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Placental pathological findings and pregnancy outcomes in a severely COVID-19 infected

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Objective

To verify the prevalence of placental alterations in a severe pregnant women infected group and to assess the association between the pathological findings and the perinatal outcomes.

Methods

This was a nested prospective cohort involving 121 pregnant women with COVID-19 between April 2020 to November 2021. Patients were classified as severe group when intensive ventilatory support (venturi mask or intubation) and/or intensive care was needed to provide support to them. Clinical, demographic, obstetric and perinatal data were collected; the placentas were analyzed macro and microscopically. Microscopic findings were divided into five groups: maternal vascular malperfusion (MVM), fetal vascular malperfusion (FVM), hematogenous infection, ascending infection and "other". For α, a descriptive level of 5% was assumed.

Results

The frequency of placental features categorized as MVM was seen in 47.9% of cases, FVM in 16.5%, hematogenous infection in 5% and findings corresponding to ascending infection in 8.3%. Cesarean section was performed in 76% of pregnancies, prematurity was observed in 55.4% and almost half of the neonates (48.8%) were admitted in neonatal intensive care unit. There were only five (4.1%) cases of fetal death and seven (5.8%) cases of neonatal death. Chorangiosis was associated with adverse perinatal outcomes, such as prematurity (p=0.002), fetal distress (p<0.001), lower APGAR scores (p=0.02) and neonatal intensive care unit (p=0.047); MVM was associated with fetal death (p=0.023); low APGAR scores were also associated with hematogenous infection (p=0.045).

Conclusion

We observed a higher prevalence of placental features in patients with severe COVID-19 infection. Adverse perinatal outcomes were associated with MVM and chorangiosis.

Table 1 – Demographic, clinical, obstetric, and neonatal characteristics of the sample (n = 121)

	Median (interquartil) / n (%)
Maternal age, years	31 (28 – 35)
BMI	33.2 (31.57 – 39.28)
Tabagism	5 (4.1)
Parity	
Nuliparous	30 (24.8)
Multiparous	91 (75.2)
Previous Comorbidities	
Hypertension	23 (19)
DM types 1/2	5 (4.1)
Gestacional Comorbidities	
Preeclampsia	8 (6.6)
GDM	8 (6.6)
Maternal data	
Diagnosis by PCR	114 (94.2)
Diagnosis by Sorology	7 (5.8)
GA at diagnosis	28.57 (25.14 – 32.99)
Time between diagnosis and delivery in days	20 (11 – 85)
Maternal death	10 (8.3)
Delivery data	
Cesarean section	92 (76)
Gestational age	35.85 (31.57 – 39.28)
Oligohydramnios	23 (19.5)
Perinatal data	
Fetal death	5 (4.1)
Prematurity	67 (55.4)
Birth weight (in grams)	2490 (1630 – 3252.5)
Fetal growth restriction	26 (21.5)
Apgar <7 at 5 min	22 (18.2)
Admission to NICU	59 (48.8)
Neonatal death	7 (5.8)

BMI, body mass index; DM, diabetes mellitus; GDM, gestational diabetes mellitus; PCR, polymerase chain reaction; NICU, neonatal intensive care unit

Table 2 – Association between placental features and perinatal outcomes.

Desfechos Perinatais	MVM		FVM		Hematogenous Infection		Ascending Infection		Others		Chorangiosis	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Prematurity (n=121)	35 (55.6)	32 (55.2)	53 (52.5)	14 (70)	64 (55.7)	3 (50)	61 (55)	6 (60)	57 (52.8)	10 (76.9)	57 (51.4)[a]	10 (100)
FD (n=117)	22 (34.9)	20 (37)	34 (35.1)	8 (40)	40 (35.7)	2 (40)	41 (37.6)	1 (12.5)	38 (36.6)	4 (33.3)	32 (29.9)[b]	10 (100)
Fetal death (n=121)	0	5 (8.6)[c]	5 (5)	0	4 (3.5)	1 (16.7)	3 (2.7)	2 (20)	4 (3.7)	1 (7.7)	5 (100)	0
APGAR (n=117)	11 (17.4)	11 (20.4)	16 (16.5)	6 (30)	19 (17)	3 (60)[d]	21 (19.4)	1 (11.1)	17 (16.2)	5 (41.7)	17 (15.9)	5 (50)[a]
P< p10 (n=121)	15 (23.8)	11 (19)	19 (18.8)	7 (35)	25 (21.7)	1 (16.7)	25 (22.5)	1 (10)	26 (24.1)	0	24 (21.6)	2 (20)
NICU (n=118)	32 (50.8)	27 (49.1)	48 (49)	11 (55)	56 (49.6)	3 (60)	54 (49.5)	5 (55.6)	49 (46.2)	10 (83.3)	51(47.2)	8 (80)[e]

MVM, maternal vascular malperfusion; FVM, fetal vascular malperfusion; FD, fetal distress; NICU, neonatal intensive care unit.

a: Fisher's exact test (p=0.002); b: Fisher's exact test p<0.001 c: Fisher's exact test (p=0.023).d: Fisher's exact test (0.045) e: Chi-squared test (p=0.047).