Comparison of Delivery-Related Complications Among Obstetrician-Gynecologists and Family Physicians Practicing Obstetrics

Daniel M. Avery, Jr, MD
Shelley Waits, MD
Jason M. Parton, PhD

Abstract

Background: Delivery-related complications and maternal postpartum outcomes of family physicians practicing obstetrics and obstetrician-gynecologists have been studied for four decades. Previous studies have shown no difference in the outcomes of family physicians practicing obstetrics compared to obstetrician-gynecologists in low-risk pregnancies. However, there is very little information in the literature regarding maternal outcomes under the care of family physicians when high-risk pregnancies are considered. This study compares the delivery-related complications among family physicians practicing obstetrics and obstetrician-gynecologists when high-risk pregnancies are included without any risk adjustment.

Methods: Nineteen common delivery complications were selected and assessed from medical records of 14,586 patients at a regional community medical center with totals for family physicians practicing obstetrics and obstetrician-gynecologists.

Results: Family physicians practicing obstetrics and obstetrician-gynecologists have similar rates of uterine rupture during labor, uterine inversion, pelvic hematomas, stillbirths, neonatal deaths, babies with Apgar scores less than 6 at 5 minutes, pulmonary emboli, placenta accreta, maternal deaths, perineal hematomas, urinary bladder and urethral injuries, and birth trauma. Family physicians had more fourth-degree extensions of episiotomies, lacerations of the cervix and postpartum hemorrhage.

Conclusions: Family physicians practicing obstetrics have comparable delivery-related complications as obstetrician-gynecologists with the same outcomes.

Introduction

Delivery-related complications and maternal outcomes of obstetrician-gynecologists and family physicians providing obstetric care have been studied for four decades.[1,2] There is no difference in the outcomes of low-risk pregnancies when obstetrician-gynecologists are compared to family physicians practicing obstetrics.[1-13] Family physicians had the same perinatal outcomes with a considerably lower cesarean section rate than obstetrician-gynecologists.[7,13] Outcomes of family medicine physicians providing obstetric care are equivalent to those of obstetricians.[7] Family physicians had no difference in newborn Apgar scores, neonatal intensive care unit admissions, birth trauma, neurological outcome, neonatal infection, rates of complications, postoperative length of stay, maternal deaths and transfusion when compared to obstetricians.[8,11,14,15] Family physicians had a lower rate of low birth weight babies.[7]

Family physicians provide safe, high-quality maternity care and meet the standard of care when compared to obstetrician-gynecologists.[2,4-10,16] Family physicians are able to perform cesarean sections and those with surgical skills have excellent outcomes.[7,16] Family physicians often manage pregnancies more expectantly with fewer interventions.[9] Management of obstetrical problems by family physicians is often different from

obstetrician-gynecologists; however, the neonatal outcome is often comparable.[3,6] Obstetricians had higher rates of intervention and these did not improve neonatal outcome.[9,11] Obstetricians that had higher rates of interventions also had higher rates of complications.[11]

Table 1: High-Risk Obstetric Categories Often Managed by Family Medicine Obstetricians

• Hypertensive Disorders	• Fetal Demise (Stillbirth)
• Gestational Diabetes	• Previous Cesarean Section
• Preterm Labor and Delivery	• Vaginal Birth After Cesarean Section (VBAC)
• Intrauterine Growth Abnormalities	• Multiple Gestation
• Fetal Heart Rate Abnormalities	• Hydatidiform Mole
• Premature Rupture of Membranes	• Fourth-Degree Extension of Episiotomies
• Malpresentations	• Vulvar and Vaginal Hematomas
• Dystocia	• Asthma
• Sterilization	• Rupture of the Uterus
• Abnormalities of Placentation	• Inversion of the Uterus
• Placental Abruption	• Pelvic Hematomas
• Chorioamnionitis	• Low Apgar Scores
• Obstetrical Hemorrhage	• Lacerations of the Cervix
• Endometritis	• Pulmonary Embolus
• Postdates	• Puerperal Sepsis
• Disorders of Amniotic Fluid Volume	• Wound Dehiscence
• Thyroid Disease	• Deep Venous Thrombosis
• Sexually Transmitted Diseases	

There are only a few studies comparing high-risk obstetrical care between the two specialties.[2,7,8,17] Most studies have looked at either low-risk pregnancies or risk-adjusted patient populations.[2,5,9,11] Obstetricians in favor of family physicians providing obstetrical care, feel that family physicians can also handle most complications of pregnancy.[17] Deutchman reported a 15-year study of outcomes of family physicians practicing obstetrics with no difference in care of high-risk patients.[7] Family physicians often have to care for high-risk pregnancies because of patients' difficulty with access to care in higher levels of care such as tertiary care medical centers.[2,8,17] This study seeks to compare the delivery-related complications among family physicians practicing obstetrics and obstetrician-gynecologists in high-risk patients. High-risk pregnancies managed by family physicians are defined by 20 categories listed in Table 1.

Materials and Methods

This study was approved by the Institutional Review Boards of The University of Alabama and DCH Regional Medical Center. The study is a retrospective investigation of de-identified delivery and birth-related information from January 1, 2003, to December 31, 2011, at DCH Regional Medical Center in Tuscaloosa, Alabama. The hospital is a 583-bed teaching hospital and tertiary referral center for West Alabama. Family physicians practicing obstetrics are required to have completed a one-year family medicine obstetrics fellowship in order to receive obstetrics privileges, which are the same obstetrics privileges granted to obstetrician-gynecologists. There is no restriction on their privileges nor are they required to have an obstetrician-gynecologist backup for obstetrical care. The family physician practicing obstetrics is expected to care for whatever type of obstetric patient that presents for care, regardless of acuity. Physicians were grouped into two groups: obstetrician-gynecologists and family medicine obstetricians. Characteristics of each physician group are found in Tables 2 and 3. High-risk obstetrics was defined by a list of high-risk obstetrics categories found in Table 1.

Table 2: Characteristics of Obstetrician-Gynecologists in Study

•Graduates of four-year accredited Obstetrics and Gynecology Residencies
•All certified by the American Board of Obstetrics and Gynecology
• Experience ranged from 1 to 30 years
• Privileges from the Department of Obstetrics and Gynecology

Table 3: Characteristics of Family Medicine Obstetricians in Study

• Graduates of three-year accredited Family Medicine Residencies
• All certified by the American Board of Family Medicine
• Three completed Family Medicine/Obstetrics Fellowships
• Experience ranged from 1 to 22 years
• Privileges from the Department of Family Medicine

The medical records department at DCH Regional Medical Center agreed and was authorized to access their medical records and provide the investigators with de-identified data from delivery of infants by family physicians practicing obstetrics and obstetrician-gynecologists from the period of January 1, 2003, to December 31, 2011. The patients, newborns, delivering physicians, types and dates of delivery were unknown to the investigators. There were sufficient numbers of each type of physician so that no single physician could be identified. The

Table 4: Delivery Complications, Descriptions, Codes, Totals, Rates, Statistics

Delivery Complication	Code	OB/GYN	%	FM/OB	%	p Value
Fourth-Degree Episiotomy	664.31	29	0.39%	18	1.02%	p<0.001
Perineal Hematoma	664.51	5	0.04%	2	0.07%	p=0.352
Rupture of Uterus	665.11	5	0.11%	0		p=0.170
Inversion of the Uterus	665.31	2	0.02%	2	0.11%	p=0.170
Pelvic Hematoma	665.71	7	0.06%	0		p=0.611
Stillbirth	656.40-656.43	64	0.53%	18	0.70%	p=0.281
Neonatal Death	V30.00-V39.01	73	0.60%	21	0.83%	p=0.210
Bladder or Urethral Injury	665.51	80	0.66%	24	0.94%	p=0.129
Birth Trauma	767.0-767.9	273	2.26%	61	2.39%	P=0.691
Apgar score<6 at 5 Minutes		91	0.75%	23	0.90%	p=0.441
Laceration of the Cervix	665.31	17	0.23%	26	1.48%	p<0.001
High Vaginal Laceration	665.41	84	1.14%	14	0.79%	p=0.203
Placenta Accreta	667.04	0		0		p=1.000
Puerperal Endometritis & Sepsis	670.20 - 670.24	64	0.53%	8	0.31%	P=0.156
Pulmonary Embolus	673.21 or 673.24	1	0.01%	1	0.04%	P=0.319
Maternal Death	761.6	0		0		p=1.000
Postpartum Hemorrhage	666.14	158	1.31%	51	2.00%	P=0.008
Wound Dehiscence	674.14	22	0.47%	1	0.13%	P=0.238
Deep Venous Thrombosis	671.4	4	0.03%	1	0.03%	P=1.000

delivery procedure descriptions and codes are listed in Table 4. Once the de-identified data were supplied by DCH personnel, they were stored on an encrypted desktop computer that was password protected behind a locked door with limited access. The data were then analyzed using SAS version 9.3 statistical software. All proportional measurements utilized contingency tables with a Pearson's chi-square statistic or a Fisher's exact test for cells with less than five observations. Some of the complications were compared to standards in *Williams Obstetrics*,[18] *Obstetrics: Normal and Problem Pregnancies,*[19] *ACOG Compendium*[20] and the obstetrical literature.

Results

Nineteen common delivery complications were selected and assessed from medical records with totals for family physicians and obstetrician-gynecologists. These data along with incidences and statistics are found in Table 4. This study evaluated 14,576 deliveries at DCH Regional Medical Center between January 1, 2003, and December 31, 2011. Obstetrician-gynecologists (OB/GYNs) delivered 12,033 (82%) of the babies and family medicine obstetricians (FM/OBs) delivered 2,543 (18%). Family physicians had a higher rate of fourth-degree extensions of episiotomy than obstetrician-gynecologists (1.02% vs. 0.39%) (p<0.001). These incidences are consistent with the 0.6% incidence of fourth-degree extension of episiotomies reported by Konnyu.[21] Family physicians had similar rates of perineal hematomas compared to obstetrician-gynecologists (0.04% vs. 0.07%) (p=0.352). These incidences were consistent with the 0.1% incidence reported in *Williams.*[18] Family physicians had no uterine ruptures during labor compared to 0.11% by obstetrician-gynecologists (0% vs. 0.11%) (p=0.170). This incidence was consistent with the 0.1% incidence reported in *Williams.*[18]

Family physicians and obstetrician-gynecologists had similar rates of uterine inversion (0.02% vs. 0.11%) (p=0.170). These incidences were consistent with the 0.05% incidence reported in Gabbe et al.[19] The rates of pelvic hematomas in both obstetrician-gynecologists and family physicians were similar (0.13% vs. 0%) (p=0.097). The incidences were consistent with the 0.10% incidence reported in *Williams*.[18] Family physicians and obstetrician-gynecologists had similar rates of stillbirth (intrauterine fetal demise) (0.53% vs. 0.70%) (p=0.281). These incidences are consistent with the 0.62% incidence reported in *ACOG*.[20] Obstetrician-gynecologists and family physicians had similar rates of neonatal death (0.60% vs. 0.83%) (p=0.210). These incidences are both higher than the 0.48% incidence reported in *Williams*.[18] Family physicians and obstetrician-gynecologists had similar rates of urinary bladder or urethral injury (0.66% vs. 0.94%) (p=0.129). Both obstetrician-gynecologists and family physicians had similar rates of birth trauma to the baby (2.26% vs. 2.39%) (p=0.691). These incidences are consistent with the 2.59% incidence of birth trauma reported by Moczygemba.[22]

Family physicians and obstetrician-gynecologists had similar rates of Apgar scores less than 6 at 5 minutes (0.75% vs. 0.90%) (p=0.441). Family physicians had higher rates of lacerations of the cervix than obstetrician-gynecologists (1.48% vs. 0.23%) (p<0.001). The rates of high vaginal lacerations were similar in obstetrician-gynecologists and family physicians (1.14% vs. 0.79%) (p=0.203). Obstetrician-gynecologists and family physicians had similar rates of pulmonary emboli (0.01% vs. 0.04%) (p=0.319). These incidences are consistent with the incidence of 0.02% reported in *Williams*.[18] No cases of placenta accreta were reported in either group. Obstetrician-gynecologists and family physicians had similar rates of puerperal endometritis and sepsis (0.53% vs. 0.31%) (p=0.156). No cases of maternal death were reported in either group (p=1.000). The incidence of maternal death in *Williams*[18] is 0.008%.

Obstetrician-gynecologists and family physicians had similar rates of wound dehiscence (0.47% vs. 0.13%) (p=0.238). This is consistent with the incidence of wound dehiscence reported in *Williams*[18] of 0.3%. Family physicians had higher rates of postpartum hemorrhage than obstetrician-gynecologists (2.00% vs. 1.31%) (p=0.008). This is lower than the incidence of postpartum hemorrhage reported by *Williams*[18] of 5%. The incidence of deep venous thrombosis was the same for obstetrician-gynecologists and family physicians (0.03% vs. 0.03%) (p=1.000). The incidence of deep venous thrombosis reported in *Williams*[18] is 0.45%.

Discussion

This study demonstrates that obstetrician-gynecologists and family medicine obstetricians have comparable rates of uterine rupture during labor, uterine inversion, pelvic hematomas, stillbirths, neonatal deaths, babies with Apgar scores less than 6 at 5 minutes, pulmonary emboli, placenta accrete, maternal deaths, vulvar and vaginal hematomas, urinary bladder or urethral injuries and birth trauma to the baby. Family medicine obstetricians had more fourth-degree extensions of episiotomies, lacerations of the cervix and postpartum hemorrhage. Complications in the hospital system may be assigned to other specialties, such as birth trauma to the baby is assigned and coded to the admitting pediatrician or neonatologist.

These data suggest that family medicine obstetricians provide adequate obstetrical care. These physicians can work independently without obstetrician-gynecologist backup as they often provide care in rural, underserved areas. They are able to provide high-risk obstetrical care as listed in the high-risk categories in this paper. In response to the paper by Rayburn,[23] family medicine obstetricians can help meet the current deficit of obstetric providers in this country with good outcomes. Family medicine physicians practicing obstetrics help the maldistribution of obstetric providers as they often practice in rural, underserved areas of the country, where obstetrician-gynecologists seldom practice.

Potential Financial Conflicts of Interest: By AJCM® policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article that might create any potential conflict of interest. The authors have stated that no such relationships exist.

Daniel M. Avery, Jr, MD, is Professor and Chair of OB/GYN and Professor and Division Chief of Pathology at the University of Alabama School of Medicine in Tuscaloosa, AL.

Shelley Waits, MD, is a Fellow of University of Alabama Family Medicine Obstetrics Fellowship Program in Tuscaloosa, AL.

Jason M. Parton, PhD, is a statistician for the University of Alabama in Tuscaloosa, AL.

References

1. Caetano DF. The Relationship of Medical Specialization (Obstetricians and General Practitioners) to Complications in Pregnancy and Delivery, Birth Injury, and Malformation. *Am J Obstet Gynecol.* 1975;123(3):221-27.
2. Nicholson HM. Risk Adjustment in Maternity Care: The Use of Indirect Standardization. *Int J Womens Health.* 2010;2:255-262.
3. Franke L, Jackson EA, Vsilenko P. Management of Gestational Diabetes by Family Physicians and Obstetricians. *J Fam Pract.* 1996 Oct;43:383-88.
4. Rosenthal TC, Holden DM, Woodward W. Primary Care Obstetrics in Rural Western New York. A Multi-Center Case Review. *N Y State J Med.* 1990;90:537-540.
5. Kirke AB. How Safe is GP Obstetrics? An Assessment of Antenatal Risk Factors and Perinatal Outcomes in One Rural Practice. *Rural Remote Health.* 2010;10:1545 (Online).
6. Hueston WJ. Variations Between Family Physicians and Obstetricians in the Evaluation and Treatment of Preterm Labor. *J Fam Pract.* 1997;45:336-340.
7. Deutchman ME, Sills D, Connor PD: Perinatal Outcomes. A Comparison Between Family Physicians and Obstetricians. *J Am Board Fam Pract* 1995;8(6):440-7.l.
8. Deutchman M, Connor P, Gobbo R. Outcomes of Cesarean Sections Performed by Family Physicians and The Training They Received: A 15-Year Study. *J Am Board Fam Pract.* 1995;8:81-90.

9. Reid AJ, Carroll JC, Ruderman J, Murray MA. Differences in Intrapartum Obstetric Care Provided to Women at Low Risk by Family Physicians and Obstetricians. *CMAJ.* 1989;140:625-633.
10. Beal JR, Burd L, Dahl S, Klug MG, McCulloch KD. Family Physicians vs. Obstetricians….Differences in Cesarean Section Rates and Indications in Rural Dakota. *North Dakota J of Hum Serv.* 1999;2(4):1-8.
11. Berghs G, Spanjaards E, Driessen L, Doesburg W, Eskes T. Neonatal Neurological Outcome after Low-Risk Pregnancies. *Eur J Obstet Gynecol.* 1995;62:167-71.
12. Taylor GW, Edgar W, Taylor BA, Neal DG. How Safe is General Practitioner Obstetrics? *Lancet.* 1980;2:1287-89.
13. Rosenblatt RA, Dobie SA, Hart LG, Schneeweiss R, Gould D, Raine TR, Benedetti TJ, Pirani MJ, Perrin EB. Interspecialty Differences in the Obstetric Care of Low-Risk Women *Am J Public Health.* 1997;87:344-351.
14. Applegate JA, Hueston WJ, King DE, Mansfield CJ, McClafin RR. Practice Variations Between Family Physicians and Obstetricians in the Management of Low-Risk Pregnancies. *J Fam Pract.* 1995;40:345-51.
15. Applegate JA, Halhout MF. Cesarean Section Rate: A Comparison Between Family Physicians and Obstetricians. *Fam Pract Res J.* 1992;12(30):255-262.
16. Notrris TE, Pirani MJ, Reese JQ, Rosenblatt RA. Are Rural Family Physicians Comfortable Performing Cesarean Sections? *J Fam Pract.* 1996;43:455-60.
17. Topping DB, Hueston WJ, MacGilvray P. Family Physicians Delivering Babies: What Do Obstetricians Think? *Fam Med.* 2003;35(10):737-41.
18. Cunningham FG, Gant NF, Leveno KT, Gilstrap LC, Hauth JC, Wenstrom KD, eds. *Williams Obstetrics.* 21st ed. New York: McGraw-Hill; 2001.
19. Gabbe SG, Niebyl JR, Simpson JL, eds. *Obstetrics: Normal and Problem Pregnancies.* 4th ed. Philadelphia: Churchill Livingstone; 2002.
20. American College of Obstetricians and Gynecologists. *ACOG Compendium of Selected Publications 2010.* Washington, DC. 2010.
21. Konnyu K, Grimshaw J, Moher D. What is Known About 3rd and 4th Degree Lacerations Occurring During Vaginal Birth? *Ottawa Hospital Research Institute.* 2010 Dec;9:1-13.
22. Moczygemba CK, Paramsothy P, Meikle S, Kouris AP, Barfield WD, Kuklina E, Posner SF, Whiteman MK, Jamieson DJ. Route of Delivery and Neonatal Birth Trauma. *Am J Obstet Gynecol.* 2010;202:361.e1-6.
23. Rayburn WF, Klagholz JC, Murray-Kregan C, Dowell LE, Strunk AL. Distribution of American Congress of Obstetrician and Gynecologist Fellows and Junior Fellows in Practice in the United States. *Obstet Gynecol.* 2012;119:1017-22.