Contents lists available at ScienceDirect





journal homepage: www.elsevier.com/locate/earlhumdev

Placental histology in clinically unexpected severe fetal acidemia at term



Laura Avagliano ^{a,*}, Anna Locatelli ^b, Luana Danti ^c, Salvatore Felis ^d, Federico Mecacci ^e, Gaetano Pietro Bulfamante ^f

^a Unit of Obstetrics and Gynecology, Department of Health Sciences, San Paolo Hospital Medical School, University of Milano, Milano, Italy

^b Department of Obstetrics and Gynecology, FMBBM, San Gerardo Hospital, University of Milano-Bicocca, Monza, Italy

^c Unit of Maternal–Fetal Medicine, Department of Obstetrics and Gynecology, Spedali Civili, Brescia, Italy

^d Department of Obstetrics and Gynecology, IRCSS Azienda San Martino, University of Genoa, Genoa, Italy

^e Department of Child and Woman's Health, Careggi Hospital, University of Florence, Florence, Italy

^f Unit of Human Pathology, Department of Health Sciences, San Paolo Hospital Medical School, University of Milano, Milano, Italy

ARTICLE INFO

Article history: Received 16 January 2015 Received in revised form 11 March 2015 Accepted 16 March 2015

Keywords: Placenta Fetal acidemia Low-risk pregnancy

ABSTRACT

Background: Fetal acidemia at birth is defined as a newborn condition wherein the cord blood pH value is less than 7.0. It could represent an association with newborn brain damage; therefore, it is important to investigate which conditions precipitate its occurrence. No extensive placental analysis has been performed in cases of acidotic newborns delivered from low-risk pregnancies. Aims: To study placental characteristics in cases with severe fetal acidemia. Study design: Retrospective case-control study. Subject: 34 cases, 102 controls. Outcome measures: Umbilical artery pH was measured at delivery from a doubly clamped portion of the cord. Placental characteristics were compared between cases with severe fetal acidemia (cord pH at birth <7.0) and controls (normal pH at birth) in term low-risk pregnancies. Results: Macroscopic placental and umbilical cord characteristics were comparable in cases and controls whereas histological characteristics exhibited differences: diffuse villous edema, increased number of syncytial knots and villous branching abnormalities significantly affected cases more frequently than controls. Diffuse villous edema is related to fetal vascularization and associated with an increase of venous pressure; in our low-risk population, it is conceivable that these changes of fetal flow and pressure occurred in labor during the alteration of fetal heart rate. An increased number of syncytial knots and villous branching abnormalities have been previously associated with chronic placental hypoxic condition; in our low-risk population they could reflect a clinically undetectable hypoxic situation that acted during pregnancy reducing fetal resources to bear labor and delivery.

Conclusions: Placental histology provides useful information related to fetal acidemia in low-risk term pregnancy.

© 2015 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Fetal pH is maintained within the normal narrow range thanks to placental exchanges that supply oxygen and remove respiratory and metabolic waste [1].

Pathological pH at birth, defined as fetal acidemia, corresponds to a cord blood pH value less than 7.0 [2,3]. Acidemia at birth could represent an association with newborn brain damage [2], therefore it is important to investigate which conditions precipitate its occurrence.

E-mail address: laura.avagliano@unimi.it (L. Avagliano).

Several maternal and fetal diseases have been related to cord blood acidemia at birth [4] and maternal–fetal illness could also affect placental anatomy and function [5,6]: for example, maternal diabetes mellitus could impair acid–base balancing and could modify placental villous tree branching and angiogenesis.

Moreover, placental lesions could impair the ability of the fetus to compensate stress at the time of labor and delivery [7,8].

To our knowledge, no extensive placental analysis has been performed in cases of acidotic newborns delivered from low-risk pregnancies. The aims of this study were to evaluate placental histology in term low-risk pregnancies, and to verify if placental examination could provide useful information for the comprehension of the genesis of fetal acidemia. Taking into account what it was demonstrated in placentas from neurologically impaired newborns [9], we tested the hypothesis that clinically silent placental chronic

^{*} Corresponding author at: Unit of Obstetrics and Gynecology, Department of Health Sciences, San Paolo Hospital Medical School, University of Milano, Via A. di Rudinì 8, 20142 Milano, Italy. Tel.: + 39 02 503 23064; fax: + 39 02 8184 3813.

lesions can reveal antepartum processes that could progress during the intrapartum period and predispose the fetus to an abnormal neonatal outcome.

2. Methods

2.1. Patients and data collection

Placentas from term singleton pregnancies were collected in four Italian Department of Obstetrics and Gynecology, during a two year

Table 1

Characteristics of our population.

period. The study is a retrospective review of a cohort of cases submitted to histopathology departments as part of clinical practice.

Criteria for inclusion in the study were: deliveries occurred after active labor at >37 weeks of gestation in healthy women with uneventful pregnancies, birth-weight appropriate for gestational age and normal fetal heart rate monitoring at admission. Exclusion criteria were any maternal or fetal diseases or pre-labor gestational complication or cesarean section before delivery.

Fetal umbilical cord arterial blood was measured at the time of delivery from a doubly clamped portion of the cord. Cases include

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			Cases (pH < 7.0) n = 34	Controls ($pH \ge 7.0$) n = 102	р
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$					
Maternal characteristics Maternal age (years) Pre-preparaty BM (kg/m ²) 332 ± 5.1 309 ± 4.5 0.01 Dece (BM 2 204 ± 5.1 23.3 ± 4.5 0.2 23.3 ± 4.5 0.2 Labor and delivery $20.6 \pm (SM 2 - 20.8)$ $10(8.0)$ 0.7 Labor and delivery 50.6 ± 0.01 $31.91.2$ $85.83.3$ 0.4 Labor and delivery 50.6 ± 0.01 32.2 ± 5.1 30.8 ± 1.4 0.05 Quartable us out-of Labor 21.6 ± 0.8 30.2 ± 0.7 30.8 ± 1.4 0.05 Vaginal delivery 30.2 ± 0.7 30.8 ± 1.4 0.05 0.2 0.0001 Intrapartum risk factors Gestation atlining of AF $7.00.5$ $12.11.8$ -6.0001 Neonatal characteristics Umbilical arcery pH 25.9 0.6 -6.0001 Neonatal characteristics Umbilical arcery pH 6.91 ± 0.6 7.26 ± 0.00 -6.0001 Umbilical cord abnormalities Nechal cord $7.06.0$ 7.26 ± 0.00 -6.0001 Maternal pyrexia 10.29 7.25 ± 0.6 -0.0					
Pre-pregnancy DM (kgm²) 22.0 ± 5.1 23.3 ± 4.5 0.2 Pre-pregnancy Decreg (M1 2 Sta) 10 (S1) 85 (S4.3) 0.4 Caucasian 31 (91.2) 85 (S4.3) 0.4 First pregnancy 21 (61.8) 56 (54.9) 0.5 Caucasian 20 (2.1) 39.8 ± 1.4 0.06 Catational age (weeks) 40 (2.1, 1.1) 39.8 ± 1.4 0.06 Catational age (weeks) 40 (2.1, 1.1) 39.8 ± 1.4 0.06 Vaginal delivery 17 (S0) 90 (88.2) -0.0001 Operative delivery with vacuum 10 (2.9.4) 10 (9.8) -0.0001 Intrapartum risk factors Maternal pyrexia 1 (2.0) 16 (15.7) 0.6 Maternal pyrexia 1 (2.0) 16 (15.7) 0.6 -0.0001 Maternal pyrexia 21 (57.4) 1 (0.9) -0.0001 Neonatal characteristics Maternal pyrexia 21 (57.9) 0.0 -0.0001 Maternal pyrexia 31 (8.0, 1.1) 10.9 -0.0001 -0.0001 Maternal pyrexia 21 (57.9) <td rowspan="3">Maternal characteristics</td> <td>Maternal age (vears)</td> <td>33.2 + 5.1</td> <td>30.9 + 4.5</td> <td>0.01</td>	Maternal characteristics	Maternal age (vears)	33.2 + 5.1	30.9 + 4.5	0.01
Obser		Pre-pregnancy BMI (kg/m ²)	22.0 + 5.1	23.3 + 4.5	0.2
Cancesian 31 (912) 85 (833) 04 First pregnancy 31 (912) 85 (833) 04 Labor and delivery 10 (83) 40 (2±1) 38 ± 1.4 0.6 Vaginal delivery 13 (82) 24 (7±6) 0.2 Induced labor 13 (82) 26 (7±1) 0.3 Operative delivery with vacuum 10 (29.4) 10 (9.8) 0.01 Operative delivery with vacuum 10 (29.4) 10 (9.8) 0.01 Intrapartum risk factors Maternal present 7 (20.6) 16 (15.7) 0.6000 Neenatal characteristics Dimbining of AF 7 (20.6) 10 (19.9) -0.0001 Neenatal characteristics Dimbining value 21 (5.4) 1 (0.9) -0.0001 Neenatal characteristics Dimbining value 11 (15.9) 25 (0.9) -0.0001 Male 19 (5.9.9) 25 (0.9.0) -0.0001 -0.0001 Male 19 (5.9.9) 25 (0.9.0) -0.0001 Male 19 (5.9.1) 25 (5.9.9) 0.0001 Male <td< td=""><td>Obese (BMI $> 30 \text{ kg/m}^2$)</td><td>2 (58)</td><td>10(98)</td><td>0.7</td></td<>		Obese (BMI $> 30 \text{ kg/m}^2$)	2 (58)	10(98)	0.7
First pregnancy 21 (61.8) 56 (54.9) 0.5 Labor and delivery 21 (61.8) 74 (72.6) 0.2 Induced labor 21 (61.8) 74 (72.6) 0.2 Vaginal delivery 17 (50.) 90 (82.) -40.0001 Operative delivery with vacuum 10 (25.4) 10 (83.) -40.0001 Cesarea section 17 (30.) 12 (11.8)* -40.0001 Maternal pyrexia 1 (25.9) 10 (15.7) 0.6 Sentinel event 2 (59)* 0 0.0002 Neconium staning of AT 7 (20.6) 16 (15.7) 0.8 Placental abription* 4 (11.3) 0 0.0001 Netonatal characteristics Maternal pyrexia 7 (20.6) 26 (5.0) -0.0001 Nuchal cord abnormal FIR* 23 (67.4) 1.09 -0.0001 -0.0001 Nuchal cord abnormalities Apgar score at 5 min 7 (7.2) 9.8 -0.0001 Umbilical cord abnormalities Apgar score at 5 min 7 (20.5) 0 -0.0001 Achrality (Absence or colling) 0		Caucasian	31 (91.2)	85 (83.3)	0.4
Gerstrional age (weeks) 40.2 ± 1.1 38.8 ± 1.4 0.06 Labor and delivery 16183 7(276) 0.2 Vaginal delivery 13 (38.2) 28 (27.4) 0.3 Vaginal delivery 13 (35.2) 28 (27.4) 0.3 Vaginal delivery 17 (50) 06 (88.2) 0.001 Gerstren sterion 17 (50) 10 (88.2) 0.001 Gerstren sterion 17 (50) 12 (2.1) * 0.001 Intrapartum risk factors Maternal pyrestia 1 (2.9) 3 (2.0) 10 Meternal pyrestia 1 (2.9) 3 (2.0) 0.0002 3.0002 0.0001 Sentinel evert 2 (57.4) 1 (0.9) -0.0001 0.002 -0.0001 Neonatal three 13 (35.9) 52 (50.9) 0 -0.0001 Birth-weight (grams) 343.8 ± 431.0 381.6 ± 348.2 0.4 Male 19 (55.9) 0 -0.0001 Apgar score 5 st af 5 min 717 ± 2.15 9.8 ± 0.6 -0.0001 Apgar score 5 st af 5 min 7		First pregnancy	21 (61.8)	56 (54.9)	0.5
Labor and deliverySpontaneous ones of labor21 (618)74 (72.6)0.2Induced labor13 (38.2)28 (27.4)0.3Induced labor13 (38.2)90 (88.2)<00011		Gestational age (weeks)	402 + 11	398 ± 14	0.06
Induced labor 13 (38.2) 28 (27.4) 0.3 Vaginal delivery 17 (50) 90 (88.2) <0.0001	Labor and delivery	Spontaneous onset of labor	21(61.8)	74 (72 6)	0.2
Vaginal delivery 17 (50) 90 (82.) <00001		Induced labor	13 (38 2)	28 (27 4)	0.3
Operative delivery with vacuum 10 (29.4) 10 (9.8) 00101 Cesarean section 17 (50) 12 (11.8) ⁴ <0.001		Vaginal delivery	17 (50)	90 (88 2)	< 0.0001
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		Operative delivery with vacuum	10(294)	10 (9.8)	0.0001
Intrapartum risk factors Maternal previat 1 (2.9) 3 (2.0) 1.0 Meconium staining of AF 7 (2.06) 16 (15.7) 0.6 Sentinel event 2 (5.9) ⁶ 0 0.0000 Placental abruption ² 4 (11.3) 0 0.0000 Nonnal FHR ⁴ 23 (67.4) 1 (0.9) <0.0001		Cesarean section	17 (50)	$12(118)^{a}$	< 0.001
Interparton Link racions Maccinity (Schar) 12.20 $16(15.7)$ 10.30 Meconium staining of AF $7(20.6)$ $16(15.7)$ 0.6 Placental abruption ⁶ $4(11.3)$ 0 0.0001 Neonatal characteristics Umbilical artery pH 6.91 ± 0.06 7.26 ± 0.09 0.00001 Male $9(55.9)$ $52(50.9)$ 0.70 0.0001 Male $9(55.9)$ $52(50.9)$ 0.70 0.0001 Apgar score $53 at 5 min$ 7.17 ± 2.15 9.8 ± 0.6 0.0001 Apgar score $55 at 5 min$ $7(20.6)$ 0 0.0001 Umbilical cord abnormalities Nuchal cord $3(8.8)$ $5(4.9)$ 0.6 Achirality (absence of coiling) 0 0 0.066 Velamentous insertion $1(2.5)$ $3(2.9)$ 1.0 Torsio $2(5.9)$ 0.66 $7.66.9$ 0.66 Velamentous insertion $1(2.5)$ $3(2.9)$ 0.66 Placental macroscopic characteristics Bilobate $1(2.9)$	Intrapartum risk factors	Maternal purevia	1 (20)	3 (2 0)	1.0
Neconital seming of Al 2 (5.9) ^b 0 0.05 Sentinel event 2 (5.9) ^b 0 0.002 Neonatal characteristics Placental abruption ^c 4 (11.3) 0 0.0001 Neonatal characteristics Umbilical artery pH 6.91 ± 0.06 7.26 ± 0.09 <0.0001		Meconium staining of AF	7 (20.6)	16(157)	1.0
Placential abruption ⁶ 4 (11.3) 0 0.002 Neonatal characteristics Abnormal FHR ⁴ 23 (67.4) 1 (0.9) <0.0001		Sontinel event	$2(50)^{b}$	0	0.06
Abnormal FHR ⁴ 23 (67.4) 1 (0.9) <00001		Placental abruption ^c	2(3.5)	0	0.00
Neonatal characteristicsAutominal rnv bilical artery pH $23 (0^{-4})$ $1 (0.9)$ $1 (0.9)$ $5 00001$ Birth-weight (grams) 3438.8 ± 431.0 3381.6 ± 348.2 0.4 Male $19 (55.9)$ $52 (50.9)$ 0.7 Intubation $6 (17.6)$ 0 <00001 Apgar score 45 min 7.17 ± 2.15 9.8 ± 0.6 <00001 Apgar score 45 min $7 (20.6)$ 0 <00001 Apgar score $5 3 t 5$ min $7 (20.6)$ 0 <00001 Hyperolling (>3 coils/10 cm) $4 (11.3)$ $10 (9.8)$ 0.7 Achirality (absence of coiling) 0 0 1.0 Torsion $2 (5.9)$ 0 0.06 Furcate insertion 0 $1 (0.9)$ 0.6 Velamentous insertion $1 (2.5)$ $3 (2.9)$ 1.0 Placental macroscopic characteristicsBilobate $1 (2.9)$ $5 (4.9)$ 1.0 Placental histologyInflammation $2 (5.9 \pm 54.9$ 2.9 ± 54.5 0.4 Placental histologyInflammation $2 (2.9 \pm 54.9$ 2.9 ± 54.5 0.6 VUE $7 (20.6)$ $9 (8.8)$ 0.1 0.002 Ruputive lesion $2 (2.9 \pm 54.9$ $2 (2.9 \pm 54.5)$ 0.6 VUE $7 (20.6)$ $9 (8.8)$ 0.1 0.002 Placental histologyInflarmation $1 (1.3)$ 0 0.002 Ruputive vas a previa 0 0 1.0 0.05 Decidual vasculopathy $3 (8.8)$ $1 (0.9)$ 0.6 VUE		Abnormal ELID ^d	4(11.3)	1(0.0)	<0.002
Includial clearsities Offinitial actery prime 6.31 ± 0.00 7.25 ± 0.09 5.0000 Birth-weight (grams) 3438 ± 431.0 3381.6 ± 343.0 3381.6 ± 343.0 3381.6 ± 343.0 3481.6 ± 348.2 0.4 Male 19 (55.9) 52 (50.9) 0.7 0.00001 0.00001 Apgar score ± 5 min 7.17 ± 2.15 9.8 ± 0.6 <0.0001	Neonatal characteristics	ADHOLIHAI FAK	23(07.4)	1(0.9)	<0.0001
bitterweight (galants) 543.65 ± 543.10 533.61 ± 546.2 0.4 Male 19 (55.9) 52 (50.9) 0.7 Intubation 6 (17.6) 0 -0.00011 Apgar score at 5 min 7 (20.6) 0 -0.00011 Umbilical cord abnormalities Nuchal cord 3 (8.8) 5 (4.9) 0.4 Hypercoiling (>3 coils/10 cm) 4 (11.3) 10 (9.8) 0.7 Achirality (absence of coiling) 0 0 1.0 Torsion 2 (5.9) 0 0.6 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 Flacental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Placental histology Inflammation 1 (2.9) 5 (4.9) 1.0 Funsitis 0 3 (2.9) 0.6 0.6 0.0 1.0 Placental histology Inflammation 7 (20.6) 3 (2.9) 0.6 0.6 0.0 0.6 VUE 7 (20.6) 3 (2.9) 0.6 0.0 0.0		Dindincal aftery pH	0.91 ± 0.00	7.20 ± 0.09	< 0.0001
Indate 19 (33) 32 (30.9) 0.7 Apgar score 3t 5 min 6 (17.6) 0 -0.0001 Apgar score 35 at 5 min 7.17 ± 2.15 9.8 ± 0.6 -0.0001 Umbilical cord abnormalities Nuchal cord 3 (8.8) 5 (4.9) 0.4 Mutchal cord 3 (8.8) 5 (4.9) 0.4 -0.0001 Umbilical cord abnormalities Nuchal cord 3 (8.8) 5 (4.9) 0.4 Hypercoiling (-3 coil/10 cm) 4 (11.3) 10 (9.8) 0.7 Achirality (absence of coiling) 0 0 1.0 Torsion 2 (5.9) 0 0 0.06 False knots 3 (8.8) 7 (6.9) 0.7 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Placental histology Inflammation 1 (2.9) 2 (2.9) 5 (3.2) 0.6 Funsitis 0 3 (2.9) 0.6 1.0 0.6 1.0 Disruptive lesion		Malo	5456.8 ± 451.0	5361.0 ± 546.2	0.4
Initiation 6 (17.9) 0 -		Intubation	19(33.9)	32 (30.9)	0.7
Apgar score 3 at 5 min 7.12 ± 1.5 9.8 ± 0.60 <0.0001 Umbilical cord abnormalities Nuchal cord 3 (8.8) 5 (4.9) 0.4 Hypercoiling (>3 coils/10 cm) 4 (11.3) 10 (9.8) 0.7 Achirality (disence of coiling) 0 0 0 1.0 Torsion 2 (5.9) 0 0.066 0.66 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Placental histology Inflarmation 1 (2.9) 5 (4.9) 1.0 Vue 7 (20.6) 9 (8.8) 0.1 0 0.1 Disruptive lesion			0(17.0)	0	<0.0001
Apga store S a Smin 7 (205) 0 <00001 Umbilical cord abnormalities Nuchal cord 3 (8.8) 5 (4.9) 0.4 Hypercoiling (>3 coils/10 cm) 4 (11.3) 10 (9.8) 0.7 Achirality (absence of coiling) 0 0 1.0 Torsion 2 (5.9) 0 0.066 Furcate insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Placental histology Inflammation 1 (2.9) 5 (4.9) 0.6 Accessories lobule 0 1 (0.9) 0.6 6 VUE 7 (20.6) 9 (8.8) 0.1 0 VUE 7 (20.6) 9 (8.8) 0.1 0 Disruptive lesion 1 0 0.002 1.0 Rupture vasa praevia 0 0 1.0 1.0 Obstr		Apgar score at 5 min	7.17 ± 2.15	9.8 ± 0.6	<0.0001
Ombinical cord abnormalities Nuchal cord 3 (8.8) 5 (4.9) 0.4 Hypercolling (>3 coils/10 cm) 4 (11.3) 10 (9.8) 0.7 Achirality (absence of coiling) 0 0 1.0 Torsion 2 (5.9) 0 0.066 Furcate insertion 0 1 (0.9) 0.66 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 1.0 Placental histology Inflammation 1 (2.9) 5 (4.9) 1.0 Puicental histology Inflammation 3 (2.9) 0.6 0.0 0.0 VUE 7 (20.6) 9 (8.8) 0.1 0.0 0.0 0.1 Disruptive lesion 4 (11.3) 0 0.002 1.0 0.0 0.0 Distruptive lesions 1 (0.9)	The billest and the second bills	Apgar score \leq 5 at 5 mm	7 (20.6)	0	< 0.0001
Hyperconing (> 3 cons) for (1) 4 (11.3) 10 (9.8) 0.7 Achirality (absence of coiling) 0 0 1.0 Torsion 2 (5.9) 0 0.066 Furcate insertion 0 1 (0.9) 0.6 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accressories lobule 0 1 (0.9) 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.6 VUE 7 (20.6) 9 (8.8) 0.10 Disruptive lesion 1.0 1.0 1.0 Rupture vasa praevia 0 0 1.0 Obstructive lesions 1.0 1.0 1.0 Decidual vasculopathy 3	Umblilical cord adnormalities	NUCHAI COFO	3 (8.8)	5 (4.9)	0.4
Achirality (absence of colling) 0 0 1.0 Torsion 2 (5.9) 0 0.06 Furcate insertion 0 1 (0.9) 0.6 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 1.0 0 0.002 Rupture vasa praevia 0 0 1.0 Obstructive lesions 1.0 1.0 0.5 Decidual vasculopathy 3 (8.8) 5 (4.9) <td rowspan="3"></td> <td>Ashinglity (sharper of asiling)</td> <td>4(11.3)</td> <td>10 (9.8)</td> <td>0.7</td>		Ashinglity (sharper of asiling)	4(11.3)	10 (9.8)	0.7
Instant 2 (3.9) 0 0.006 Furcate insertion 0 1 (0.9) 0.6 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 0.6 Area (cm ²) 22.6.9 ± 54.9 22.9.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 4 (11.3) 0 0.0002 Rupture vasa praevia 0 0 1.0 Obstructive lesions Infarction 3 (8.8) 1 (0.9) 0.5 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.5 Decidual vasculopathy 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 0 <td>Achirality (absence of colling)</td> <td>0</td> <td>0</td> <td>1.0</td>		Achirality (absence of colling)	0	0	1.0
Hurcate insertion 0 1 (0.9) 0.6 Velamentous insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 3 (2.9) 0.6 0.002 Rupture vasa praevia 0 3 (2.9) 0.6 Obstructive lesion 1.0 0.002 0.002 Rupture vasa praevia 0 0 1.0 Obstructive lesions 1.0 0.002 1.0 Infarction 3 (8.8) 1 (0.9) 0.05 Obstructive lesions 1.0 0.05 0.07 Infarction 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8)		Torsion	2 (5.9)	0	0.06
Velamentous insertion 1 (2.5) 3 (2.9) 1.0 False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 VUE 0 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 1.0 0.0002 0.0002 Rupture vasa praevia 0 0 1.0 Obstructive lesions 1.0 1.0 0.05 Infarction 3 (8.8) 1 (0.9) 0.05 Distructive lesions 1.0 0.0 1.0 Obstructive lesions 1.0 0.0 0.0 Infarction 3 (8.8) 1 (0.9)		Furcate insertion	0	1 (0.9)	0.6
False knots 3 (8.8) 7 (6.9) 0.7 True knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 7 (20.6) 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Obstructive lesions 1.0 1.0 0.5 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.05 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Velamentous insertion	1 (2.5)	3 (2.9)	1.0
Irue knots 0 0 1.0 Placental macroscopic characteristics Bilobate 1 (2.9) 5 (4.9) 1.0 Accessories lobule 0 1 (0.9) 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.10 Disruptive lesion 4 (11.3) 0 0.0002 Rupture vasa praevia 0 0 1.0 Pectomaternal hemorrhage 0 0 1.0 Obstructive lesions Infarction 3 (8.8) 1 (0.9) 0.5 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.5 0.5 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 1 (0.9) 0.5 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.7 Diffuse villous edema 13 (38.2) 0		False knots	3 (8.8)	7 (6.9)	0.7
Placental macroscopic characteristics Bilobate $1 (2.9)$ $5 (4.9)$ 1.0 Accessories lobule 0 $1 (0.9)$ 0.6 Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflarmation $3 (2.9)$ 0.6 Funisitis 0 $3 (2.9)$ 0.6 VUE $7 (20.6)$ $9 (8.8)$ 0.6 Disruptive lesion $4 (11.3)$ 0 0.002 Rupture vasa praevia 0 0 1.0 Obstructive lesions 1.0 1.0 0.002 Rupture vasa praevia 0 0 1.0 Decidual vasculopathy $3 (8.8)$ $1 (0.9)$ 0.05 Decidual vasculopathy $3 (8.8)$ $5 (4.9)$ 0.4 Massive fibrin deposition $3 (8.8)$ $7 (6.9)$ 0.7 Diffuse villous edema $13 (38.2)$ 0 <0.0001		True knots	0	0	1.0
Accessories lobule0 $1(0.9)$ 0.6 Area (cm2) 26.9 ± 54.9 229.5 ± 53.5 0.4 Placental histologyInflammation $$	Placental macroscopic characteristics	Bilobate	1 (2.9)	5 (4.9)	1.0
Area (cm ²) 226.9 ± 54.9 229.5 ± 53.5 0.4 Placental histology Inflammation 3 (2.9) 0.6 Acute chorioamnionitis 0 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 0 1.0 Obstructive lesions 1 1.0 0.4 1.0 Peto-maternal hemorrhage 0 0 0.5 0.4 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.05 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Accessories lobule	0	1 (0.9)	0.6
Placental histology Inflammation Acute chorioamnionitis 0 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 1.0 1.0 Obstructive lesions 1 1.0 1.0 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.05 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Area (cm ²)	226.9 ± 54.9	229.5 ± 53.5	0.4
Acute chorioamnionitis 0 3 (2.9) 0.6 Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 0 1.0 Obstructive lesions 1 0.9 0.05 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001	Placental histology	Inflammation			
Funisitis 0 3 (2.9) 0.6 VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 1 0 0.002 Abruption 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 0 1.0 Obstructive lesions 1 0.9 0.05 Decidual vasculopathy 3 (8.8) 1 (0.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Acute chorioamnionitis	0	3 (2.9)	0.6
VUE 7 (20.6) 9 (8.8) 0.1 Disruptive lesion 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 0 1.0 Obstructive lesions 1 (0.9) 0.05 0 Infarction 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Funisitis	0	3 (2.9)	0.6
Disruptive lesion 4 (11.3) 0 0.002 Abruption 4 (11.3) 0 0.002 Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 0 1.0 Obstructive lesions 100 0 1.0 Infarction 3 (8.8) 1 (0.9) 0.05 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		VUE	7 (20.6)	9 (8.8)	0.1
Abruption 4 (11.3) 0 0.002 Rupture vasa praevia 0 1.0 Feto-maternal hemorrhage 0 1.0 Obstructive lesions 10 1.0 Infarction 3 (8.8) 1 (0.9) 0.05 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Disruptive lesion			
Rupture vasa praevia 0 0 1.0 Feto-maternal hemorrhage 0 0 1.0 Obstructive lesions 0 0 1.0 Infarction 3 (8.8) 1 (0.9) 0.05 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Abruption	4 (11.3)	0	0.002
Feto-maternal hemorrhage001.0Obstructive lesions01.00.05Infarction3 (8.8)1 (0.9)0.05Decidual vasculopathy3 (8.8)5 (4.9)0.4Massive fibrin deposition3 (8.8)7 (6.9)0.7Diffuse villous edema13 (38.2)0<00001		Rupture vasa praevia	0	0	1.0
Obstructive lesionsInfarction3 (8.8)1 (0.9)0.05Decidual vasculopathy3 (8.8)5 (4.9)0.4Massive fibrin deposition3 (8.8)7 (6.9)0.7Diffuse villous edema13 (38.2)0<0.0001		Feto-maternal hemorrhage	0	0	1.0
Infarction 3 (8.8) 1 (0.9) 0.05 Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <00001		Obstructive lesions			
Decidual vasculopathy 3 (8.8) 5 (4.9) 0.4 Massive fibrin deposition 3 (8.8) 7 (6.9) 0.7 Diffuse villous edema 13 (38.2) 0 <0.0001		Infarction	3 (8.8)	1 (0.9)	0.05
Massive fibrin deposition3 (8.8)7 (6.9)0.7Diffuse villous edema13 (38.2)0<0.0001		Decidual vasculopathy	3 (8.8)	5 (4.9)	0.4
Diffuse villous edema13 (38.2)0<0.0001Fetal thrombotic vasculopathy001.0Adaptive lesions01.0		Massive fibrin deposition	3 (8.8)	7 (6.9)	0.7
Fetal thrombotic vasculopathy 0 0 1.0 Adaptive lesions		Diffuse villous edema	13 (38.2)	0	<0.0001
Adaptive lesions		Fetal thrombotic vasculopathy	0	0	1.0
		Adaptive lesions			
Increased n. of syncytial knots 13 (38.2) 14 (13.7) 0.005		Increased n. of syncytial knots	13 (38.2)	14 (13.7)	0.005
Chorangiosis 3 (8.8) 3 (2.9) 0.3		Chorangiosis	3 (8.8)	3 (2.9)	0.3
Villous branching anomalies 12 (35.3) 15 (14.7) 0.02		Villous branching anomalies	12 (35.3)	15 (14.7)	0.02

Data are expressed as mean \pm standard deviation or number (percentage).

AF = amniotic fluid, BMI = body mass index, min = minute, n. = number, FHR = fetal heart rate, VUE = chronic villitis to unknown etiology.

Placental lesions are not mutually exclusive: in each case more than one abnormality may coexist.

^a Cesarean section in controls were performed for labor dystocia: 8/12 failure to progress in the active first stage, 4/12 failure to progress in the second stage.

^b Including 1 uterine rupture and 1 maternal shock for anaphylaxis after antibiotic administration.

^c Placental abruption was identified clinically (by the presence of vaginal hemorrhage and FHR abnormality) and confirmed by histological examination.

^d Abnormal fetal heart rate includes bradycardia or prolonged deceleration immediately before the delivery.

Download English Version:

https://daneshyari.com/en/article/3917887

Download Persian Version:

https://daneshyari.com/article/3917887

Daneshyari.com