis of septated cysts.

## Conclusion

In pregnancies without antenatal care, multiple pregnancies can be overlooked as well as any cystic hygroma in fetus/fetuses may reach huge sizes that can be misdiagnosed causing a delay in treatment. Therefore, cystic hygroma should be kept in mind in the differential diagnosis of septated cysts.

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# Treatment of Viable Cesarean Scar Ectopic Pregnancy with Combination of Intracardiac KCl and Systemic Methotrexate: Case Report

**Gürkan Yazıcı, Aysun Savaş, Talat Umut Kutlu Dilek, Saffet Dilek**

*Mersin Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Mersin, TR*

**Abstract**

**Objective:** Succesful pharmacologic treatment of ceserean scar pregnancy was reviewed by recent litereture.

**Case:** 24 years old G3P2A0 woman who diagnosed as ceserean scar pregnancy was treated by systemic multiple dose of methotrexate following the ultrasound guided intracardiac KCl injection.

**Conclusion:** Pharmacologic treatment of ceserean scar pregnancy should be combined with intracardiac KCL injection in the presence of high hCG titer and cardiac activity.

**Keywords:** Ceserean scar pregnancy, intracardiac KCl, methorexate.

***Canlı sezaryen skar gebeliğinin intrakardiyak KCl ve sistemik metotreksat kombinasyonu ile tedavisi: olgu sunumu***

**Amaç:** Sezaryen skar gebeliğinin başarılı farmakolojik tedavisi literatür eşliğinde gözden geçirilmiştir.

**Olgu:** Yirmi dört yaşında, G3P2A0 olan, 2 kez sezaryen ile doğum yapmış, asemptomatik ve son adet tarihine göre 8 hafta 4 günlük gebeliği olan bir sezaryen skarı gebeliği (CSP) olgusunun intrakardiyak potasyum klorür (KCl) enjeksiyonu sonrası, multiple doz metotreksat kemoterapisi ile tedavisi edilmiştir.

**Sonuç:** Yüksek hCG titreleri olan veya kardiyak aktivitenin izlendiği sezaryen skar gebeliklerinin farmakolojik tedavisi intrakardiyak KCl ile kombine edilmelidir.

**Anahtar Sözcükler:** Sezaryen skar gebeliği, intrakardiyak KCl, sistemik metotreksat.

## Introduction

Pregnancy implanted to cesarean scar (CSP) is a rare form of ectopic pregnancy. In a series of 12 cases, Jurkovic et al.[1] reported approximate CSP incidence in all pregnancies as 1:2226, CSP rate as 0.15% in women who had cesarean and 6.1% in women who had at least one cesarean and one ectopic pregnancy.[1,2] Data for CSP is mostly based on case presentations and anectodal information since it is rare. Therefore, there is no clinical method agreed for its diagnosis and treatment. In this article, the literature is reviewed by presenting CSP case successfully treated with multiple dose methotroxate chemotherapy after intracardiac KCl injection.

Correspondence: Gürkan Yazıcı, Mersin Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Mersin
e-mail: gyazici@mersin.edu.tr

## Case

Twenty-four years-old female patient with gravida 3, para 2, abortus 0 and O Rh (-) blood type referred to our clinic with cervical pregnancy on 8th week and 4th day of her pregnancy according to her last menstrual period. Patient had no complaint when applied. It was learnt from the history of patient that she had a cesarean in her first delivery due to rectal presentation four years ago and her second delivery was done by cesarean 10 months ago. Serum Beta-hCG value was 62316 mIU/ml. In the transvaginal ultrasonography (TVUSG) performed, it was observed that there was a gestational sac with 42x33 mm diameter and an embryo inside with heart beat just over internal os. The patient was diagnosed as CSP since cervical canal and uterine cavity were empty, gestational sac at sagittal section developed from anterior of uterine isthmus, anterior uterine wall did not show continuity and myometrium got thin between bladder and sac (Figs. 1 and 2).

Intracardiac KCl was applied to the patient by means of 20 gauge spinal needle accompanied with ultrasonography and it was observed that cardiac pulse was gone. After the process, anti-D immunoglobulin prophylaxis was applied to the patient and multiple dose systemic methotrexate protocol was initiated. 1 mg/kg intramuscular methotrexate at 1st, 3rd, 5th and 7th days, and 0.1 mk/kg intramuscular folinic acid at 2nd, 4th, 6th and 8th days were applied to the patient. No complication was observed in the patient during treatment. Beginning from the second day of treatment, the patient had vaginal bleeding for three days. Serum Beta-hCG value was measured as 44174 mlU/ml on the last day of chemotherapy while it was 70074 mlU/ml on the day when treatment began. Serum Beta-hCG value which decreased gradually later was reset at sixth week after chemotherapy and no progression was observed in next follow-ups (Diagram 1). At first week after chemotherapy, the gestational sac became a 14x10 mm area including par-

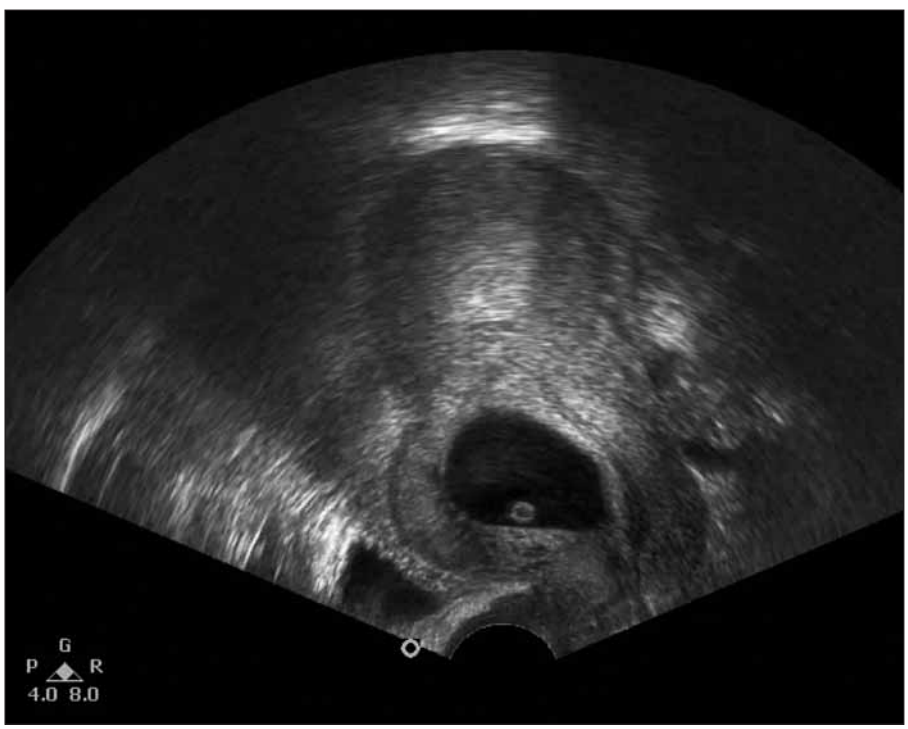


**Figure 1.** In transvaginal examination, it is seen that cervical canal and uterine cavity are empty and gestational sac locates at lower segment.

tially cystic and solid areas and it disappeared at the end of third week.

## Discussion

Cesarean scar pregnancy was first reported in 1978. There are totally 161 cases reported in English medical literature between January 1966 and October 2006 and actual incidence of CSP is unknown since few cases are reported in the literature. While CSP incidence has been increasing in recent years due to the increase in cesarean deliveries, its successful treatment seems possible by conservative methods without requiring surgical operations like hysterectomy since early diagnosis by transvaginal monitoring in early gestational weeks is more prevalent.[1]

The most accepted theory among all theories defined for CPS development physiopathology is the implantation of blastocyst into the microscopic separation area on myometrium. Microscopic separation area may arise due to removing placenta by hand (hallas) as well as traumas of other uterine surgeries such as cesarean, dilatation & curettage, myomectomy, metroplasty, hysteroscopy etc. Increased risk factors for CSP are the performance of cesarean due to rectal presentation, providing two or more cesareans, dilatation / curettage, ectopic pregnancy, existence of placental pathologies, providing pregnancy by in vitro fertilization, and the shortness of period between previous cesarean and pregnancy development.[2,3] When cases were evaluated, ages increased as cesarean increases and mean ages of patients were 33.4±5.7.4 Gestational week at diagnosis was found as 5-12 weeks (mean 7.5±2.5) and 4 days, and the period between last cesarean and cesarean scar was 6-12 months.[1,2] As in many cases reported in the literature, the period between first cesarean indication, rectal presentation and previous cesarean and cesarean scar pregnancy was 10 months in our case. Gestational age of our case was 8 weeks and 4 days.

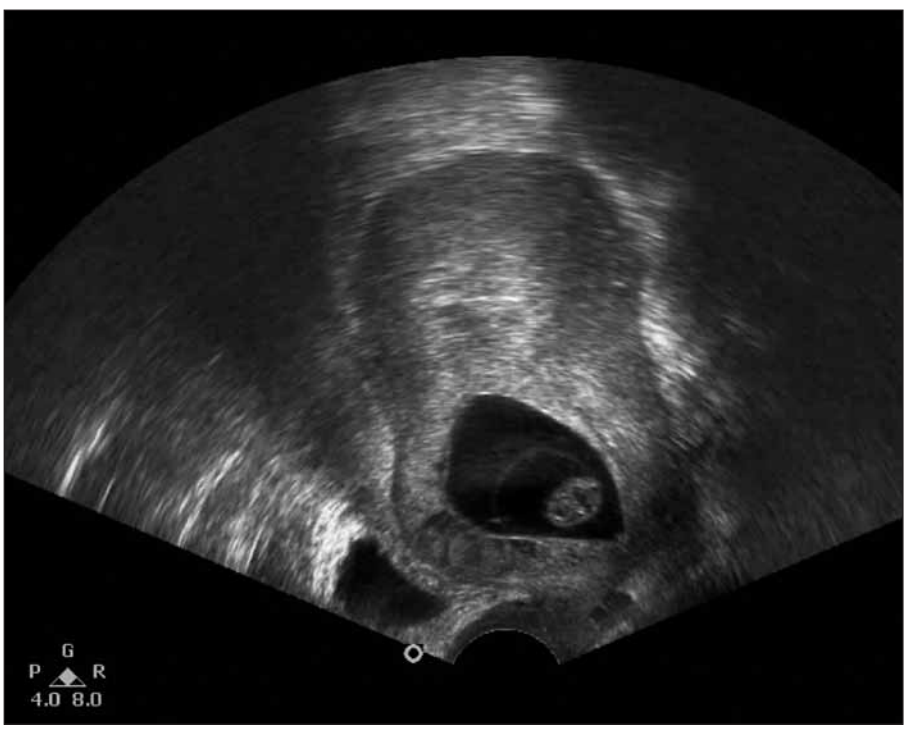


**Figure 2.** In transvaginal examination, it is seen that myometrium gets thin and the sac protrudes towards bladder.

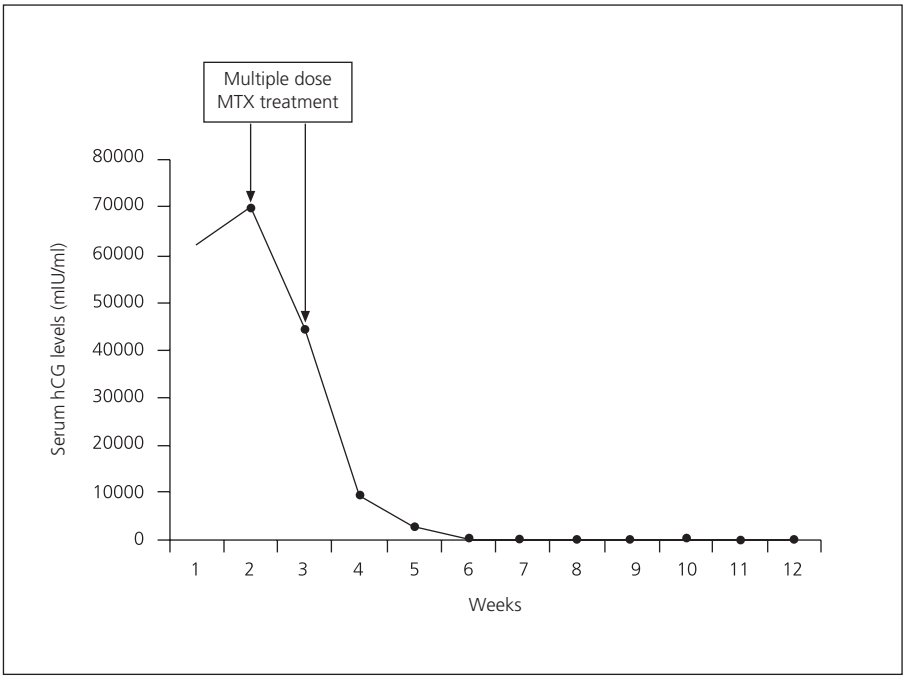


**Diagram 1.** hCG titer progress after systemic methotrexate treatment.

It should be remembered that an important number of cases (36.8%) like our case may have asymptomatic progress while there is painless vaginal bleeding in many cases (38.6%). Vaginal bleeding together with abdominal pain (15.8%) and only abdominal pain (8.8%) are other important clinical indicators.[4]

The sensitivity of using transvaginal ultrasonogprahy in CSP is 84.6% and it is frequently confused with cervical pregnancy, cervico-isthmic pregnancy, advanced spontaneous abortus and incomplete abortus.4 Sonographic diagnosis criteria of CSP are: (i) empty uterine cavity; (ii) empty cervical canal; (iii) dilution or discontinuity of anterior uterine wall on sagittal uterus section where amniotic sac is shown, and (iv) development of gestational sac from uterine isthmus and the existence of myometrial layer thinned between bladder and sac.[2] Color Doppler ultrasonography, three-dimensional ultrasonography, three-dimensional power Doppler ultrasonography and magnetic resonance monitoring are other methods that may be used in diagnosis.

There is no algorithm agreed upon for the treatment like in CSP diagnosis. However, during advanced gestational weeks, ending pregnancy on first trimester is advised by many researchers due to the increase in development risk of complications threatening life in later weeks of pregnancy such as massive bleeding and uterine rupture. Conservative medical treatment, local injection treatments, surgical sac aspiration, dilatation curettage (D&C), surgical treatments and their various combinations are among current treatment options.[2]

The agent frequently used in medical treatment is methotrexate and it can be used in single or multiple dose protocols. Methotrexate, KCl, hyperosmolar glucose and crystallized tricosantin are used in the local injection treatment. While dilatation and curettage can be performed alone, they can also be combined with medical treatments and local injection treatments. The possibility of remaining rest tissue which may require systemic methotrexate use after dilatation and curettage, and massive bleeding risk that may proceed up to hysterec-

tomy should be remembered. Most of the patients applied surgical treatment are the patients who get late period diagnosis and/or have instable hemodynamics.4,5 Smorgick et al.6 reported that they achieved 100% success in 5 cesarean scar pregnancy on whom they applied systemic methotrexate. Due to high initial hCG titer and the existence of fetal cardiac activity in our case, multiple methotrexate application was preferred after intracardiac KCl application.

## Conclusion

In cases where high hCG titer or cardiac embryonal cardiac activity are monitored, it is considered suitable to combine systemic treatments with local treatments since using systemic methotrexate alone has low success rates.

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# The Correlation of Ultrasound and Magnetic Resonance Imaging in the Thoracic Anomalies: Case Series

Talat Umut Kutlu Dilek[1], Arzu Doruk[1], Sevgül Köse[2], Filiz Çayan[1], Saffet Dilek[1]

[1]*Mersin Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Mersin, TR*
[2]*Mersin Üniversitesi Tıp Fakültesi, Radyodiagnostik Anabilim Dalı, Mersin, TR*

**Abstract**

**Objective:** To discuss, the correlation of ultrasound and magnetic resonance imaging (MRI) for the differantial diagnosis of pulmonary anomalies.

**Case:** Two cases of pulmonary anomalies including congenital cystic adenomatoid malformation, bronchopulmonary sequestration and one case of congenital diaphragmatic hernia which diagnosed at 2nd trimester ultrasound were evaluated by MRI.

**Conclusion:** Differantial diagnosis of bronchopulmonary sequestration and congenital cystic adenomatoid malformation could be done succesfully by MRG. Also, mediastinal shift and pulmonary hypoplasia due to diaphragmatic hernia could be evaluated correctly.

**Keywords:** Ultrasound, magnetic resonance imaging, bronchopulmonary sequestration, congenital diaphragma hernia, congenital cystic adenomatoid malformation.

*Fetal toraks anomalilerinde ultrasonografi ve manyetik rezonans görüntülemenin korelasyonu: olgu serisi*

**Amaç:** Pulmoner anomalilerin ayırıcı tanısında manyetik rezonans görüntüleme (MRG) ve ultrasonografi korelasyonunu tartışmak.

**Olgu:** İkinci trimesterde ultrasonografisinde tanı alan, Konjenital kistik adenomatoid malformasyon ve bronkopulmoner sekestrasyon olan 2 pulmoner anomali vakası ve konjenital diafragmatik herni olgusu MRG ile değerlendirilmiştir.

**Sonuç:** Bronkopulmoner sekestrasyon ve konjenital kistik adenomatoid malformasyon arasındaki ayırıcı tanı MRG ile başarılı bir şekilde yapılabilir. Buna ek olarak diyafragmatik herniye bağlı mediastinal şift ve akciğer hipoplazisi doğru olarak değerlendirilebilir.

**Anahtar Sözcükler:** Ultrasonografi, manyetik rezonans görüntüleme, bronkopulmoner sekestrasyon, konjenital diyafragma hernisi, konjenital kistik adenomatoid malformasyon.

## Introduction

By the inclusion of ultrasonography into antenatal follow-up for the last three decades, it has become possible to do prenatal early diagnosis of many pulmonary and thoracic congenital anomalies. Within this group, there are congenital cystic adnomatoid malformation, pulmonary sequestration and bronchogenic cysts. Another anomaly which can be added into this group is the congenital diaphragm hernia which may lead to serious decrease in pulmonary volumes that is not actually caused by lung and airways. Early diagnosis of these lesions provides obstetricians following cases to move coordinately with pediatric surgery

Correspondence: Talat Umut Kutlu Dilek, Mersin Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı, Mersin
e-mail: umutdilek@gmail.com

team by detecting patients who may need transfer to appropriate centers when required or newborn care and surgery at postnatal early period.[1] It is possible to diagnose and follow up most of these cases by ultrasonography. However, magnetic resonance imaging (MRI) can be used when differential diagnosis cannot be performed or details of changes in anatomy cannot be presented. Within last decade, latest developments in MRI technology such as obtaining faster cross sections, decreasing the effect of fetal movements in this way, getting clearer images has helped MRI to be in especially diagnosis and differential diagnosis of central nervous system anomalies.[2,3] In this article, we aimed to report ultrasonography and MRI correlation in thoracic anomalies.

## Cases

### Case 1

Twenty-two years old case with gravida 2 and para 1 was referred to our center by the pre-diagnosis of thoracic cystic mass on her 25th gestational week. The patient had a history of spontaneous term vaginal delivery without any characteristic in her medical background. In her ultrasonography, single alive fetus complied with 25th gestational week was observed. During the same evaluation, it was observed that stomach and duodenum were herniated to left hemithorax due to left hemidiaphragm defect, mediastinum was pushed rightward and herniated organs were on the posterior of heart. No additional structural anomaly was detected in ultrasonography, amniotic fluid index was normal (Fig. 1). Diaphragm contours on the left were not seen in the obstetric MR examination of the patient clearly and stomach was observed as supradiaphragmatically (Fig. 2). The case was observed with these findings up to 39th gestational week and she delivered a boy with 8/9 apgar score and 2760g of weight by cesarean. In the postoperative period, the patient confirmed for left diaphragm hernia diagnosis was operated at postnatal 2nd day and the defect on her left diaphragm was fixed primarily. Two-month and 20 day old baby continued to live without any problem.

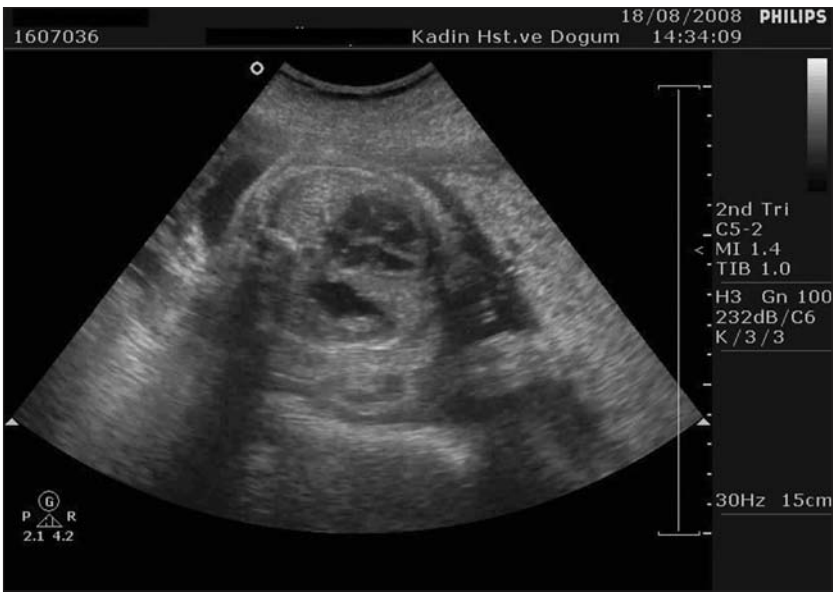


**Figure 1.** Mediastinal shift caused by stomach herniated to left hemithorax, and heart observed on right hemithorax.

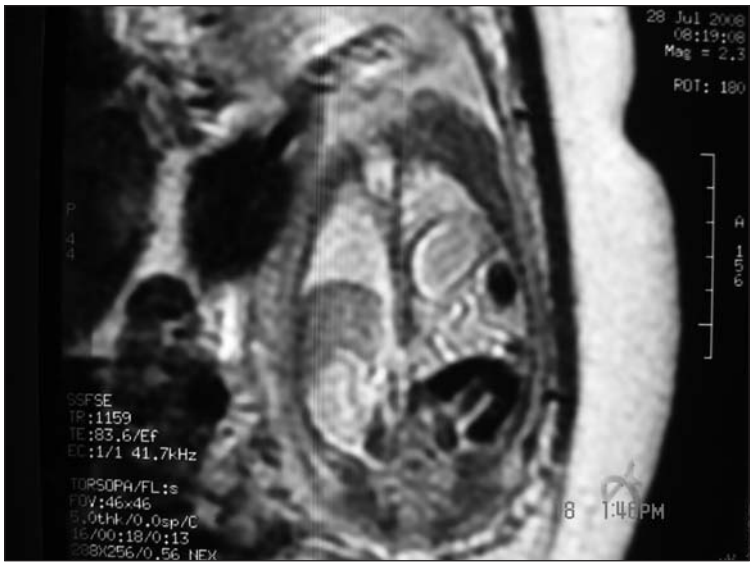


**Figure 2.** In T2 weighted coronal section, it is observed that the volume of left lung decreases and there is an area just on the inferior of lung parenchyma conforming to stomach.

### Case 2

Twenty-one years-old case with primigravida applied to our polyclinic for routine pregnancy follow-up. Biochemical scanning test of patient at second trimester was reported as low risky, and it was observed at the ultrasonographic examination of the patient performed at 22nd gestational week that there were slight rightward push in heart and well-confined formation at left lung posterobasal and left lung hyperechogenic with 35x26 mm dimensions (Fig. 3). In the power Doppler examination per-

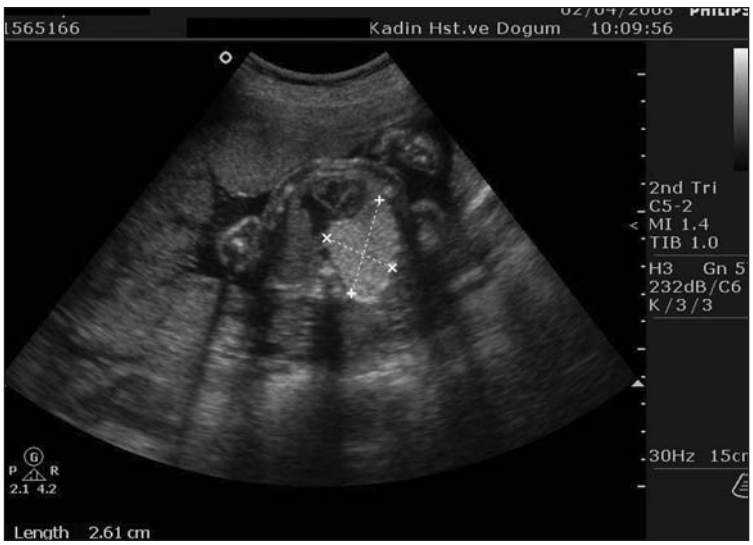


**Figure 3.** Well-confined formation causing hyperechogenic in left lung posterobasal and rightward push in heart.

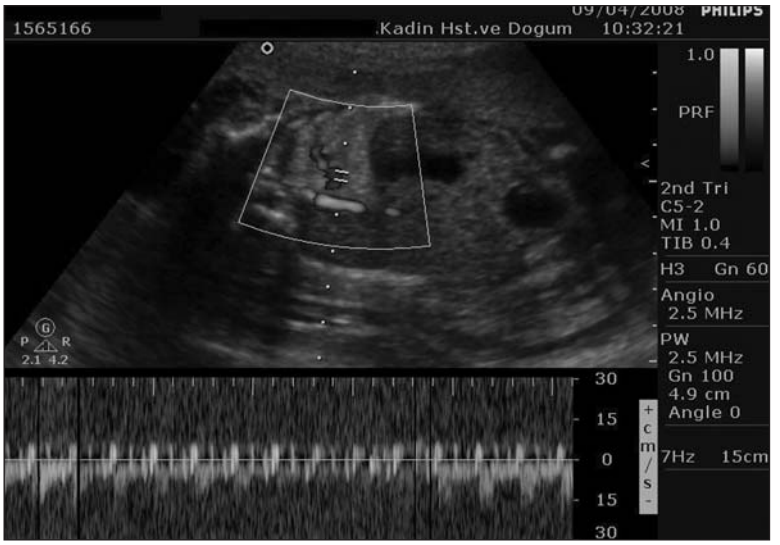


**Figure 4.** It is observed in power doppler scanning that the bleeding of sequestrum segment is received from aorta.

formed, it was observed that arterial bleeding was received from aorta (Fig. 4). In the obstetric MR evaluation of the patient, the structure observed more intensely as to adjacent lung parenchyma in T2 weighted sections was evaluated as pulmonary sequestration (Fig. 5). The patient whose pregnancy follow-ups continued without any problem applied to initiate delivery while she was pregnant for 40 weeks and 4 days. A boy with 9/10 apgar score and 3190g weight was delivered by normal spontaneous vaginal delivery. It was observed in the thorax

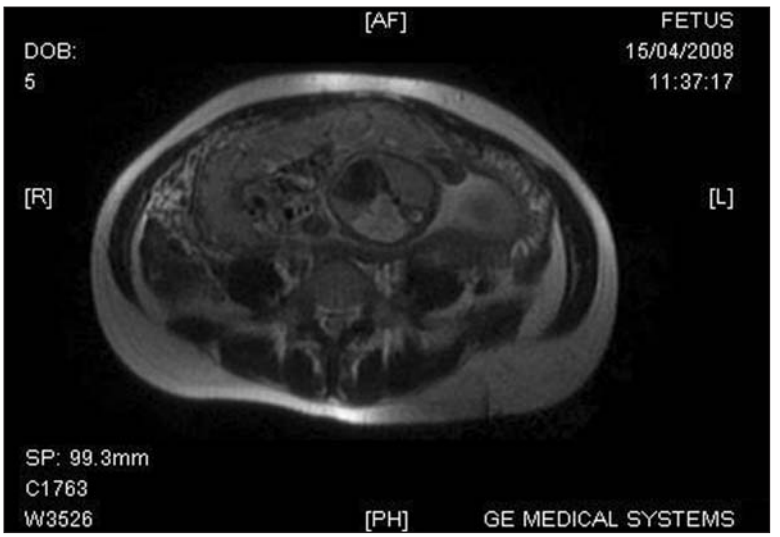


**Figure 5.** In T2 weighted axial images, homogenous triangular solid lesion with approximately 1.5-2 cm diameter on inferior lobe of left lung is observed which has higher signal intensity than normal lung parenchyma.

computerized tomography scanning in postnatal period that the lesion was regressed.

### Case 3

A twenty-six years-old patient with gravida 2, para 1 and living 1 applied to our clinic for a routine pregnant follow-up at 17th gestational week. Biochemical scanning test of the patient at 2nd trimester was reported as low risky. In the anatomical scanning, 2.54 $cm^3$ mass lesion with 20x12x18 mm dimension was observed which was including some cystic and solid areas on right lung posterobasal and not causing a push towards mediastinum (Figs. 6 and 7). In the

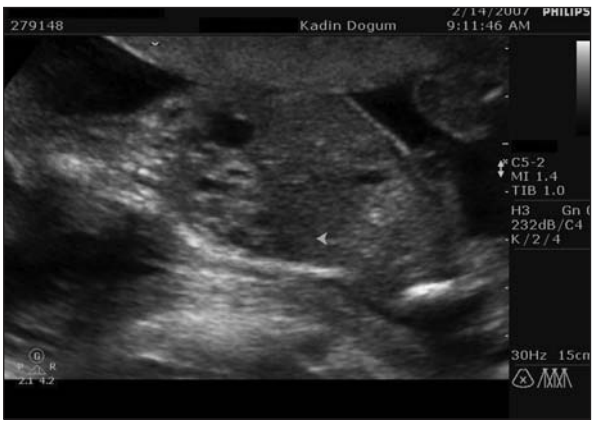


**Figure 6.** 2.54 $cm^3$ mass lesion with 20x12x18 mm dimension including some cystic and solid areas on right lung posterobasal.

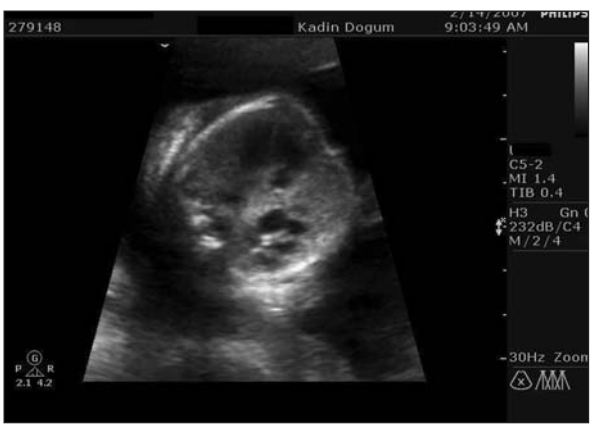


**Figure 7.** No push is observed on mass dependent mediastinum.

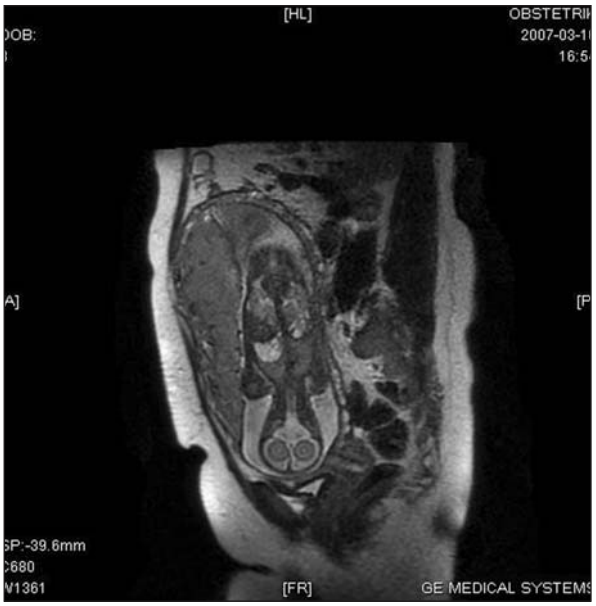


**Figure 8.** In T2 weighted coronal section, multiple cystic area is observed with hyperintense signal which settled on right lung posterobasal.

obstetric MR examination done by these findings, mass lesion formed of multiple cysts observed as hyperintense in T2 weighted sections were found in right lung basal (Figs. 8 and

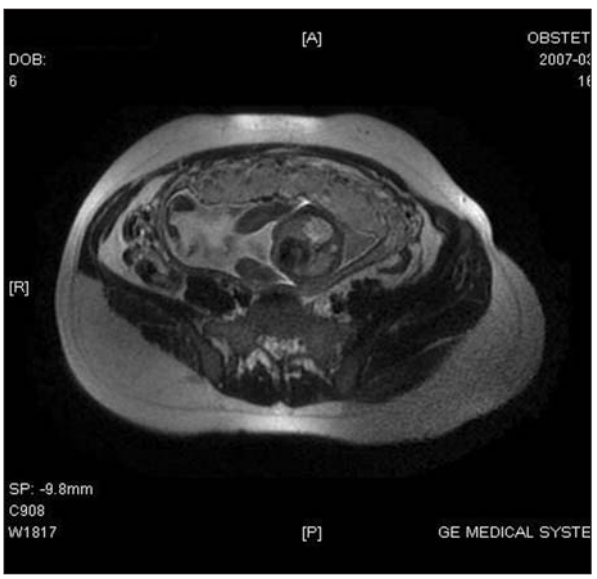


**Figure 9.** In T2 weighted axial section, multiple cystic area is observed with hyperintense signal which settled on right lung posterobasal.

9). By these findings, amniosynthesis was applied as an invasive prenatal diagnosis test. Routine pregnancy follow-up of the patient was maintained after karyotype outcome was reported as 46 XX. In the evaluations performed in following gestational weeks, it was observed that there was no increase in dimensions and volumes of the lesion. The patient was taken into cesarean since she had a previous cesarean history while she was pregnant for 38 weeks and 5 days, and a 3620g girl with 8/9 apgar score was delivered alive. It was seen in the thorax computerized tomography evaluated in the postnatal period that the dimensions of lesion regressed. The follow-up has still been carried on.

## Discussion

Developments in ultrasonography technology and more systematic and effective use of ultrasonography in antenatal follow-up made possible to detect solid or cystic lesions occupying a place within thorax at the end of first trimester or in the beginning of second trimester. In this way, the association of diagnosed lesions with other accompanying structural anomalies or aneuploidies can be detected earlier and it can be accordingly possible to end pregnancy before it gains viability, to postpone treatment to neonatal period or to apply intrauterine interventions in experienced reference centers as in congenital diaphragm hernia.

Lung development at intrauterine period is affected negatively by lesions within thorax, oligohydramnios, occlusive anomalies on main airways or neurological problems decreasing fetal respiratory movements.[3] Primary technique for evaluating thorax and lungs is ultrasonography. Non-inclusion of air by airways and lungs in prenatal period makes fetal thorax and lungs a suitable anatomical structure for both ultrasonography and MRI. In this way, mass lesions found in lungs or anatomical definitions of extrathoracic masses within thorax, and their effects on lung volume and diaphragm contour can be detected by ultrasonography.

As a result of compresson due to intrathoracic mass lesions, pulmonary hypoplasia and mediastinal replacement can be met. The severity of hypoplasia is related with occurrence time and dimensions of lesion. An advantage of MRI compared to ultrasonography in congenital diaphragm hernia is the possibility of displaying whether liver is herniated or not, and of anatomical localization of herniated liver lobe.[4] In cases where amniotic fluid decreases, as a result of decreased fetal movements, it may be possible to display fetal anatomy in detail by MRI when movement artifacts decrease in MRI. Although findings of diaphragm hernia were presented by ultrasonography in our case, MRI was used to be able to detect reduce in lung volume sonographically since the patient was obese. Following this, the family was informed together with pediatric surgery team for current situation and possible method of management. Compression and mediastinal shift in left lung confirmed on MRI was followed by ultrasonography for the whole remaining pregnancy period.

While it is seen as a hyperintense lesion in MRG T2A sections in congenital adenomatoid cystic malformation cases, it has lower signal intensity according to adjacent liver tissue in T1 and FLAIR sequences.[4,5] The greatest contribution of FLAIR sequence in the diagnosis of congenital adenomatoid cystic malformation is to be able to determine whether macrocystic or microcystic component is dominant. In the distinction of bronchopulmonary sequestration from microcystic cases, MRI may contribute to ultrasonography. It was reported that approximately 19-56% of cases followed by ultrasonography regressed during follow-up period. In these cases, MRI is more successful than ultrasonography for determining residual lesions.6 In this case; MRI was referred to confirm the diagnosis found by ultrasonography.

Bronchopulmonary sequestration is followed as well-confined ecodense and homogenous masses in ultrasonography. By Doppler ultrasonography, feeding artery can mostly be presented. On the other side, in cases where

feeding artery cannot be presented by ultrasonography, it may be difficult to distinguish from type 3 adenomatoid cystic malformation. In such cases, borders of lesion, determining other accompanying lesions and presentation of feeding artery can be provided by ultrafast MRI. While the follow-up in ultrasonography in question is in favor of adenomatoid cystic malformation, it is in favor of bronchopulmonary sequestration to follow up solidly. Both in bronchopulmonary sequestration and congenital cystic adenomatoid malformation, as gestational week proceeds, the possibility of detecting in MRI decreases as signal intensity of lesions and the rate of lesion in growing lungs relatively decrease.5 It was observed that it became hard to distinguish from normal lung tissue in progressive gestational weeks due to the decrease in echogenicity of lesion and acoustic shading caused by costas during the follow-up of last two cases by ultrasonography.

There are inconsistent outcomes about additional data of MRI provided for patient management for intrathoracic lesions. Levine et al.5 reported that MRI provided data in addition to ultrasonography in 38% of cases and they changed patient management in 8% of patients. This contribution was reported as 33% in the study of Coakley et al.7 and as 17% in the study of Hubbard et al.8 In all these three studies, MRI was used to confirm diagnoses of ultrasonography and to put out the effects of lesions on lung hypoplasia. On the other hand, MRI did not change ultrasonographic diagnosis and management way in all three cases.

## Conclusion

Main advantages of MRI are the possibility of multi-planar evaluation free of fetus position when presenting pulmonary hypoplasia and the possibility of evaluating in the presence of oligohydramnios. Except limited cases, MRI does not provide data to ultrasonography which may cause changes in patient management. Ultrasonography for diagnosis of cases and evaluation of cases with hydrops diagnoses as well as the diagnosis of cases is the first option since it can be obtained cheaply and easily and it provides an evaluation opportunity free of artifacts caused by fetal movements.

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