1. Use of anti-Parkinson medication during pregnancy: a case series.

**Author(s):** Tüfekcioğlu, Zeynep; Hanağası, Haşmet; Yağçi Çakmakli, Gül; Elibol, Bülent; Esmeli Tokuçoğlu, Figen; Kaya, Zeynep Ece; Ertan, Sibel; Özekmekçi, Sibel; Emre, Murat

**Source:** Journal of neurology; Aug 2018; vol. 265 (no. 8); p. 1922-1929

**Publication Date:** Aug 2018

**Publication Type(s):** Journal Article

**PubMedID:** 29926223

**Abstract:**

**INTRODUCTION**
Experience about the use and safety of anti-Parkinson (anti-PD) medication during pregnancy is scarce.

**METHODS**
We have retrospectively evaluated the course and outcome of pregnancy in PD patients who used anti-PD medication during their pregnancy.

**RESULTS**
14 PD patients who used anti-PD medication during part or whole of their pregnancy were included. Dopamine agonists were used in 13 patients, levodopa/benserazide in 4, levodopa/carbidopa/entacapone in 1, rasagiline in 7, amantadine in 4, and biperiden in 1 patient. Nine patients were on combination treatment at the time of their pregnancy. During their whole pregnancy, dopamine agonists had been used in six patients, levodopa in four, and rasagiline in one. Four patients experienced adverse outcomes: one had spontaneous abortion while receiving pramipexole, one elderly mother gave birth to a child with Down syndrome, while receiving pramipexole and rasagiline, in one case, there was fetal distress under levodopa/benserazide, piribedil, and rasagiline which resolved spontaneously, in one case, one of the twins did not survive after the birth while the mother was receiving pramipexole and rasagiline. In none of these cases an association with the use of anti-PD medication and adverse outcomes was clearly established. In one patient, motor symptoms worsened despite high dose levodopa, four others experienced transient worsening upon dose reduction.

**CONCLUSION**
Results in our case series suggest that levodopa, rasagiline, pramipexole, and ropinirole alone or in combination with each other may be considered relatively safe during pregnancy. Expected benefits and risks should be considered when prescribing anti-PD medication in pregnant women.

**Database:** Medline

Author(s): Ward, V D

Source: International journal of obstetric anesthesia; May 2018; vol. 34 ; p. 99-102

Publication Date: May 2018

Publication Type(s): Journal Article

PubMedID: 29352622

Abstract: Parkinson's disease is prevalent worldwide but mainly affects the elderly and is rarely seen in women of child-bearing age. The clinical signs and symptoms, the physiological changes of pregnancy, and drug interactions, pose unique challenges for the anaesthetic management of patients with Parkinson's disease who present for delivery. A 36-year-old primigravid woman at 36 weeks' gestation, with Parkinson's disease, presented for pre-anaesthesia assessment prior to elective caesarean section. Her Parkinson's disease had been diagnosed four years previously and was treated with Sinemet (levodopa/carbidopa) and pramipexole. Despite maximum allowable drug doses in pregnancy, she reported disease progression, with right-sided weakness in the upper and lower limbs and an altered gait. Spinal anaesthesia for elective Caesarean section was performed in the sitting position, using 0.5% hyperbaric bupivacaine, morphine 150 µg and fentanyl 25 µg. The anaesthesia and Caesarean section were uneventful. She was discharged home with a healthy baby on the fourth postoperative day.

Database: Medline


Author(s): Seier, Mara; Hiller, Amie

Source: Parkinsonism & related disorders; Jul 2017; vol. 40 ; p. 11-17

Publication Date: Jul 2017

Publication Type(s): Journal Article Review

PubMedID: 28506531

Abstract: Pregnancy does not often occur in the setting of Parkinson's disease (PD) as the most common age of onset is beyond the childbearing years, yet management of these two conditions is crucial for the health of both mother and child. Here we review treatment data of PD during pregnancy, primarily from case reports and drug registries, and focus on available evidence regarding the pregnancy risks for patient and fetus. Historically, it was reported that many women had worsening of symptoms during pregnancy but this may be because anti-parkinsonian medications were not recommended or were under dosed. Levodopa has the best safety data for use in pregnancy and amantadine should be avoided in women who are pregnant or trying to become pregnant. The data for other pharmacological and surgical treatments is less clear. There is no evidence that women with PD have higher rates of birth or fetal complications.

Database: Medline
4. Pregnancy and Parkinson's disease: A review and update

Author(s): Seier M.; Hiller A.

Source: Movement Disorders; Jun 2017; vol. 32; p. 849-850

Publication Date: Jun 2017

Publication Type(s): Conference Abstract

Abstract: Objective: To investigate the literature on pregnancy in the setting of Parkinson's disease (PD) in order to better understand and treat women who become pregnant. Background: PD only presents before the age of 40 in about 5% of cases and it is estimated that only about 400 women less than 50 years old are diagnosed with PD each year in the United States. Additionally, epidemiologic studies have shown that men are more than 1.5-2 times as likely to develop PD than women. As a result, the incidence of pregnancy in the setting of PD is relatively low and our knowledge is largely limited to cases reported in the literature. There has not been a systematic update to the literature in nearly 20 years. As a result, knowledge in treating and counseling women of childbearing age with PD is lacking. Methods: We collected reports in the English literature from 1985 to 2016 to find cases of pregnancy and PD. Analysis of the papers included patient characteristics, birth outcomes, PD symptom control, use and dosages of anti-parkinsonian medications during pregnancy. Results: There are 79 cases of pregnancy and PD reported in the literature from 28 separate articles. Of those, 75 resulted in live births. Regarding motor symptom outcomes, 41% of women were found to have worsening of their PD symptoms while 44% were found to have no change or improvement in PD symptoms. PD symptom control was not mentioned in 14% of cases. Regarding medication use in the setting of PD and pregnancy, levodopa was by far the most common medication used, with 47 pregnancies discussed. The dose of levodopa used ranged from 100 to 2500mg/day. No major abnormality (other than one case of osteomalacia) or birth complications were directly related to levodopa use. In cases where both medication status and symptoms were reported, 64% of women who were treated with anti-PD medications had improvement or stability during pregnancy, compared to only 33% of women who were not treated with anti-PD medication. Limited cases of dopamine agonists, anticholinergics, MAO-B and COMT inhibitors were also found. There is strong evidence of poor fetal outcomes associated with amantadine use. Conclusions: Women with PD should be counselled that pregnancy has variable effects on PD symptoms and that levodopa has been used safely in many patients. Amantadine use should be avoided if possible and there is insufficient data to make recommendations on the use of other PD medications.

Database: EMBASE
5. Levodopa/carbidopa intestinal gel therapy during pregnancy and delivery, first documented case

Author(s): Zlotnik Y.; Giladi N.; Hilel A.; Shapira Y.; Klepikov D.; Ezra A.; Goldstein S.; Gurevich T.
Source: Movement Disorders; May 2014; vol. 29
Publication Date: May 2014
Publication Type(s): Conference Abstract
Available at Movement Disorders - from Wiley Online Library Science, Technology and Medicine Collection 2017

Abstract: Objective: Continuous intestinal levodopa infusion to the duodenum (levodopa/carbidopa intestinal gel) is one of the options of providing continuous dopaminergic stimulation in Parkinson's disease (PD). Background: There are no data on the effect of levodopa/carbidopa intestinal gel treatment on pregnancy and delivery. Methods: We describe a patient who was treated with levodopa/carbidopa intestinal gel during the course of pregnancy and delivery. Results: A 39-year-old professional singer was diagnosed with PD at the age of 29 years. After a normal pregnancy and vaginal delivery of a healthy infant at the age of 31, rasagiline and dopamine agonists were initiated due to worsening of her motor abilities. She subsequently developed dopamine dysregulation syndrome. Levodopa therapy was initiated at the age of 32 and led to dramatic improvement, but this was shortly followed by the appearance of dyskinesia, severe motor fluctuations and painful dystonia. She refused deep brain stimulation because of the risk of dysphonia. levodopa/carbidopa intestinal gel monotherapy was initiated at the age of 37, and resulted in improvement of motor fluctuations, gait and dyskinesia. One year later, while she was under levodopa/carbidopa intestinal gel treatment (daily dose of 1100 mg/ day), she became pregnant in spite of the risk of teratogenicity associated with levodopa treatment (category C). The pregnancy was defined as being high risk with no complications, and the patient was closely monitored by an obstetrician. There were no gastroenterologic complications associated with the jejunostoma, nor were there any technical problems with the device. The dyskinesias were more prominent during the entire pregnancy despite reduction of the levodopa/carbidopa intestinal gel dosage. Due to severe dyskinesia during the first hours of labor, the levodopa/carbidopa intestinal gel dosage was reduced from 50 mg/ hr to 20 mg/hr, which resulted in a prominent "OFF" state and slowing of the labor process. Increasing the dosage to the previous one resulted in speeding the labor process. She gave birth by normal vaginal delivery to a healthy infant (birthweight 2350 g, Apgar score 9 at 1 minute, 10 at 5 minutes). The baby is now 10 months old and her psychomotor development is normal, but she is currently under evaluation for failure to thrive (weight 6,200 kg, under the normal weight percentiles for age) whose association with the levodopa/carbidopa intestinal gel treatment is unknown. Conclusions: We share our experience with the first documented case of levodopa/carbidopa intestinal gel treatment during pregnancy and delivery.

Database: EMBASE

**Author(s):** Lindh, Jonas

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jul 2007; vol. 22 (no. 10); p. 1515

**Publication Date:** Jul 2007

**Publication Type(s):** Letter

**PubMedID:** 17486647

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science, Technology and Medicine Collection 2017

**Database:** Medline

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**Author(s):** Shulman, L M; Minagar, A; Weiner, W J

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jan 2000; vol. 15 (no. 1); p. 132-135

**Publication Date:** Jan 2000

**Publication Type(s):** Research Support, Non-u.s. Gov't Case Reports Journal Article

**PubMedID:** 10634252

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science, Technology and Medicine Collection 2017

**Abstract:** Pregnancy in patients with Parkinson's disease (PD) is a rare occurrence. Previous reports based on retrospective analysis suggest that pregnancy may have a deleterious effect on PD. We describe the effects of pregnancy on the symptomatology of a 33-year-old woman with PD using quantitative neurologic and quality-of-life scales prepartum, intrapartum, and postpartum. During her pregnancy, she was only treated with carbidopa/levodopa. The pregnancy resulted in a normal full-term vaginal delivery of a healthy infant. Significant worsening of this patient's motor symptoms occurred during pregnancy without return to baseline at 15 months postpartum. Pregnancy may exacerbate PD and may have a long-term negative impact on the course of the illness. This report may assist physicians in the counseling of patients with young-onset PD who wish to consider pregnancy.

**Database:** Medline
8. Cathecol-O-methyltransferase inhibitors: another possibly useful pharmacological tool for treating Parkinson’s disease in pregnancy?

**Author(s):** Basile S.; Pinelli S.; Garibaldi S.; Salerno M.G.; Altamura C.; Calcagno M.

**Source:** Journal of Obstetrics and Gynaecology; Apr 2017; vol. 37 (no. 3); p. 381-382

**Publication Date:** Apr 2017

**Publication Type(s):** Article

**Database:** EMBASE


**Author(s):** Julius A.; Longfellow K.

**Source:** Medical Clinics of North America; Jul 2016; vol. 100 (no. 4); p. 733-761

**Publication Date:** Jul 2016

**Publication Type(s):** Review

**PubMedID:** 27235613

**Database:** EMBASE

10. Transient Parkinsonism during pregnancy in patient heterozygous for Gaucher’s disease: Case report

**Author(s):** Patel S.; Appleby K.; Fernandez H.

**Source:** Movement Disorders; Jun 2016; vol. 31

**Publication Date:** Jun 2016

**Publication Type(s):** Conference Abstract

**Abstract:** Objective: To present a case of a woman who became transient Parkinsonian during pregnancy and found to have a rare genetic mutation and describe response to Levodopa treatment. Background: Patient is a 37 year old right-handed woman who had a 10 year history of mild intermittent tremor only noticed during motor activities. Tremor did not interfere with her occupation as a parole officer and she was able to remain an active runner. When she became pregnant in 2014, she noticed tremors worsened and was more frequent and present at rest. In addition she had become bradykinetic and rigid which inhibited her from running. She even began to notice she was freezing when walking. At 22 weeks gestation, she, unfortunately, suffered a miscarriage due to placental infarction. All of her neurological symptoms resolved a few days post miscarriage. She had another pregnancy in September 2014 and again symptoms of resting tremor, stiffness, bradykinesia and freezing of gait appeared and continued to worsen throughout her pregnancy. Of note, she reports her brother lost a baby due to Gaucher’s disease and whole family was tested and she is heterozygous for Gaucher’s disease with one copy of INSV2 mutation. Methods: Her exam shows bilateral bradykinesia, rigidity, right worse than left, a right hand resting tremor and a shuffled gait. Results: Symptoms progressed throughout her pregnancy, requiring her to be on bedrest due to significant freezing when she would walk and fear of falling. After baby was born, this time her symptoms did not disappear. She was started on Rytary and had DaTScan obtained. Symptoms dissipated completely with Rytary and she developed mild dyskinesias. DaTScan showed findings consistent with neurodegenerative Parkinsonism. Conclusions: This is a novel case report due to several reasons: 1. This INSV2 mutation linked to Gaucher’s disease has rarely been
reported to be a cause of Parkinsonism. 2. Robust response to levodopa treatment, compared to prior reports of patients with Parkinsonism and heterozygous for Gaucher's disease. 3. Her initial transient Parkinsonism completely resolved after her miscarriage and remained persistent after second pregnancy.

**Database:** EMBASE

11. Deep brain stimulation during pregnancy and delivery: Experience from a series of "DBS babies"

**Author(s):** Scelzo E.; Krack P.; Moro E.; Fraix V.; Mehrkens J.H.; Botzel K.; Chabardes S.; Polosan M.; Seigneuret E.; Mendes A.

**Source:** Frontiers in Neurology; 2015; vol. 6

**Publication Date:** 2015

**Publication Type(s):** Article

**Available at:** Frontiers in neurology - from PubMed Central

**Abstract:** Introduction: Deep brain stimulation (DBS) is widely used to improve quality of life in movement disorders (MD) and psychiatric diseases. Even though the ability to have children has a big impact on patients' life, only a few studies describe the role of DBS in pregnancy. Objective: To describe risks and management of women treated by DBS for disabling MD or psychiatric diseases during pregnancy and delivery. Methods: We report a retrospective case series of women, followed in two DBS centers, who became pregnant and went on to give birth to a child while suffering from disabling MD or psychiatric diseases [Parkinson's disease, dystonia, Tourette's syndrome (TS), Obsessive Compulsive Disorder (OCD)] treated by DBS. Clinical status, complications and management before, during, and after pregnancy are reported. Two illustrative cases are described in greater detail. Results: DBS improved motor and behavioral disorders in all patients and allowed reduction in, or even total interruption of disease-specific medication during pregnancy. With the exception of the spontaneous early abortion of one fetus in a twin pregnancy, all pregnancies were uneventful in terms of obstetric and pediatric management. DBS parameters were adjusted in five patients in order to limit clinical worsening during pregnancy. Implanted material limited breastfeeding in one patient because of local pain at submammal stimulator site and led to local discomfort related to stretching of the cable with increasing belly size in another patient whose stimulator was implanted in the abdominal wall. Conclusion: Not only is it safe for young women with MD, TS and OCD who have a DBS-System implanted to become pregnant and give birth to a baby but DBS seems to be the key to becoming pregnant, having children, and thus greatly improves quality of life. Copyright © 2015 Scelzo, Mehrkens, Botzel, Krack, Mendes, Chabardes, Polosan, Seigneuret, Moro and Fraix.

**Database:** EMBASE

Author(s): Ziman N.; Coleman R.R.; Starr P.A.; Walker H.; Volz M.; Guthrie S.; Ostrem J.L.

Source: Movement Disorders; Jun 2015; vol. 30

Publication Date: Jun 2015

Publication Type(s): Conference Abstract

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science , Technology and Medicine Collection 2017

Abstract:Objective: To describe a series of dystonia patients who had successful pregnancies after DBS and to provide guidelines for women considering pregnancy with DBS. Background: DBS is a highly effective treatment for isolated idiopathic dystonia when oral medications and botulinum toxin fail to provide sufficient symptomatic relief. Dystonia often affects children and young adults and DBS therapy can allow patients to regain functional independence. Some of these individuals eventually start families and become pregnant; however, there is limited literature to guide physicians and to help patients navigate this scenario. Additionally, with expanding indications for DBS and earlier use in well-established indications, pregnancy with DBS may become more prevalent.

Methods: We reviewed all DBS cases implanted at UCSF and UAB from 1998 to 2014 and identified patients who became pregnant. Patient records were reviewed and a structured interview was conducted. Results: We identified 5 dystonia patients implanted at 2 centers that became pregnant and had successful pregnancies (6 pregnancies, 7 live births; 1 twin pair). Patients presented with generalized dystonia (n=2; one DYT1+), cervical dystonia (n=1), juvenile onset primary hemidystonia (n=1), and hemidystonia secondary to a striatal infarct (n=1). All patients received GPi implants (n=3 bilateral, n=2 unilateral). The average time from 1st DBS implant to 1st pregnancy was 5.7 years. Pulse generators present at birth included Activa RC (n=2), Activa PC (n=2), Activa SC (n=1), and Soletra (n=1). All pregnancies were uncomplicated and each patient received appropriate prenatal care. Mode of delivery was not influenced by the presence of DBS. Four children were born by spontaneous vaginal delivery and 3 by planned c-section. Stimulation remained ON during 3 of the births (all vaginal deliveries) and was turned OFF for 4 (1 vaginal and 3 c-section deliveries). All deliveries were uncomplicated and all children were born full term and healthy as defined by APGAR scores. Pulse generators did not hinder breast-feeding.

Conclusions: In this small sample, pregnancy, delivery, and breastfeeding were well tolerated by women with various forms of dystonia who were receiving DBS therapy. Treatment with DBS therapy should not be considered a contraindication to pregnancy.

Database: EMBASE
Objective: 1. To report of two cases of pregnancy in women with a mutation in PARK2 gene, which confers a form recessive of Parkinson's disease autosomal and Early Onset. 2. Describe and document as was the use of Pramipexole during both pregnancies. Background: Both patients were diagnosed with early onset Parkinson's disease (EOPD). Moreover, their belongs to a large family cluster with intricate intermarriage between cousins resulting in many PD members due to Parkin mutation. The more young lady(1) to get pregnant for the first time in April 2011 and as soon she got pregnant again in March 2012. She could not tolerate selegiline or biperiden and pramipexole was introduced before from gestation. During both pregnancies the patient keep pramipexole, once your symptoms worsened progressively despite our guideances. The another lady currently be pregnant and keep pramipexole 0.125mg eTID, and be reasonable well in fifth week of gestation. Results: Delivery was in due time and the baby and mother were dismissed from hospital well. Today both children are healthy and acquiring the development milestones properly. In each case were in agreement their families. Conclusions: Genetic forms of Parkinsonism with EOPD increases the chance of the affected woman to get pregnant. The majority of drugs used for the treatment of PD are classified by the Food and Drug Administration in category C. Nevertheless, most studies in humans have shown the safe use of levodopa. Our patient was treated with pramipexole and the Parkinsonian symptoms were stable during gestation and the newborns were healthy. There are few series in the literature with small number of patients to conclude with certainty the influence of pregnancy on PD as well as the effect of the antiParkinsonian drugs on the fetus. Women with EOPD need to be instructed about the risks of the medication during gestation, the drug regimen, and specialized prenatal care for closer surveillance of mother and fetal health.

Database: EMBASE
14. Pregnancy outcome in women exposed to dopamine agonists during pregnancy: A pharmacoepidemiology study in EFEMERIS database

Author(s): Hurault-Delarue C.; Montastruc J.-L.; Beau A.-B.; Lacroix I.; Damase-Michel C.

Source: Archives of Gynecology and Obstetrics; Aug 2014; vol. 290 (no. 2); p. 263-270

Publication Date: Aug 2014

Publication Type(s): Article

PubMedID: 24664257

Available at Archives of Gynecology and Obstetrics - from SpringerLink

Abstract: Purpose: The objective of this exposed-unexposed study was to evaluate potential effects of dopamine agonists during pregnancy. Methods: Data from EFEMERIS, a cohort of 57,408 pregnant women living in South West France, were used to compare exposed and unexposed women. The exposed group included 183 women (0.3 %) who received at least one prescription for one dopamine agonist during pregnancy. These women were individually matched with two unexposed women from the cohort for age and the month-and-year of the start of pregnancy. Pregnancy losses, birth defects, preterm births, low birth weight and psychomotor development were studied. Results: Bromocriptine was the most frequently prescribed dopamine agonist, followed by cabergoline and quinagolide. Most (75 %) of the dopamine agonists were prescribed at the beginning of pregnancy (first trimester). There was no difference between the two groups concerning pregnancy history and demographic data. After adjustment for potential confounders, prescription and dispensation of dopamine agonists was associated with an increased risk of pregnancy loss [PORa = 3.7; 95 % confidence interval (CI) 1.8-7.4] and preterm birth (PORa = 3.6; 95 % CI 1.5-8.3). The prevalence of birth defects and low birth weight was not significantly different between the two groups. No difference in psychomotor development at either 9 or 24 months was observed between the two groups. Conclusion: This study suggests that prenatal exposure to dopamine agonists may be associated with an increased risk of pregnancy loss and preterm birth. © 2014 Springer-Verlag.

Database: EMBASE

15. Two cases of pregnancy in Parkinson’s disease.

Author(s): Lamichhane, Dronacharya; Narayanan, N S; Gonzalez-Alegre, Pedro

Source: Parkinsonism & related disorders; Feb 2014; vol. 20 (no. 2); p. 239-240

Publication Date: Feb 2014

Publication Type(s): Letter Case Reports

PubMedID: 24182521

Available at Parkinsonism & Related Disorders - from PubMed Central

Database: Medline

Author(s): Benbir, Gulcin; Ertan, Sibel; Ozekmekci, Sibel

Source: Presse medicale (Paris, France : 1983); Jan 2014; vol. 43 (no. 1); p. 83-85

Publication Date: Jan 2014

Publication Type(s): Letter Case Reports

PubMedID: 23688703

Database: Medline

17. Emergency call from gynecologists: How to treat restless legs syndrome during pregnancy?

Author(s): Trenkwalder C.

Source: European Journal of Neurology; Sep 2013; vol. 20 (no. 9); p. 1223-1224

Publication Date: Sep 2013

Publication Type(s): Editorial

PubMedID: 23294429

Available at European journal of neurology - from Wiley Online Library Science, Technology and Medicine Collection 2017

Abstract: Click here to view the accompanying paper in this issue. © 2013 EFNS.

Database: EMBASE

18. Pregnancy outcome in women exposed to dopamine agonists during pregnancy: A study in efemeris database

Author(s): Hurault-Delarue C.; Montastruc J.; Beau A.; Lacroix I.; Damase-Michel C.

Source: Drug Safety; Sep 2013; vol. 36 (no. 9); p. 888

Publication Date: Sep 2013

Publication Type(s): Conference Abstract

Available at Drug safety - from ProQuest (Hospital Premium Collection) - NHS Version

Abstract: Background: Dopamine agonist drugs can be prescribed for several indications like hyperprolactinemia or Parkinson's disease. Little is known on the possible effect of dopaminergic agonists on embryo-fetal development. Objectives: To describe pregnancy outcomes in women having a prescription of dopamine agonists and compare to an unexposed group. Methods: An "exposed-non exposed" study was conducted using data from EFEMERIS, a cohort of 57,408 pregnant women living in South West France (database of all prescribed and dispensed reimbursed drugs during pregnancy and their outcomes). 183 women (0.3 %) who get at least one dispensation of dopamine agonist drug (bromocriptine, cabergoline, quinagolide, lisuride, piribedil, ropinirole) during pregnancy constituted the "exposed group" (no prescription of levodopa was dispensed to pregnant women). They were individually matched with 2 "unexposed" women according to their age and the month-year of the beginning of their pregnancy. Pregnancy terminations, birth defects, preterm births, low birthweight and psychomotor development were studied. We used a conditional logistic regression to analyse risks for each outcome associated with dispensation of dopamine agonist drugs. Results: Bromocriptine was the most prescribed dopamine agonist followed by cabergoline and quinagolide. 75 % of dopamine agonist prescriptions concerned the beginning of pregnancy (first trimester of pregnancy). There was no difference between the two groups.
concerning pregnancy history and demographic data. After adjustment for potential confounders, prescription and dispensation of dopamine agonists was associated with an increased risk of pregnancy termination (PORa = 3.7; 95 % CI 1.8-7.4) and preterm birth (PORa = 3.6; 95 % CI 1.5-8.3). The prevalence of birth defect and low birthweight was not statistically different between both groups. No difference in psychomotor development at 9 and 24 months was observed between the two groups. Conclusion: The results of this study suggest that situations involving fetal exposure to dopamine agonist drugs are at increased risk of pregnancy termination and preterm birth.

**Database**: EMBASE

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19. A case control study of women with Parkinson’s disease and their fertility characteristics.

**Author(s)**: Yadav, Ravi; Shukla, Garima; Goyal, Vinay; Singh, Sumit; Behari, Madhuri

**Source**: Journal of the neurological sciences; Aug 2012; vol. 319 (no. 1-2); p. 135-138

**Publication Date**: Aug 2012

**Publication Type(s)**: Journal Article

**PubMedID**: 22647587

**Abstract**: BACKGROUND Parkinson disease (PD) is less common in women and studies have shown that oestrogen is protective to dopaminergic neurons in primate models. The findings in clinical and epidemiological studies have not clearly established this observation. This study was undertaken to evaluate associations of reproductive characteristics in a population with higher fertility and risk of PD among women.

**METHODS** Trained interviewers used structured interviews to obtain information about demographic characteristics and reproductive history from women subjects with PD. An equal number of healthy age matched female controls were also studied to compare their reproductive characteristics with women with PD.

**RESULTS** We recruited 81 consecutive women with PD and age matched healthy women controls. Mean age at interview was 55.89 ± 10.07 years for women with PD, 55.05 ± 10.53 years for controls. Significant positive correlation was observed with cumulative length of pregnancy (r=0.32; p=0.003), age at menopause (r=0.55; p=0.001) and length of fertile life with age of onset of PD (r=0.27; p=0.02). Gravidity (r=0.26; p=0.02) and parity (r=0.35; p=0.001) also correlated positively with age at onset.

**CONCLUSION** The onset of PD is delayed in women with higher number of pregnancies, longer fertile life and longer cumulative length of pregnancies. This could also explain the epidemiological observations of lower incidence of PD in women and the protective role of estrogens.

**Database**: Medline

Author(s): Serikawa, Takehiro; Shimohata, Takayoshi; Akashi, Mami; Yokoseki, Akio; Tsuchiya, Miwa; Hasegawa, Arika; Haino, Kazufumi; Koike, Ryoko; Takakuwa, Koichi; Tanaka, Keiko; Tanaka, Kenichi; Nishizawa, Masatoyo

Source: BMC neurology; Jun 2011; vol. 11; p. 72

Abstract: Pregnancy in patients with Parkinson disease is a rare occurrence. To the best of our knowledge, the effect of pregnancy as well as treatment in genetically confirmed autosomal recessive juvenile parkinsonism (ARJP) has never been reported. Here, we report the first case of pregnancy in a patient with ARJP associated with a parkin gene mutation, ARJP/PARK2. CASE PRESENTATION: A 27-year-old woman with ARJP/PARK2 was diagnosed as having a spontaneous dichorionic/diamniotic twin pregnancy. Exacerbation of motor disability was noted between ovulation and menstruation before pregnancy as well as during late pregnancy, suggesting that her parkinsonism might have been influenced by fluctuations in the levels of endogenous sex hormones. During the organogenesis period, she was only treated with levodopa/carbidopa, although she continued to receive inpatient hospital care for assistance in the activities of daily living. After the organogenesis period, she was administered sufficient amounts of antiparkinsonian drugs. She delivered healthy male twins, and psychomotor development of both the babies was normal at the age of 2 years. CONCLUSION: Pregnancy may worsen the symptoms of ARJP/PARK2, although appropriate treatments with antiparkinsonian drugs and adequate assistance in the activities of daily living might enable successful pregnancy and birth of healthy children.

Database: Medline


Author(s): Santos J.G.; Chien H.F.; Barbosa E.R.

Source: Movement Disorders; May 2011; vol. 26

Abstract: Objective: To report a case of early onset Parkinson’s disease (EOPD) due to familial parkin mutation and Tourette syndrome (TS) treated with pramipexole during pregnancy. To discuss the concomitant manifestation of parkinsonism and tics. Background: Case Report: A 28-year-old female patient presents vocal and motor tics since early childhood characterizing TS. She never sought for treatment because the tics were mild and never interfered with her daily activities. Five years ago, she came to our Movement Disorder Clinic because of mild resting tremor and rigidity in the right arm and periodical dystonic posture on right foot. She belongs to a big family with intricated marriage between cousins resulting in many PD members due to parkin mutation (Chien et al, 2006). Because her symptoms got worse, four years ago biperiden was introduced, and few months later selegiline was added. She could not tolerate both medications so pramipexole was prescribed and it improved her clinical picture satisfactorily. No worsening of tics was noticed and the dosage of pramipexole was titrated up to 3mg daily. One year later the patient got pregnant. We tried to
diminish the dose of pramipexole but her parkinsonian symptoms worsened considerably, and the patient refused to change the medication regimen. No complications were observed on the fetus during pregnancy. Delivery occurred at 39 weeks, and both mother and baby were discharged from the hospital three days later. The child is healthy and acquiring the development milestones in due time. The concomitant manifestation of tic (hyperkinetic movement disorder) and parkinsonism (hypokinetic movement disorder) in this patient is peculiar and no other case has been described to our knowledge. Although DeLong circuitry is useful for the comprehension of most common movement disorders it may not explain the pathophysiology of both disease, PD and TS.

Conclusions: There are few reports in the literature about the use of antiparkinsonian drugs during pregnancy and its effects on the fetus. Female patients with EOPD require special care during fertile period because of the risk of pregnancy and the use of medication during this must be well monitored.

Database: EMBASE


Author(s): Kranick, Sarah M; Mowry, Ellen M; Colcher, Amy; Horn, Stacy; Golbe, Lawrence I

Source: Movement disorders : official journal of the Movement Disorder Society; Apr 2010; vol. 25 (no. 6); p. 665-671

Publication Date: Apr 2010

Publication Type(s): Journal Article Review

PubMedID: 20437535

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science, Technology and Medicine Collection 2017

Abstract: Pregnant patients are rarely encountered in the movement disorders clinic, but they present significant dilemmas regarding treatment and counseling for neurologists. While movement disorders in pregnancy once described those disorders arising de novo during pregnancy, such as chorea gravidarum or restless leg syndrome, advancing maternal age in Western countries will likely increase the number of women in whom pregnancy complicates a pre-existing movement disorder. Physicians treating these women must be aware of the impact of the movement disorder and its treatment on fertility, pregnancy, fetal development, lactation, and infant care. This review summarizes retrospective series and case reports to both guide clinicians and to stimulate and direct the design of prospective studies.

Database: Medline
23. Use of High Dose Trihexyphenidyl for Dystonia during Pregnancy

**Author(s):** Robottom B.J.; Reich S.G.

**Source:** Movement Disorders; Sep 2009; vol. 24 (no. 12); p. 1878-1879

**Publication Date:** Sep 2009

**Publication Type(s):** Conference Abstract

Available at Movement Disorders - from Wiley Online Library Science, Technology and Medicine Collection 2017

**Abstract:**
Objective: To report two uncomplicated pregnancies in one woman receiving high-dose trihexyphenidyl for dystonia. Background: Trihexyphenidyl is one of the most effective agents for treatment of young-onset dystonia. As such, women of childbearing potential use trihexyphenidyl despite inadequate information about potential effects on pregnancy, labor, and fetal development. Trihexyphenidyl is pregnancy class C meaning there are no adequate, well-controlled studies in pregnant women. Methods: Case report and literature review. Case Report: At ages 25 and 27, a woman with childhood-onset primary generalized dystonia (DYT1 negative), treated with trihexyphenidyl since age 16, had uneventful, full-term pregnancies. Dystonia improved mildly during the first pregnancy and remained stable throughout the second pregnancy. During the first pregnancy she received trihexyphenidyl 32 mg per day. A healthy boy was born at 42 weeks gestation by C-section performed for failure of labor to progress. During the second pregnancy, she received trihexyphenidyl 50 mg per day. Elective C-section was performed at 40 weeks. The infant had decreased blood pressure transiently, not requiring intervention. Breastfeeding was not attempted as the effects of trihexyphenidyl on breast milk are unknown. The children, currently ages 13 and 11 are healthy. Conclusion: Two pregnancies were carried to term without adverse effects despite high-dose trihexyphenidyl. Although case reports cannot replace proper epidemiologic studies, given the rarity of pregnancy during treatment with high-dose trihexyphenidyl for dystonia, such studies are not likely to be performed. Therefore, anecdotal experience is valuable to demonstrate that high-dose trihexyphenidyl is not necessarily a contraindication to pregnancy.

**Database:** EMBASE

24. Early-onset parkinsonism and pregnancy

**Author(s):** Damasio J.; Magalhaes M.

**Source:** Sinapse; May 2009; vol. 9 (no. 1); p. 64-66

**Publication Date:** May 2009

**Publication Type(s):** Article

**Abstract:**
Introduction: Pregnancy in Parkinson's disease (PD) patients is rare. The impact of pregnancy on Parkinson's disease (PD) progression, the teratogenicity of antiparkinsonian medication, the course of the pregnancy and delivery are crucial issues. Case Report: We describe the case of a 35 year-old parkinsonian woman who became pregnant twice. The first pregnancy ended in an early miscarriage, attributed to a silent rubella infection; the second pregnancy was full-term and culminated in a caesarean delivery. Medication was stopped during both pregnancies with minor clinical deterioration. Conclusion: In this patient, the PD treatment had no impact on pregnancy and there was no teratogenicity. We believe that the clinical deterioration during pregnancy was related to the disease's natural history.

**Database:** EMBASE

**Author(s):** Robottom, Bradley J; Mullins, Roger J; Shulman, Lisa M

**Source:** Expert review of neurotherapeutics; Dec 2008; vol. 8 (no. 12); p. 1799-1805

**Publication Date:** Dec 2008

**Publication Type(s):** Research Support, Non-u.s. Gov't Case Reports Journal Article Review

**PubMedID:** 19086876

Available at [Expert review of neurotherapeutics](https://expertreviewneurotherapeutics.proquest.com) - from ProQuest (Hospital Premium Collection) - NHS Version

**Abstract:** Pregnancy in Parkinson's disease (PD) is an uncommon occurrence. Available reports suggest that there may be a worsening of PD symptom severity related to pregnancy. In this special report, medical literature on pregnancy in PD will be reviewed with regard to disease progression and the safety of antiparkinsonian medications. A case report of pregnancy in a woman with PD will be described. It is speculated that the symptoms of PD may be affected by changing hormone levels.

**Database:** Medline

26. Young onset Parkinson's disease. Practical management of medical issues

**Author(s):** Calne S.M.; Kumar A.

**Source:** Parkinsonism and Related Disorders; Mar 2008; vol. 14 (no. 2); p. 133-142

**Publication Date:** Mar 2008

**Publication Type(s):** Article

**PubMedID:** 17804273

**Abstract:** Young Onset Parkinson's disease (YOPD) is defined as Parkinson's disease diagnosed between the ages of 21 and 40 years. Problems faced by this group are different from those faced by older subjects because they face decades with the illness. This article reviews current literature and offers suggestions for intervention when appropriate and practical suggestions in the areas of drug treatment, rehabilitation, nutrition, sexuality, pregnancy, menstruation and menopause. The suggestions are not exclusively restricted to the management of YOPD, but emphasis is placed on items where people with YOPD have either had particular difficulties or where they can proactively self-manage their illness. © 2007 Elsevier Ltd. All rights reserved.

**Database:** EMBASE
27. Movement disorders in pregnancy.
Author(s): Bordelon, Yvette M; Smith, Marsha
Source: Seminars in neurology; Nov 2007; vol. 27 (no. 5); p. 467-475
Publication Date: Nov 2007
Publication Type(s): Journal Article Review
PubMedID: 17940926
Abstract: Movement disorders are not commonly seen during pregnancy. As a result, there are few studies on whether disease manifestations are affected by the hormonal changes that occur during pregnancy or on the teratogenicity of commonly used medications for movement disorders on the developing fetus. This article discusses movement disorders that are seen only during pregnancy (chorea gravidarum) or that may present during pregnancy (restless legs syndrome), the effect that pregnancy has on symptoms and treatment (in Parkinson's disease, essential tremor, dystonia, tic disorders, and Wilson's disease), and the role of genetic testing for movement disorders in genetic counseling for pregnant women.
Database: Medline

Author(s): Rubin, Susan M
Source: Disease-a-month : DM; Apr 2007; vol. 53 (no. 4); p. 206-213
Publication Date: Apr 2007
Publication Type(s): Journal Article Review
PubMedID: 17586327
Database: Medline

Author(s): Scott, Michael; Chowdhury, Muhammad
Source: Movement disorders : official journal of the Movement Disorder Society; Aug 2005; vol. 20 (no. 8); p. 1078-1079
Publication Date: Aug 2005
Publication Type(s): Letter Case Reports Review
PubMedID: 16001415
Available at Movement Disorders - from Wiley Online Library Science, Technology and Medicine Collection 2017
Database: Medline
30. Movement disorders in pregnancy

Author(s): Smith M.S.A.; Evatt M.L.

Source: Neurologic Clinics; Nov 2004; vol. 22 (no. 4); p. 783-798

Publication Date: Nov 2004

Publication Type(s): Review

PubMedID: 15474767

Abstract: Movement disorders are not particularly common during pregnancy, with a few exceptions. RLS occurs most commonly followed by CG. Currently, with the incidence of rheumatic fever lower than previously, any woman who develops CG should be checked for illness other than rheumatic heart disease. The differential includes systemic lupus erythematosus and antiphospholipid antibody syndrome [21]. Regarding the use of dopaminergic agents, the dopamine agonist, pergolide, can be maintained during pregnancy for the treatment of PD, Segawa disease, and RLS. The use of levodopa and ropinirole should be limited during pregnancy because of the possible teratogenic effects. Amantadine is contraindicated during pregnancy [54]. The data on selegiline are controversial; animal studies show possible serotonergic effects [52] and teratogenic effects [53]. If treatment is indicated in patients who have Tourette syndrome, the high potency neuroleptics drugs (haloperidol) are preferred to treat associated symptoms [38]. Depression is a common comorbidity in patients who have PD, HD, Tourette syndrome, or other chronic neurologic diseases. Depression treatment during pregnancy is covered by Levy et al elsewhere in this issue. As discussed previously, most of the data on the use of drugs during pregnancy, especially the dopaminergic agents, are limited to animal studies and case reports. Therefore, it is in part left to the neurologist to decide on treatment based on the individual patient, clinical judgment, and inferences from animal studies and limited case reports.

Database: EMBASE

31. Pramipexole-treated Parkinson's disease during pregnancy

Author(s): Mucchiut M.; Belgrado E.; Cutuli D.; Bergonzi P.; Antonini A.

Source: Movement Disorders; Sep 2004; vol. 19 (no. 9); p. 1114-1115

Publication Date: Sep 2004

Publication Type(s): Article

PubMedID: 15372610

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science , Technology and Medicine Collection 2017

Abstract: There are few reports about drug-related effects on PD pregnancy. We describe the case of a woman affected by PD treated with pramipexole monotherapy during pregnancy. The child, born by caesarean delivery, is healthy, whereas motor disability of the mother progressively increased to the point that levodopa therapy was necessary. © 2004 Movement Disorder Society.

Database: EMBASE
32. Antiparkinsonian treatment in pregnancy.

**Author(s):** De Mari, Michele; Zenzola, Angelo; Lamberti, Paolo

**Source:** Movement disorders : official journal of the Movement Disorder Society; Mar 2002; vol. 17 (no. 2); p. 428-429

**Publication Date:** Mar 2002

**Publication Type(s):** Letter Case Reports Comment

**PubMedID:** 11921143

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science, Technology and Medicine Collection 2017

**Database:** Medline

33. Pregnancy in Parkinson's disease: a review of the literature and a case report.

**Author(s):** Benito-León, J; Bermejo, F; Porta-Etessam, J

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jan 1999; vol. 14 (no. 1); p. 194

**Publication Date:** Jan 1999

**Publication Type(s):** Letter Case Reports Comment Review

**PubMedID:** 9918378

Available at Movement disorders : official journal of the Movement Disorder Society - from Wiley Online Library Science, Technology and Medicine Collection 2017

**Database:** Medline

34. Pregnancy in Parkinson's disease: a review of the literature and a case report.

**Author(s):** Hagell, P; Odin, P; Vinge, E

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jan 1998; vol. 13 (no. 1); p. 34-38

**Publication Date:** Jan 1998

**Publication Type(s):** Case Reports Journal Article Review

**PubMedID:** 9452323

**Abstract:** Pregnancy is rare in Parkinson's disease (PD). In the literature on studies of antiparkinsonian drugs in animals during pregnancy, there are reports on malformations of the skeletal and circulatory system. However, the majority of studies in animals have not shown any teratogenicity. Amantadine has been teratogenic in rats and selegiline has caused neurochemical and behavioral alterations in rats when coadministered with clorgyline. The published experience with humans consists of 35 pregnancies among 26 women suffering from PD, including this report, and a number of cases treated with antiparkinsonian agents for other reasons. With the exception of the majority of the cases where amantadine was used, complications have been rare. However, there are indications that suggest a possible risk of a woman's parkinsonism worsening in connection with pregnancy. We also report the case of a woman with PD who was treated with L-dopa-benserazide during an uncomplicated pregnancy and gave birth to a healthy boy without experiencing any worsening of her PD.

**Database:** Medline
35. Human transplacental transfer of carbidopa/levodopa.

**Author(s):** Merchant, C A; Cohen, G; Mytilineou, C; DiRocco, A; Moros, D; Molinari, S; Yahr, M D

**Source:** Journal of neural transmission. Parkinson’s disease and dementia section; 1995; vol. 9 (no. 2-3); p. 239-242

**Publication Date:** 1995

**Publication Type(s):** Research Support, Non-u.s. Gov't Clinical Trial Journal Article

**PubMedID:** 8527007

**Abstract:** A paucity of information is available concerning the use of levodopa and carbidopa during pregnancy. Particularly lacking is whether these agents cross the placenta and whether levodopa undergoes metabolism in the fetus. The present study carried out in aborted fetal tissues demonstrates that levodopa crosses the placental barrier and suggests that it may be metabolized in fetal tissues, including the brain and spinal cord. The possibility exists that early exposure to levodopa or dopamine may alter the normal neuronal development in the fetus, and caution in the use of levodopa during pregnancy should be observed.

**Database:** Medline

36. Pregnancy and movement disorders

**Author(s):** Golbe L.I.

**Source:** Neurologic Clinics; 1994; vol. 12 (no. 3); p. 497-508

**Publication Date:** 1994

**Publication Type(s):** Review

**PubMedID:** 7990787

**Abstract:** The concurrence of pregnancy and movement disorders is an uncommon event in a general neurologic practice. Even at specialized movement disorder referral centers, there is insufficient experience to adequately guide management of pregnancy, except perhaps in the case of WD. The questions posed most urgently by patients regard the safety of medication, an issue on which there is insufficient data, and their ability to care for a child for at least the next decade, an issue that differs by disease and social situation. The author's formulation of efficacy and toxicity suggests that certain medications commonly used in movement disorders should be discontinued before pregnancy, if possible. These medications include neuroleptics, amantadine, diazepam, primidone, selegiline, and reserpine. Pregnancy may unmask a pre-existing potential for chorea (i.e., chorea gravidarum) and frequently has a mild exacerbating effect on symptoms of PD; however, it has little effect on other movement disorders. Severe generalized dystonia would probably interfere with vaginal delivery, but the scant existing data suggest minimal effect of movement disorders on pregnancy, childbirth, and neonatal health.

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