

## Özgün Klinik Araştırma

# Surgical Approach to Lumbar Disk Herniation in Pregnant Women

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**Objective:** Our aim is to emphasize the importance of surgery along with the route of anesthesia and positioning of the patient during surgery when treating pregnant patients who present with progressive neurologic deficit and pain due to lumbar disc herniation.

**Material and Method:** Patients in this study were already followed up by our obstetric department. After a conservative medical approach with analgesics, symptoms did not resolve and contrarily worsened progressively so they were referred to neurosurgery department. Three pregnant patients with lumbar disc herniation were operated during pregnancy. Two of the three patients presented in their second (n=2) or first trimester (n=1) of their pregnancies. Indications for surgery involved cauda equina syndrome, progressive loss of muscle strength and pain resistant to conservative medical treatment. Two of the three patients presented with primary herniation and the third patient had a recurrent herniation. All of the three patients were requested to sign an informed consent form.

**Results:** Three pregnant patients were operated due to lumbar disc herniation and all the signs and symptoms of herniation resolved soon after surgery.

**Conclusion:** Surgical repair of lumbar herniation under spinal anesthesia is safe surgical treatment of choice in pregnant patients which prevents development of permanent neurological deficit and preterm delivery triggered by pain.

**Key words:** Pregnancy, lumbar disc herniation, microdiscectomy

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## Gebelerde Lomber Disk Hernisine Cerrahi Yaklaşım

**Amaç:** Gebelerde şiddetli ağrı ve nörolojik defisit nedeniyle cerrahi endikasyonu olan lomber disk hernisi olgularında uygulanacak anesteziyi, hasta pozisyonunu ve cerrahi yöntemin önemini vurgulamak istedik.

**Gereç ve Yöntem:** Çalışmadaki olgular kadın-doğum kliniğince takip edilmekteydi. Analjeziklerle ve konservatif tedaviye rağmen, semptomları düzelmeyen veya ilerleyen olgular nöroşirürji kliniğine sevk edildi. Lomber disk hernisi saptanan 3 olgu opere edildi. İki olgumuz, 3. trimesterde, 1 olgumuz ise 1. trimesterdeydi. Ameliyat için kesin endikasyonlarımız, kauda equina sendromu, ilerleyici motor güç kaybı ve konservatif tedaviye yanıt vermeyen ağrıydı. Opere edilen 3 olgumuzdan 2'si primer, 1'i ise nüks olguydu. Tüm olgularımıza spinal anestezi uygulandı.

**Bulgular:** Lomber disk hernisi nedeniyle opere edilen 3 olguda da semptom ve bulguların tamamı ameliyat sonrası düzeldi.

**Sonuç:** Gebelerde lomber disk hernisinin spinal anestezi ile ameliyatı güvenli bir yöntemdir. Cerrahi, ağrı nedeniyle erken doğum riskini ortadan kaldırmak ve kalıcı nörolojik defisitleri önlemek için tercih edilecek tedavidir.

**Anahtar kelimeler:** Gebelik, lomber disk hernisi, mikrodiskektomi

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**F**ifty percent of the pregnant women experience back pain <sup>(12,21)</sup> during pregnancy. Nevertheless the incidence of lumbar disc herniation is very rare (1/10000) during pregnancy excepting preexisting hernias. Although conservative treatment is the first treatment of choice, surgical approach is indicated for selective cases <sup>(3,4,11,18)</sup>.

Type of surgery and anesthetic approach to be used are crucial matters in the decision of the treatment of lumbar disc herniation in pregnancy. Diagnostic tools applicable during pregnancy, anesthetic drugs and techniques to be used throughout surgery and hemodynamic instability of the pregnant women are the main risk factors either for the patient herself and the fetus. The trimester of the pregnancy at the time of surgery is a major risk factor, as well <sup>(5,18)</sup>. The first trimester is the time for organogenesis and the second and third trimesters are precarious for enzymatic changes and PDA. In this study we tried to draw attention to the timing of surgery for the pregnant women with LDH, the anesthetic technique for surgery and the importance of positioning the patient. Three pregnant patients with LDH were presented in the study. Although one of the patients had recurrent herniation, they are all diagnosed and treated surgically during pregnancy.

## MATERIAL and METHOD

**Case 1:** 35- year- old woman presented in her 24 th week of pregnancy. The patient presented with severe pain starting from the hip towards the right leg. Physical examination findings were as follows; right Laseque test 30 degrees (+) and loss of strength during the dorsoflexion of the right toe. VAS (Visual analogue scale) score was 10 points. MR imaging of the spine showed right extruded discal hernia at L5-S1 and signs of pressure on the root of the right S1 was also observed. Surgery was decided. The patient

was positioned in the left lateral decubitus position and right microdiscectomy at L5-S1 was performed under spinal anesthesia. Neurological signs mentioned above and other symptoms

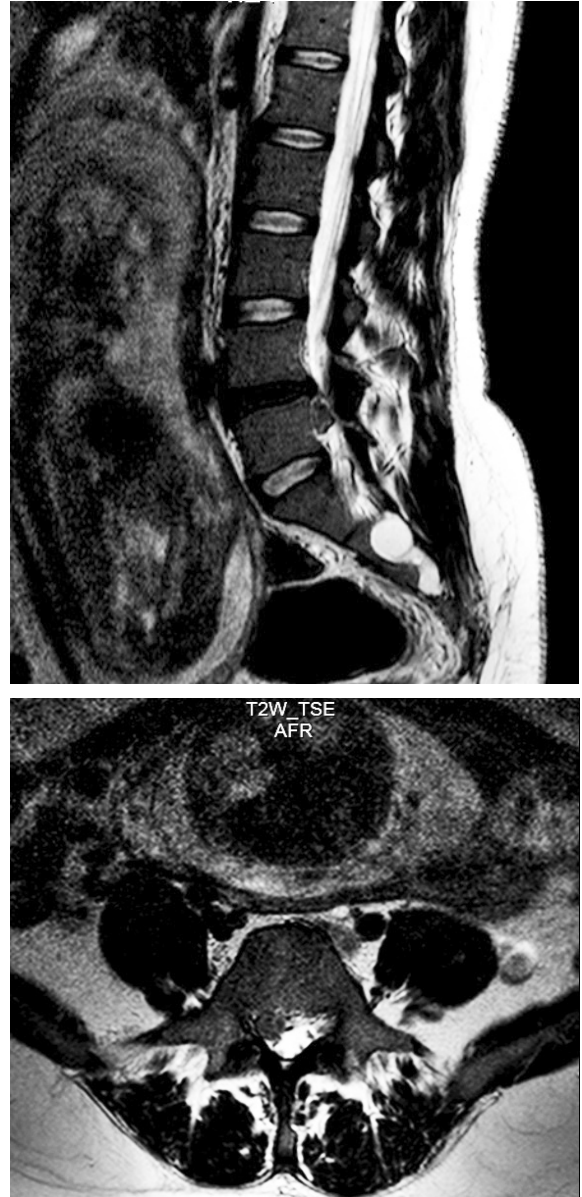


Figure 1. Case 1.1, 2 Lumbar MR images preoperatively.

of the patient regressed soon after surgery. She gave birth to a 3500 gr, healthy baby by C/S, at 38th week of her pregnancy (Figure 1).

**Case 2:** A 34 –year- old woman presented in her 26th week of pregnancy. She was referred to our clinic by the department of obstetrics. She

was suffering from back pain for a month and she had a severe pain in the right leg for a week. She was walking hardly and she could not uplift her right foot. She had loss of sense in her right foot. Her physical examination findings were as follows: right Laseque 20 degrees (+), and 50% loss of muscular strength during dorsoflexion of the right foot. Her VAS score was 10 points. MR imaging revealed right extruded discal hernia at L4-5 and signs of pressure on the root of the right L5 was also observed. Surgery was decided. The patient was positioned in the left lateral decubitus position and right microdiscectomy at L4-5 was performed under spinal anesthesia. Neurological signs and symptoms of the patient regressed soon after surgery. She gave birth to a 3200 gr, healthy baby by C/S, in 38th week of her pregnancy.

**Case 3:** A 38-year- old woman presented in her 9th week of pregnancy. She was operated 2 years ago for lumbar disc herniation. She was suffering from pain in her left hip and leg for at least a month when she attended to our clinic. Since she was in her first trimester, conservative treatment was applied for a time. She attended to our clinic again with progressive symptoms. Her physical examination findings were as follows: left leg Laseque 20 degrees (+), and 30% loss of muscular strength during dorsoflexion of the left foot. MR imaging revealed left extruded recurrent discal hernia at L4-5 and signs of pressure on the root of left L5 was also observed. Surgery was decided. The patient was positioned in prone position and left microdiscectomy in L4-5 was performed under spinal anesthesia. Neurological signs and symptoms of the patient regressed soon after surgery. She was in her 17th week of pregnancy and had no complaints for he time (Figure 2).

All the patients underwent obstetrical examination on the day of surgery and immediately after the surgery. They were evaluated again the other

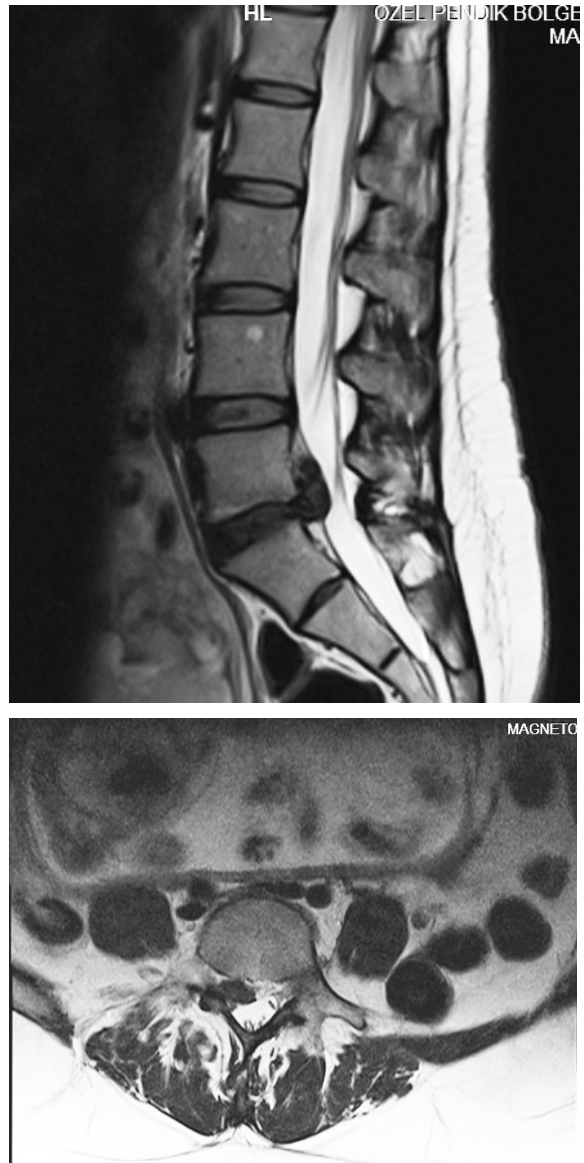


Figure 2. Case 2.1, 2 Lumbar MR images preoperatively.

day and a week later by US. All the decisions and procedures were undertaken with the association of neurosurgeons, obstetricians, anesthesiologists and the patient herself. After monitorization of the patient, she was positioned on her left side to perform spinal anesthesia through L3-4 space. Blood pressure and heart rate of the patients were monitored throughout the surgery. Fifteen minutes after induction of anesthesia, the operation started and the procedures took about 30-45 minutes. Microdiscectomy was performed under operating microscope. Peroperatively, all the





Figure 3. Case 3.1, 2 Lumbar MR images preoperatively.

hemodynamic parameters were monitored and neither the mother nor the fetus showed instability. Monitorization of the fetus by Doppler US during the surgery at every 15 minutes, did not demonstrate any variation in heart rate (140-160 pulse/minute). Patients were positioned back to supine position when the operation ended. Heart rates and blood pressures were checked again and ephedrine was administered if any signs of hypotension occurred.

## DISCUSSION

Back pain was evident in half of the pregnant women and usually treated with conservative approach <sup>(4)</sup>. LDH is the most common spinal pathology resulting in back pain although it is rarely (1/10000) seen among pregnant women <sup>(19)</sup>. Recurrent LDH is also uncommon in pregnancy and pregnancy is not a risk factor for its recurrency <sup>(30)</sup>. LDH is very rarely seen in the 1st and 2nd decades of a woman's life and surgery is an exceptional treatment modality <sup>(6,23,25)</sup>. The incidence of LDH correlates with the increasing age. So the older a pregnant woman, the more often we might observe LDH during pregnancy <sup>(24)</sup>. The patients we presented in this report are all in their 3rd decades of life.

In epidemiological researches, it has been reported that annually 87000 pregnant women in the USA are undergoing surgery and/or anesthesia due to non- obstetrical reasons. Reports from the European Society revealed that annually 115000 pregnant women are undergoing surgery and/or anesthesia due to non- obstetrical reasons. The incidence of these non- obstetrical conditions resulting in surgery is reported to be 0.3-2.2 % in the USA and of these 42 % of them presented in the first, 35 % in the second, and 23 % in the third trimesters <sup>(29)</sup>. Most common surgeries during pregnancy are laparoscopic appendectomy (1/1500-2000 pregnancy) and cholecystectomy (1-8/10000 pregnancy). Neurosurgery and cardiovascular surgery are quite rare in pregnancy <sup>(22)</sup>. We did not find any reports about the frequency of lumbar disc surgery during pregnancy.

Elective surgeries are not recommended during pregnancy but if inevitable first trimester must be avoided. Second trimester might be a better option for elective cases. Fifteen-90 days of a fetus' life is the time of organogenesis. Beyond 13 weeks the complications usually result in

IUGR or functional disorders. In the emergency cases (acute abdomen, malignancy, neuro or cardiovascular surgery), appropriate time is not asked, the main issue is to save the mother's life. In some exceptional situations such as intraoperative blood loss, surgery performed in the prone or sitting upright positions, complicated surgeries with long duration of anesthesia, hyperventilation of the mother or cardiopulmonary operations, Cesarean section may be performed during or before the operation in order to avoid fetal risks <sup>(5,10)</sup>.

MR imaging is a safe diagnostic tool for patients who suffer from back pain resistant to conservative therapies. If neurological signs accompany pain, radiological imaging should be performed urgently. Indications for surgery in case of LDH do not differ amongst the pregnant and non-pregnant women. Pregnant or not, in order to prevent permanent deficits, diagnosis and definitive treatment must be planned as soon as possible following emergence of symptoms and neurological signs <sup>(19)</sup>. Absolute indications for surgery are cauda equina syndrome, and progressive loss of strength. In case of persistence of pain despite conservative medications, surgery is still an option <sup>(11,12,27)</sup>. Resistant back pain might trigger preterm delivery due to overstress <sup>(13,26)</sup>. In our report, all of the three patients suffered from resistant pain and progressive neurological deficits.

When a surgery planned for a pregnant women even for non-obstetrical reasons, the route of anesthesia is still a question although you rely on evidence-based reports in the literature. Fetal or maternal risks are always exist. In order to minimize the risks, every discipline involved in any part of the follow up must interfere with the decisions and the responsibility of the mother and the baby should be shared. Preop evaluation is especially important and the anesthetic approach must be planned beforehand.

During pregnancy either regional or general anesthesia can be performed successfully for non-obstetrical operations but still regional anesthesia must be the first choice in most of the cases <sup>(18,28)</sup>. Spinal or epidural anesthesia is suggested in lumbar disc surgeries for pregnant women <sup>(4,11,14)</sup>. Spinal anesthesia is a widely used technique throughout countries because it is easy to perform and its effects readily starts <sup>(7,15,20)</sup>. Except for the patients with spinal canal stenosis, spinal anesthesia is the first choice in pregnant women. Neurological complications may occur with canal stenosis <sup>(31)</sup>. Pulmonary aspiration and the risk of transmission of the drug to the fetus is very rare compared to general anesthesia. Brown and Levi reported 2 patients in their 20th weeks of pregnancy and 1 patient in her 16th gestational week with cauda equina syndrome and the authors had to perform an urgent operation under epidural anesthesia <sup>(4)</sup>. Since the reports are very few about general anesthesia during pregnancy and its fetal effects, epidural anesthesia was their choice to avoid the fetal risks and to reduce pain. Besides all beneficial effects of regional anesthesia, there are side effects such as hypotension, back pain, headache, nausea, vomiting, meningitis, meningismus, urinary retention and neurological symptoms.

Another bothering suspicion about the anesthesia undertaken during pregnancy is whether it induces a preterm delivery or not. Fortunately, evidence-based reports until today have no proof about its triggering potential. Although surgery or anesthesia are claimed to be an etiological factor for IUGR, spontaneous abortions and perinatal mortality, there may be other etiological factors effective on mother and the fetus except for drugs, such as stress, anxiety, hypoxia-hypercarbia (smoking) or hypoglycemia (DM).

Maternal heart rate, EKG, blood pressure, peripheral oxygen saturation, body temperature, end-tidal CO<sub>2</sub> pressure can be monitored, and

evaluated throughout the surgery <sup>(17)</sup>. Hypotension during surgery, anemia caused by heavy intraoperative blood loss, hypoxemia and increased sympathetic tonus result in uteroplacental insufficiency leading to fetal asphyxia. Hypotension may cause tissue hypoxia leading to serious complications such as cerebral ischemia, myocardial infarction, acute renal failure and cardiac arrest <sup>(12,19,21)</sup>.

Fetal monitorization during surgery is a matter of concern. Whether to monitorize the fetus continuously or temporarily is still a subject of controversy. American Association of Obstetricians and Gynecologists decided to monitorize the fetus on an individual basis. What is safe for the mother or the fetus should be decided and then the required action should be taken <sup>(1)</sup>. In our survey, we decided on individual basis, and while one fetus was continuously monitorized, the other two fetuses were observed before and after surgery.

In this study, two patients presented in their second trimesters while the other one with recurrent hernia presented in the first trimester. Prone position which is usually used in surgeries of lumbar region, helps to reduce blood loss by decreasing venous pressure <sup>(15)</sup>. In the first and second trimesters of pregnancy, since the aortacaval compression would be minimal, it is eligible to operate the patient in prone position. Beyond second trimester, the patient must be operated in lateral position with the operating table is tilted head up. This precaution would reduce aortacaval compression <sup>(9)</sup>. It is quite harder to operate on the patient in the lateral position when compared with the prone position. Fahy et al, performed lumbar surgery on two pregnant women in their 33 gestational weeks while the patients were lying in prone position <sup>(8)</sup>. In selected cases Cesarean section followed by laminectomy was reportedly preferred <sup>(2,3)</sup>. In our survey, two patients presented in the second trimester were operated

on the lateral position while the patient with 9 weeks of pregnancy was operated on prone position.

It is also important to provide pain relief after the operation. Another advantage of regional anesthesia is that it is a quite effective way of relieving pain and it has minimal (if any) effect on fetal heart rate. In general anesthesia you may offer patient controlled intravenous analgesia application, and during the postoperative period while you can give analgesics via epidural catheter if you used intraoperative epidural anesthesia.

In this report, we presented the results of lumbar surgeries we have performed during pregnancy. Pregnant women is rarely operated during pregnancy, and only a few reports have been cited in the literature. Two of the patients we have operated, gave birth to healthy babies in 38 th week of pregnancy via C/S and the pediatric follow up showed no significant difference than the other babies. The third patient is going on with her pregnancy on her 17th week.

As a conclusion, lumbar discal hernia is a rare condition in pregnancy but if neurological symptoms accompany pain, surgery must be planned. These symptoms may not only cause progressive loss of muscle strength but they may also trigger preterm delivery. General or regional anesthesia can either be applied but regional anesthesia is the first choice considering fetal and maternal risks. Second trimester is the most eligible time for surgeries. Progressive neurologic deficit is the milestone in the decision favouring surgery in the first trimester. We haven't encounter any postoperative and the symptoms regressed soon after surgery. Although three cases are not enough to establish an approach to lumbar discal hernias, since there are a few reported cases of neurosurgical operations during pregnancy, our findings are still important.

## REFERENCES

1. ACOG Committee Opinion No. 474: Nonobstetric surgery during pregnancy. ACOG Committee on Obstetric Practice. *Obstet Gynecol* 2011;117:420-1.  
<http://dx.doi.org/10.1097/AOG.0b013e31820eede9>
2. Al-areibi A, Conveney L, Singh S, Katsiris S. Case report: anesthetic management for sequential Cesarean delivery and laminectomy. *Can J Anesth* 2007; 54:471-4.  
<http://dx.doi.org/10.1007/BF03022034>
3. Brown MD, Brookfield KF. Lumbar disc excision and cesarean delivery during the same anesthesia. A case report. *J Bone Joint Surg Am* 2004;86-A:2030-2.
4. Brown MD, Levi AD. Surgery for lumbar disc herniation during pregnancy. *Spine* 2001;26:440-3.  
<http://dx.doi.org/10.1097/00007632-200102150-00022>
5. Carvalho B. Nonobstetric surgery during pregnancy. IARS Review Course Lectures 2006; 23-30.
6. Dewing CB, Provencher MT, Riffenburgh RH, Kerr S, Manos RE. The outcomes of lumbar microdiscectomy in a young, active population: correlation by herniation type and level. *Spine* 2008;33:33-8.  
<http://dx.doi.org/10.1097/BRS.0b013e31815e3a42>
7. Edirne S, Özyalçın SN, Raj PP, Heavner J, Aldemir T, Yücel A. Rejyonel Anestezi. Nobel Tıp Kitabevleri, İstanbul 2005; 159-84.
8. Fahy UM, Oni M, Findlay D, Sell P. Surgical management of herniated lumbar disc in pregnancy. *J Obstet Gynaecol* 1998;18:544-5.  
<http://dx.doi.org/10.1080/01443619866291>
9. Geun-Nyoung S, Cheon-Hee P, June-Seog C, Yong-Mi A, Jung Ryl K. Epidural anesthesia for percutaneous endoscopic lumbar discectomy during pregnancy -A case report- *Korean J Anesthesiol* 2008;54(5):577-80.  
<http://dx.doi.org/10.4097/kjae.2008.54.5.577>
10. Goodman S. Anesthesia for nonobstetric surgery in the pregnant patient. *Semin Perinatol* 2002;26:136-45.  
<http://dx.doi.org/10.1053/sper.2002.32203>
11. Han IH, Kuh SU, Kim JH, Chin DK, Kim KS, Yoon YS, et al. Clinical approach and surgical strategy for spinal diseases in pregnant women: a report of ten cases. *Spine* 2008;33:614-9.  
<http://dx.doi.org/10.1097/BRS.0b013e31817c6c7d>
12. Han IH. Pregnancy and spinal problems. *Curr Opin Obstet Gynecol* 2010;22:477-81.  
<http://dx.doi.org/10.1097/GCO.0b013e3283404ea1>
13. Heaman MI, Blanchard JF, Gupton AL, Moffatt ME, Currie RF. Risk factors for spontaneous preterm birth among Aboriginal and non-Aboriginal women in Manitoba. *Paediatr Perinat Epidemiol* 2005;19:181-93.  
<http://dx.doi.org/10.1111/j.1365-3016.2005.00644.x>
14. Kathirgamanathan A, Jardine AD, Levy DM, Gre-vitt MP. Lumbar disc surgery in the third trimester-with the fetus in utero. *Int J Obstet Anesth* 2006;15:181-2.  
<http://dx.doi.org/10.1016/j.ijoa.2005.10.007>
15. Kayhan Z. Klinik anestezi. Logos Yay. Tic. A.Ş., İkinci Baskı, İstanbul 1997; 482-9.
16. Kim HS, Kim SW, Lee SM, Sin H. Endoscopic discectomy for the cauda equina syndrome during third trimester of pregnancy. *J Korean Neurosurg Soc* 2007; 42:419-20.  
<http://dx.doi.org/10.3340/jkns.2007.42.5.419>
17. Kuczkowski KM. Nonobstetric surgery during pregnancy: What are the risks of anesthesia? CME Review Article *Obstet Gynecol Surv* 2003;59:52-6.  
<http://dx.doi.org/10.1097/01.OGX.0000103191.73078.5F>
18. Kuczkowski KM. Nonobstetric surgery in the parturient: anesthetic considerations. *J Clin Anesth* 2006; 18:5-7.  
<http://dx.doi.org/10.1016/j.jclinane.2005.11.003>
19. LaBan MM, Perrin JC, Latimer FR. Pregnancy and the herniated lumbar disc. *Arch Phys Med Rehabil* 1983;64:319-92.
20. Morgan GE, Mikhail MS, Murray MJ, Larson CP. Klinik Anesteziyoloji (LANGE), Güneş Kitabevi, Üçüncü Baskı, Ankara 2004; 260-9.
21. Mousavi SJ, Parnianpour M, Vleeming A. Pregnancy related pelvic girdle pain and low back pain in an Iranian population. *Spine* 2007;32:100-4.  
<http://dx.doi.org/10.1097/01.brs.0000254123.26649.6e>
22. Ni Mhuireachtaigh R, O'Gorman DA. Anesthesia in the pregnant patients for nonobstetric surgery. *J Clin Anesth* 2006;18:60-6.  
<http://dx.doi.org/10.1016/j.jclinane.2004.11.009>
23. Parisini P, Di Silvestre M, Gregg T, Miglietta A, Paderni S. Lumbar disc excision in children and adolescents. *Spine* 2001;26:1997-2000.  
<http://dx.doi.org/10.1097/00007632-200109150-00011>
24. Parrish KM, Holt VL, Easterling TR, Connell FA, LoGerfo JP. Effect of changes in maternal age, parity, and birth weight distribution on primary cesarean delivery rates. *JAMA* 1994;271:443-7.  
<http://dx.doi.org/10.1001/jama.1994.03510300049037>
25. Pietila TA, Stendel R, Kombos T, Ramsbacher J. Lumbar disc herniation in patients up to 25 years of age. *Neurol Med Chir (Tokyo)* 2001;41:340-4.  
<http://dx.doi.org/10.2176/nmc.41.340>
26. Pike IL. Maternal stress and fetal responses: evolutionary perspectives on preterm delivery. *Am J Hum Biol* 2005;17:55-65.  
<http://dx.doi.org/10.1002/ajhb.20093>
27. Smith MW, Marcus PS, Wurtz LD. Orthopedic issues in pregnancy. *Obstet Gynecol Surv* 2008;63:103-11.  
<http://dx.doi.org/10.1097/OGX.0b013e318160161c>
28. Van De Welde M, De Buck F. Anesthesia for nonobstetric surgery in the pregnant patient. *Minerva Anestesiol* 2007;73:235-40.
29. Van de Welde M. Nonobstetric surgery during pregnancy. In: Chestnut's Obstetric Anesthesia Practice and Principles, 4th ed., Philadelphia: Mosby Elsevier 2009; 337-60.  
<http://dx.doi.org/10.1016/B978-0-323-05541-3.00017-X>
30. Weinreb JC, Wolbarsht LB, Cohen JM, Brown CE, Maravilla KR. Prevalence of lumbosacral intervertebral disk abnormalities on MR images in pregnant and asymptomatic nonpregnant women. *Radiology* 1989; 170:125-8.  
<http://dx.doi.org/10.1148/radiology.170.1.2521192>
31. Yuen EC, Layzer RB, Weitz SR, Olney RK. Neurologic complications of lumbar epidural anesthesia and analgesia. *Neurology* 1995;45:1795-801.  
<http://dx.doi.org/10.1212/WNL.45.10.1795>