Primiparity: A Traditional Intrapartum Obstetric Risk Reconfirmed

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Abstract

Background: Intrapartum risk is based mainly on obstetric history, which is lacking in primiparous women.

Objectives: To ascertain whether the traditional known risk of primiparity is an independent variable for both maternal and neonatal outcome.

Methods: All women admitted to labor during March-April 2002 were canvassed for eligibility to participate in the study based on an obstetric risk scoring system developed and validated for our population. During the study period, 1473 women presented for delivery. Of these, 298 (20%) were eligible according to the exclusion criteria as "low risk" parturients: 135 (45%) were primiparous and 163 (55%) were multiparous (2–5 births).

Results: After correction for significant confounding factors, primiparity was revealed as an independent significant risk factor for instrumental delivery (odds ratio 15.5, 95%confidence interval 1.88–125) and for early postpartum hemorrhage (OR 5.6, 95%CI 1.9–16.6).

Conclusions: This study highlights early postpartum hemorrhage as a significant risk for primiparous women, independent of mode of delivery, and also confirms previous reports of maternal complications requiring transfer from birth centers/home deliveries to tertiary centers.

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Until the beginning of the 20th century, women had little recourse but to give birth at home. Advances in clinical practice, improved socioeconomic status, emphasis on medical hygiene, the advent of anesthesia, and the availability of matched blood products engendered a shift of obstetric care to hospitals [1]. Most recently, studies of outcomes from birth centers/home deliveries have underscored that cost-effective, safe and successful care can be provided to "low risk" obstetric patients. Societal opinion makers also support this trend. In addition, satisfaction with outcomes achieved in the non-hospital setting may assist hospital policy decision makers and national health planners in allocating scarce resources on the institutional level, organizing medical services on the departmental level, and monitoring the progress of labor and delivery on the individual level [2]. However, in order to recommend a qualitative and quantitative shift in priorities regarding the low risk parturient, it is essential to specify which parturient qualifies as low risk and to provide evidence on the relative paucity of adverse obstetric and neonatal outcomes.

OR = odds ratio
CI = confidence interval

Traditionally, the low risk population is defined by eliminating high risk groups. Studies have categorized high risk into maternal and fetal considerations, focusing on maternal pregnancy complications that impact the fetus [3,4] or on tests that define fetal status before labor [5-9]. Despite numerous high risk classifications, 74% of women with poor neonatal outcomes had not been classified within traditional high risk groups [10,11]. Definitions of high risk, based on different studies and incorporating nearly 70 maternal and fetal parameters [12-16], have variously identified 35–85% of low risk candidates [17,18]. Inevitably, a requisite component of any parturition risk assessment is data on previous labor and delivery; therefore, primiparous women, by virtue of having no obstetric history, are not included in risk analyses.

The purpose of this study was to employ rigorous inclusion criteria of obstetric low risk in a prospective assessment of primiparity as an independent risk factor for intrapartum instrumental intervention and/or adverse fetal outcome. We regard the reconfirmation of this traditional obstetric risk factor in a sample of our national population as critical for allocation of delivery room resources and for the establishment of future guidelines for local homes or birthing centers.

Patients and Materials

All women admitted to labor during March-April 2002 were canvassed for eligibility to participate in the study based on an obstetric risk scoring system developed and validated for our population [19]. Parturients were excluded if a high risk criterion was met [Table 1]. All women have national health insurance, and there was no bias with regard to demographic characteristics.

Table 1. High risk exclusion criteria

General characteristics
Maternal age < 20 or > 35 years, significant medical history before or during the pregnancy (hypertensive, cardiac, endocrine, immune, renal, pulmonary, or hematological diseases), any smoking history, drug addiction (per history);
Previous obstetric history
Previous habitual miscarriages, intrauterine fetal death, offspring with congenital malformations or cerebral palsy, previous uterine scar;
Present obstetric characteristics
Parity > 5, multifetal gestation, pregnancy achieved by artificial reproduction techniques, gestational age at admission < 37 or > 40, non-vertex presentation, antepartum bleeding, diagnosed abnormalities of the amniotic fluid, known infection of the genital tract, anemia (Hg < 8 g/dl), estimated fetal weight (by ultrasound and/or clinical evaluation) <2500 or >4000 grams.

Departmental procedures, reinforced by practical guidelines, are offered by certified nurse-midwives in the presence of an obstetrician. These include diagnosis of active labor, pharmacological pain relief, labor management, interpretation of electronic fetal heart tracings, delivery, and episiotomy. Decisions regarding induction or/and augmentation of labor, instrumental delivery, and repair of episiotomy/other lacerations are made by an obstetrician. Our medical facility with combined obstetric and neonatal tertiary centers does not require out-transfers.

Data were retrieved from the perinatal database, followed by individual chart review. Validity of data was checked independently by two obstetricians on a random subset of 50 charts: no discrepancies were found. Parturients were grouped according to parity (P1 versus P2–5). The main outcome measure that was queried was incidence of instrumental delivery.

Statistical analysis

Comparison of the two groups for quantitative variables was carried out using an independent samples *t*-test. The chi-square test and Fisher's exact test were used to assess the association between two qualitative variables. The sample size of 150 patients was determined by the expected rate of instrumental deliveries in each group (7% in primiparous versus 1% in multiparous women) and power calculation of 85% for statistical significance. A logistic regression model was built to verify variables simultaneously affecting the proposed outcome measures: instrumental delivery and neonatal compromise. All tests were two-tailed and a *P* value of 5% or less was considered statistically significant.

Results

During the study period 1473 women presented for delivery. Of these, 298 women (20%) were eligible according to the exclusion criteria as "low risk" parturients: 135 (45%) were primiparous and 163 (55%) were multiparous (2–5 births). There were no significant differences between these groups with regard to antenatal care, body mass index, or neonatal birth weight [Table 2]. However, there were significant differences in characteristics of maternal labor and delivery and in neonatal outcome [Tables 3 and 4]. Therefore, verification and correction of the significant confounding factors of labor induction, low Bishop score, use of oxytocin, and epidural analgesia were undertaken. After correction for these factors, primiparity revealed itself as an independent significant risk factor for instrumental delivery (odds ratio 15.5, 95% confidence interval 1.88–125) and for early postpartum hemorrhage (OR 5.6, 95% CI 1.9–16.6). All instrumental deliveries were by vacuum extraction.

In the primiparous group, indications for instrumental delivery included 4 cases (29%) of persistent occipito-posterior position of the head, 3 cases (23%) of deep transverse arrest, 6 cases (43%) of fetal distress, and 1 case (7%) of maternal exhaustion. There was only one case of instrumental delivery in the multiparous group, which was due to maternal exhaustion.

There were 7 cases (5.2%) of early postpartum hemorrhage in the primiparous group: 6 (86%) due to uterine atony and 1 (14%) due to laceration of the uterine cervix. The one case (0.6%) of early postpartum hemorrhage in the multiparous group was due to retained placenta and subsequent manual evacuation of the uterine content.

No cesarean section was required in either group, while the overall year departmental cesarean rate was 10.4%.

None of the neonates in the multiparous group were admitted to the neonatal intensive care unit, but 21 (15.7%) in the primiparous group were. These included 5 cases (23.8%) for observation due to a low 5' Apgar score who were discharged to the regular ward after 24 hours, 4 (19%) due to suspected meconium aspiration but none required mechanical ventilation, 4

Table 2. Maternal characteristics

	Nulliparous (N=135)	Multiparous P2–5 (N=163)	*P*
Ethnicity (Jewish)	132 (97.8%)	150 (92%)	NS
Mean body mass index	26 ± 2.1	28 ± 1.3	NS
Antenatal care visits ≥ 3	134 (99.3%)	162 (99.7%)	NS
Group B Streptococcus carrier state	9 (6.7%)	5 (3.1%)	NS

NS = not significant

Table 3. Obstetric characteristics

	Nulliparous (total=135)	Multiparous (total=163)	*P*
Bishop score 0–4	34 (25.4%)	19 (11.7%)	0.002
Induction	9 (6.7%)	0	0.001
Epidural	107 (79.3%)	64 (39.3%)	< 0.001
1st + 2nd stage labor time in hours (mean ± SD)	10.2 ± 5.1	6 ± 4.0	< 0.001
Oxytocin 1st stage	23 (18.4%)	13 (8%)	0.011
Oxytocin 2nd stage	32 (26.0%)	18 (11.0%)	0.001
Episiotomy	110 (81.5%)	4 (2.5%)	< 0.001
Perineal & vaginal lacerations	13 (9.6%)	22 (13.5%)	NS
Malposition confirmed at delivery	3 (2.2%)	1 (0.6%)	NS
Instrumental delivery	14 (10.4%)	1 (0.6%)	< 0.001
No. of maternal hospitalization days (mean ± SD)	2.3 ± 0.5	2.0 ± 0.5	< 0.001
PPH (early)	7 (5.2%)	1 (0.6%)	0.025
Fetal distress in labor	7 (5.2%)	0	0.004

PPH = early postpartum hemorrhage defined as blood loss of > 700 ml and/or hemoglobin drop of > 1 g/dl within 24 hours after delivery

Table 4. Neonatal characteristics

	Nulliparous (N=135)	Multiparous (N=163)	*P*
Birth weight (g) (mean ± SD)	3160 ± 350	3260 ± 363	NS
Gender (male/female, ratio)	50/85, 0.59	72/91, 0.79	NS
Fetal distress in labor	7 (5.2%)	0	0.004
Apgar 5' < 8	5 (3.7%)	0	0.018
NICU admission	21 (15.7%)	0	< 0.001

neonates (19%) had difficulties in breathing (attributed to maternal opiate parenteral analgesia), 1 neonate (4.8%) suffered from scalp laceration after a vacuum delivery and was monitored for appearance of subgaleal hematoma, and the remaining 7 cases (33.3%) were for short follow-up (≤ 24 hours) only (two babies > 4000 g were followed for hypoglycemia and 5 due to maternal intrapartum fever, 3 of whom had evidence of B streptococcal colonization). No neonate required more than 72 hours in the NICU[1]. The significant difference in NICU admission rate was eliminated by the final regression model.

Discussion

The traditional obstetric belief that the first delivery is "the true test of the pelvis" has guided many generations of practitioners. The impact of the first delivery on future pregnancy and delivery decisions by both the patient and obstetrician is unparalleled. Most scoring systems do not include primiparous parturients in the high risk category [17-19]. A few early studies have derivative results showing primiparity as associated with increased risk for maternal and fetal complications [20-23]. However, because inclusion criteria were not designated to study the effects of a first delivery, the first not necessarily being an intrinsic risk in other medical situations, many studies have been restricted to the traditional risk factors of hypertension, gestational diabetes, parturients above 35 years of age, previous cesarean delivery, and high multiparity [23,24]. The current study directly addresses the issue of primiparity, while strictly defining the low risk group. In addition, the current study population is socioeconomically homogenous, with equal accessibility to antenatal care and hospital admission, further emphasizing the risks of primiparity.

Intriguingly, although the overall departmental cesarean rate is about 10%, there were no cesareans in either of the study populations. This fact is explained by the rigorous exclusion criteria of all high risk pregnancies and further confirms the validity of the inclusion criteria. Although in this study the exclusion of women with previous cesarean sections may have biased the multiparous population since this requirement cannot be manipulated in primiparous women, the fact that none of the women in either group required cesarean implies that a significant bias is not reasonable, although a small effect cannot be ruled out.

Mode of delivery was not the only significant clinical endpoint uncovered in this study. Instrumental delivery has received only minor consideration relative to the incidence of cesarean section in low risk populations [24]. In the United States during the period 1989–1997, the use of vacuum extraction increased from 3.5% to 6.2%; the Israeli rate of instrumental deliveries reached 6.5% [19] while in our department the overall instrumental delivery rate during the period of the study was 5.03% (1.7% in multiparous women).

We consider that the main limitation of this study relates to the subjects we were able to recruit for the study. Of 1500 pregnancies only 20% were eligible for our strict criteria for low risk pregnancies. Hence, the number of nulliparous women was 135 and that of multiparous women (2–5 previous deliveries) 163. That is certainly one reason why the confidence interval values are so wide; nonetheless, we think that despite the limited number of participants, our study underscores primiparity as an independent important risk for instrumental delivery [Table 3].

The impact of intrapartum interventions in a low risk population and their role in labor outcomes in present and future pregnancies should be seriously considered. It takes an emotional as well as physical toll on the mother and neonate. Performing an instrumental delivery can lead to future requests for elective cesarean delivery and potentially a higher rate in the primary cesarean rate [25]. The excess of perinatal deaths and morbidity observed among primigravida in birth centers/home deliveries has caused concern and future larger studies should be encouraged [20,22].

The current study highlights early postpartum hemorrhage as a significant risk for primiparous women, independent of mode of delivery. The present results also confirm previous reports of maternal complications requiring transfer from birth centers/home deliveries to tertiary centers [22]: the main reason for transfer before delivery was failure to progress and need for intervention (instrumental or cesarean delivery), while the main reasons for transfer after delivery were hemorrhage and retained placenta.

Although neonatal risk was not confirmed, this was perhaps due to the small sample size for the outcome. In analyzing the neonate admission rate, it seems that NICU admissions were required for initial stabilization rather than for long-term interventions. Future large prospective cohort studies are required to confirm the above tentative findings on neonatal risks.

We suggest that the definition of any obstetric risk include "primiparity" and thus confirm the traditional obstetric concerns for the first delivery. Analysis of regional maternal and neonatal outcomes should take into consideration the characteristic primiparous/multiparous rate in each unit. We believe that the outcome of the first pregnancy is an important determinant for primary cesarean sections and for family planning programs. This characteristic rate of primiparity should be taken into consideration in health planning and resource allocation for obstetric care and birth centers/home deliveries. In our opinion and before larger scale national studies are available, the delivery of primiparous women outside hospital should be discouraged.

NICU = neonatal intensive care unit

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Capsule

Perceptual asymmetry

We invariably see ourselves quite differently from how others see us. Pronin reviews the reasons for this perceptual asymmetry. Perceptual asymmetry arises from differences in the type of information acquired by the individual versus the observer (i.e., introspective awareness of feelings and intentions versus inferences drawn from observed behaviors) and in how these types of information are prioritized and used to weight judgments of our own behaviors versus those of others. A greater appreciation for this intrinsic incongruity may lead to an enhanced understanding, both of ourselves and of others.

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Capsule

Transcription factor's double life exposed

Mutations in the transcription factor MeCP2 (transcriptional repressor methyl-CpG binding protein 2) cause a broad range of neurobehavioral abnormalities, including autism, mild learning disabilities, and mental retardation. MeCP2 has been widely believed to regulate a small number of target genes in the brain by repressing their expression. By applying microarray technology to mouse models that either lack or over-express MeCP2, Chahrour and team found that this transcription factor regulates more than 2000 genes in the hypothalamus alone and that MeCP2 in fact appears to activate the expression of about 85% of these genes. The discovery that MeCP2 regulates such a large number of genes suggests that therapeutic strategies for MeCP2-related disorders should focus on restoring neuronal function rather than correcting the function of individual gene targets.

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