

ORIGINAL RESEARCH ARTICLE

Neonatal outcomes in twin pregnancies with the first twin in breech presentation according to the mode of delivery: A cohort study from Dakar Senegal

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Abstract

The objectives of this study were to compare perinatal outcomes in twin pregnancies where the first twin was in the breech presentation. To do so, we performed a 10-year retrospective cohort study in a single university center. All patients with a twin pregnancy with the first twin in breech presentation, a gestational age greater than or equal to 34 weeks' gestation, and a birth weight ≥ 1500 g were included. The main outcome measures were 5-minute Apgar score <7 and perinatal mortality. We included 353 pairs of twins which complied with the inclusion criteria. One hundred and fifty (150) patients delivered vaginally while 203 pairs of twins were delivered by caesarean section. Patients who delivered abdominally were similar to those who delivered vaginally with regard to age, parity, and gestational age. Six twins A delivered vaginally and 2 delivered by caesarean section had an Apgar score <7 ($p = 0.76$) whereas 12 twins B delivered vaginally and 2 delivered abdominally had an Apgar score <7 ($p = 0.001$). Perinatal mortality did not differ significantly between twins delivered abdominally and those delivered vaginally. There was no evidence that vaginal delivery was risky with regards to depressed Apgar scores for Twin A and neonatal mortality for breech first twins that weighed at least 1500 g. However, Twin B delivered vaginally were more likely to present with a low 5-minute Apgar score. Along with the literature, the findings of this study do not currently allow to define a consensual obstetric attitude towards management of breech first twin deliveries. Until more prospective multicenter randomized controlled studies shed light on this problem, the skills, experience and judgment of the obstetrician will play a major role in the decision-making process. (*Afr J Reprod Health* 2022; 26[5]: 50-56).

Keywords: Twin, breech, delivery, cesarean, outcome, Senegal

Résumé

Les objectifs de cette étude étaient de comparer les résultats périnataux dans les grossesses gémellaires où le premier jumeau était en présentation du siège. Pour ce faire, nous avons réalisé une étude de cohorte rétrospective sur 10 ans dans un seul centre universitaire. Toutes les patientes ayant une grossesse gémellaire avec le premier jumeau en présentation du siège, un âge gestationnel supérieur ou égal à 34 semaines de gestation et un poids de naissance ≥ 1500 g ont été incluses. Les principaux critères de jugement étaient le score d'Apgar à 5 minutes <7 et la mortalité périnatale. Nous avons inclus 353 paires de jumeaux qui remplissaient les critères d'inclusion. Cent cinquante (150) patientes ont accouché par voie vaginale tandis que 203 paires de jumeaux ont accouché par césarienne. Les patientes ayant accouché par voie abdominale étaient similaires à celles ayant accouché par voie basse en ce qui concerne l'âge, la parité et l'âge gestationnel. Six jumeaux A accouchés par voie vaginale et 2 accouchés par césarienne avaient un score d'Apgar <7 ($p = 0,76$) tandis que 12 jumeaux B accouchés par voie basse et 2 accouchés par voie abdominale avaient un score d'Apgar <7 ($p = 0,001$). La mortalité périnatale ne différait pas significativement entre les jumeaux nés par voie abdominale et ceux nés par voie basse. Il n'y avait aucune preuve que l'accouchement vaginal était risqué en ce qui concerne les scores d'Apgar déprimés pour le jumeau A et la mortalité néonatale pour les premiers jumeaux par le siège qui pesaient au moins 1500 g. Cependant, les jumeaux B accouchés par voie vaginale étaient plus susceptibles de présenter un faible score d'Apgar à 5 minutes. A l'instar de la littérature, les résultats de cette étude ne permettent pas actuellement de définir une attitude obstétricale consensuelle vis-à-vis de la prise en charge des premiers accouchements de jumeaux par le siège. Jusqu'à ce que des études contrôlées randomisées multicentriques plus prospectives éclairent ce problème, les compétences, l'expérience et le jugement de l'obstétricien joueront un rôle majeur dans le processus de prise de décision. (*Afr J Reprod Health* 2022; 26[5]: 50-56).

Mots-clés: Jumeau, siège, accouchement, césarienne, issue, Sénégal

Introduction

Twin pregnancy is considered a high-risk pregnancy and always warrants special attention. The spontaneous incidence of twin pregnancies is around 1% and is constantly increasing¹. This would have increased by 62%² mainly due to the extension of the use of medically assisted reproductive techniques².

Breech first presenting twin is rare occurring in less than 0.5% of all births. Its frequency in twin pregnancies is estimated between 20 and 30%³.

The choice of the mode of delivery is a crucial issue to be resolved at the end of antenatal care. In twin pregnancies, the route of delivery depends on several factors including gestational age, the type of twins, fetal presentations, and experience of the clinician performing the delivery⁴.

Breech first presenting twin pregnancies have been managed by caesarean for many years. Historically, this was because of a fear of interlocking fetal heads during delivery of breech-vertex twins. This complication is however, exceedingly rare. Less than 200 cases of this complication have been reported since 1958 leading to an estimated frequency of less than 1/1000 twin deliveries^{3,5}. In addition, a number of retrospective studies have reported an increased perinatal risk from attempted vaginal deliveries, and the rate of scheduled caesarean deliveries with breech presentation increased steadily until 2000. "Term Breech Trial", the randomized trial by Hannah *et al.*⁶ published in October 2000 in *The Lancet* came to reinforce, even confirm ultimately for some, this hypothesis. The objective of Hannah's study was to compare a policy of planned vaginal birth with a policy of planned caesarean section for selected breech-presentation pregnancies at term. The hypothesis was that a systematic caesarean section reduces the risk of death or severe morbidity in the new-born compared to an attempted vaginal delivery. The main result shows a significant reduction in the primary endpoint (perinatal mortality or neonatal mortality or severe neonatal morbidity) in the planned caesarean group compared to the attempted vaginal group (17 out of 1,039 newborns [1.6%] versus 52 out of 1,039 newborns [5.0%]; RR: 0.33, 95% CI [0.19-0.56]; p

<0.0001). The authors concluded that planned caesarean section policy is much safer than vaginal birth in the breech presentation. A dramatic change in clinical practice ensued, which has increased the rate of caesarean section in breech presentations worldwide for singleton and twin pregnancies in which the first twin was in breech presentation⁷. Expertise in vaginal breech delivery has decreased and many obstetricians graduated with minimal or no experience in vaginal breech delivery⁷. The same fears were seen to spread in twin pregnancies with the first twin in breech presentation.

Following the publication of this study, several practitioners shared their results to contradict them. However, these studies have small sample sizes and their statistical analysis lacks power. Despite this, caesarean delivery is the preferred mode of delivery for twin pregnancies with the first twin in the breech presentation in many settings⁸.

Because the practice of routine cesarean delivery for breech-presenting twins is not based on any clear-cut or evidence-based indications, we conducted this study to compare the perinatal outcome of vaginally delivered breech-presenting twins to those delivered by cesarean at a University maternity in Dakar, Senegal.

This study is aimed at comparing perinatal outcomes in twin pregnancies where the first twin is in the breech presentation.

Methods

Type and period of study

This is a 10-year retrospective cohort study (2010-2019) comparing neonatal outcomes of twins with the first twin in the breech presentation.

Setting

The study was performed at the Maternity of Philippe Maguilen Senghor Health Center (PMSHC) in Dakar Senegal. Senegal's health system consists of three main parts: a peripheral level, a regional and a central level. The peripheral level (that is, local community level) is known as "*District sanitaire*" with one health center and several primary care units. The regional intermediate level addresses problems of health of a

given region/area. The central and national level holds the minister's office, subdivisions and related services. Furthermore, facilities are made of three categories: national and regional hospitals, health centers and health posts. PMSHC is a level 2 health center. It does not have the performance of a hospital, but surgical procedures are performed there. Teams of residents in obstetrics, midwives and nurses provide continuous Emergency Obstetric and Newborn Care (EmONC). On-call duties are carried under the supervision of an obstetrician. The setting has 34 beds with near 7,500 deliveries per year.

Inclusion criteria

All patients with a twin pregnancy with the first twin in breech presentation, a gestational age greater than or equal to 34 weeks' gestation were included in the study.

Non-inclusion criteria

Twins with the following conditions were not included in the study: antepartum death, infants with congenital abnormalities incompatible with life, infants weighing <1,500 g and pregnancies of less than 34 weeks' gestation. Those criteria were used in an attempt to eliminate cases where poor outcome could be related to factors other than the mode of delivery.

Policy of vaginal delivery

The decision on the mode of delivery was made by the obstetrician responsible for the labor room based on the information available in the patient's record.

A caesarean was also scheduled in situations contraindicating vaginal delivery: scared uterus, suspected fetal macrosomia for either twin, a narrowed pelvis, deflection of the head of the first twin diagnosed by ultrasound.

Data collection

Deliveries registered over a 120 month-period (1st January 2010 to 31st December, 2019) were extracted from E-Perinatal, our Electronic medical record system. Furthermore, data extracted were moved to Statistical Package for Social Science database, cleaned and then analyzed.

Data analysis

Mean, median, standard deviation, frequencies and percentages were reported to describe the variables and inferential statistics were used to establish associations between mode of delivery and the various selected outcomes. All statistical tests were two-sided and the level of significance was set at $p < 0.05$.

Results

During the study period, there were 353 pairs of twins in which the first was in the breech presentation. One hundred and fifty (150) patients delivered vaginally while 203 pairs of twins were delivered by caesarean section. The overall caesarean rate for twins during the study period was 56.7%. Table 1 presents patients' and pregnancy characteristics.

Patients who delivered abdominally were similar to those who delivered vaginally with regard to age, parity, and gestational age as shown in Table 1. However, twins delivered abdominally had higher birthweight compared to those delivered vaginally (2414.87 g vs 2515.86 for twin A, $p = 0.041$ and 2353 g vs 2471.03 g for twin B, $p = 0.013$).

The neonatal outcome is summarized in Table 2. The data are subdivided by the actual mode of delivery (vaginal delivery versus C-Section). Six twins A delivered vaginally and 2 delivered by caesarean section had an Apgar score < 7 ($p = 0.76$) whereas 12 twins B delivered vaginally and 2 delivered abdominally had an Apgar score < 7 ($p = 0.001$).

Perinatal mortality did not differ significantly between twins delivered abdominally and those delivered vaginally.

Discussion

Main findings

There was no evidence that vaginal delivery is risky, in terms of depressed Apgar scores for Twin A and neonatal mortality, for breech first twins that weighed at least 1500 g. However, Twin B delivered vaginally were more likely to present with a low 5-minute Apgar score.

Table 1: Comparison of mothers and babies baseline characteristics in vaginal and abdominal delivery

Characteristics	Vaginal delivery N = 150	Caesarean section N = 203	p value
Maternal age (years)	28.88	28.36	0.826
Parity	2.05+1.8	1.95+1.95	0.622
Gestational age	38.26	38.24	0.727
Birth weight			
Twin A	2478.22	2514.87	0.041
Twin B	2528.54	2462.93	0.013

Table 2: Perinatal outcome in vaginal and abdominal delivery of breech first twin

Outcome	Vaginal delivery N = 150	Caesarean section N = 203	p value
5-minute Apgar score < 7			
Twin A	6 (4%)	2 (1%)	0.76
Twin B	12 (8%)	2 (1%)	0.001
Perinatal mortality			
Twin A	3 (2%)	2 (1%)	0.361
Twin B	3 (2%)	0 (0%)	0.76

Interpretation of results

The choice of mode of delivery is a crucial issue to be resolved at the end of the pregnancy. In twin pregnancies, the mode of delivery depends on several factors including gestational age, the type of twin pregnancy, fetal presentations, and experience of the clinician performing the delivery⁴.

In women with monoamniotic twin gestations, the American College of Obstetrician and Gynecologists⁹ recommends caesarean section from 32 weeks and before 36 weeks to avoid an umbilical cord complication of the second twin. Likewise, the Royal College of Obstetrician & Gynecologists (RCOG) recommend caesarean section for women with a monochorionic monoamniotic twin pregnancy between 32⁺⁰ and 33⁺⁶ weeks or after any complication is diagnosed requiring earlier delivery¹⁰. Other European countries suggest also caesarean as mode of delivery in monozygotic twin pregnancies¹¹.

In diamniotic twin pregnancies with the first twin in vertex presentation, vaginal delivery is a reasonable option¹⁰⁻¹² regardless the presentation of the second twin and provided that an obstetrician with experience in internal podalic version is present¹³. A randomized controlled trial by Barrett *et al.*¹⁴ demonstrated that in twin pregnancies between 32⁺⁰ weeks and 38⁺⁶ weeks of gestation, with the first twin in the vertex presentation, planned caesarean delivery did not significantly decrease or increase the risk of fetal or neonatal death or serious neonatal morbidity, as compared

with planned vaginal delivery. In vertex-vertex twins, trial of labor and vaginal delivery is therefore appropriate regardless of the estimated fetal weight and the gestational age⁸.

In the United States and in the United Kingdom, caesarean section is the recommended mode of delivery if the first twin is not cephalic at the time of planned birth^{10,12} while in Francophone countries (France, Belgium), it is suggested that there is no reason to recommend one mode of delivery rather than another in case of twin pregnancy regardless of its term in particular, there is no need to recommend one mode of delivery over another in case of twin pregnancy with the first twin in breech^{11,15}.

In the literature, we failed to find recommendations from African Obstetric Colleges with regard to management of twin pregnancies.

With the exception of the Term Breech Trial, no significant experimental studies on the safety of planned vaginal breech delivery has been yet performed. The most significant observational study (*PREMODA*) carried out prospective data collection on 8,105 consecutive cases of women with a breech fetus who delivered in 174 centers in France and in Belgium over a one-year period¹⁵. The results of the *PREMODA* study showed no difference in perinatal mortality rates between planned vaginal breech delivery and planned caesarean section (0.8/1,000 vs. 1.5 /1,000), or short-term neonatal morbidity (1.6% vs. 1.45%). An Apgar index score less than 4 has been observed more frequently in planned vaginal breech

deliveries than in planned caesarean sections (0.2/1,000 vs. 1.6/1,000). Four times larger in size than the Term Breech Trial, the PREMODA study demonstrated that a cautious approach to planned vaginal breech delivery in a modern obstetric unit with the right staff can reach an acceptable level of security for many women¹⁶.

Our findings are in line with those results supporting the idea that vaginal delivery is a reasonable option for twin pregnancies with the first twin in breech presentation. However, our results are not reassuring for the second vaginally born twin with more low Apgar scores. This situation could be due to a lack of monitoring means in particular a cardiotocography with two sensors for the two twins.

In the study by Bourtembourg *et al.*³, the authors observed no difference in neonatal outcomes in the caesarean section group compared to the vaginal delivery group. On the other hand, they noticed a significant difference in the mode of delivery as depending on parity.

Sibony *et al.*¹⁷ in 2005 studied the mode of delivery and neonatal morbidity of 614 twin pregnancies according to their presentation with a vaginal delivery rate of 82% (60 to 70% in most series). These authors do not consider that the first twin in breech presentation is an indication for a priori caesarean section due to the extreme rarity of complications such as twin dystocia, and the lack of difference in obstetrical and neonatal prognosis observed in their series. They recommend the vaginal route when the first breech is breech after radiopelvimetry and the delivery is under the supervision of a skilled obstetrician.

One might ask: why argue? Should we not simply accept, like vaccinations or asepsis, this new progress in medicine which makes it possible to avoid neonatal asphyxia, fetal trauma and perineal tears, while ensuring families and caregivers an appointment for birth. The answer is: caesarean section is not the safest mode of delivery, neither for the infant nor for the mother, since maternal mortality is 1 to 3 %, a four to ten times risk greater than that of vaginal delivery¹⁸.

Implications for practice

Despite the number of studies showing no excess of perinatal risk associated with vaginal delivery,

many teams recommend a caesarean section. However, the findings of this study along with the literature do not currently allow to define a consensual obstetric attitude towards management of breech first twin deliveries.

In the absence of evidence of one route of delivery rather than another, practitioners who are accustomed to delivering twin pregnancies with the first twin in breech presentation should not change their practice. This will allow skills to be passed on to younger practitioners. Otherwise, the experience necessary for this practice will be lost forever. Caesarean section would then be - after 4 to 5 years for any team having adopted this policy - the only feasible delivery route. In Obstetrics, deliveries are unscheduled, and obstetric complications even less. If childbirths are unpredictable in their spontaneous onset, they are also unpredictable in their course. Practitioners will necessarily be faced with an inevitable vaginal birth of a twin pregnancy with the first twin in breech presentation justifying an intervention, which, to have the best chances, must be carried out within a few minutes. This therefore justifies the permanent presence or at least the immediate accessibility of the skilled specialist to practice required maneuvers. In addition, settings in developing countries to carry on practicing twin deliveries should endeavor to monitor both twins during labor.

Implication for research

As the results of this study showed, vaginal birth is a reasonable option. One of the ways to determine the best delivery route for patients with twin pregnancies with the first twin in breech presentation is a randomized controlled trial. However, such a response may be difficult to obtain for several reasons. The medico-legal has grown so much, especially in the developed countries, that no risk seems to be allowed or acceptable. All pregnancies should result in a living, healthy child. Since Hannah's study, many obstetricians have for some lost skills to deliver a breech presentation; others have never learned to perform a breech delivery. In common sense, a caesarean is much safer than a vaginal birth. This media influence eventually hovered over delivery rooms. Randomized controlled trials - which are supposed to provide the answer everyone expects - are

probably impossible to perform for this very particular area. The answer or part of the answer would probably come from communities where the practice of vaginal breech delivery is still common. This is the case in Senegal. Confidence in the practice of breech birth has also spread to that of twin pregnancies with the first twin in breech presentation. Observational studies from large cohorts from these countries could shed some light on this field.

Implication for public health

Obstetric Colleges and global health authorities should take into account the lack of evidence to suggest one delivery route rather than another and the fact that caesarean section is a much less safe method of delivery. In terms of public health, encouraging practitioners to continue to practice breech delivery in twin pregnancies and to pass the skills on to younger practitioners would help reduce the number of caesarean deliveries for this indication and by ricochet, maternal mortality and morbidity by caesarean section. In addition, an increasingly abundant psychological literature testifies to the negative effects of caesarean section¹⁹. Women who have had a caesarean delivery express less satisfaction with the experience of the birth; they more often suffer from loss of self-confidence; they feel frustration at the discrepancy between what they imagined and reality. Dissatisfaction is based on the norm, which considers vaginal delivery as “normal childbirth” and promotes the feeling of not having experienced “correctly” an essential event in their mother's life¹⁹⁻²⁰. Some regret not having known the pain of childbirth. This dissatisfaction refers to the place of motherhood in the construction of female identity, articulated in certain contexts with the importance of childbirth in the construction of maternal identity. In addition, the symptoms of stress, are also more frequent during caesarean sections: fear of death for herself or for the baby, fear of anesthesia, of surgery¹⁹. Operative stress is no different from that seen during other surgeries, but the difference is due to the attitude of those around them, who are less attentive and compassionate. Women focus their attention on the child and does not understand the persistence of anxiety once the latter is born healthy¹⁹.

Strengths and Limitations

This retrospective cohort study includes flaws of observational studies. Caesarean section was the only option available still 2015 and decision to delivery was based upon the clinical judgment of the obstetrician.

Even over 300 twin pairs, this study is based on a medium sample size. Therefore, a lack of statistical power and possible sampling bias could be present. In addition, double-blinding of patients and clinicians was not possible, given the nature of the intervention. It should be noted that in view of all these limitations, the generalization of the results of these studies to a larger and identical population is limited.

Conclusion

This study showed that there was no evidence that vaginal delivery is risky, in terms of depressed Apgar scores for Twin A and neonatal mortality, for breech first twins that weighed at least 1500 g. However, Twin B delivered vaginally were more likely to present a low 5-minute Apgar score. Along with the literature, the findings of this study do not currently allow to define a consensual obstetric attitude towards management of breech first twin deliveries. In conclusion, the preferable mode of delivery in breech-first presenting twins is still poorly understood. Although the prevailing opinion is in favor of caesarean section, several reports indicate that vaginal delivery may be achievable in terms of perinatal mortality and morbidity, at least in carefully selected cases. These reports are limited, however, by their small sample sizes. Until more prospective multicenter randomized controlled studies shed light on this situation, the skills, experience and judgment of the obstetrician will play a major role in the decision-making process.

References

1. Cruikshank DP. Intrapartum management of twin gestations. *Obstetrics & Gynecology* 2007;109:1167-1176.
2. Blondel B. [Augmentation des naissances gémellaires et conséquences sur la santé]. Increase in twin births and health consequences. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*.

- 2009/12/01/ 2009;38(8, Supplement 1):S7-S17. doi:https://doi.org/10.1016/S0368-2315(09)73555-0
3. Bourtembourg A, Ramanah R and Jolly M. [L'accouchement gémellaire en cas de premier jumeau en présentation podalique. Etude d'une série continue de 137 cas]. Twin delivery with the first twin in breech position. A study of 137 continuous cases. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*. Apr 2012;41(2):174-81. doi:10.1016/j.jgyn.2011.10.005
 4. The American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 144: Multifetal gestations: twin, triplet, and higher-order multifetal pregnancies. *Obstetrics & Gynecology*. May 2014;123(5):1118-32. doi:10.1097/01.AOG.0000446856.51061.3e
 5. Pons JC and Hoffmann P. [La césarienne a-t-elle une indication en cas de grossesse gémellaire ?]. Does cesarean section have an indication for twin pregnancies? *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*. 2000;29:40-50.
 6. Hannah ME, Hannah WJ, Hewson SA, Hodnett ED, Saigal S and Willan AR. Planned caesarean section versus planned vaginal birth for breech presentation at term: a randomised multicentre trial. *The Lancet*. 2000/10/21/ 2000;356(9239):1375-1383. doi:https://doi.org/10.1016/S0140-6736(00)02840-3
 7. Kotaska A and Menticoglou S. No. 384-Management of Breech Presentation at Term. *Journal of Obstetrics and Gynaecology Canada*. 2019;41(8):1193-1205. doi:10.1016/j.jogc.2018.12.018
 8. Gabbe SG, Niebyl JR and Simpson JL. *Obstetrics. Normal and Problem Pregnancies*. 7th ed. Elsevier; 2016.
 9. Baxi LV and Walsh CA. Monoamniotic twins in contemporary practice: a single-center study of perinatal outcomes. *The Journal of Maternal-Fetal & Neonatal Medicine*. Jun 2010;23(6):506-10. doi:10.3109/14767050903214590
 10. Impey LWM, Murphy DJ, Griffiths M and Penna LK. Management of Breech Presentation. *British Journal of Obstetrics and Gynaecology*. 2017;124: e151-e177.
 11. Collège National des Gynécologues Obstétriciens Français. [Recommandations pour la pratique clinique: grossesses gémellaires]. Recommendations for clinical practice: twin pregnancies. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*. 2009;38(S128-31)
 12. ACOG Committee Opinion. Antenatal corticosteroid therapy for fetal maturation. *Obstetrics & Gynecology*. 2017;130(2):e102-e109.
 13. D'Alton ME. Delivery of the second twin: revisiting the age-old dilemma. *Obstetrics & Gynecology*. Feb 2010;115(2 Pt 1):221-2. doi:10.1097/AOG.0b013e3181cd3380
 14. Barrett JF, Hannah ME and Hutton EK. A randomized trial of planned cesarean or vaginal delivery for twin pregnancy. *New England Journal of Medicine*. Oct 3 2013;369(14):1295-305. doi:10.1056/NEJMoa1214939
 15. Goffinet F, Carayol M and Foidart J-M. Is planned vaginal delivery for breech presentation at term still an option? Results of an observational prospective survey in France and Belgium. *American Journal of Obstetrics and Gynecology*. 2006/04/01/ 2006;194(4):1002-1011. doi:https://doi.org/10.1016/j.ajog.2005.10.817
 16. Lansac J, Crenn-Hebert C, Rivière O and Vendittelli F. How singleton breech babies at term are born in France: A survey of data from the AUDIPOG network. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2015/05/01/ 2015;188:79-82. doi:https://doi.org/10.1016/j.ejogrb.2015.02.029
 17. Sibony O, Touitou S, Luton D, Oury JF and Blot P. Modes of delivery of first and second twins as a function of their presentation. Study of 614 consecutive patients from 1992 to 2000. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. Jun 1 2006;126(2):180-5. doi:10.1016/j.ejogrb.2005.08.013
 18. Deneux-Tharoux C, Carmona E, Bouvier-Colle MH and Breart G. Mortalité maternelle en France. *BEH*. 2006;50:392-402.
 19. Lobel M and DeLuca RS. Psychosocial sequelae of cesarean delivery: Review and analysis of their causes and implications. *Social Science & Medicine*. 2007/06/01/ 2007;64(11):2272-2284. doi:https://doi.org/10.1016/j.socscimed.2007.02.028
 20. Gustin P. [Technologies de la naissance : des psys s'en mêlent...]. Technologies of birth: psychologists get involved ... *Le Coq-héron*. 2010;203(4):45-59. doi:10.3917/cohe.203.0045.